

# *Chapter Seven*

## The Continuing Response

### INTRODUCTION

The experiences of medical personnel in the response to the 9/11 attack on the Pentagon provided valuable lessons to regional hospitals, the Army Medical Command (MEDCOM), the Army Center for Health Promotion and Preventive Medicine (CHPPM), and military and civilian mental health professionals. During the months and years following the terrorist attacks, these organizations and individuals revised disaster plans, improved communications, strengthened alliances, expanded readiness training, and wrote new procedures and doctrine. As a result, responders are much more prepared for a terrorist attack today than they had been in September 2001.

### HOSPITALS

Area hospitals were quick to analyze their problems and to plan solutions. In the months following 9/11, hospital staffs revamped emergency preparedness plans, rethought training issues, updated equipment, restocked supplies, tackled communication problems, and made other changes to respond to terrorist attacks in general and to bioterrorism in particular. To coordinate responses and determine mutual needs, hospitals and clinics in the national capital region increased their networking within healthcare coalitions and became strong partners in emergency preparedness.

#### *Military Hospitals*

The Walter Reed Army Medical Center (WRAMC) led Army medical facilities in the Washington, DC, area in emergency preparedness. The command changed the process of dealing with emergencies by blending the Federal Response Plan's incident command system into the Army command system: the highest ranking

person at the scene would take command until someone with higher rank arrived. In a fire, however, the fire chief continued to outrank everyone else. The WRAMC hospital restructured its emergency plans based on the probability of being involved in a response to a terrorist attack. It also adopted the DC fire department's codes, as did all hospitals in the Washington area. Emergency codes became universal.<sup>1</sup>

WRAMC produced the "Red Book," an emergency management procedures handbook, that contained emergency telephone numbers and defined and explained emergency codes. Code red, for instance, meant that everyone had to evacuate the building. Ward masters were responsible for making sure that every floor and every ward had one of those books. To maintain readiness, all hospital staff were required to take an emergency readiness training course once a year.<sup>1</sup>

WRAMC also provided readiness training to hundreds of military and civilian healthcare providers in the North Atlantic Regional Medical Command (NARMC) and in the national capital region in the medical management of chemical and biological casualties. WRAMC also established a chemical decontamination program for the base and provided guidance throughout NARMC on decontamination requirements and training. In addition, under the direction of Colonel Michael Dunn, commander of the Walter Reed Health Care System, the hospital established a coordinated nuclear, biological, and chemical casualty care network that improved the capabilities of the military training facilities in the national capital region.<sup>2</sup>

WRAMC also increased its ability to work with other hospitals in an emergency. Through the District of Columbia Hospital Association, WRAMC's emergency management committee worked with other area hospitals and agencies to improve information sharing about numbers of casualties, kinds of injuries, and bed space available, in a timely and secure manner. In November 2005, association hospitals participated in a city-wide mass casualty exercise using the Internet to exchange information. Participants later added other information-sharing systems, including a group alert paging system for key emergency personnel, e-mail alerts, and a hospital metro-area radio system. For a time, Colonel Edward Lucci, WRAMC's chief of emergency medicine, served as cochair of the DC Hospital Association's emergency management committee along with a representative from the Washington Hospital Center. In addition, WRAMC became the back-up clearing house hospital to Children's Hospital (also in Washington) for emergencies and patient over-flow.<sup>2</sup>

The Military District of Washington has improved communications by updating its radio systems to include hospital-based systems and hand-held radios. These actions have improved communications among hospitals, between hospitals and individuals, and among individuals at the emergency site. Military personnel tested the system, with success, at the Veteran's Day ceremony at Arlington on 10 November 2005.<sup>2</sup>

Within NARMC, the DeWitt Army Community Hospital, at Fort Belvoir, Virginia, began improving its planning and preparations for future crises. Hospital commander Colonel Eileen Malone believed that DeWitt's emergency prepared-

ness plan worked well on 9/11 because the tragedy happened on a Tuesday, when the hospital had a full staff. Had the attack occurred at 0300 on a weekend, the setup would not have worked as well. Hence, DeWitt rewrote its emergency preparedness plan to work at any time, day or night, on any day of the week. It was produced as an easy-to-follow manual with removable, color-coded pages to correspond with threat levels (during a code yellow event, the yellow pages could easily be pulled out).<sup>3</sup>

DeWitt also took new measures to deal with mass casualties. The hospital set up a quick reaction team that could staff the gate and provide alternative access if needed; established a safe security system to prevent contaminated people from entering the hospital; prepared suitable command and control standards so that patients did not overwhelm the health care system; and listed personnel according to skill so that the hospital would know where it was lacking expertise on a given day. DeWitt secured space in nearby Bardon School as a place to evacuate patients in case of a bomb threat. Colonel Malone wanted the plan to be “as automatic as fire drills.” The staff would be able to respond instantly and appropriately without thinking about what actions to take.<sup>3</sup>

In preparation for a chemical or biological warfare response, DeWitt acquired more protective equipment and respirators, outfitted its surgical pavilions appropriately, and installed more water lines to help with decontamination. The hospital trained its staff in decontamination techniques and stocked supplies of atropine for a chemical attack and ciprofloxacin and doxycycline antibiotics for a biological attack.<sup>3</sup>

The intention of the commanders of DeWitt and other Army hospitals was to be able to respond to weapons of mass destruction scenarios using a complicated healthcare system composed of military and civilian providers. Healthcare facilities at the federal, state, and local levels, Colonel Malone believed, had to work together and be “perfectly integrated.” One alone could never handle the response, so joint planning was necessary for a successful response.<sup>3</sup> (The Walter Reed Healthcare System consisted of WRAMC, the DiLorenzo Clinic, DeWitt, and Kimbrough Ambulatory Care Center at Fort Meade, MD.)

DeWitt’s emergency department chief, Major Michael K Halliday, served as the military representative to a core regional disaster response group that was developing emergency policy. Each of DeWitt’s three family health centers in three different counties worked with their communities in developing plans to coordinate the different area hospital systems. These measures were ongoing and took months to develop. By 27 October 2001, Colonel Malone could say, “We’re certainly in a thousand percent better position today to deal with weapons of mass destruction than we were on the 11th.”<sup>3</sup>

### *Civilian Hospitals*

Although the Virginia Hospital Center in Arlington was prepared to handle the casualties it received on 9/11, the facility made improvements to make sure it was ready for any future attack. The hospital fine-tuned its emergency preparedness

plan, obtained new equipment, established new processes, and provided hospital-wide educational services to its nursing and medical staff. The infectious disease department offered several programs, and lectures open to the public and staff included topics such as bioterrorism and some of its agents, anthrax, smallpox, and botulism. The hospital's leaders attended county-wide monthly planning meetings with other medical facilities, and its nursing staff joined in formal consultations with nurses from other hospitals in Northern Virginia and Washington, DC.<sup>4,5</sup>

Potential problems surfaced at the Washington Hospital Center's burn unit shortly after the attack. Caring for nine Pentagon burn victims while continuing to serve the community had exhausted the unit's surgical teams by the third week after September 11. Dr Marion H Jordan, director of the burn unit, came to believe that burn centers needed to assess their ability to care for multiple burn patients from a major disaster in addition to their daily patient census. He suggested in a speech to members of the Association of Burn Surgeons at the National Disaster Medical System (NDMS) conference in Atlanta, Georgia, in May 2002, that in a future attack, ground zero burn centers should distribute burn patients to multiple burn facilities so they would be able to continue their normal patient flow and fulfill responsibilities to the community. Had the Pentagon wedge and the Twin Towers not collapsed, and more of the injured escaped, the Washington Hospital Center and Cornell University Hospital in New York City would have been swamped with thousands of burn victims. Burn centers across the country began to incorporate plans for such cooperation in their emergency preparedness documents.<sup>6,7</sup>

In its disaster plan, the American Burn Association recommended that US Army burn special medical augmentation response teams (SMART teams) assist in secondary triage and transport of burn patients to burn centers not in the disaster area. (Under the NDMS, the regulation and movement of patients is the responsibility of the Department of Defense [DoD].) Of the 37 Army SMART teams, two are burn teams operated by the Army Institute of Surgical Research, at Brooke Army Medical Center, Fort Sam Houston, Texas. The Army's burn teams were not needed and not used in the response to the Pentagon attack.<sup>8(pp104,105)</sup>

### *Hospital Alliances*

An important improvement after 9/11 was the strengthening of regional hospital alliances, which included both civilian and military hospitals. There was a precedent for such coalitions: before 9/11, a committee of civilian and military emergency medical service (EMS) workers from different counties in Northern Virginia met monthly to discuss various needs and problems. EMS personnel from the DC Hospital Association held similar monthly meetings. After 9/11 hospital personnel and public health staff also became interested in meeting to discuss disaster preparedness. Dr Daniel Hanfling, chairman of the Disaster Preparedness Committee at Inova Fairfax Hospital; Dr Yorke Allen, chairman of emergency medicine at Virginia Hospital Center—Arlington; and Craig DeAtley, an expert on

disaster medicine, formed an emergency response working group that came to be known as the Northern Virginia Emergency Response Coalition. Beginning on 23 September 2001, key clinical and administrative hospital leaders throughout Fairfax (including DeWitt Army Community Hospital), Alexandria, Prince William, and Loudon counties met once a month to discuss ways to improve regional healthcare and how to respond collectively to future terrorist attacks. Topics of discussion included emergency preparedness, chemical and biological warfare, effective communications, and the need for similar equipment. Planning, resources, and mutual aid needs were examined “in earnest” at those meetings, said Dr Hanfling. “If there’s a silver lining [to the September 11 attack], that’s one of them for us.”<sup>9</sup> Gradually, regional fire, law enforcement, intelligence, EMS, and public health personnel were brought into the coalition to make decisions about healthcare for the entire community.<sup>9,10</sup>

As these people came together to discuss preparedness issues, Dr Hanfling became convinced that the Northern Virginia hospitals needed their own more inclusive and better structured forum for coordinating planning efforts, including the development of “a comprehensive [mass casualty] hospital communication and information management system between the 13 NVHA [Northern Virginia Hospital Alliance] hospitals in six counties in northern Virginia.”<sup>9</sup> As a result, he helped form the NVHA in September 2002. The alliance supplemented the ongoing work of the Emergency Response Coalition. Inova Fairfax Hospital became the lead agent of the group and the hub of the network that coordinated activities with outlying community hospitals, including military facilities, and with hospital organizations in Washington, DC, and Maryland. The state of Virginia adopted the model and created regional hospital coordinating centers for its six regions.<sup>9-13</sup>

The Northern Virginia Hospital Alliance realized that in order for its members to respond in concert with multiple agencies in multiple jurisdictions to mass casualty incidents involving weapons of mass destruction and other hazards, effective communication and healthcare information management systems needed to be in place. Based on predictions of potential terrorist actions by the Federal Bureau of Investigation (FBI), Central Intelligence Agency, and other agencies, regional hospitals needed the capacity to admit 500 to 1,000 casualties. Hospitals also had to be able to work in concert with first responders such as fire and police departments, EMS units, and with other agencies including public health offices, the American Red Cross, mental health organizations, state and national guard bureaus, and the DoD.<sup>13,14</sup>

Dr Hanfling and Major General (Retired) Michael Wyrick, who served as executive director of the Northern Virginia Hospital Alliance from October 2002 through September 2005, wrote a proposal to develop such systems in October 2002. By using key reference sources and experienced leaders, Hanfling and Wyrick created a model for identifying essential elements of an emergency preparedness program. Subject matter experts earmarked 13 major functions: public health, communication, information management, patient movement, chemical decontamination capability, radiological decontamination capability, surge capac-

ity, hospital clinical management, mental health, family support, volunteer support, media management, and provider licensure and credentialing. The model also fostered the use of common definitions of terms. The Northern Virginia Hospital Alliance implemented the proposal in early 2003.<sup>13–15</sup> Since that time, “a reliable communication system complemented by an information management system connecting all these agencies,” has been in place.<sup>13</sup> “What began as a communications solution,” stated Dr Hanfling, evolved “into a more comprehensive healthcare information management system.”<sup>14</sup>

One aspect of the improved coordination among hospitals was the practice of a “command hospital communication concept”<sup>11(p29)</sup> during regional disaster drills. During the drills, the incident commander, or the commander’s designee, relied on the command hospital, Inova Fairfax, which had the appropriate communications system, to serve as a link to other area hospitals and take responsibility for seeing that patients with specific needs were delivered to the appropriate medical facilities. Burn victims were sent to burn units, trauma patients to trauma centers, and the less seriously injured to other hospitals. The command hospital told the incident commander how many beds were available at particular hospitals and what kinds of patients could be sent there; in turn, the incident commander told the command hospital the number of patients involved. The absence of direct access to the incident commander early on 9/11 had put the hospitals in a situation that could have been disastrous had there been more casualties.<sup>11(pp29,30)</sup>

Another improvement was the institution of a radio communications system “to combat the chaos of disaster,” said General Wyrick.<sup>10</sup> “What we realized from September 11, 2001,” said Dr Hanfling, “is that hospitals were the last to know about what was going on at the Pentagon.”<sup>10</sup> During a mass casualty exercise involving the Pentagon in May 2001, telephone communication had proven ineffective and slow; finding out the number of beds available in Northern Virginia hospitals for the mock disaster victims had taken more than an hour. By using radio linkage such as citizens’ band (CB) radios, however, the same information could be spread in a matter of minutes, and hospitals would be linked with one another and provide continuous communication during a disaster. Radios could also rapidly transmit information on the best treatment for victims of biological or chemical attacks.<sup>10</sup>

The alliance used a \$225,000 federal bioterrorism grant to build a radio network among the 13 Northern Virginia hospitals in 2002. These included DeWitt Army Community Hospital; Fauquier Hospital; Inova hospitals in Alexandria, Fair Oaks, Fairfax, and Mount Vernon; Loudoun Hospital Center; Mary Washington Hospital; Northern Virginia Community Hospital; Potomac Hospital; Prince William Hospital; Reston Hospital; and Virginia Hospital Center–Arlington.<sup>10</sup>

Although Army hospitals in the Washington, DC, area have their own reliable communication system and information management system through the Army’s healthcare program and NARMC, 9/11 showed that in an age of terrorism and nuclear threat military and civilian hospitals need to work closely together to provide expert care to multiple casualties. Since 9/11, military hospitals have partici-

pated more actively in their local hospital associations. One example is the service as co-chair of the DC Hospital Association's emergency management committee of Colonel Lucci, WRAMC's emergency medicine chief. DeWitt Army Community Hospital's active participation in the Northern Virginia Hospital Alliance is another. Both military and civilian hospitals benefit from these associations.

#### US ARMY MEDICAL COMMAND

After 9/11, homeland security and bioterrorism incidents emerged as the two major issues requiring attention by MEDCOM. To that end, MEDCOM created a division of homeland security under the leadership of Lieutenant Colonel Bernard Hebron to develop plans for providing medical support to federal, state, and local governments in the event of a national disaster. Staff studied major bioterrorism as well as chemical scenarios. Although MEDCOM was unsure what the requirements for this support or the Army Medical Department's ultimate role would be, doctrine began to emerge on how the Army would respond with medical assets to support civilian authorities, including the development of a list for patient decontamination kits for Army medical facilities containing detection devices and equipment to neutralize chemicals on a person.<sup>16</sup>

MEDCOM had been preparing for a possible weapons-of-mass-destruction attack on US soil even before 9/11. By 1999, for example, WRAMC was well equipped with decontamination equipment and had trained a large number of personnel in decontamination activities. In August of that year, DeWitt Army Community Hospital and Weed Army Community Hospital at Fort Irwin, California, each obtained a portable decontamination unit and the training to use it. After both hospitals expressed satisfaction with the package, MEDCOM standardized the equipment and training among the 21 remaining Army medical facilities. By April 2001, those facilities had received delivery of the equipment and training.<sup>17(encl1)</sup>

In addition, before 9/11 MEDCOM's Plans Division had designed a pamphlet providing guidance to medical facilities on the preparation of emergency management plans, including how to respond to weapons of mass destruction and how to use the Army's SMART teams. The leaflet had been staffed and was waiting for the surgeon general's signature when the 9/11 attack occurred. After the tragedy, the brochure was returned to the MEDCOM Plans Division for expansion, for the inclusion of more defined protocols, and for another review. It was published in October 2003 as MEDCOM Pamphlet 525-1, *Medical Emergency Management Planning*.<sup>18</sup> At this writing, it is undergoing revision and expansion again to incorporate new guidance from federal authorities, various program and organizational changes, new terminology, and new missions for SMART teams, including the addition of SMART-logistics teams. When changes are completed, the pamphlet will be a supporting document to Medical Command Regulation 525-4, which governs emergency preparedness.<sup>17(encl2)</sup> A new version of another document, Regulation 525-4, was published on 15 January 2010 to reflect the "many changes in Federal Response, Defense Support of Civil Authorities (DSCA) and Homeland

Security policies and guidelines affecting preparedness for and response to all-hazards incidents.”<sup>19</sup>

On 17 December 2001, the Army surgeon general, Lieutenant General James B Peake, issued a memorandum<sup>17(encl3)</sup> to the commanders of his major subordinate commands on plans for enhancing medical nuclear, biological, and chemical readiness. Appended to the memorandum was a table of 20 scheduled tasks and aggressive timelines to be executed “as quickly as possible” if an attack occurred. According to the memo, the Medical Department would provide exportable courses to enhance the performance of medical activities under nuclear, biological, and chemical conditions. Medical care tasks for the victims of such attacks were “to be trained, tested and measured.” Regional medical commanders were to put these plans into effect, giving priority to emergency room personnel and first responders for training support packages when they were developed and fielded.<sup>17(encl3)</sup>

The Medical Department’s council of colonels determined that medical treatment facilities and SMART teams should receive personal protective equipment and civilian respirator face masks. Each facility was to receive ten sets of the equipment and at least two face masks per emergency room treatment bed. At little added cost, the Plans Division matched personal protective equipment to masks and purchased 1,355 sets of the equipment, which were delivered from December 2002 through March 2003. Medical treatment facilities also received funds through regional medical commands for additional purchases, if they became necessary, such as equipment for the new SMART-logistics teams and for the treatment facilities themselves.<sup>17(encl4)</sup>

SMART teams of nuclear, biological, and chemical experts and patient decontamination teams at medical centers needed a device to detect chemical warfare agents and toxic industrial materials in order to ensure separation of the decontaminated patient from other patients as quickly as possible, and to confirm that victims were contamination free. The Plans Division purchased 11 ChemPro 100 handheld chemical agent detectors from Environics (Mikkeli, Finland) “with training and support packages” for the nuclear, biological, and chemical and patient decontamination teams, greatly enhancing their capabilities.<sup>17(encl5)</sup>

MEDCOM also strengthened its biosurveillance activities through several clinical databases, with MEDCOM preventive medicine specialists analyzing the data daily.<sup>20</sup> Since 9/11 MEDCOM also has been upgrading hospital training and equipment to be able to identify and treat any early cases of a bioterrorist-induced illness. The Army’s Institute of Chemical Defense Research and Walter Reed’s Army Institute of Research are involved. The Army has increased its stocks of nerve agent antidote, chemical agent kits, and protective suits. The Army Medical Department (AMEDD) is integrating emergency management plans and contingencies with the civilian sector, especially the Centers for Disease Control and Prevention.<sup>20,21</sup>

In improving hospital training, equipment, and biosurveillance systems, the Medical Department relied on the expertise of its own professionals, especially



the commander of Walter Reed Health Care System, Colonel Michael A Dunn, who had commanded the Army's Research Institute of Chemical Defense and had been the main Persian Gulf War chemical defense trainer. The Medical Department also worked diligently with the civilian sector in training for the detection of early cases of biological or chemical contamination. Its personnel likewise joined committees to develop more comprehensive and better researched biological incident response plans for the metropolitan Washington area. The steps taken by the Medical Department were similar to efforts undertaken throughout the country after 9/11, when states received large sums of federal money for improving hospital training and equipment and for biosurveillance systems.<sup>20</sup>

As discussed in Chapter 2, Colonel Bruce Burney, chief of the Operations Division in MEDCOM's Directorate of Health Care Operations, believed that the subordinate commands would consider the two most important shortfalls in the Medical Department's response to 9/11 to be the lack of intelligence information in the Army's major commands, and the inability of those organizations to provide guidance to their subordinate commands based on this intelligence. After 9/11, the mission of Ronald Hatton, MEDCOM's senior intelligence officer, expanded to include security as well as intelligence. In addition to force protection guidance, Hatton began providing intelligence updates to all the commands and major subordinate commands.<sup>22,23</sup>

As part of its post-9/11 strategy, MEDCOM moved toward implementing new DoD instructions involving significant coordination between installations and medical treatment facilities. In emergencies before 9/11, the Medical Department relied on a few specially trained and equipped regional response teams. After 9/11, every Army post was required to have a medical team capable of responding to a 9/11-type of event involving hazardous substances. Medical facilities had to be able to support the response teams being created at every military post for the installations to have the capability to counter a terrorist attack. Army hospital staffs had always been able to triage and handle mass casualties, but dealing with a terrorist attack on a 9/11 scale was a much larger task than those in scenarios practiced by installation hospitals for years.

Implementation of the DoD's new plan required increased personnel, training, and exercises, which 2002 levels of staffing and funding made difficult to achieve. Medical response teams were being formed on an ad hoc basis, with dubious training and abilities, according to Colonel Tim Mallon, CHPPM's director of clinical preventive medicine. Although MEDCOM had a plan for how to implement the DoD instructions on nuclear, biological, and chemical situations—casualty support had been a part of preventive medicine and occupational medicine for some time—staffing would take time. Colonel Mallon believed that even if the Army doubled the number of its occupational medicine doctors, one-third of US Army installations would be without one. "So essentially you haven't changed the situation," said Colonel Mallon.<sup>24(p18)</sup> "We may be heading there," added Colonel Paul Smith, an occupational medicine staff officer at the Office of the Surgeon General, "but we're not there yet."<sup>24(p18)</sup> By April 2002, the well-intentioned plans

of the DoD and MEDCOM for a post-9/11 military response to a terrorist attack might not have had the necessary staffing and resources, but efforts were moving in that direction. However, the October 2001 anthrax contamination incident in Washington, DC, involving the city's mail handling systems seemed to have overly influenced the command's planners, who then focused more on developing strategies to deal with hazardous materials such as anthrax and less on devising ways to handle explosive damage in another mass casualty event like the attack on the Pentagon.<sup>24</sup>

Nevertheless, MEDCOM improved its ability to respond to terrorism both medically and operationally by developing plans and issuing instructions on ways to improve training; nuclear, biological, and chemical casualty treatment capability; intelligence proficiency; and the documentation of medical competencies. MEDCOM stockpiled chemical agent kits, nerve agent antidotes, and protective suits and masks, and worked on better command, control, and coordination among its own personnel, within the DoD, and with the civilian sector. During all of those activities, MEDCOM continued to manage healthcare and beneficiary care and to plan for deployments around the world.<sup>16,25</sup>

#### COLONEL STEPHEN WALLACE AND THE ARMY MEDICAL DEPARTMENT RESPONSE

MEDCOM digested and incorporated into its plans and training exercises some of the ideas it received from Army medical participants in the 9/11 response. Colonel Stephen Wallace, Army Medical Department liaison at ground zero in New York City (see Chapter 6, New York City), wrote a prescient after-action report including 22 recommendations that the Medical Department might use to implement measures in preparation for another attack. Wallace based his proposals on his liaison experience in New York City; his many military assignments, including service as a medical operations planner for missions in the Balkans, Croatia, and Liberia; his years of military professional education; and his personal experiences as an emergency medical technician with fire and rescue departments. A 49-year-old military field grade officer and combat veteran, he "had seen and done a lot," according to Wallace. He sent his report in a 5 October 2001 memo to Major General Harold Timboe, commanding general of NARMC and WRAMC. Wallace forwarded copies of the report to other Army Medical Department officers, commands, departments, and divisions.<sup>26,27</sup> In making the following suggestions, he became the intellectual force for determining "where do we go from here."<sup>26</sup>

Below are his 22 recommendations, followed by MEDCOM responses.

- 1. Begin medical surveillance on all military personnel who were at Ground Zero** due to the various HAZMAT [hazardous materials] and environmental substances detected there. The PGI Surveillance Program format could be used to accomplish this effort for active duty military. Recommend NYARNG [New York Army National Guard] also participate through their NY State health resources.<sup>26(p3)</sup>

In response, the Army surgeon general directed CHPPM to conduct postdeployment medical surveys for all 9/11 military responders.<sup>17(encl6),26(p3)</sup>

**2. Be ready for other possible attacks by forming a group of MEDCOM LNOs** [liaison officers] who can be immediately deployed if this happens again in other cities. These LNOs could serve as the RMC [regional medical command] commanders' and TSG's [the surgeon general's] eyes and ears on the ground; provide a direct link between MEDCOM and all responding local, state and federal agencies to include the DCE [defense coordinating element] and FEMA [Federal Emergency Management Agency]; and provide an important show of support for the local officials who would appreciate this representation (note: not all cities are as well prepared as NYC [New York City]).<sup>26(p3)</sup>

MEDCOM believed that its SMART teams could function as liaisons, particularly when the Medical Command control, communications, and telemedicine team, known as SMART MC3T, deployed with other specialty teams.<sup>17(Encl6)</sup> MEDCOM Pamphlet 525-1, issued in October 2003, stated that SMART teams

are composed of military officers, warrant officers, enlisted soldiers, Department of the Army civilians, and appropriate Department of Defense contractors assigned to Medical Command by name. The SMARTs are capable of deploying to provide liaison to local, state and federal response assets in domestic support, military installation support, civil-military cooperative assistance, and disaster relief and humanitarian assistance operations in CONUS [the Continental United States].<sup>18(p30)</sup>

**3. Implement a MEDCOM Homeland Defense Medical Operations Cell** (modeled on the efficiency and effectiveness of the NARMC Operations Center) manned 24/7 to keep TSG and all subordinate commanders operationally aware of issues pertaining to Homeland Defense medical issues and intelligence especially during and after an attack in CONUS. In the past, MEDCOM's war mission meant deployment of our soldiers overseas to combat zones. Unfortunately, our nation has become a combat zone for terrorists. As Homeland Defense takes shape, MEDCOM should be represented.<sup>26(p4)</sup>

Since 9/11, MEDCOM has made homeland defense a major priority. It has established a dedicated homeland security cell, and the emergency operations center at the Office of the Surgeon General, known as Ops Center XXI, has become a permanent, 24-hour facility.<sup>17(enc16)</sup> This center, along with the regional medical commands' emergency operations centers and MEDCOM's quarterly contingency planning workshops, helps provide information and intelligence on homeland defense medical issues.<sup>17,18(pp32,33)</sup>

**4. Send more MEDCOM officers, senior NCOs [noncommissioned officers] and DACs [Department of the Army civilians] to FEMA and other disaster/WMD [weapons of mass destruction] training seminars and conferences.** Valuable education gained at these conferences will better prepare more MEDCOM personnel for attacks, disasters and MASCALs within their areas of operation.<sup>26(p4)</sup>

Each year individual officers and teams attend conferences and exercises that focus on responses to disasters and chemical, biological, radiological, nuclear, and explosives incidents. The annual Association of the US Army Medical Symposium and the annual Force Health Protection Conference (sponsored by CHPPM) are two of many that are well attended. MEDCOM's Plans Division conducted SMART team/homeland security conferences in February 2001 and February 2003. The division also has quarterly contingency planning workshops.

Army personnel assigned to the FEMA NDMS Federal Coordinating Center program attend the NDMS national conference annually. Regional medical command personnel and FEMA regional staff work together at consequence management exercises that deal with response to disasters. In addition, many Army installations conduct their own large-scale disaster exercises in conjunction with local, state, or regional agencies.<sup>28</sup>

**5. Incorporate lessons learned from the Pentagon and WTC [World Trade Center] attacks for immediate MASCAL training exercises throughout the MEDCOM.** Just as we are sending medical staff to civilian Trauma Centers to better prepare for battlefield surgery, also send some MEDCOM officers to civilian hospitals in Virginia, Washington, DC, and NYC to gain further information on their responses to the Pentagon and World Trade Center MASCALS. Include command and staff officers in these information gathering visits.”<sup>26(p4)</sup>

MEDCOM has published lessons learned and conducted training exercises throughout the organization. MEDCOM has not sent officers to civilian hospitals to learn from their experiences, but Medical Department personnel attend regular meetings of Washington-area hospitals, where discussions focus on how to improve regional healthcare and how to respond collectively to future terrorist attacks (see discussion of hospital alliances, above).<sup>28</sup>

**6. Immediately expand MASCAL, combat, weapons, and CTT (common task training) training requirements throughout the command.** America is on the frontline and our CONUS MEDCOM MTF [medical treatment facility] personnel need to be as ready as TOE [table of organization and equipment] medical unit soldiers deploying overseas. At many MEDDACs where this officer has served, CTT is considered an inconvenience to many MEDDAC staff and something to suffer through once per year for several hours in a day. While PROFIS [Professional Officer Filler Information System] personnel usually get a little more advanced training, in this officer’s opinion, this is still not enough time to thoroughly train soldiers to maintain combat level proficiency in combat and medical skills for rescue and evacuation, casualty treatment, weapons and NBC [nuclear, biological, chemical] area. MTF DACs [military treatment facility Department of the Army civilians] need training too.<sup>26(p4)</sup>

Three months after 9/11, Surgeon General Peake issued a plan for enhancing emergency response capabilities in general and for nuclear, biological, and chemical response capabilities specifically. The Army Medical Department Center and School was to “prepare exportable, tailored and scalable courses”<sup>29</sup> that explained how to perform medical tasks in a nuclear, biological, and chemical environment. Starting in December 2001 and continuing through 2002, the regional medical commands executed this plan by having their personnel take the courses, giving priority to emergency room and first responder training. In addition, military treatment facilities participate in at least one mass casualty exercise each year.<sup>18(pp102–104),29</sup>

**7. Ensure every MEDCOM soldier is “110%” trained in NBC. Ensure every MEDDAC has NBC equipment for ALL staff. Provide NBC orientation training to DAC staff.** In NYC, for two weeks after 11 Sep 01, there were daily discussions of the potential for a further biological/chemical (biochem) attack following the WTC attack. Hospital personnel there

have had extensive training in case of a biochem attack. Their hospitals have equipment ready for use if biochem casualties arrive at their Emergency rooms. NYC EMS is ready to rescue and transport these type of patients to the hospital.<sup>26(p4)</sup>

From January through April 2001, MEDCOM equipped and trained for patient decontamination in all military treatment facilities with emergency rooms. On 17 December 2001, the surgeon general issued his plan for enhancing medical nuclear, biological, and chemical readiness. In 2002 MEDCOM purchased 1,355 sets of personal protective equipment and powered, air purifying respirators, which 38 medical treatment facility emergency rooms and SMART teams received in December 2002 through March 2003. This protective equipment capability enabled medical treatment facilities to meet the needs of their installations or the nearby community according to local plans. MEDCOM planned and programmed more capability for more facilities for the future. Although all staff would not be provided nuclear, biological, chemical equipment, all medical personnel, including military, Army civilians, and contractors, were required to complete nuclear, biological, chemical, and high-yield explosives training by the end of fiscal year 2006. MEDCOM developed a Web-based package of training consisting of four courses for clinicians, operator/responders, executives, and nonmedical personnel.<sup>17(enc1-5),28,30</sup>

**8. Ensure every MTF DAC gets more training in building evacuation, personal protection in case of an attack, and emergency first aid (for non-medical DACs).** As we learned in the Pentagon attack, our DACs are in this too. MTFs need to include them in training, which would benefit them in case of attack.<sup>26(p4)</sup>

On 9 January 2004, the assistant secretary of defense tasked the Army to provide chemical, biological, nuclear, and high-yield explosives training for military medical personnel, civil service, and contract personnel as recommended in no. 8. See also the response to recommendation 7, regarding Army civilians.<sup>17(enc16)</sup>

**9. Ensure every chain of command has leadership ready to take charge if the current leaders become casualties.** NYFD lost dozens of senior officers when the WTC towers collapsed. The subordinate leaders were immediately promoted to fill the upper ranks. If a MTF HQ [headquarters] were destroyed, there should be an established second chain of command ready to take charge and continue MTF operations.<sup>\*\*26(p5)</sup>

MEDCOM Plans Division conducts quarterly contingency planning workshops that focus on leadership skills and responsibility for military treatment facilities' planners and other interested personnel.<sup>17(enc16)</sup>

**10. Ensure every MEDCOM organization has a contingency plan if their headquarters and all of their telecommunication and IM/IT [information management/information technology] are destroyed in an attack.** NYC OEM [Office of Emergency Management] was completely destroyed in the attack. A small temporary command immediately started operating and within three days, a brand new operational command post was fully operational at Pier 92 with several hundred key staff. Also ensure all MEDCOM organizations have alternate methods of communicating with their higher headquarters in case of attack (cell phone rosters, internet email, etc.<sup>26(p5)</sup>

MEDCOM plans quarterly contingency planning workshops. Emergency planners at every Medical Department level prepare and maintain emergency management plans and submit them to higher headquarters for validation.<sup>18(p5),19(p3)</sup>

**11. Ensure redundancy in all key areas and operations.** The Pentagon and WTC attacks taught us a lesson that ANYTHING is possible.<sup>26(p5)</sup>

According to MEDCOM Pamphlet 525-1 on emergency management planning, the logistics division of each military treatment facility oversees a four-tiered concept of medical logistics support: (1) The division provides installation support packages of 15 days of medical nuclear, biological, and chemical defense materiel for 25% of the regional population. These packages are maintained by the installation medical supply activity. (2) The logistics division also provides regional medical support packages of 15 days of medical nuclear, biological, and chemical defense materiel for 25% of the regional population. (3) Additionally, the division administers Army and DoD medical assets by utilizing existing depot supplies, vendor-managed inventories, and stock rotation contracts to store a 30-day supply for contingencies. (4) If directed, the installation medical supply activity may be required to store and maintain specific quantities of national stockpiled materials from the national pharmaceutical stockpile program managed and maintained by the Centers for Disease Control and Prevention.<sup>18(pp80,81)</sup>

**12. Ensure every MEDCOM organization has the capability of an IMMEDIATE emergency reaction force response from garrison armed soldiers, 'locked and loaded,' or that weapons and ammunition are readily available to key staff if a MEDCOM or MTF organization is attacked by terrorists armed with small arms, explosives or knives.** Patients, staff and the facility must be defended against cowardly terrorists who will hit unprotected soft targets. NYC hospital have armed NYPD and security personnel within their hospitals.<sup>26(p5)</sup>

Most military medical treatment facility security forces are either civilian contract personnel or a mix of civilian and military police. Quick-reaction forces under installation emergency management plans may be available to a military treatment facility during such an event.<sup>17(encl6)</sup>

**13. Have teams sent out by OTSG [Office of the Surgeon General] or MEDCOM RMCs to perform operations readiness inspections (ORIs) on all MEDDACs for MASCAL and security responses.** The MEDCOM has a wealth of talent in its senior ranks, many of whom have combat experiences and service in areas of the world where terrorism occurs. Use this talent to devise a uniformed security/force and facility protection system applicable to all MTF and MEDCOM organizations. Then send out inspection teams to ensure compliance.<sup>26(p5)</sup>

Under MEDCOM Regulation 1-2, which covers MEDCOM's organizational inspection program, the Office of the Surgeon General's inspector general, at the request of regional medical commanders and major subordinate medical commanders, inspects medical commands for systemic issues, such as readiness problems, and identifies opportunities to improve them. Military police provide security at MEDCOM and medical treatment facilities.<sup>31(pp1-3),32(p1)</sup>

**14. Ensure MEDDACs take every opportunity to meet and train with FEMA organizations within their local areas.** FEMA personnel (including those called up for disasters) would welcome this cooperation and joint training. MEDDACs should be strongly encouraged to perform mass training with local area hospitals.<sup>26(p5)</sup>

MEDCOM's joint exercises with FEMA occur at the regional level using SMART teams or similar groups. The Southeast Regional Medical Command has worked with FEMA in a region-wide exercise called Consequence Management since 2002. The Northern Virginia Hospital Alliance and the DC Hospital Association encourage mass casualty training at local area hospitals, including military hospitals.<sup>17(encl6)</sup>

**15. Ensure MEDDACs "stock up" on emergency medical supplies and items which would be needed if the garrison is attacked.** After an attack, Prime Vendor may take days to restock emergency items and garrison security may hamper medical resupply operations.<sup>26(p5)</sup>

According to MEDCOM Pamphlet 525-1 on emergency management planning,

due to the increased threat level to Continental United States installations, medical nuclear, biological, and chemical defense materiel must be on hand in greater quantities, have decentralized storage, have rapid distribution to systems, and be readily available to installation and military treatment facility commanders.<sup>18(p259)</sup>

A 15-day supply of this defense materiel must be on hand for 25% of a regional population. This materiel, which is a component of medical equipment sets, also supports nonmilitary personnel in overseas areas, Army National Guard incident teams, emergency response teams, SMART teams, and ready reaction forces that are not part of the installation force protection program.<sup>18(pp259-265)</sup>

**16. Ensure sufficient supplies are stocked to handle biohazards especially bodies and body parts if a major attack occurs.** Have a MEDDAC and a garrison plan on where to place bodies and body parts in case of a major attack (in Panama, the Howard AFB Bowling alley was turned into a temporary morgue). NYC used a financial building lobby as a temporary morgue.<sup>26(p6)</sup>

At this writing, MEDCOM had not dealt with this issue, believing that body bags and other recovery equipment would not be part of its responsibility, but would belong to Army mortuary affairs units or Department of Homeland Security NDMS disaster mortuary operational response teams.<sup>17(encl6)</sup>

**17. Ensure all MEDCOM organizations have 100% personnel rosters and standing instructions on what to do if attack/disaster occurs.** All staff should know where to call in for accountability and reporting instructions (and have a secondary number to call in case normal communications is disrupted).<sup>26(p6)</sup>

MEDCOM's quarterly contingency planning workshops provide guidance on what to do should an attack or disaster occur. Also, chapter 5 of MEDCOM Pam-

phlet 525-1 provides information and specific guidance on the development and execution of the activity's emergency management plan.<sup>17(enc13),18(pp40-53)</sup>

**18. Ensure all MEDCOM organizations have either a secondary temporary badge ID [identification] system or stickers to place on current badges in case of an attack.** (NYC OEM Ground Zero Red Badges were compromised on Day 6 by someone making copies of them at Kinko's in Manhattan.)<sup>26(p6)</sup>

Most military treatment facilities have ID badges, but not a secondary method of identification.<sup>17(enc16)</sup>

**19. Ensure all MEDCOM organizations have plans for Mental Health support if an attack occurs.** (For MEDDACs that would mean having or being [sic] to obtain sufficient mental health resources for the wounded, MTF staff, garrison personnel and family members.)<sup>26(p6)</sup>

MEDCOM planners are in the process of writing the physical and behavioral health follow-up plan to the medical emergency management plan, which will be published as annex S of chapter 6 of Pamphlet 525-1. The most current version is dated 1 October 2003.<sup>18</sup>

**20. Inventory civilian hospital capabilities near every US Army post.** (Know which hospitals can take burn cases, head and chest trauma, biochem victims, etc. Have MTF personnel tour those civilian facilities and meet their staff.)<sup>26(p6)</sup>

MEDCOM plans quarterly contingency planning workshops in which participants discuss the capabilities of local civilian hospitals. MEDCOM Regulation 525-4, *Emergency Management Planning*, states:

Procedures and agreements for mutual emergency medical support between military and surrounding civilian medical facilities [are] included [in emergency management contingency plans]. The procedures and agreements [are] exercised during semi-annual mass casualty exercises and continually updated to ensure the availability of a full range of emergency medical services to the supported installations.<sup>19(pp5,6)</sup>

In addition, coalitions of Washington-area hospitals encourage mass casualty training with local area military medical facilities.<sup>19(pp2,5)</sup>

**21. Inventory personnel records in the MEDCOM for officers and enlisted with considerable experience (military and civilian) in the Middle East; linguistic skills, etc.** (Offer these soldiers useful opportunities in TOE units, MEDCOM Headquarters and Joint Staffs, to provide expertise which will be needed to defeat and defend against this terrorist enemy.)<sup>26(p6)</sup>

MEDCOM's Plans Division has stated that this issue is outside its jurisdiction and is in the health language skills area of responsibility. MEDCOM continues to update its capabilities and doctrine and to reach out to other organizations with health language skills and emergency healthcare responsibilities.<sup>17(enc16)</sup>



**22. Think outside the box—Always!** (After the Pentagon and World trade Center attacks, ANYTHING can happen—we must be ready!)<sup>26(p6)</sup>

MEDCOM has not addressed all the lessons from 9/11; for example, although MEDCOM has discussed the need for more assistance to the families of injured Army civilians in a disaster, the provision of assigning an assistance officer to the families of the injured civilian has not been instituted.

#### US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE

While MEDCOM headquarters worked on improving its ability to respond to the terrorist threat, CHPPM developed antiterrorism policy and procedures. In particular, it strengthened its ability to respond to nuclear, biological, and chemical threats such as contaminated water supplies, radiation, anthrax, smallpox, and toxic chemical substances. In addition, the agency worked more closely with nonmilitary government agencies such as the Centers for Disease Control and Prevention, which included DoD in its communication planning sessions. Indeed, remarked Kevin Delaney, chief of CHPPM's Health Information Operations, since 9/11 the military had developed more capability to deal with a crisis and had better command and control mechanisms in place than did the "Centers for Disease Control, or even FEMA, or the FBI."<sup>21</sup> (As far as the FBI is concerned, in the author's opinion, he is probably wrong.) As a result, federal agencies began to take a closer look at what the military and CHPPM, in particular, had to offer. The linkage of DoD with other response agencies to discuss strategies for future crises was a major consequence of 9/11.<sup>21,33</sup>

After 9/11, CHPPM began developing a contingency plan that included practicing responses to nuclear, biological, and chemical threats. Before 9/11 CHPPM was responsible only for providing SMART team consultation; however, its response to the Pentagon involved much more than that. As a result of 9/11, Colonel Mallon believed, "our response needs to be more thoroughly thought out, more thoroughly equipped, trained, exercised." He and his colleagues focused their efforts on issues and concerns defining CHPPM's future responses.<sup>24</sup>

CHPPM also took a number of actions to protect drinking water supplies against terrorist acts. The water supply management program of CHPPM's Environmental Health Engineering Directorate developed a "Fact Sheet on Countering Terrorism of Water Supplies" to help Army and DoD personnel to better understand likely water supply targets, ways to improve preparations and responses, and how to access other important sources of information on the subject.<sup>33(p3-23)</sup>

Radiological threats in the workplace were also of high concern. CHPPM's health physics program provided Army radiation safety staff officers and other professionals with a protocol to assess the radiation emitted by x-ray cabinets and scanner systems that agencies were purchasing to check packages and equipment for contamination.<sup>33(p3-63)</sup>

As part of the Army's response to the 9/11 attacks, CHPPM's industrial hygiene field service program supported the investigation of the October 2001 anthrax contamination incident in Washington. Program members deployed with the preventive medicine team to help the US capitol incident management team, a multi-disciplinary federal agency force, deal with the presence of anthrax contamination in the Hart Senate Office Building by instituting protocols and strategies for taking anthrax samples from the environment and the workplace. Program members also partnered with the US Marine Corps' hazardous materials units, whose personnel were the first responders, and with the Centers for Disease Control and Prevention, the National Institute for Occupational Safety and Health, and the Environmental Protection Agency to collect samples of anthrax and confirm and document its presence in the buildings of the US Capitol.

From 19 October to 31 December, this multidisciplinary team worked around the clock to collect and analyze over 10,000 samples for *Bacillus anthracis* in over 30 buildings. Its findings enabled its members to offer advice on respiratory protective equipment and the decontamination of affected offices. The preventive medicine teams' contributions included surveying and experimenting



US Army Center for Health Promotion and Preventive Medicine's rapid-response team is assessing the Hart Senate Office Building's HVAC (heat, ventilation, and air conditioning) system for future sample locations and gathering information for future fumigations.

Photograph: Lyn C Kukral, Public Affairs Officer, US Army Center for Health Promotion and Preventive Medicine.



Tony Intrepido, US Army Center for Health Promotion and Preventive Medicine, and Mark Durno, US Environmental Protection Agency, leave the Hart Senate Office Building after conducting research on anthrax spore behavior in Senator Tom Daschle's office (where an anthrax-contaminated letter was opened).

Photograph: Lyn C. Kukral, Public Affairs Officer, US Army Center for Health Promotion and Preventive Medicine.

in known “hot zones” of contamination; reviewing the “remediation” plan of the Hart Senate Office Building; voting as a part of the review working group on guidance to the incident commander on the reopening of buildings cleansed of anthrax; leading, directing, and advising members of Congress at congressional meetings on industrial health matters; working closely with members of Congress, the FBI, the US Coast Guard, the Agency for Toxic Substances and Disease Registry, and the US Capitol Police to plan the cleaning of af-

fectured buildings and to identify and describe potential health threats to building occupants.<sup>33(pp3-66,4-2,4-4)</sup>

WRAMC contributed to CHPPM's anthrax mission by sending infectious disease doctors and nurses to the Capitol building to help test people for anthrax infection after the anthrax spores were found in the Hart Senate Office Building's mail, and to administer antibiotics. These experts spent about 10 days on the job. The US Army Medical Research Institute of Infectious Diseases conducted the anthrax microbiology analysis that determined the positive and negative results of the swabs. Laboratory results were compiled and recorded in the Army's computerized Composite Health Care System, a health information management tool.<sup>20</sup>

From 25 October to 2 November 2001, CHPPM personnel provided support to the US Postal Service's Brentwood office in Washington, DC, where two postal workers died as a result of handling mail contaminated with anthrax spores. A team of two industrial hygienists and two environmental engineers first observed and then guided safety and health practices at the facility, consulted with outside health contractors hired by the Postal Service, and maintained command and control of decontamination operations. CHPPM personnel coordinated their activities with the Occupational Safety and Health Administration, the Environmental Protection Agency, and the National Institute for Occupational Safety and Health.<sup>33(pp3-66)</sup> The staff of the DiLorenzo Tricare Health Clinic, with additional staff from WRAMC and assistance from CHPPM, tested military mail handlers at risk for anthrax (the DC General Hospital offered anthrax testing for all mail handlers, including those of the city's various federal agencies, but the DoD wanted to take care of its own personnel).<sup>20</sup>

After 9/11, the Deployment Environmental Surveillance Program supported the surgeon general's Directorate of Health Care Operations by developing a model and preparing casualty estimates and information for a mass casualty incident involving toxic industrial chemicals or materials in a major metropolitan area. CHPPM's Geographic Information System personnel interpreted these findings geographically, which was necessary for planning purposes and analysis. MEDCOM used the results to develop policy to support civilian populations in major catastrophes. CHPPM also shared the information with the EPA's Chemical Emergency Planning and Preparedness Office, the science advisor to the Department of Justice, the US Chemical Safety and Hazard Investigation Board, and FEMA. In much the same way, CHPPM's Field Preventive Medicine Division loaned personnel to the surgeon general's Directorate of Health Care Operations medical nuclear, biological, and chemical section to help assess the vulnerability of military chemical stockpiles. A CHPPM team responsible for industrial health initiatives associated with the Army's response to 9/11 also wrote guidance on personal protective measures for CHPPM personnel and for New York and New Jersey National Guard units to reduce their exposure during a chemical emergency response.<sup>21,33(pp3-103,4-7,4-25)</sup>

#### THE PENTAGON POST-DISASTER HEALTH ASSESSMENT SURVEY

In early November, seeking both to reassure the Pentagon's employees and to document and assess postdisaster health problems in order to determine how best to respond to future attacks, CHPPM's Directorate of Epidemiology and Disease Surveillance used the Internet to deploy a health assessment survey. A paper survey was also made available in the DiLorenzo Clinic. Whether injured or not, respondents were asked to describe any health problems they had developed in the days following the 9/11 attack and the effects the tragedy had had upon them. The questionnaire reached more than 19,000 Pentagon employees, and 4,751 responded to it.<sup>33(ppii.3-28),34-36</sup>

Analysis of the responses revealed that 96% of employees sustained no injuries during the attack, and 250 persons sought medical treatment after the tragedy. Other results were:

- A majority (84%) indicated that they did not have old and or new health problems or concerns that have become worse since the attack.
- A majority (85%) indicated that they had some type of inhalation exposure that was mostly attributed to odors rather than smoke.
- Of those exposed to smoke, a majority (68%) were exposed to light smoke only, and 64% of this group for 10 minutes or less.
- A majority (72%) of respondents were located inside the Pentagon building during the attack and greater than 100 feet from the collapsed sections at the time of the attack.
- A majority (62%) were able to evacuate the building in 10 minutes or less and were not injured during the evacuation.
- Of those injured during the evacuation, 20.8% fell and 20.8% suffered cuts from glass or structural debris.
- Most (20.8%) suffered cuts from glass or structural debris.
- A majority (96%) were not trapped and were able to reach the outside.
- Of those who reported being trapped (4%), most were trapped for less than 10 minutes, mainly by smoke, a door, or debris.
- A majority (58%) indicated that they knew someone killed or injured.<sup>36</sup>

Evaluation of the mental health impact was an important part of the assessment. Forty percent of respondents (1,837) had mental health concerns in the 4 months following the attack. Illnesses included alcohol abuse (2.5%), posttraumatic stress disorder (7.9%), depression (17.7%), panic attacks (23.1%), and generalized anxiety (26.9%). Respondents reported reduced daily functioning and use of counseling services.<sup>37-39</sup> "Risk factors known to be associated with mental health problems after traumatic events were strongly predictive of the high-risk categories identified."<sup>38(p284)</sup>

## WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT SURVEY

In support of the Army's response to 9/11, the Army surgeon general also asked CHPPM to conduct the World Trade Center Support Health Assessment Survey. Between January 2002 and June 2003, a CHPPM team headed by Colonel Richard Kramp built upon the Pentagon survey to create a similar program for those affected by the World Trade Center attack. Many of the questions also came from a questionnaire developed by the US Army Corps of Engineers for its own personnel who had worked at ground zero. CHPPM's Directorate of Health Promotion and Wellness, the Walter Reed Army Institute of Research's psychiatry department, the Corps of Engineers, the Uniformed Services University of the Health Sciences, and a triservice team of mental health experts also participated in the survey's development.<sup>40(pp2,3)</sup>

Surveys were given to active duty Army personnel, the New Jersey National Guard, and Corps of Engineers employees who provided support in the area of the World Trade Center. Surveys were not sent to members of the New York Guard, who were participating in their own medical evaluation. One hundred and sixty-two individuals, accounting for 63% of the 256 surveys sent out, responded to the questionnaire. Activated Reserve or National Guard soldiers represented 53% of those providing answers; the remainder were active duty or civilian employees.<sup>40(p4)</sup>

Survey respondents answered questions about their exposure to smoke, dust, chemicals, fumes, and the approximate percentage of time they wore respirators. Most reported wearing respirators at least part of the time. Those working within the exclusion zone ("collapsed remains/debris at World Trade Center Complex within ground zero"<sup>40(p6)</sup>) or at Fresh Kills landfill (the Staten Island debris field investigation site, which employed the New Jersey National Guard) reported the most exposure to pollutants—96% and 98%, respectively—and alluded to wearing respirators a larger percentage of the time. Thirty percent (46 of the 152 respondents) admitted they had not used respirators at one or more of the locations despite being aware of their exposure to hazardous materials.<sup>40(pp6,7)</sup>

All reported exposures to dust, chemicals and fumes, and smoke; 149 (88%) revealed vulnerability to dust, 108 (67%) to chemicals and fumes, and 71 (44%) to smoke (Table 7-1). Most believed they were threatened by more than one pollutant. Respondents considered exposure to dust and smoke to be light intensity, and exposure to chemicals and fumes to be medium. Most who responded reported exposure to contaminants for more than 30 hours. The greatest exposure was to dust, chemicals, and fumes (Table 7-2).<sup>40(p10)</sup>

Only 18%, or 291 individuals, reported worsened health problems or concerns since working at the World Trade Center. Eighty-two percent, or 132 survey participants, declared no worsened health problems or concerns at all (Table 7-3). New complaints since working at the World Trade Center were factors for 61 respondents (37.7%), while 101 (62.3%) reported no new health problems. In general, 71 people (44%) reported the worsening of old health problems and the development of some kind of new health concerns since beginning their tour of duty

TABLE 7-1

**WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT  
SURVEY RESPONDENTS' EXPOSURE TO DUST, CHEMICALS/  
FUMES, AND SMOKE**

Contaminant	Respondents (N=162)	Percentage
Dust	142	87.7
Chemicals/Fumes	108	66.7
Smoke	71	43.8
None of the above	8	4.9

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

at ground zero (see Table 7-3). Pulmonary symptoms headed the list of worsening health conditions, with cough and breathing problems being the most common (Table 7-4). Old and new ailments also included eye, nose, or throat irritations; stress-related headaches; and such injuries as burns and noise-related hearing impairments (Table 7-5). One hundred and twenty-four persons, or 76.5%, reported no mental health problems. The remaining 23.5% listed posttraumatic stress syndrome, depression, alcohol abuse, panic attacks, and generalized anxiety as concerns (Table 7-6).<sup>40(pp11,12,17)</sup>

Overall, the survey succeeded in reaching out to Army members working at ground zero after the 9/11 attacks by providing them with assurance that their

TABLE 7-2

**WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT  
SURVEY RESPONDENTS' ESTIMATED INTENSITY OF EXPOSURE\***

Contaminant	Respondents (N=154)		Light		Medium		Heavy	
	No.	%	No.	%	No.	%	No.	%
Dust	140		70	50.0	46	32.9	24	17.1
Chemicals/Fumes	106		36	34.0	44	41.5	26	24.5
Smoke	70		42	60.0	24	34.3	4	5.7

\*Missing responses for two respondents exposed to dust, one exposed to chemicals/fumes, and one exposed to smoke.

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

**TABLE 7-3****WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT  
SURVEY RESPONDENTS' HEALTH PROBLEMS OR CONCERNS**

	Respondents (N=162)	Percentage
<b>Worsened Health Problems or Concerns</b>		
No	132	82.0
Yes	291	18.0
Missing (or conflicting)	1	.06
<b>New Health Problems or Concerns</b>		
No	101	62.3
Yes	61	37.7

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

individual health problems were of concern to MEDCOM and giving them a venue where their concerns could be addressed and where they could be directed to sources of information for further assistance. Survey team members walked

**TABLE 7-4****WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT  
SURVEY RESPONDENTS' PULMONARY SYMPTOMS**

Pulmonary Symptom	Respondents (N=71)	Percentage
No symptoms	15	23.4
Pulmonary symptoms not listed	17	26.6
Shortness of breath while walking	12	18.8
Early morning cough that wakes you up	16	25.0
Chest pain with deep breathing	14	21.9
A cough that occurs mostly lying down	15	23.4
Shortness of breath that interferes with job	11	17.2
A cough that produces phlegm	21	32.8
Coughing up blood	1	1.5
Wheezing that interferes with job	5	7.7
Missing	7	9.9

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.



TABLE 7-5

**WORLD TRADE CENTER SUPPORT HEALTH ASSESSMENT  
SURVEY RESPONDENTS' IDENTIFICATION OF NEW OR  
WORSENERD HEALTH PROBLEMS OR CONCERNS**

Old/New Health Problems or Concerns	Respondents (N=71)	Percentage
Cough	39	55.7
Breathing problems	29	41.4
Irritated eyes, nose or throat	24	34.3
Headaches	19	27.1
Stress-related	16	22.9
Injuries	4	5.7
Burns	0	0
Hearing	3	4.3
Other not listed	22	28.6
Missing	1	1.4

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

door-to-door in the Pentagon to reach out to personnel while collecting data, and they also made high priority follow-up contacts with personnel having postattack mental health issues.<sup>40(p25)</sup>

TABLE 7-6

**WORLD TRADE CENTER NUMBER OF INDIVIDUALS AT HIGH  
RISK FOR MENTAL HEALTH OUTCOMES**

Mental Health Outcomes	Respondents (N=162)	Percentage
Posttraumatic Stress Disorder	17	10.5
Depression	27	16.7
Alcohol abuse	4	2.5
Panic attacks	24	14.8
Generalized anxiety	25	15.4
Any of the above	38	23.5
None	124	76.5

Data source: US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

## MENTAL HEALTH

The Army learned from the Vietnam War, the Oklahoma City bombing, and other experiences the importance of providing mental health support to survivors in the wake of tragedy. After the attack on the Pentagon, MEDCOM deployed mental health teams to primary care clinics and other locations to assist survivors, hoping to reduce dysfunctional reactions, depression, anxiety, and other psychological concerns. During the first 4 months after the attack, psychological problems were evident, as the results to the Pentagon Post-Disaster Health Assessment Survey can testify; however, the kinds of problems and their numbers were not considered abnormal in light of the magnitude of the event, and during the following year MEDCOM did not see “a huge jump in . . . psychosomatic type issues, sick call rates, [or] things of that nature.”<sup>24(p47)</sup>

Nevertheless, a workshop on mental health and mass violence planned for the Washington, DC, area before 9/11 took on increased importance after the attack. Mental health experts from the Department of Health and Human Services, DoD, Department of Veterans Affairs, Department of Justice, and American Red Cross met at the Arlie Conference Center in Warrenton, Virginia, from 29 October through 1 November 2001, to evaluate various forms of early psychological intervention commonly used by mental health workers in initial responses to disasters and mass violence. The meeting’s goal was to reach a consensus on the best early practices to use with victims of such traumatic events. The participants found that evidence of the effectiveness of early psychiatric interventions following such incidents was limited. Although previous randomized controlled trials among small groups of disaster survivors indicated that early interventions could reduce distress in family members, and that certain cognitive behavioral approaches could reduce depression as well as incidence, severity, and duration of posttraumatic stress disorder, the clinical trials also suggested that some forms of psychological after-action reviews that encouraged expression of emotions after a traumatic event might have heightened the risk in some survivors for later development of adjustment difficulties or stress disorders. Because these trials were small in number and did not collect sufficient data, however, workshop attendees concluded that “early interventions should be delivered as needed, in an acceptable manner and in keeping with best available expertise” in response to mass violence or disastrous situations. But data “should be collected through systematic research and evaluation”<sup>41(p8)</sup> so that timing of early interventions would be better informed in the future. Military attendees of the workshop also admitted that military stress control systems had been long practiced but not long studied. Some studies had resulted from collecting and collating data from theaters of operations, but much research remained to be done.<sup>41(pp5,8),42</sup>

At the workshop, mental health professionals also developed a list of key components of early interventions. Among them were meeting basic needs; providing psychological first aid; discussing how well needs were being met; observing and listening to those most affected; monitoring the rescue and recovery environment, such as media coverage and rumors; offering information and therapy by “walk-

ing around”; providing technical assistance, consultation, and training; fostering resilience and recovery; conducting clinical assessments and referrals when needed; and providing treatment to reduce symptoms or improve functioning.<sup>41(pp13,14)</sup>

After the workshop, the three military services reached an agreement to stop using critical incident stress procedures, because they sometimes caused more harm than good for survivors who reacted adversely to hearing one-on-one recital of events. The Air Force personnel initially resisted the decision—critical incident stress management had been their most used procedure and they were skeptical of less formal procedures they thought could be too intrusive—but eventually agreed.<sup>43</sup>

In the post-9/11 period, the Army’s mental health planners focused on developing procedures for counseling and managing military disasters in garrison environments. This entailed improving the combat stress control model, which was based primarily on the general disaster stress management techniques as outlined at the Warrenton workshop. For the Army, mental health was part of disaster planning, and disasters were part of the continuum of combat.<sup>43</sup> Also during this time, the military continued to work with civilian mental health workers in planning joint responses to future disasters. At monthly meetings, the military identified participating organizations and their resources; discussed processes; shared information; and formed relationships, including the organization of a mental health coalition in the national capital region to respond to future crises.<sup>44</sup>

#### SUMMARY

MEDCOM continued to respond to the events of 9/11 long after the attacks. With the emergence of homeland security and bioterrorism as important issues, Army hospitals in the national capital region coordinated antiterrorism activities, fine-tuned planning within the Walter Reed Health Care System, and worked with civilian healthcare coalitions. Civilian medical facilities reassessed emergency preparedness provisions and interhospital communications in light of the new threats. To counter terrorism, MEDCOM focused on crisis-action planning, training, equipment acquisitions, new kinds of SMART teams, and the implementation of DoD instructions for antiterrorism measures. CHPPM strengthened its ability to respond to terrorist acts by practicing responses to nuclear, biological, chemical, and radiological threats; protecting water supplies; and working more closely with government agencies. Part of CHPPM’s expanding role in bioterrorism was its support for the investigation of the anthrax contamination incident in Washington. Because of the experiences of 9/11, the Army Medical Department made crucial doctrinal changes to improve its ability to counter future attacks. As a result of the lessons learned in the Pentagon attack, the Army is much better prepared to respond to another such event.

## References

*Unless otherwise stated, transcripts of interviews and copies of documents used in this chapter can be found at the Office of the Surgeon General Medical History Office, Fort Sam Houston, Texas.*

1. Hunt H (former Chief, Future Operations and Plans, Walter Reed Army Medical Center). Interview by Condon-Rall ME; Washington, DC; 18 January 2006.
2. E-mail from Colonel Edward B Lucci, Chief of Emergency Medicine, Walter Reed Army Hospital, to Mary Ellen Condon-Rall, 22 December 2005.
3. Malone E (Colonel, Commander of DeWitt Army Community Hospital). Interview by Cox DR; Ft Belvoir, VA; 27 October 2001 .
4. Bowman R (Assistant Patient Care Director, Virginia Hospital Center). Interview by Herman J; Arlington, VA; 15 January 2002. Transcript: Naval Historical Center, Washington, DC
5. McGuire J (Nursing Administrator, Virginia Hospital Center). Interview (telephone) by Herman J; Arlington, VA; 2002. Transcript: Naval Historical Center, Washington, DC.
6. Jordan MH, Hollowed KA, Turner DG, Wang DS, Jeng JC. The Pentagon attack of September 11, 2001: a burn center's experience. *J Burn Care Rehabil.* 2005;26(2):109–116.
7. Jordan MH (Director, Washington Hospital Center Burn Unit). Interview (telephone) by Condon-Rall ME; 31 July 2003.
8. ABA Board of Trustees, Committee on Organization and Delivery of Burn Care. Disaster management and the ABA plan. *J Burn Care Rehabil.* 2005;26:102–106.
9. Hanfling D (Chairman, Disaster Preparedness Task Force, Inova Fairfax Hospital). Interview by Condon-Rall ME; Fairfax, VA; 8 August 2005.
10. Young M. Listening for disaster: radios to link hospitals in case of disaster. *Fairfax Journal.* 2002. In: E-mail from Daniel Hanfling (chairman, Disaster Preparedness Task Force, Inova Fairfax Hospital) to Mary Ellen Condon-Rall, 15 August 2005.
11. Hanfling D (Chairman, Disaster Preparedness Task Force, Inova Fairfax Hospital). Interview by Bornstein L; Fairfax, VA; nd. Transcripts: Office of the Surgeon General Medical History Office, Fort Sam Houston, TX, and Us Naval Historical Center, Washington, DC.
12. Halliday MK (Major, Director, Emergency Department, DeWitt Army Community Hospital). Interview by Cox DR; Ft Belvoir, VA; 30 October 2001.
13. Northern Virginia Hospital Alliance. Project proposal: designs of hospital mass casualty communication and information management systems, nd. In: E-mail, Daniel Hanfling to Mary Ellen Condon-Rall, 2 November 2005.

14. E-mail from Daniel Hanfling (Chairman, Disaster Preparedness Task Force, Inova Fairfax Hospital) to Mary Ellen Condon-Rall, 11 November 2005.
15. E-mail from Daniel Hanfling (Chairman, Disaster Preparedness Task Force, Inova Fairfax Hospital) to Mary Ellen Condon-Rall, 15 November 2005.
16. Lett D (Colonel, Chief, Plans Branch, Plans Division, US Army Medical Command Headquarters). Interview by Glisson R; Ft Sam Houston, TX; 5 October 2001.
17. Hebron BF (Chief, US Army Medical Command Plans–Homeland Security). *AMEDD Response to 9/11 from MEDCOM–Plans–Homeland Security (encls 1-6)*. Memorandum for Mary Ellen Condon-Rall, 27 Oct 2004.
18. US Army Medical Command. *Medical Emergency Management Planning*. Ft Sam Houston, TX: MEDCOM; 2003. MEDCOM Pamphlet 525-1.
19. US Army Medical Command. *Emergency Management Planning*. Ft Sam Houston, TX: MEDCOM; 2010. MEDCOM Regulation 525-4.
20. Timboe H (Major General, Commander, North Atlantic Regional Medical Command). Interview by Cox DR; 5 March 2002.
21. Delaney K (Chief, Health Information Operations). Interview by Glisson R; Aberdeen Proving Ground, MD; 22 April 2002.
22. Burney B (Colonel, Chief, Operations Division, Directorate/Health Care Operations). Interview by Glisson R; 5 October 2001.
23. Hatton R (Senior Intelligence Officer, Office of the Surgeon General, US Army Medical Command). Interview by Glisson R; 5 October 2001.
24. Mallon T (Lieutenant Colonel, Director of Clinical Preventive Medicine, US Army Center for Health Promotion and Preventative Medicine) and Smith P (Colonel, Occupational Medicine Staff Officer, Office of the Surgeon General). Interview by Glisson R; 24 April 2002.
25. Bessette T (Mobilization Planner, Plans Division, US Army Medical Command). Interview by Glisson R; Ft Sam Houston, TX; 5 October 2001.
26. Wallace SC (North Atlantic Regional Medical Command Liaison Officer). *After Action Report–NARMC LNO Duty in New York City (14–26 Sep 01) Following 11 Sep 01 Terrorist Attack*. Memorandum to Commanding General, NARMC and Walter Reed Army Medical Center, 5 Oct 2001: 3–6.
27. E-mail, Stephen Wallace to Mary Ellen Condon-Rall, 21 September 2006.
28. E-mail, David Fallert (MEDCOM contractor) on behalf of Bernard F Hebron Sr (Lieutenant Colonel, US Army Chief, Plans/Homeland Security Branch), to Mary Ellen Condon-Rall, 3 December 2004.
29. Peake JB, US Army Surgeon General. *Plan for Enhancing Medical NBC Readiness*. Memorandum to commanders, US Army Medical Command major subordinate commands, 17 December 2001.
30. Winkenwerder W Jr, Assistant Secretary of Defense for Health Affairs. *Chemical, Biological, Radiological, Nuclear, and (High Yield) Explosives Training for Military Medical Personnel*. Memorandum to Assistant Secretary of the Army, Assistant Secretary of the Navy, Assistant Secretary of the Air Force, 9 January 2004.
31. US Army Medical Command. *Administration U.S. Army Medical Command Organizational Inspection Program*. Ft Sam Houston, TX: MEDCOM; 6 June 2005. MEDCOM Regulation 1-21: 2, 3.
32. US Department of the Army. *Assistance, Inspections, Investigations, and Follow-up: Inspector General Activities and Procedures*. Washington, DC: DA; 10 March 2003. Army Regulation 20-1, US Army Medical Command Suppl 1.
33. Riley-Hess EB. *Annual Historical Report Army Medical Department Activities [RCS - Med 41 (R4)] 1 January–31 December 2001*. Aberdeen Proving Ground, MD: US Army

Center for Health Promotion and Preventive Medicine; nd.

34. Rustine E (System Engineer and Administrator, Information Management Division, US Army Center for Health Promotion and Preventive Medicine). Interview by Glisson R; Aberdeen Proving Ground, MD; 24 April 2002 .

35. Davis D (Chief, Infrastructure Management Division, US Army Center for Health Promotion and Preventive Medicine). Interview by Glisson R; Aberdeen Proving Ground, MD; 24 April 2002.

36. Egerton WE, Dydek GJ, Jordan NN. *Pentagon Post Disaster Health Assessment Survey. Population Health Outcomes Report*. Aberdeen Proving Ground, MD: US Army Center for Health Promotion and Preventive Medicine; 20 May 2002. Report no. 13-HG-7685-02.

37. USACHPPM provides data from Pentagon post-disaster health assessment survey. *Pentagram*. 7 December 2001.

38. Jordan NN, Hoge CW, Tobler SK, Wells J, Dydek GJ, Egerton WE. Mental health impact of 9/11 Pentagon attack: validation of a rapid assessment tool. *Am J Prev Med*. 2004;26(4):284–293.

39. Hoge CW, Engel CC, Orman DT, et al. Development of a brief questionnaire to measure mental health outcomes among Pentagon employees following the September 11, 2001 attack. *Mil Med*. 2002;167:60–63.

40. US Army Center for Health Promotion and Preventive Medicine. *World Trade Center Support Health Assessment Survey, January 2002–September 2003*. Aberdeen Proving Ground, MD: USCHPPM; 2003. Occupational Health Report No. 64-MA-3656-2.

41. National Institute of Mental Health. *Mental Health and Mass Violence: Evidence Based Early Psychological Intervention for Victims/Survivors of Mass Violence. A Workshop to Reach Consensus on Best Practices*. Washington, DC: U.S. Government Printing Office; 2002. NIH Publication No. 02-5138. Available at: [www.nimh.nih.gov/health/publications/massviolence.pdf](http://www.nimh.nih.gov/health/publications/massviolence.pdf). Accessed on: 5 April 2011.

42. Cozza SJ (Colonel, Chief, Psychiatry Department, Walter Reed Army Medical Center). Interview by Mary Ellen Condon-Rall.; Washington, DC; 31 January 2006.

43. Ritchie CE (Colonel, Psychiatry Consultant, Office of the Surgeon General). Interview by Mary Ellen Condon-Rall; 6 March 2006.

44. Dodgen D, LaDue LR, Kaul RE. Coordinating a local response to a national tragedy: community mental health in Washington, DC after the Pentagon attack. *Mil Med*. 2002;167:87–89.