COMMANDER'S GUIDEBOOK:

MTF PREPAREDNESS AND RESPONSE TO RADIOLOGICAL AND NUCLEAR TERRORISM

Prepared by:

Bureau of Medicine and Surgery
Chemical, Biological, Radiological, Nuclear and High-Yield Explosives
Program Cell MED-02 and the Integrated Product Team (CBRNE IPT)

February 2002

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PREFACE

The threat of nuclear terror is small, but real. The consequences of nuclear attack would be even more horrific than the September 11, 2001 attacks on the World Trade Center and the Pentagon. If a crude nuclear weapon were to detonate in a metropolitan area, thousands of people could be killed instantly and thousands more could die slowly from ionizing radiation effects. This Commander's Guidebook: Preparedness and Response to Radiological and Nuclear Terrorism, a companion to similar guides on biologic, chemical and high explosive terrorism, is intended to stimulate thought and provide a format for planning. Nuclear and radiological terrorist warfare scenarios range from the detonation of a nuclear weapon to the deliberate dispersal of radioactive material. While the most likely threat is the dispersal of radioactive materials, the terrorist use of a nuclear weapon must also be considered.

Readily lethal sources of radioactive material can be obtained by terrorists. Terrorist groups, such as the al-Qaeda network, have boasted of plans for a "Hiroshima" against America. While the threat is traditionally conceived of as arising from foreign terrorists, the threat could also arise domestically.

This Guidebook is not a cookbook. It will not propose definitive answers. There are so many permutations of terrorist threat that definitive answers are impossible. However, there are some things we do know, courses of action to contemplate, scenarios we can plan for, and painful decisions to consider. Hopefully, this Guidebook will equip military treatment facilities (MTF) and base installation planners with basic background information, scenarios, treatment recommendations and references to produce an effective plan. Appendix A provides guidance on funding considerations.

This guide is a product of BUMED's Chemical, Biological, Radiological, Nuclear and high-yield Explosives Integrated Product Team (CBRNE IPT), and Navy Medicine subject matter experts. It will be revised and updated annually or as events dictate. BUMED welcomes recommendations on how this Guidebook can be improved. Comments should be addressed to BUMED (Attn: MED-02 CBRNE Program Manager).

BUMED offers a 24 hour notification and consultation line in the event of a nuclear or radiological terrorism attack — the MED-27 Readiness Watch Officer at (202) 445-0500.

*** CBRNE IPT Membership *:**
Chair - Assistant Chief for Operational Medicine and Fleet Support (MED-02)
Vice Chair - Assistant Chief for Healthcare Operations (MED-03)
The Medical Officer of the Marine Corps (TMO)
Director, Medical Resources, Plans and Policy (N931)
Force Surgeon, CINCLANTFLT / USJFCOM
Medical Officer, Chemical Biological Incident Response Force (CBIRF)
Surgeon, Joint Task Force - Civil Support (JTF-CS)
Assistant Chief for Resources and Budget (MED-01)

CHAPTER 1: A SCENARIO

NUCLEAR TERRORISM: A SCENARIO

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Incipient Stage (first 1-2 hours)

You are the Commander of a Military Treatment Facility adjacent to a city of approximately 600,0000 residents. Just before noon on Monday morning, you hear and feel a significant explosion. You turn on the television to get an update but the local channels are no longer broadcasting. Similarly, the majority of local radio stations are ominously quiet. Within minutes your presence is requested at your Emergency Dispatch Center. The dispatcher is receiving many urgent calls for assistance from around the city. Disjointed, emotional reports tell of a horrendous explosion that created a blast wave that blew out windows and eardrums. Reports of massive fires and a funnel shaped cloud of debris arising from the center of the city overwhelm the dispatch frequencies. The dispatcher sends out her ambulance crews and notifies the Emergency Department of the situation. On arrival at the city border, an ambulance crew confirms a mass casualty situation. Road traffic is hopelessly snarled as many slowly moving cars, trucks, and buses are impeded by masses of people who are evacuating the city in utter panic. Vehicles on the roads are being abandoned as people flee creating even greater traffic back-ups. Crews of fire trucks attempt to find a fire main that will provide a sustainable source of water as they unsuccessfully battle a massive fire. The police seem unable to control the situation.

Nuclear Weapon Effects

The potential yield of a nuclear weapon may vary over many orders of magnitude, from 0.0005 – 2,000 kilotons (kt), where a kiloton refers to the equivalent energy yield from a 1,000 tons of conventional TNT. Most experts agree that terrorists could achieve a maximum yield of 10 kt from an improvised weapon that would be transportable by motor vehicle. To produce a weapon of larger yield and/or smaller dimensions would require the resources of a technically sophisticated nation. Terrorists could in theory steal such a weapon but much more likely is the possibility of terrorists attempting to detonate a nuclear weapon of 1 kt size.

A nuclear weapon generates casualties through four routes: blast effects, thermal radiation, initial nuclear radiation and residual/fallout radiation. The first three routes occur within the first minute of the explosion and produce victims suffering combined injuries. Many of these victims are killed instantly. From a MTF Commander's viewpoint, the fourth route is of most importance, since it produces the most victims requiring medical care. To illustrate this point, the patient numbers from a 1-kt weapon detonated at the Capital (Ground Zero-GZ) in Washington, D.C., during a typical workday would produce:

Patient Category	Radiation Dose (rem = cSv)	Patient Numbers	Beds Needed	Time in Hospital
Combined injuries (rad/burns/wounds)				
Minimal to intensive care		1 K – 3 K	0.5 K – 3 K	10 days – 5 weeks
Radiation patients from fallout area				
Expectant	(830 – 1500)	18.0 K	18.0 K (100%)	~10 days
Intensive care	(530 – 830)	19.5 K	19.5 K (100%)	10 days – 6 weeks
"Critical" care	(300 – 530)	33.0 K	26.4 K (80%)	2 – 5 weeks
Normal care	(150 – 300)	66.0 K	33.0 K (50%)	2 – 5 weeks
	Subtotal:	139.5 K	97.4 K – 99.9 K	
Outpatient	(70 – 150)	82.5 K		
Health monitoring	(25 – 70)	106.0 K		
Worried well	(< 25)	>150.0 K		
Fatalities (prompt effects)		**> 7.0 K**		

This estimate was generated by staff at the Armed Forces Radiobiology Research Institute, based on information from the following sources:

a. Hazard Prediction Assessment Capability Program (HPAC) software, Ver. 3.21; proponent is the Defense Threat Reduction Agency.

b. Field Manual 8-9, NATO Handbook on the Medical Aspects of NBC Defense Operations, AMEDP-6(B), 01 Feb 1996, and Field Manual 8-10-7, Health Service Support in a Nuclear, Biological, and Chemical Environment, 26 Nov 1996.

Casualties from a 1 kt blast:

Direct Injuries.

1. Surviving casualties closer than 0.6 km may be expectant (likely to die) because of the severity of the radiation dose (>800 rem). Surviving casualties more than 0.6 km from GZ will require immediate or timely treatment to survive.

2. Direct thermal effects will range from third-degree burns at 0.4 km from GZ to first-degree burns at 0.5 km from GZ. At 0.5 km the blast overpressure is greater than 3.8 psi, the threshold for serious wounds from missiles. The radiation dose at 0.7 km is 500 rem (50% dead in weeks, if medical intervention is not provided). From these specifications, casualties at 0.5 km will have significant combined injuries of first-degree burns, serious wounds, and radiation doses exceeding the lethal dose.

Combined Injuries.

Burn casualties arise from the direct blast and thermal pulse from the detonation. Burn patients may also have other injuries such as radiation exposure and wounds. The number of combined injury patients may be small because of the tight overlap of severe radiation and blast effects and range. Estimated 1,000 to 3,000 patients.

Radiation Casualties.

There will be a **large** number of patients with only radiation exposure from the fallout. Their injuries will vary from minimal to expectant. With aggressive supportive treatment, there are medications such as cytokines (prompt use) and antibiotics (appropriate and timely use) that can treat radiation injuries effectively. Patients with exposures of 550 to 830 rem of radiation and without other injuries may survive provided that they are treated immediately with cytokines and *in vivo* amplification treatment initiated on the first day (if there is functional marrow). Bone marrow transplant may be used in place of *in vivo* amplification, but this is a limited capability and is resource intensive. Survival of these patients will depend upon the immediate availability of medical resources. Insufficient medical assets may place many of these patients into the expectant category**.**

1. **Expectant Patients**. There may be a large number of expectant patients who will need comfort and analgesics. They will occupy bed space and may need to be isolated from other patients. The total number of expectant patients is estimated at 18,000.

2. **Outpatients**. Individuals who are exposed to 70 to 150 rem of radiation and have no other injuries can be treated as outpatients. Their activity level should be kept at a minimum because of potential weakness and a moderate drop in their granulocyte, lymphocyte, and platelet counts. Some of these individuals who were exposed at the high end may have to be admitted but should require only minimal care. Many should be able to take care of themselves, provided they have housing, sanitation, and infrastructure support. The outpatient number is estimated to be 83,000.

3. **"Worried well"**. Because of the large-area dispersion of the fallout, fear of radiation exposure, uncertainty of the long-term effects, and misinformation, a large number of minimally exposed but otherwise healthy individuals and non-irradiated individuals will flood the medical treatment facilities seeking treatment and assessment of their health. They will interfere with the management and treatment of the patients with confirmed injuries or other medical problems. They must be identified and separated immediately for best use of limited medical assets. This number may well exceed 150,000.

The estimated patient numbers above can be significantly reduced if the fallout area is promptly identified and there is good coordination among the local, State, and Federal governments to rapidly shelter the population indoors before the fallout cloud arrives. No one should be outdoors when the fallout cloud arrives. Fallout occurs primarily in the downwind direction from the nuclear detonation. The fallout area experiencing the highest radiation exposure will be engulfed in about an hour after the detonation. Authorities must provide immediate warning for everyone to seek shelter indoors in the projected fallout area. The residue cloud presents a hazard to personnel in aircraft as well as those on the ground. News and police aircraft would likely provide coverage of the event. Personnel in aircraft that pass through or close to the residue cloud may receive significant doses.

Exposure rates from radioactive fallout decrease over time as approximated by the 7:10 rule. For every seven-fold increase in time after deterioration, there is a ten-fold decrease in exposure.

Time (H+)	Decay	Radiation Intensity
1	-	1000 rad/h
7	1/10	100 rad/h
49	1/100	10 rad/h
343	1/1000	1 rad/h

For example, if a 50 rad/h radiation exposure rate exists at three hours after detonation, by the end of 21 hours, it will have decreased to 5 rad/h, and by the end of 147 hours, it will have decreased to 0.5 rad/h.

MTF Commander Actions, Incipient Stage:

- Once the hospital emergency department receives notification of the incident, it should immediately initiate its radiological response plan.
    - A good plan must control the spread of radioactive contamination.
    - Security personnel should be stationed at appropriate locations to limit access to only essential personnel and to provide directions for first responders. Placement of non-skid plastic sheeting (typically yellow) down passageways where the ambulance gurney may pass is recommended.
    - Radiation protection personnel equipped with RADIACs should support radioactive decontamination of patients and control of personnel and material as they move from "contaminated" to "clean" spaces in the medical facility.
    - Staff must emphasize that LIFE-THREATENING MEDICAL CONSIDERATIONS ALWAYS TAKE PRECEDENCE OVER RADIOACTIVE MONITORING AND/OR DECONTAMINATION OF THE PATIENT.
- Know local emergency response resources and be prepared to quickly involve civilian law enforcement and medical personnel when mass casualties occur. Establishing a working relationship with civilian counterparts prior to any incident is critical. Civilian law enforcement and fire department officials may be needed to assist in the evacuation of downwind facilities, especially when these facilities are outside the confines of the military jurisdiction.
- MTF commanders may have to function independent of state or federal response assistance agencies for at least the first 24 hours following a nuclear or radiological event. Radiological monitoring, decontamination, dose estimation, distribution of iodine blocking agent, and public communications need advanced consideration.

RECOMMENDED PROCEDURES FOR ON-SCENE RESPONDERS

(Adapted from the 1998 FBI Contingency Plan for Weapons of Mass Destruction –FBI 1998).

1. On-scene responders should wear gloves and a gown or other protective clothing. Each responder should be provided with a personal dosimetry device. (See NAVMED P-5055, Chapter 6, for a description of the Navy's personnel radiation dosimeter).

2. Medically unstable patients should be transported to a hospital immediately. A radiological survey, decontamination procedures, or steps taken to contain the contamination may be performed in the ambulance provided these actions do not interfere with more immediate medical requirements of the patient. (See BUMEDINST 6470.10A, for a description of radiological survey and decontamination procedures using Navy RADIACs).

3. If the patient is medically stable and conditions at the site permit, limit any further exposure to radiation by moving the patient to an area of low background radiation. The outer clothing of the individual should be removed and the patient wrapped in a cloth sheet or blanket to permit handling. The wrapping should be loose to avoid hyperthermia and allow easy access to the patient by medical personnel.

4. Treat the patient's injuries (i.e. burns, cuts, etc.) sustained in the incident and then, if needed, provide symptomatic treatment for the radiation illness. If an open wound is involved, cover the wound with a clean dressing.

5. Do not release a medically stable patient to ambulance personnel before a radiological survey has been performed. If contamination is confirmed, a preliminary decontamination should be performed. Record the results of the radiological survey and proceed to decontaminate the patient.

6. Decontaminate the medically stable patient by washing the individual to remove any radioactive contamination, beginning with the areas of highest levels of contamination. Proceed gently, mindful that this is a preliminary decontamination and that a more thorough decontamination process will be performed at a medical facility. When finished, repeat the radiation survey of the patient and record the final results. Save all clothing and bedding and all metal objects (e.g. jewelry, coins, belt buckles, etc.). The metal objects may be helpful in assessing the patient's radiation dose. Tag each item with patient's name, location, time and date. Save each in appropriate containers; mark clearly with: "RADIOACTIVE-DO NOT DISCARD."

7. Transport patient to a medical facility for further treatment. The medical facility should be given advanced warning that they are going to receive patients exposed to radiation so that the facility can institute the appropriate medical protocols.

8. On-scene responders should be mindful to follow the basic radiation protection principles:

TIME: Reduce the amount of time exposed.

DISTANCE: Increase your distance from the radioactive source.

SHIELDING: Use shielding between you and the source.

Consolidation (2-24 hours)

It is now two hours after the initial call for assistance was received. You have initiated your mass casualty protocol. Your operating rooms have been cleared of all non-critical surgeries. Non-critical in-patients are being discharged. Ambulances have begun to arrive with casualties. Numerous individuals are arriving in their own vehicles and demanding attention. Personnel are standing by outside the Emergency Department with radiation detection equipment (RADIACs) obtained from your Nuclear Medicine Clinic to check incoming patients for radioactive contamination. They are rapidly filling 55 gallon drums with radioactively contaminated clothing as the patient queues begin to grow. Ambulatory contaminated personnel are being showered while litter bound patients are being sponged cleaned. You quickly realize you need more RADIACs. Even patients not displaying signs of external trauma are complaining of nausea, vomiting, fatigue and weakness.

With limited medical resources and overwhelming numbers of patients, triage is essential, but the challenge is estimating the patient's radiation dose. Since your patients were not wearing external radiation dosimetry you must estimate their dose based on their clinical symptoms and their physical location following the detonation. Your health physics staff employs two assets at their disposal: (1) a biodosimetry assessment software (BAT) software tool, and (2) a computer link to an external organization that is providing up-to-date information on radiation geographical dispersal patterns. Correlating your patients' physical location over time with these geographical dispersal patterns allows you to estimate a radiation dose. The BAT tool allows you to generate a second dose estimate. Based on these two independent dose estimates, your staff assigns the patient a radiation dose that provides a criterion to triage the patient.

Your medical supplies for treating patients suffering from acute radiation syndrome are quickly depleting. The head of the Pharmacy Department has placed an urgent call to the PRIME vendor source and additional supplies of cytokine,, antiemetics and antibiotics are on the way. The PRIME vendor has been notified of the need for future supplies of cytokines and these are forthcoming, but cannot be delivered until tomorrow. Calls have been placed to other hospitals outside of your local area requesting that they provide any additional drug supplies that can be spared.

Protection of Mission Capability

First and foremost, MTF commanders need to maintain mission capability and protect the MTF staff and patients. Relevant considerations include universal protective precautions (gloves, gowns, masks, eye protection, etc.), individual protective equipment (IPE), facility protection, and security. Recommendations for specific actions vary with the nature of the radiation exposure, however an overview of IPE, collective protection, and decontamination can be found in Chapter 2.

Assistance

MTF commanders should be prepared to function independent of State or Federal response assistance agencies for at least the first 24 hours following attack. Assistance from various DoD deployable platforms may be forthcoming, and considerations as to possible site locations, infrastructure support, supplies, and coordination with local civilian authorities should be undertaken in advance. Facility support for related functions (morgue overflow, decontamination stations, staging and reception areas) need advanced consideration.

Casualty Management and Estimation of Radiation Dose

Estimation of dose is critical for the management and treatment of radiation and combined injury patients. Armed Forces Radiobiology Research Institute's (AFRRI) Biodosimetry Assessment Tool (BAT) software product provides medical personnel an automated estimation of patient radiation dose, based on clinical symptoms, from which an initial management and treatment strategy can be developed. Naval medical facilities may obtain a free copy of this product by contacting the AFRRI biological dosimetry team leader at: http://www.afrri.usuhs.mil/. Inputs include the onset of the prodromal syndrome, erythema, blood cell kinetics, physical dosimetry (if any), lymphocyte cytogenetics, infection, internal contamination or some combination of this data. This software can maintain the files of a large number of patients.

Another independent method of estimating a patient's dose is by correlating their physical location over time with radiation sources. The Defense Threat Reduction Agency has a software product with this capability, the Hazard Prediction and Assessment Capability (HPAC). The HPAC is Microsoft Windows operating system compatible and is a forward deployable modeling capability available for the U.S. government. It can predict hazard areas based on radioactive material releases into the atmosphere and then assess the impact on exposed civilian and military populations. The software uses integrated source terms, high-resolution weather forecasts, and particulate transport to model hazard areas. One of HPAC's strengths is fast access to real-time weather data via Meteorological Data Servers on the Internet. HPAC also has embedded climatology or historical weather for use when real weather input is not available. By default, HPAC assumes a flat earth for the terrain. This may be a reasonable approximation for small spatial domains, however, users may choose to use complex 3-D terrain data describing topographic variations. The digital terrain data files were developed by the National Imagery and Mapping Agency (NIMA). Population data, provided by the Census Bureau, is based on longitude and latitude.

HPAC distribution is tightly controlled and its output should be interpreted by a trained health physicist. Consequently, Navy medical facilities should obtain this service in "real time" from resources listed in Appendix B. In the event of terrorist attacks on naval nuclear reactors or

nuclear weapons, the cognizant line commander has analogous software modeling capabilities and can provide appropriate input to the medical facility. Similarly, for commercial nuclear power plants, both the Nuclear Regulatory Commission and the applicable state emergency management agency can provide input. Points of contact for these agencies are listed in NCRP Report 138.

Treatment of Patients Who Have Received Large Doses of Ionizing Radiation
There are two excellent on-line references, both downloadable from the MED-27 web site: https://bumed.med.navy.mil/MED27/

- Army FM 4-02.283/Navy NTRP 4-02.21/Air Force AFMAN 44-161(I)/ Marine Corps MCRP 4-11.1B, Treatment of Nuclear and Radiological Casualties, 20 December 2001.

- Armed Forces Radiobiology Research Institute, "Medical Management of Radiological Casualties" First Edition, December 1999.

Release of radioactive isotopes of iodine (i.e. I-131) to the environment could occur following a serious accident with a nuclear reactor, a nuclear detonation, or a radiological dispersal device containing radioactive iodine. Potassium iodide (KI) administered before or promptly after intake of radioactive iodine can block or reduce the accumulation of radioactive iodine in the thyroid. New guidance on iodine prophylaxis was issued by the FDA in December 2001. See Chapter 4. This guidance will be incorporated into Enclosure 9, of BUMEDINST 6470.10A (http://navymedicine.med.navy.mil/instructions/external/6470-10A.pdf) in the near future.

Pharmaceuticals

In coordination with the State and Federal authorities, the MTF commander should notify the Emergency Support Operations Center (ESOC), Defense Supply Center Philadelphia (DSCP) of a radiological terrorist event at 215-737-3965. This announcement will activate emergency actions at DSCP and will allow lead-time to source the expected high-volume requests for CBRNE medical items. See Chapter 3 for information on the ESOC and transport of mass protection and treatment materiel. See Chapter 4 for recommendations on post-radiation emergency treatment.

Communications

Advance planning should define procedures for dealing with media and the release of public information. Clear, consistent risk communication should be provided via press briefings, MTF fact sheets or flyers disseminated to staff members, patients, families, visitors, media, and to the general public. Staying out in front in the information campaign will assist in decreasing the risk of panic in the community. BUMED resources are available to assist MTFs in developing these communication materials.

MTF personnel can expect to be confronted by news media before, during, and after a NW related disaster. In addition, some MTF staff may feel compelled to "tell their story" about what is happening. A pre-established policy governing staff interaction with the media, release of information, avoidance of speculative or hypothetical questions and establishment of authorized

spokespersons will minimize disruptions. Close cooperation with operational units is essential to insure that casualty notification procedures are followed. Consideration should be given to having a designated site located away from the MTF to hold regularly scheduled and pre-announced media related news events.

MTF Commander Actions, Intermediate Stage:

- Protect and preserve mission capability

- Ensure safety of facility, staff and patients

- Notification of the Base installation commander should be immediate. Early notification of the BUMED Readiness Division Watch Officer is also recommended (202) 445-0500. Alternative notification of BUMED can be made to the OOD/CDO cell phone at (202) 316-0932/3 and to the Navy Environmental Health Center (757) 462-5500**.**

- Medical radiological consultation teams from the Armed Forces Radiobiology Research Institute (AFRRI) and Navy, Army and Air Force radiological response teams are readily available. See Appendix B. Coordinate and integrate assistance into a unified effort.

- Implement MTF media and communications plan with designated single release point for information. Consider use of neutral, non-MTF site for media briefings at pre-announced times. Provide centralized information source for family and friends seeking patient status reports. Maintain close contact with Casualty Assistance Call Officers (CACO)

Mass Casualty Management (25-48 hours)

Hospital Emergency Incident Command System

MTF commanders should have a complete understanding of the Hospital Emergency Incident Command System (HEICS) module and the Incident Command System (ICS) for improving their command and control during disasters and emergencies. ICS is a mandated requirement established by federal law for any CBRNE terrorism related response. Understanding the basic terminology and concepts of these two systems will greatly increase MTF effectiveness through improved cooperation and coordination with multiple response agencies at all levels. The Hospital Emergency Incident Command System (HEICS) may be downloaded from the following website: http://www.emsa.cahwnet.gov/dms2/history.htm. The Federal Emergency Management
Agency (FEMA) has produced a self-study course on the Incident Command System (ICS), obtainable at http://www.fema.gov/emi/is195.htm.

Facility Security

Security and crowd control measures may become necessary at MTFs, emergency departments, fatality handling sites, and at other vital installation locations. A good MTF traffic management plan provides physical control of ingress and egress routes for essential personnel, equipment, food, water, for residents within the affected area, and for travel to and from the reception and staging areas.

Protection of Staff

MTF responders and healthcare staff should wear proper protective equipment when working with potentially contaminated material and victims. When and if a hazardous area is defined, proper protection should be available for not only first responders but also to those people living or otherwise located near these hazardous areas. Refer to Chapter 2 for more information and Appendix B for website resources on individual protective equipment (IPE), collective protection, MTF decontamination, and universal precautions needed in any CBRNE environment.

Victims should be decontaminated prior to entrance into healthcare facilities. In such an event EMS personnel would require experience in a rapid triaging system, such as the Simple Triage and Rapid Treatment (START) System.

Prior to any event, community leaders must be informed of the MTF distribution plan with its priority emphasis on protection of military mission capability and essential personnel. In implementing the distribution plan of protective gear or pharmaceuticals, MTF commanders should be prepared to field pointed questions from staff members, families, the media and the general public.

In the event that elevation to THREATCON Charlie or Delta is required, access to the military installation will be severely restricted. Personnel from off base and from civilian facilities who

may be required to respond in the event of an emergency should be identified in advance and placed on rosters provided to base security. These rosters must be kept current to be of any utility.

Re-supply of CBRNE medical items may be facilitated 24 hours/day through the Emergency Support Operations Center (ESOC), Defense Supply Center, Philadelphia. See Chapter 3 and Appendix B for more information on the ESOC. On-hand inventory distributions should consider the re-supply without assistance from the National Pharmaceutical Stockpiles (NPS "Push Packs") and Vendor Managed Inventory of CDC/VA may be delayed. See Chapter 3 for more information on the NPS Push Packs. Navy Medicine's just-in-time inventory posture precludes the stockpile of most medical materiel and commodities, however, MTF commanders will need to make individual decisions based on fiscal and operational needs regarding how much and what kind of CBRNE materiel is required at the local level. The 2000 Joint Warfighting Capability Assessment study conducted by Logistics Management Institute (LMI) for the combatant commanders proved that CBRNE medical defense pharmaceuticals are readily available from commercial sources at a 150 percent estimated dual multiple theater warfare demand and deliverable within 24-48 hours of notification. Transportation of supplies from depot stock, manufacturer, or distributor within CONUS, given our current capabilities, is achievable at 24-48 timeframe as well. However, OCONUS strategic and tactical transportation capabilities are still under study by LMI, therefore, it will be premature to assume 100 percent and 24-48 transportation coverage for these items.

The "Worried Well"

Many patients may present for medical care both with and without symptoms consistent with exposure. After evaluation, they are found not to be casualties of the event and in retrospect, are dubbed the "worried well." This is a diagnosis that can ONLY be made in retrospect and these patients will place demands on the healthcare system until their unaffected status is confirmed. The potential exists for the numbers of these "worried well" to exceed the number of actual casualties several times over.

MTFs should anticipate the potential for large volumes of patients who may ultimately be determined to be unaffected and establish procedures that accommodate the demands on space, staffing, equipment, consumables and transportation which these patients create. These patients cannot be assumed to be healthy and the MTF must also take care not to lose sight of the fact that many of these patients may have other medical problems unrelated to the incident or which are exacerbated by the incident and require attention.

Support Services

MTF commanders can use the disaster relief and emergency services of the American Red Cross to provide information hotlines, assist with implementation of central coordination efforts involving various volunteer service groups and non-governmental organizations (NGOs), or provide food and shelter. The Red Cross should be included in MTF disaster planning and drills/exercises.

In a federally declared emergency, the American Red Cross serves as the Lead Federal Agency for Mass Care services under the Federal Response Plan (FRP). See Appendix B for information on the FRP.

NGOs, such as the Salvation Army, Latter Day Saints Charities, Catholic Medical Missions, United Methodist Relief Committee and others, can play a vital role in emergency relief. NTF commanders should consider establishing a volunteer skill/NGO database to catalog skill and professional services that can assist with victim and family support services (e.g. healthcare, shelter, food, water, language translation services, childcare, animal care, etc.)

There may be individual volunteer, staff augmentees, NGOs, and others who will be present to assist the MTF during the NW event. The needs of these volunteer caregivers should also be considered. Victim and family support needs should also be included in MTF mutual assistance agreements with the local community resource. The Emergency Services Division, Medical Services Branch of the Canadian Minister of Health and National Welfare produced the manual "Personal Services: Psychosocial Planning for Disasters", a practical guide to planning, training, organizing, and implementing personal and family services in the wake of a disaster. This manual is available at http://www.hc-sc.gc.ca/msb/emergency/pers_e.pdf.

Psychosocial Aspects of NW

During a nuclear terrorism event anxiety, fear, and panic can be expected from not only victims of the attack, but from the MTF staff members and their families. MTF commanders can assist with the management of psychosocial needs by incorporating mental health scenarios and mental health professional (including chaplains and local community clergy support) into NW drill and exercise. The National Center for Post-Traumatic Stress Disorders has produced a monograph on disaster counseling, entitled "Disaster Response and Recovery: A Handbook for Mental Health Professionals" which is available at http://www.empowermentzone.com/disaster.txt.

Mutual Aid Agreements

The MTF should consider pre-established mutual aid agreements with neighboring communities and health agencies for sharing of resources across jurisdictional boundaries. Such agreements should consider: EMS, private ambulance services, first responder and other transportation services, sharing of local fixed site health care facilities, skilled nursing facilities, and residential homes, patient overflow and facility expansion sites, hospital supply centers for obtaining mechanical ventilators, local funeral home resources, and county medical examiner affiliation.

Mutual aid agreements should be coordinated with the nearest base installation to facilitate overall military response efforts and allow improved communications between the installation commander and the MTF commander. Physical security need, transportation requirements, and the possibility of access restrictions and/or quarantine order should be anticipated.

MTF Commanders Actions, Mass Casualty Phase:

EMERGENCY MANAGEMENT Response Activities:

- Activate MTF Emergency Operations Center (EOC)
- Request local, State, Federal representation to MTF EOC
- Implement MTF Emergency Operations Plan

- Provide facility security in conjunction with base installation/law enforcement agencies at: MTF, ER, Ambulatory Care Centers, medical supply depots, PPE distribution sites, morgue, ingress and egress routes for essential personnel, equipment and residents.

- Implement mass personal protective equipment distribution as per previously defined protocol. (Refer to Scenario and Chapter 2 for considerations).

- Refer to the section on the "worried well" for recommended response activities dealing with concerned, but unaffected patients.

***SUPPORT SERVICES Response Activities*:**

- Implement central coordination of NGOs/volunteer service organizations
- Conduct next of kin notification
- Provide families with non-medical logistics, and transportation assistance
- Perform crisis, mental health, and grief counseling
- Provide translation services for non-English speakers
- Seek State Department liaison if disaster involves OCONUS MTFs/foreign victims
- Provide individual and family financial assistance/lodging assistance

PSYCHOLOGICAL Response Activities:

- Minimize panic by clearly communicating risks involved with NW event
- Develop informational items describing how MTF plans to protect its patients (e.g. use of media/press flyers, info/fact sheets etc.)
- Provide NW training and education opportunities for all staff—include frank discussions of potential risks
- Include mental health participation in NW drills and exercises
- Consider MOU/MOAs for mental health services with local community

- Establish liaison with local, regional and State assistance teams BEFORE their services are needed. Coordinate training exercises and drills with National Disaster Medical System (NDMS) sponsored Disaster Medical Assistance Teams (DMAT) and National Guard response teams.

- Activate mutual aid agreements with local and regional community agencies and with the base installation.

Consequence Management (Beyond 48 hours)

Military medical radiological consultant teams have arrived on-scene and are relieving your initial responders. The Laboratory Department Head is growing concerned with the disposition of the deceased. Your local morgue is filled to capacity and funeral homes are overwhelmed with remains. The FBI, the Federal Emergency Management Agency (FEMA) and military disaster mortuary teams should arrive shortly. They have arranged for the decontaminated deceased to be transported to railroad refrigerator cars that have been located in the civilian community.

Lead Federal Agencies

With an emergency declared by the President, two federal agencies, FBI and the FEMA, will assume lead federal agency roles and set up a Joint Operations Center (JOC) to provide immediate assistance to local and state authorities. Crisis and consequence management activities should work concurrently. FBI has overall control during crisis management, even on military property. FEMA can offer assistance on or off military installations and serves primarily in an advisory and support role to local and state authorities. FEMA has the lead agency role for domestic consequence management efforts and supports the FBI's role in accordance with Presidential Decision Directive (PDD39) (Appendix B).

In the event of a terrorist attack at or near an OCONUS MTF, the State Department is the Lead Federal Agency and will coordinate the U.S. response to requests for relief to foreign governments affected by terrorist attacks against U. S. military/MTF targets.

CINCLANTFLT Role

Commander-in-Chief, Atlantic Fleet (CINCLANTFLT) is charged with planning all Navy support to DoD relief operations in support of federally declared relief efforts within CONUS, Puerto Rico, U. S. Virgin Islands. CINCLANTFLT also provides for foreign disaster relief operations OCONUS in support of U.S. government relief efforts for those nations located within the geographic areas of both CINC Joint Forces Command (JFCOM) and CINC Southern Command (SOUTHCOM). INCONUS deployments of DoD specialized response units under a federally declared emergency are initially validated by a DoD Coordinating Officer, with DoD response units then being ultimately tasked to JFCOM and mobilized by the Joint Task Force - Civil Support (JTF-CS) office. JFCOM will be the supported theater commander for disaster relief operations and CINCLANTFLT will be a supporting component command.

Military Support to Civil Authorities

MTF commanders may be asked to provide direct medical assistance and support to the civilian community in the absence of a federally declared emergency. MTF commanders have authority to provide emergent response assistance to local and state governments under DoD Instruction 3025.1 Military Support to Civil Authorities (Appendix B). The "Immediate Response" authority of DoDINST 3025.1 may be exercised by MTF commanders when imminently serious conditions resulting from a civil emergency require immediate action to save lives, reduce suffering, or mitigate great property damage. Some examples of approved immediate response activities include, but are not limited to, rescue, evacuation, emergency medical treatment of casualties, maintenance or restoration of emergency medical capabilities, and safeguarding the public health.

Current capabilities and military mission requirements will dictate what MTF resources might be made available under the "Immediate Response" clause. In general, support of military operations will have mission priority over any civil operations, unless otherwise directed by the Secretary of Defense. Additionally, MTF commanders are cautioned DoDINST 3025.1 prohibits the MTF from developing plans or using its resources strictly for the purpose of providing an immediate response to the civilian community.

Posse Comitatus Considerations

Use of Navy medical personnel in the civilian community on an emergent basis does not violate the Posse Comitatus Act (18 USC 1385). The Act requires advance approval for the use of federal military forces to enforce Federal, State, or local civil law. However, all MTF mutual aid agreements with civilian agencies should include a legal review. MTFs may consult with BUMED Legal at (202) 762-3091.

Mortuary Affairs

With activation of the National Disaster Medical System (NDMS), specialized NDMS Disaster Mortuary Teams (DMORTs) will deploy to assist with fatality management efforts. Consideration should be given to establishing mutual assistance agreements for alternative storage sites such as refrigerated trucks, rail cars, and other cold storage facilities that can hold remains until final disposition. Additionally, assistance is available from state and federal disaster mortuary assistance teams as part of the National Disaster Medical System (NDMS). See Appendix B for more information on these NDMS disaster mortuary assistance teams. MTF commanders may face difficult decisions concerning the final disposition of remains, especially when recommended procedures conflict with family member's preferences. Coordination with the chaplain community is encouraged.

Additional information may be found in JP 4-06 Joint Tactics, Techniques, and Procedures for Mortuary Affairs in Joint Operations, at http://www.dtic.mil/doctrine/jel/new_pubs/jp4_06.pdf and in Appendix M-3 "mass Fatalities"—Kentucky State Emergency Operations Plan at: http://kyem.dma.state.ky.us/KY%20EOP/kyeop.htm.

FATALITY MANAGEMENT—Response Activities

- Manage expected high volume of families seeking deceased relatives
- Use morgue as initial central processing site for fatalities
- Consider use of long-term fatality storage facility until final disposition
- Maintain mortuary registry of similar deaths
- Consider temporary and final disposition of fatalities
- Implement options for release of remains, as appropriate

Quarantine and Contamination

Close and frequent communication via chain of command authority with BUMED, base installation commander/RLC, and with local, State, and Federal authorities is essential to contain the spread of contamination. Contingency plans should address MTF continuity of operations, and provide policies and procedures for essential movement of first responders, other critical personnel, staff augmentation, food and water, and physical security in the event of a quarantine order.

The burden of requesting a quarantine order remains a public health decision at the local, regional, or State agency level. If authority to quarantine is requested by public health officials, the order will be issued to law enforcement officials beginning at the local community government level. Authority to issue such orders rest with the Governor of the State.

Quarantine imposes serious legal, logistics, enforcement, and other concerns and may seem harsh and cruel to hose people affected. In addition, the extended period of radioactivity after a nuclear incident may extend the period of quarantine. State quarantine laws vary. MTF commanders should obtain military legal counsel on the full implications of a quarantine order in the local community.

Residual Hazard Assessment and Mitigation

FEMA has overall responsibility for coordinating the clean up of environmental hazards after an incident, however, residual hazard mitigation is the shared responsibility of the MTF along with local, State and Federal environmental and health agencies. Assessment and mitigation efforts may include efforts of the MTF environmental health staff for sampling of air, water, soil, insect and animal screening for the NW agent.

RESIDUAL HAZARD ASSESSMENT AND MITIGATION Response Activities

- Request environmental health officer assistance for air, water, soil, and surface screens.
- Conduct local area control and decontamination.

Criminal Investigations

MTF Commanders may be asked to cooperate with the local and Federal law enforcement activities in their criminal investigations of the event.

MTF Commanders Actions, Consequence Management Phase:

- Understand the Federal Response Plan (FRP), Joint Operations Center (JOC), and DoD emergency response units and their impact upon MTF command and control. Refer to Appendix B for specific resource information on the FRP, JOC, JTF-Civil Support office, NDMS, and National Guard Civil Support teams.

- Be aware of the restrictions outlined in DoD Instruction 3025.1 "Military Support to Civil Authorities" (MSCA) especially the "Immediate Response" clause.

- Contact local and State public health agencies for NW plan coordination efforts. See Appendix B for State agencies.

RADIOLOGICAL TERRORISM: A SECOND SCENARIO

Incipient Stage (first 1-3 hours)

You are the Commander of a Military Treatment Facility adjacent to a Naval Station. Your Emergency Department dispatcher receives a report of an explosion at one of the enlisted barracks at the Naval Station and a request for ambulance support.

Upon arrival at the scene, your ambulance crews discover more than 50 injured sailors. They quickly transport the critical patients by ambulance to your facility. Approximately one hour after the patient's arrival at your facility, you receive a phone call from the Naval Station OOD's office with a report that the on-scene rescuers have discovered high levels of radioactivity at the explosion scene. The OOD advises that you monitor your facility for radioactive contamination. You immediately order the Nuclear Medicine staff to report to your Emergency Department with appropriate monitoring equipment.

As you proceed to the Emergency Department, you find your Nuclear Medicine staff outside of the Emergency Department monitoring the passageways. They report detectable radiation levels throughout your MTF. They advise you to secure the facility until they can decontaminate the premises, but state that without further equipment and additional trained staff, decontamination of the MTF could take days. You contact facility Security and order them to secure the facility gates.

The Command OOD announces over the public address system, "No eating, drinking, or smoking until further notice." The OOD also requests that personnel in the MTF remain in place until radiation safety personnel can determine the full extent of the radioactive contamination. You place a phone call to your responsible line commander and BUMED advising them that your facility is shut down until it can be "free released" and request radiological monitoring support.

Radiological Weapons

A nuclear weapon is a weapon of mass *destruction*. A radiological weapon is a weapon of mass *disruption*. Various radiological weapon designs are possible:

- **Radiological Dispersal Device.** A radiological dispersal device (RDD) is a device designed to spread radioactive contamination over the widest possible area and affect the greatest number of people. The radioactive material could be in the form of

a fine powder, a liquid mist, or a gas. The material could be spread by hand, such as by simply emptying a container over the desired area, or by incorporating the radioactive material into a conventional explosive device. The explosive device will have the potential to spread the material over a larger area than manual dispersal. Construction of a RDD of small yield is not difficult. It can be made using sources such as those used in industrial radiography, nuclear medicine clinics, or consumer devices. However, the theft of large sources would usually be promptly noted and reported to law enforcement and regulatory authorities. The dispersal of the source using explosives causes the concentration of radioactive material to diminish in proportion to the extent of the spread. Therefore, increasing the number of affected people by dispersing the material over a wide area will also diminish its health impacts. However, even with minimal health effects, the impact of the spread of contamination, especially the psychological impact as well as the effects on the local economy, could be very considerable**.**

- **Radiological Exposure Device.** A radiation exposure device (RED) is radioactive material, either as a sealed source or as material within some type of container (e.g., a shoebox), that is intended to expose people in the vicinity of the device to radiation emitted from it. The radioactive material could be in the form of a contained powder, a contained liquid, or a solid object. A RED may be used by terrorists to cause harm by exposing people to the radiation (usually gamma radiation) emitted by the radioactive material. To create a significant exposure, the target individuals would need to be fairly close to the source of radiation. In addition, the smaller the source (i.e. lower radioactive content), the closer they would have to be for any significant effects to occur. For example, if the radioactive material typically found in an industrial radiography device (considered to be a fairly large source) is left unshielded, a person standing one meter from the source would need to remain at that location for approximately 5 hours in order to receive a potentially lethal dose. Death in this case would occur within about two weeks. If the distance is doubled, the time necessary to get the same dose of radiation will be quadrupled.
  The RED devices that could reasonably be expected terrorists would employ would have limited health impacts compared with conventional nuclear weapons. The time and distance estimates are based on the assumption that the terrorists use a fairly high activity and relatively easily obtainable source, such as those used in industrial radiography. It is conceivable that much higher activity sources could be obtained and used. If this were the case, the doses delivered will be much higher. This is a less likely scenario, though, since theft and handling of such sources is very difficult and much more susceptible to detection by the authorities**.**

Intermediate Stage (2-4 hours)

Your ambulances have delivered only eight injured patients to your facility. In spite of the fact that your MTF has been secured, many other patients are arriving at your facility requesting treatment. The phone lines are overwhelmed with people calling your facility seeking medical information and assistance in contacting family and friends. A few callers are both frightened and unsatisfied with the answers provided and demand further information.

Radiation protection technicians bearing RADIACs have arrived from other military and civilian organizations to assist in the cleanup of your facility. One technician has been assigned to monitor incoming patients. She reports screening several hundred individuals, but has yet to find a single radioactively contaminated patient. BUMED has dispatched a medical radiological assistance team to your facility and is providing consultation via the phone system. The FBI has been notified and their agent requests that any injured patients be retained at your facility until they can be interviewed by FBI staff.

The "Worried Well" Patient

As discussed in the first scenario, in any terrorist incident, the actual number of victims may be dwarfed by the numbers of patients who present for care, but who are subsequently found not to be casualties. These individuals are of major concern to the MTF commander because they cannot be assumed to be well without evaluation, but this evaluation can place heavy demands on the MTF resources and result in diversion from more critical needs.

MTFs should anticipate the potential for large volumes of patients who may ultimately be determined to be unaffected and establish procedures that accommodate the demands on space, staffing, equipment, consumables and transportation which these patients create. These patients cannot be assumed to be healthy and the MTF must also take care not to lose sight of the fact that many of these patients may have other medical problems unrelated to the incident or which are exacerbated by the incident and require attention.

The problem of the "worried well" can be ameliorated by timely and accurate release of information. Establishing credibility and keeping lines of communication open are critical to maintaining control of the situation. Advance planning for how and when information will be released will minimize disruptions. National Council on Radiation Protection and Measurements (NCRP) Report 138 is an invaluable resource with samples of prepared public statements and answers to standard questions on many nuclear and radiological terrorist issues. It is available at: http://www.ncrp.com.

With the exception of the scale of the destruction, the issues with a weapon of mass *disruption* are similar to those for weapon of mass *destruction*. These can be reviewed in the first scenario and will not be repeated here.

CHAPTER 2

Individual Protection, Collective Protection, Decontamination, Universal Precautions

INDIVIDUAL PROTECTIVE EQUIPMENT (IPE)

The level of individual protective equipment (IPE) needed by staff members who are treating and/or responding to a nuclear or radiation incident will be determined by the nature of the attack and the level of exposure predicted. The Incident Commander at the scene makes this decision for the level of protection. In a contaminated zone or decontamination environment, MTF commanders should allow for frequent staff rotation due to the physical strain and stress of wearing IPE.

For complete decontamination, clothes and personal equipment must be decontaminated. There may be particular problems when caring for the injured since it may be necessary to remove the victim's clothes by cutting them off. This must be done in such a way that further contamination of staff is avoided. During subsequent treatment it is essential to ensure that the entire patient is decontaminated to avoid the risk of exposing the MTF medical staff to the NW agents.

For further guidance on IPE see http://www.nap.edu/html/terrorism/ch3.html.

COLLECTIVE PROTECTION

The use of IPE is of limited value where greater numbers of medical personnel need to operate together for longer periods of time in a CBRNE environment. Collective Protection systems typically involve a fully functional CBRNE protected zone or unit supplied with both pressurized and filtered air. Use of Collective Protection allows delivery of medical care to continue in any CBRNE contaminated environment. Within a Collective Protective environment, the use of IPE is not required. Collective Protection systems are typically designed to be integral parts of the designated zone or unit's heating, ventilation, and air conditioning (HVAC) system. Work inside a Collective Protective System implies that the victim has been adequately decontaminated prior to placement in the system.

Collective Protection against CBRNE agents employs efficient filtration, systems integrity, and associated control mechanisms. Systems integrity involves use of efficient seals and pressure gradient airflow. Techniques for expedient collective protection are detailed at: http://www.firefighting.com/default.asp?GoTo=namID938.

MISSION ORIENTED PROTECTIVE POSTURES (MOPP) LEVELS

MTF commanders should become familiar with the various levels of MOPP. The MOPP system is designed to be a flexible means of increasing or decreasing levels of personal protection based on an assessment of the actual CBRNE threat encountered.

MOPP levels should be increased when encountering known contamination or before entering an area believed to be contaminated. First responders and other healthcare personnel should always mask if they are in downwind / plume hazard areas, and if detection equipment has not yet been deployed. MOPP levels should not be increased solely on the basis of unconfirmed reports of a CW attack. Important Note: The use of IPE in higher MOPP levels for extended periods can cause dehydration, heat stress injury, and otherwise degrades the normal efficiency of medical personnel in performing routine tasks. Higher MOPP levels impair visibility, mobility, and communication. More information on MOPP levels can be found at: http://www.gulflink.osd.mil/mopp

DECONTAMINATION

Decontamination (decon) of patients affected by radioactive materials is critical to treatment. Any decontamination required ideally would take place prior to entry into the MTF. See Scenario, Consequence Management for more info on when decontamination of patients may be necessary. However, during a terrorist incident, ambulatory casualties may self-evacuate to the nearest medical facilities. Medical personnel who will be treating patients and who have not been decontaminated need to be wearing IPE.

Prior coordination of decontamination capabilities and response assets is needed with the Base installation or local fire department and with other local first responder agencies. MTF personnel should be prepared to perform patient decontamination if any pre-designated decontamination assets are delayed or unavailable. If patient decontamination is required, it should be performed in a pre-designated location, ideally outside the MTF but near the emergency department. Consideration for special decontamination arrangements may be needed if difficult weather / temperature conditions are present. BUMED Instruction 3400.1 provides details on decontamination of casualties under a variety of circumstances.

MOPP Level Local Decision

The on scene commander determines the appropriate MOPP levels based on the local environment, threat analysis, personal vulnerability and working conditions.

CHAPTER 3

Observations from TOPOFF

Executive Summary/Approach Findings

TOPOFF Exercise

The United States Congress, believing "that few of the ***top officials*** of agencies have ever fully participated" in domestic preparedness exercises has directed the Department of Justice to conduct an exercise "with the participation of all key personnel who would participate in the consequence management of [an actual chemical, biological, or cyber] terrorist event." [Senate Report 105-233]

TOPOFF Exercise Planning Conference

The **TOPOFF Exercise Planning Conference** brought together over 100 state and local emergency response planners and practitioners from across the nation, to identify objectives to be used in designing the Top Official's (TOPOFF) Exercise. Hosted by the Department of Justice and the Federal Emergency Management Agency, the Conference was held May 20-21, 1999 in Chantilly, VA.

Over the day and a half of the Conference, fire/HAZMAT, law enforcement, medical/EMS, and emergency management professional identified and prioritized consensus objectives reflecting each discipline and jurisdiction, large and small. As a result, the TOPOFF Exercise will directly address the concerns and issues of Stakeholders nationwide.

The Process

On the morning of the first day of the conference, participants were assigned to functional/professional working groups (law enforcement, fire/HAZMAT, medical/EMS, local emergency management, and state emergency management). These working groups were asked to identify and prioritize critical exercise objectives for a national exercise.

In the afternoon session, these exercise objectives were considered by five multidisciplinary groups, tasked with recommending consensus objectives for use by TOPOFF exercise planners. Their prioritized objectives reflect the cross-cutting nature of the groups' makeup and provide the basis for the Conference's recommendations.

TOPOFF Conference Recommendations

The following categories highlight the final objectives that were produced by the TOPOFF Conference participants.

Command and Control

- Exercise an integrated Emergency Management Structure (Incident Command System, Unified Command System, etc.).
- Exercise Interagency and Intra-agency coordination.
- Demonstrate Federal, State, and local integration and cooperation.
- Show the integration of the medical community into the overall emergency response.
- Exercise the interaction between crisis to consequence management: FBI and FEMA roles.
- Exercise crime scene evidence preservation, criminal investigation, and chain of custody issues.
- Exercise communications degradation.
- Review and exercise procedures and mechanisms for reimbursement to local and State agencies for expenses and losses incurred due to a WMD incident.

Incident Timing/Scope

- A no notice event
- Stage multiple events at multiple locations or jurisdictions on a local, State, and Federal level. Utilize contrasting cities (i.e. Nunn-Lugar-Domenici and non-Nunn-Lugar-Domenici cities) and involve rural participants.
- Exercise over multiple days.
- Conduct the event with "real time" deployment of assets and real resource limitations in handling mass fatalities and mass casualties.
- Address both crisis and consequence management issues simultaneously.
- Demonstrate the distinction between chemical and biological incidents, including an overt release, covert release or biological event. Have a combined event, (i.e. explosive and a biological agent).

Public Information

- Exercise and evaluate public affairs plans and procedures for establishing and maintaining responsive and thoroughly coordinated public information programs at the local, State, and Federal levels.
- Prepare to handle disinformation and misinformation from overnight experts, media designated Subject Matter Experts, media use by the adversary, as well as public expectations and misunderstandings.

Medical/Public Health

- Exercise the medical and public health infrastructure, response and resources, provision of health resources (prophylaxis), and mutual aid/support to handle mass casualties and mass fatalities on an immediate level. Assess the ability to provide extended care and extended

resources. Examine the effectiveness and timeliness of the Federal government response to provide long-term support to jurisdictions.
- Demonstrate the ability to protect lives.
- Prevent injury at all levels through an assessment of the capability to deliver, distribute and administer medical supplies (antibiotics, antidotes, and vaccinations, ventilators, ICU capabilities) and personnel in a timely manner, and manage disposition of mass fatalities (the management of contaminated remains).
- Exercise surveillance, diagnosis, and identification capabilities.
- Show the ability to effectively integrate supplemental support.
- Determine the capabilities and resources to provide mental health care for victims, first responders, and the community at large.

Infrastructure

- Test the ability to protect and/or respond to disruptions of critical infrastructure resulting from a catastrophic WMD attack.
- Test different types of infrastructure, public works, (water and wastewater), utilities, and transportation.
- Test quarantine challenges (transportation of victims and facilities to house them).
- Test technical capabilities of federal resources, including software and hardware.

Resource Management

- Promote and broaden understanding of the assets available at all levels, how to call up these assets, and stress the most effective integration of federal assets in local, county, and State operations.
- Analyze the adequacy of current federal response systems and programs at meeting local, State and regional needs.
- Identify, manage, and move Federal, State, and local resources and mutual aid pacts, including local accommodation/reception support to augment federal assets.
- Demonstrate the prioritization of limited specialized Federal response assets to separate and simultaneous WMD incidents.
- Utilize a broad resource pool: contractors, the private sector, volunteers and Non-Governmental Organizations.
- Integrate the activation/call up of personnel, including Reserves and the National Guard.

Information Sharing

- Demonstrate the value of information sharing between Federal, State, and local entities in preventing and/or mitigating the consequences of WMD.
- Exercise information sharing horizontally, vertically, up, down and across all levels.
- Reassess classification issues, who should be cleared?
- Conduct threat assessments and pre-event intelligence for jurisdictions.

Interoperable Communications

- Expose suspected gaps in physical communications interoperability between functional and jurisdictional levels of government during a WMD incident.

Lessons Learned

- Utilize a neutral party or observers to assist in the peer evaluation and capture of lessons learned.
- Disseminate After Action Reports on a timely and widespread basis.
- Ensure widespread dissemination and discussion of lessons learned.
- Maintain a comprehensive recording of incident play.
- Identify and evaluate the efficacy of deployed Federal and State assets and standing response plans utilized during the incident response.

Consensus Objectives/Guidance

In plenary session on the morning of May 21, the Planning Conference participants received, discussed, and adopted the following consensus objectives for the TOPOFF Exercise:

1. Command and Control

1.1. Exercise an integrated Emergency Management Structure (Incident Command System, Unified Command System, etc.).
1.2. Exercise Interagency and Intra-agency coordination.
1.3. Demonstrate Federal, State, and local integration and cooperation.
1.4. Show the integration of the medical community into the overall emergency response.
1.5. Exercise the interaction between crisis to consequence management: FBI and FEMA roles.
1.6. Exercise crime scene evidence preservation, criminal investigation, and chain of custody issues.
1.7. Exercise communications degradation.
1.8. Review and exercise procedures and mechanisms for reimbursement to local and State agencies for expenses and losses incurred due to a WMD incident.

2. Incident Timing/Scope

2.1. A no notice event
2.2. Stage multiple events at multiple locations on a local, State, and Federal level. Utilize contrasting cities (i.e. Nunn-Lugar-Domenici and non-Nunn-Lugar-Domenici cities) and involve rural participants.
2.3. Exercise over multiple days.
2.4. Conduct the event with “real time” deployment of assets and real resource limitations in handling mass fatalities and mass casualties.
2.5. Address both crisis and consequence management issues simultaneously.

2.6. Demonstrate the distinction between chemical and biological incidents, including overt release, covert release, and hoax. Recognize, identify and predict consequences stemming from a chemical or biological event. Have a combined event, (i.e. explosive and a biological agent).

3. Public Information

3.1. Exercise and evaluate public affairs plans and procedures for establishing and maintaining responsive and thoroughly coordinated public information programs at the local, State, and Federal levels.
3.2. Prepare to handle disinformation and misinformation from overnight experts, media designated Subject Matter Experts, media use by the adversary, as well as public expectations and misunderstandings.

4. Medical/Public Health

4.1. Exercise the medical and public health infrastructure, response and resources, provision of health resources (prophylaxis), and mutual aid/support to handle mass casualties and mass fatalities on an immediate level. Assess the ability to provide extended care and extended resources. Examine the effectiveness and timeliness of the Federal government response to provide long-term support to jurisdictions.
4.2. Demonstrate the ability to protect lives.
4.3. Prevent injury at all levels through an assessment of the capability to deliver, distribute and administer medical supplies (antibiotics, antidotes, and vaccinations, ventilators, ICU capabilities) and personnel in a timely manner, and manage disposition of mass fatalities (the management of contaminated remains).
4.4. Exercise surveillance, diagnosis, and identification capabilities.
4.5. Show the ability to effectively integrate supplemental support.
4.6. Determine the capabilities and resources to provide mental health care for victims, first responders, and the community at large.

5. Infrastructure

5.1. Test the ability to protect and/or respond to disruptions of critical infrastructure resulting from a catastrophic WMD attack.
5.2. Test different types of infrastructure, public works, (water and wastewater), utilities, and transportation.
5.3. Test quarantine challenges (transportation of victims and facilities to house them).
5.4. Test technical capabilities of federal resources, including software and hardware.

6. Resource Management

6.1. Promote and broaden understanding of the assets available at all levels, how to call up these assets, and stress the most effective integration of federal assets in the local, county, and State operations.
6.2. Analyze the adequacy of current federal response systems and programs at meeting local, State, and regional needs.
6.3. Identify, manage, and move Federal, State, and local resources and mutual aid pacts, including local accommodation/reception support to augment federal assets.
6.4. Demonstrate the prioritization of limited specialized Federal response assets to separate and simultaneous WMD incidents.
6.5. Utilize a broad resource pool: contractors, the private sector, volunteers and Non-Governmental Organizations.
6.6. Integrate the activation/call up of personnel, including Reserves and the National Guard.

7. Information Sharing

7.1. Demonstrate the value of information sharing between Federal, State, and local entities in preventing and/or mitigating the consequences of WMD.
7.2. Exercise information sharing horizontally, vertically, up, down and across all levels.
7.3. Reassess classification issues, who should be cleared?
7.4. Conduct threat assessments and pre-event intelligence for jurisdictions.

8. Interoperable Communication

8.1. Expose suspected gaps in physical communications interoperability between functional and jurisdictional levels of government during a WMD incident.

9. Lessons Learned

9.1. Utilize a neutral party or observers to assist in the peer evaluation and capture of lessons learned.
9.2. Disseminate After Action Reports on a timely and widespread basis.
9.3. Ensure widespread dissemination and discussion of lessons learned.
9.4. Maintain a comprehensive recording of incident play.
9.5. Identify and evaluate the efficacy of deployed Federal and State assets and standing response plans utilized during the incident response.

These objectives are intended for use by the designers of the exercise in developing the scenario and specific elements for TOPOFF. The Planning Conference participants recognized that it might not be possible to incorporate every objective into the exercise design. It was their consensus, however, that by addressing as many of the recommended items as possible, TOPOFF can provide maximum and substantial value to WMD terrorism responders at all levels of government.

Report from the Department of Justice.

National Pharmaceutical Stockpile

A decision to deploy the stockpile is based on the best epidemiologic, laboratory and public health information regarding the nature of the threat.

- The mission of the CDC's National Pharmaceutical Stockpile program (NPS) is to ensure the availability of life saving pharmaceuticals, antibiotics, chemical interventions, as well as medical, surgical and patient support supplies, and equipment for prompt delivery to the site of a disaster, including a possible biological or chemical terrorist event anywhere in the United States.

- The NPS is available to supplement the initial response to an incident of biological or chemical terrorism. That response will come from the local and state emergency medical and public health personnel.

- A primary purpose of the NPS is to provide critical drugs and medical material that would otherwise be unavailable to local communities.

- CDC's NPS is a unique resource available to all United States public health departments.

Contents of Stockpile

- CDC has established relationships with various national security agencies to facilitate continuous updates and analyses of threat agents and ensure that the NPS reflects current needs.

- Expert panels convened by CDC prioritized the following biologic agents: smallpox, anthrax, pneumonic plague, tularemia, botulinum toxin and viral hemorrhagic fevers.

- Because anthrax, plague and tularemia can be effectively treated with antibiotics that are immediately available, purchasing these products for the NPS formulary was given first priority.

- The NPS also has a cache of vaccine available to address smallpox threats.

- In addition to medications and supplies for intravenous administration, the NPS include medical equipment that would be essential for treatment, including airway supplies, bandages and dressings, and other emergency medication. These are items that local clinicians may find in short supply in the event of a terrorism event.

- The National Pharmaceutical Stockpile (NPS) has two basic components. The first component consists of eight 12-hour Push Packages for immediate response. These 12-hour Push Packages are fully stocked, positioned in environmentally controlled and secured

warehouses, and ready for immediate deployment to reach any affected area within 12 hours of the federal decision to release the assets.

- A 12-hour push package is a pre-assembled set of supplies, pharmaceuticals, and medical equipment ready for quick delivery to and use in the field. Each "package" consists of 50 tons of material intended to address a mass casualty incident. These packages will permit emergency medical staff to treat a variety of different agents, since the actual threat may not have been identified at the time of the stockpile deployment.

- The second component is comprised of Vendor Managed Inventory (VMI) material. If the incident requires a larger or multi-phased response, follow-on VMI packages will be shipped to arrive within 24 to 36 hours.

- The follow-on VMI packages are comprised of pharmaceuticals and supplies that can be "tailored" to provide pharmaceuticals, supplies and/or products specific for the suspected or confirmed agent or combination of agents.

From the Centers for Disease Control,
http://www.bt.cdc.gov/DocumentsAPP/national_pharmaceutical_stockpile.pdf

Important Note: Only State and Federal authorities can formally request NPS—such assistance cannot be requested directly by the MTF commander. Note also that technical assistance personnel accompany NPS Push packs only. NPS has no dedicated support personnel to help secure, distribute, transport, or apply the mass therapy.

Chapter 4

Guidance: Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies

This guidance represents the Food and Drug Administration's (FDA's) current thinking on this topic. It does not create or confer any rights for or on any person and does not operate to bind FDA or the public. An alternative approach may be used if such approach satisfies the requirements of the applicable statutes and regulations.

I. INTRODUCTION

The objective of this document is to provide guidance to other Federal agencies, including the Environmental Protection Agency (EPA) and the Nuclear Regulatory Commission (NRC), and to state and local governments regarding the safe and effective use of potassium iodide (KI) as an adjunct to other public health protective measures in the event that radioactive iodine is released into the environment. The adoption and implementation of these recommendations are at the discretion of the state and local governments responsible for developing regional emergency-response plans related to radiation emergencies. This guidance updates the Food and Drug Administration (FDA) 1982 recommendations for the use of KI to reduce the risk of thyroid cancer in radiation emergencies involving the release of radioactive iodine. The recommendations in this guidance address KI dosage and the projected radiation exposure at which the drug should be used.

These recommendations were prepared by the Potassium Iodide Working Group, comprising scientists from the FDA's Center for Drug Evaluation and Research (CDER) and Center for Devices and Radiological Health (CDRH) in collaboration with experts in the field from the National Institutes of Health (NIH). Although they differ in two respects (as discussed in Section IV.B), these revised recommendations are in general accordance with those of the World Health Organization (WHO), as expressed in its *Guidelines for Iodine Prophylaxis Following Nuclear Accidents: Update 1999* (WHO 1999).

II. BACKGROUND

Under 44 CFR 351, the Federal Emergency Management Agency (FEMA) has established roles and responsibilities for Federal agencies in assisting state and local governments in their radiological emergency planning and preparedness activities. The Federal agencies, including the Department of Health and Human Services (HHS), are to carry out these roles and responsibilities as members of the Federal Radiological Preparedness Coordinating Committee (FRPCC). Under 44 CFR 351.23(f), HHS is directed to provide guidance to state and local governments on the use of radioprotective substances and the prophylactic use of drugs (e.g., KI)

to reduce the radiation dose to specific organs. This guidance includes information about dosage and projected radiation exposures at which such drugs should be used.

The FDA has provided guidance previously on the use of KI as a thyroid blocking agent. In the *Federal Register* of December 15, 1978, FDA announced its conclusion that KI is a safe and effective means by which to block uptake of radioiodines by the thyroid gland in a radiation emergency under certain specified conditions of use. In the *Federal Register* of June 29, 1982, FDA announced final recommendations on the administration of KI to the general public in a radiation emergency. Those recommendations were formulated after reviewing studies relating radiation dose to thyroid disease risk that relied on estimates of ***external*** thyroid irradiation after the nuclear detonations at Hiroshima and Nagasaki and analogous studies among children who received therapeutic radiation to the head and neck. Those recommendations concluded that at a projected dose to the thyroid gland of 25 cGy or greater from ingested or inhaled radioiodines, the risks of short-term use of small quantities of KI were outweighed by the benefits of suppressing radioiodine-induced thyroid cancer.[1] The amount of KI recommended at that time was 130 mg per day for adults and children above 1 year of age and 65 mg per day for children below 1 year of age. The guidance that follows revises our 1982 recommendations on the use of KI for thyroid cancer prophylaxis based on a comprehensive review of the data relating radioioidine exposure to thyroid cancer risk accumulated in the aftermath of the 1986 Chernobyl reactor accident.

III. DATA SOURCES

A. Reliance on Data from Chernobyl

In epidemiological studies investigating the relationship between thyroidal radioiodine exposure and risk of thyroid cancer, the estimation of thyroid radiation doses is a critical and complex aspect of the analyses. Estimates of exposure, both for individuals and across populations, have been reached in different studies by the variable combination of:

(1) direct thyroid measurements in a segment of the exposed population;
(2) measurements of ^{131}I (iodine isotope) concentrations in the milk consumed by different groups (e.g., communities) and of the quantity of milk consumed;
(3) inference from ground deposition of long-lived radioisotopes released coincidentally and presumably in fixed ratios with radioiodines; and
(4) reconstruction of the nature and extent of the actual radiation release.

All estimates of individual and population exposure contain some degree of uncertainty. The uncertainty is least for estimates of individual exposure based on direct thyroid measurements. Uncertainty increases with reliance on milk consumption estimates; is still greater with estimates derived from ground deposition of long-lived radioisotopes, and is highest for estimates that rely heavily on release reconstruction.

Direct measurements of thyroid radioactivity are unavailable from the Hanford, Nevada Test Site, and Marshall Islands exposures. Indeed, the estimates of thyroid radiation doses related to these releases rely heavily on release reconstructions and, in the former two cases, on recall of

the extent of milk consumption 40 to 50 years after the fact. In the Marshall Islands cohort, urinary radioiodine excretion data were obtained and used in calculating exposure estimates. Because of the great uncertainty in the dose estimates from the Hanford and Nevada Test Site exposures and due to the small numbers of thyroid cancers occurring in the populations potentially exposed, the epidemiological studies of the excess thyroid cancer risk related to these radioiodine releases are, at best, inconclusive. As explained below, the dosimetric data derived in the studies of individual and population exposures following the Chernobyl accident, although not perfect, are unquestionably superior to data from previous releases. In addition, the results of the earlier studies are inadequate to refute cogent case control study evidence from Chernobyl of a cause-effect relationship between thyroid radioiodine deposition and thyroid cancer risk.[2]
The Chernobyl reactor accident of April 1986 provides the best-documented example of a massive radionuclide release in which large numbers of people across a broad geographical area were exposed acutely to radioiodines released into the atmosphere. Therefore, the recommendations contained in this guidance are derived from our review of the Chernobyl data as they pertain to the large number of thyroid cancers that occurred. These are the most comprehensive and reliable data available describing the relationship between thyroid radiation dose and risk for thyroid cancer following an environmental release of ^{131}I. In contrast, the exposures resulting from radiation releases at the Hanford Site in Washington State in the mid-1940s and in association with the nuclear detonations at the Nevada Test Site in the 1950s were extended over years, rather than days to weeks, contributing to the difficulty in estimating radioactive dose in those potentially exposed (Davis et al., 1999; Gilbert et al., 1998). The exposure of Marshall Islanders to fallout from the nuclear detonation on Bikini in 1954 involved relatively few people, and although the high rate of subsequent thyroid nodules and cancers in the exposed population was likely caused in large part by radioiodines, the Marshall Islands data provide little insight into the dose-response relationship between radioactive iodine exposure and thyroid cancer risk (Robbins and Adams 1989).

Beginning within a week after the Chernobyl accident, direct measurements of thyroid exposure were made in hundreds of thousands of individuals, across three republics of the former Soviet Union (Robbins and Schneider 2000, Gavrilin et al., 1999, Likhtarev et al., 1993, Zvonova and Balonov 1993). These thyroid measurements were used to derive, in a direct manner, the thyroid doses received by the individuals from whom the measurements were taken. The thyroid measurements were also used as a guide to estimate the thyroid doses received by other people, taking into account differences in age, milk consumption rates, and ground deposition densities, among other things. The thyroid doses derived from thyroid measurements have a large degree of uncertainty, especially in Belarus, where most of the measurements were made by inexperienced people with detectors that were not ideally suited to the task at hand (Gavrilin et al., 1999 and UNSCEAR 2000). However, as indicated above, the uncertainties attached to thyroid dose estimates derived from thyroid measurements are, as a rule, lower than those obtained without recourse to those measurements.

It is also notable that the thyroid radiation exposures after Chernobyl were virtually all ***internal***, from radioiodines. Despite some degree of uncertainty in the doses received, it is reasonable to conclude that the contribution of external radiation was negligible for most individuals. This distinguishes the Chernobyl exposures from those of the Marshall Islanders. Thus, the increase in thyroid cancer seen after Chernobyl is attributable to ingested or inhaled radioiodines. A

comparable burden of excess thyroid cancers could conceivably accrue should U.S. populations be similarly exposed in the event of a nuclear accident. This potential hazard highlights the value of averting such risk by using KI as an adjunct to evacuation, sheltering, and control of contaminated foodstuffs.

B. Thyroid Cancers in the Aftermath of Chernobyl

The Chernobyl reactor accident resulted in massive releases of ^{131}I and other radioiodines. Beginning approximately 4 years after the accident, a sharp increase in the incidence of thyroid cancer among children and adolescents in Belarus and Ukraine (areas covered by the radioactive plume) was observed. In some regions, for the first 4 years of this striking increase, observed cases of thyroid cancer among children aged 0 through 4 years at the time of the accident exceeded expected number of cases by 30- to 60-fold. During the ensuing years, in the most heavily affected areas, incidence is as much as 100-fold compared to pre-Chernobyl rates (Robbins and Schneider 2000; Gavrilin et al., 1999; Likhtarev et al., 1993; Zvonova and Balonov 1993). The majority of cases occurred in children who apparently received less than 30 cGy to the thyroid (Astakhova et al., 1998). A few cases occurred in children exposed to estimated doses of < 1 cGy; however, the uncertainty of these estimates confounded by medical radiation exposures leaves doubt as to the causal role of these doses of radioiodine (Souchkevitch and Tsyb 1996).

The evidence, though indirect, that the increased incidence of thyroid cancer observed among persons exposed during childhood in the most heavily contaminated regions in Belarus, Ukraine, and the Russian Federation is related to exposure to iodine isotopes is, nevertheless, very strong (IARC 2001). We have concluded that the best dose-response information from Chernobyl shows a marked increase in risk of thyroid cancer in children with exposures of 5 cGy or greater (Astakhova et. al., 1998; Ivanov et al., 1999; Kazakov et al., 1992). Among children born more than nine months after the accident in areas traversed by the radioactive plume, the incidence of thyroid cancer has not exceeded preaccident rates, consistent with the short half-life of ^{131}I.
The use of KI in Poland after the Chernobyl accident provides us with useful information regarding its safety and tolerability in the general population. Approximately 10.5 million children under age 16 and 7 million adults received at least one dose of KI. Of note, among newborns receiving single doses of 15 mg KI, 0.37 percent (12 of 3214) showed transient increases in TSH (thyroid stimulating hormone) and decreases in FT4 (free thyroxine). The side effects among adults and children were generally mild and not clinically significant. Side effects included gastrointestinal distress, which was reported more frequently in children (up to 2 percent, felt to be due to bad taste of SSKI solution) and rash (~1 percent in children and adults). Two allergic reactions were observed in adults with known iodine sensitivity (Nauman and Wolff 1993).

Thus, the studies following the Chernobyl accident support the etiologic role of relatively small doses of radioiodine in the dramatic increase in thyroid cancer among exposed children. Furthermore, it appears that the increased risk occurs with a relatively short latency. Finally, the Polish experience supports the use of KI as a safe and effective means by which to protect against thyroid cancer caused by internal thyroid irradiation from inhalation of contaminated air

or ingestion of contaminated food and drink when exposure cannot be prevented by evacuation, sheltering, or food and milk control.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Use of KI in Radiation Emergencies: Rationale, Effectiveness, Safety

For the reasons discussed above, the Chernobyl data provide the most reliable information available to date on the relationship between internal thyroid radioactive dose and cancer risk. They suggest that the risk of thyroid cancer is inversely related to age, and that, especially in young children, it may accrue at very low levels of radioiodine exposure. We have relied on the Chernobyl data to formulate our specific recommendations below.

The effectiveness of KI as a specific blocker of thyroid radioiodine uptake is well established (Il'in LA, et al., 1972) as are the doses necessary for blocking uptake. As such, it is reasonable to conclude that KI will likewise be effective in reducing the risk of thyroid cancer in individuals or populations at risk for inhalation or ingestion of radioiodines.

Short-term administration of KI at thyroid blocking doses is safe and, in general, more so in children than adults. The risks of stable iodine administration include sialadenitis (an inflammation of the salivary gland, of which no cases were reported in Poland among users after the Chernobyl accident), gastrointestinal disturbances, allergic reactions and minor rashes. In addition, persons with known iodine sensitivity should avoid KI, as should individuals with dermatitis herpetiformis and hypocomplementemic vasculitis, extremely rare conditions associated with an increased risk of iodine hypersensitivity.

Thyroidal side effects of stable iodine include iodine-induced thyrotoxicosis, which is more common in older people and in iodine deficient areas but usually requires repeated doses of stable iodine. In addition, iodide goiter and hypothyroidism are potential side effects more common in iodine sufficient areas, but they require chronic high doses of stable iodine (Rubery 1990). In light of the preceding, individuals with multinodular goiter, Graves' disease, and autoimmune thyroiditis should be treated with caution, especially if dosing extends beyond a few days. The vast majority of such individuals will be adults.

The transient hypothyroidism observed in 0.37 percent (12 of 3214) of neonates treated with KI in Poland after Chernobyl has been without reported sequelae to date. There is no question that the benefits of KI treatment to reduce the risk of thyroid cancer outweigh the risks of such treatment in neonates. Nevertheless, in light of the potential consequences of even transient hypothyroidism for intellectual development, we recommend that neonates (within the first month of life) treated with KI be monitored for this effect by measurement of TSH (and FT4, if indicated) and that thyroid hormone therapy be instituted in cases in which hypothyroidism develops (Bongers-Schokking 2000; Fisher 2000; Calaciura 1995).

B. KI Use in Radiation Emergencies: Treatment Recommendations

After careful review of the data from Chernobyl relating estimated thyroid radiation dose and cancer risk in exposed children, FDA is revising its recommendation for administration of KI based on age, predicted thyroid exposure, and pregnancy and lactation status (see Table).

Threshold Thyroid Radioactive Exposures and Recommended Doses of KI for Different Risk Groups				
	Predicted Thyroid exposure(cGy)	KI dose (mg)	# of 130 mg tablets	# of 65 mg tablets
Adults over 40 yrs	≥500	130	1	2
Adults over 18 through 40 yrs	≥10			
Pregnant or lactating women	≥ 5			
Adoles. over 12 through 18 yrs*		65	1/2	1
Children over 3 through 12 yrs				
Over 1 month through 3 years		32	1/4	1/2
Birth through 1 month		16	1/8	1/4

*Adolescents approaching adult size (≥ 70 kg) should receive the full adult dose (130 mg).
The protective effect of KI lasts approximately 24 hours. For optimal prophylaxis, KI should therefore be dosed daily, until a risk of significant exposure to radioiodines by either inhalation or ingestion no longer exists. Individuals intolerant of KI at protective doses, and neonates, pregnant and lactating women (in whom repeat administration of KI raises particular safety issues, see below) should be given priority with regard to other protective measures (i.e., sheltering, evacuation, and control of the food supply).

Note that adults over 40 need take KI only in the case of a projected large internal radiation dose to the thyroid (>500 cGy) to prevent hypothyroidism.

These recommendations are meant to provide states and local authorities as well as other agencies with the best current guidance on safe and effective use of KI to reduce thyroidal radioiodine exposure and thus the risk of thyroid cancer. FDA recognizes that, in the event of an emergency, some or all of the specific dosing recommendations may be very difficult to carry out given their complexity and the logistics of implementation of a program of KI distribution. The recommendations should therefore be interpreted with flexibility as necessary to allow optimally effective and safe dosing given the exigencies of any particular emergency situation. In this context, we offer the following critical general guidance: ***across populations at risk for radioiodine exposure, the overall benefits of KI far exceed the risks of overdosing, especially in children, though we continue to emphasize particular attention to dose in infants***.

These FDA recommendations differ from those put forward in the World Health Organization (WHO) 1999 guidelines for iodine prophylaxis in two ways. WHO recommends a 130-mg dose of KI for adults and adolescents (over 12 years). For the sake of logistical simplicity in the

dispensing and administration of KI to children, FDA recommends a 65-mg dose as standard for all school-age children while allowing for the adult dose (130 mg, 2 X 65 mg tablets) in adolescents approaching adult size. The other difference lies in the threshold for predicted exposure of those up to 18 years of age and of pregnant or lactating women that should trigger KI prophylaxis. WHO recommends a threshold of 1 cGy for these two groups. As stated earlier, FDA has concluded from the Chernobyl data that the most reliable evidence supports a significant increase in the risk of childhood thyroid cancer at exposures of 5 cGy or greater. The downward KI dose adjustment by age group, based on body size considerations, adheres to the principle of minimum effective dose. The recommended standard dose of KI for all school-age children is the same (65 mg). However, adolescents approaching adult size (i.e., >70 kg) should receive the full adult dose (130 mg) for maximal block of thyroid radioiodine uptake. Neonates ideally should receive the lowest dose (16 mg) of KI. Repeat dosing of KI should be avoided in the neonate to minimize the risk of hypothyroidism during that critical phase of brain development (Bongers-Schokking 2000; Calaciura et al., 1995). KI from tablets (either whole or fractions) or as fresh saturated KI solution may be diluted in milk, formula, or water and the appropriate volume administered to babies. As stated above, we recommend that neonates (within the first month of life) treated with KI be monitored for the potential development of hypothyroidism by measurement of TSH (and FT4, if indicated) and that thyroid hormone therapy be instituted in cases in which hypothyroidism develops (Bongers-Schokking 2000; Fisher 2000; Calaciura et al., 1995).

Pregnant women should be given KI for their own protection and for that of the fetus, as iodine (whether stable or radioactive) readily crosses the placenta. However, because of the risk of blocking fetal thyroid function with excess stable iodine, repeat dosing with KI of pregnant women should be avoided. Lactating females should be administered KI for their own protection, as for other young adults, and potentially to reduce the radioiodine content of the breast milk, but not as a means to deliver KI to infants, who should get their KI directly. As for direct administration of KI, stable iodine as a component of breast milk may also pose a risk of hypothyroidism in nursing neonates. Therefore, repeat dosing with KI should be avoided in the lactating mother, except during continuing severe contamination. If repeat dosing of the mother is necessary, the nursing neonate should be monitored as recommended above.

V. ADDITIONAL CONSIDERATIONS IN PROPHYLAXIS AGAINST THYROID RADIOIODINE EXPOSURE

Certain principles should guide emergency planning and implementation of KI prophylaxis in the event of a radiation emergency. After the Chernobyl accident, across the affected populations, thyroid radiation exposures occurred largely due to consumption of contaminated fresh cow's milk (this contamination was the result of milk cows grazing on fields affected by radioactive fallout) and to a much lesser extent by consumption of contaminated vegetables. In this or similar accidents, for those residing in the immediate area of the accident or otherwise directly exposed to the radioactive plume, inhalation of radioiodines may be a significant contributor to individual and population exposures. As a practical matter, it may not be possible to assess the risk of thyroid exposure from inhaled radioiodines at the time of the emergency. The risk depends on factors such as the magnitude and rate of the radioiodine release, wind direction and

other atmospheric conditions, and thus may affect people both near to and far from the accident site.

For optimal protection against inhaled radioiodines, KI should be administered before or immediately coincident with passage of the radioactive cloud, though KI may still have a substantial protective effect even if taken 3 or 4 hours after exposure. Furthermore, if the release of radioiodines into the atmosphere is protracted, then, of course, even delayed administration may reap benefits by reducing, if incompletely, the total radiation dose to the thyroid. Prevention of thyroid uptake of ingested radioiodines, once the plume has passed and radiation protection measures (including KI) are in place, is best accomplished by food control measures and not by repeated administration of KI. Because of radioactive decay, grain products and canned milk or vegetables from sources affected by radioactive fallout, if stored for weeks to months after production, pose no radiation risk. Thus, late KI prophylaxis at the time of consumption is not required.

As time is of the essence in optimal prophylaxis with KI, timely administration to the public is a critical consideration in planning the emergency response to a radiation accident and requires a ready supply of KI. State and local governments choosing to incorporate KI into their emergency response plans may consider the option of predistribution of KI to those individuals who do not have a medical condition precluding its use.

VI. SUMMARY

FDA maintains that KI is a safe and effective means by which to prevent radioiodine uptake by the thyroid gland, under certain specified conditions of use, and thereby obviate the risk of thyroid cancer in the event of a radiation emergency. Based upon review of the literature, we have proposed lower radioactive exposure thresholds for KI prophylaxis as well as lower doses of KI for neonates, infants, and children than we recommended in 1982. As in our 1982 notice in the *Federal Register*, FDA continues to recommend that radiation emergency response plans include provisions, in the event of a radiation emergency, for informing the public about the magnitude of the radiation hazard, about the manner of use of KI and its potential benefits and risks, and for medical contact, reporting, and assistance systems. FDA also emphasizes that emergency response plans and any systems for ensuring availability of KI to the public should recognize the critical importance of KI administration in advance of exposure to radioiodine. As in the past, FDA continues to work in an ongoing fashion with manufacturers of KI to ensure that high-quality, safe, and effective KI products are available for purchase by consumers as well as by state and local governments wishing to establish stores for emergency distribution.

KI provides protection only for the thyroid from radioiodines. It has no impact on the uptake by the body of other radioactive materials and provides no protection against external irradiation of any kind. FDA emphasizes that the use of KI should be as an adjunct to evacuation (itself not always feasible), sheltering, and control of foodstuffs.

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1 For the radiation emitted by ^{131}I (electrons and photons), the radiation-weighting factor is equal to one, so that the absorbed dose to the thyroid gland expressed in centigrays (cGy) is numerically equal to the thyroid equivalent dose expressed in rem (1 cGy = 1 rem).

2 We have included in this guidance an extensive bibliography of the sources used in developing these revised recommendations. http://www.fda.gov/cder/guidance/4825fnl.htm.

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APPENDIX A

Funding Considerations:
NW Preparedness and Response

In recent years, the trend in Navy medicine has been to move away from holding large amounts of supplies in the MTF to relying on "just in time" delivery. The time required for this "just in time" delivery varies with the geographic location of the MTF, the amount of materiel required and ease of access to other resources in the community.

In this era of increased threat from asymmetric warfare, the notion of "just in time delivery" requires re-evaluation. What is "just in time" in a peacetime environment may be "just missed" in time of crisis. If casualties are to be reduced and losses prevented, commanders may well be served by moving to a posture of "just in case" stockpiling.

There are no absolute answers for what constitutes adequate stockpiling for preparedness. It will be impossible to prepare for all possible contingencies. Furthermore, what is acceptable for a large MTF in a high-risk metropolitan region with access to other civilian resources will not be the same as what is acceptable for a small MTF in a low risk rural area but which is also constrained by limited access to civilian resources.

In assessing what constitutes appropriate preparedness, the MTF commander must consider the likelihood of attack, the nature of the possible attack, the scale of the mission which must be protected, the rapidity with which other resources can be tapped and the amount of money available to fund this preparedness. Decisions on how much to rely on "just in time" or how much to shift to a "just in case" posture should be individualized to fit the situation and should be based on an evidence-based analysis of the appropriate medical response and the MTF fiscal constraints. When that decision is made, the following information provides guidance on obtaining funding.

There are three ways for MTF commanders to obtain funding for CW preparedness and response activities:

- **Program Objective Memorandum (POM) cycle**
- **Business Case Analysis (BCA)**
- **Mid Year Review Process**

POM cycle:
MTF Commanders can plan and program for long-term CBRNE preparedness and response activities at their facilities using the Program Objective Memorandum (POM) cycle process. Individual MTF activity issues related to CBRNE preparedness and response need to be

submitted in the December / January timeframe each year to meet POM cycle requirements. Contact BUMED (either MED-01 or the MED-02 CBRNE Program Manager) for a sample of a CBRNE disaster preparedness POM item.

BCA:
MTF planning efforts to acquire resources for CBRNE medical disaster preparedness and response prior to the next POM cycle may also take place through the BCA process. BCA is intended to provide an avenue for medical activities to justify resources for a new unbudgeted initiative, with actions (if not assets) under local control, when that initiative has documented and quantifiable benefits (cost avoidance, savings, efficiencies) or a "return on investment" in future years. Contact BUMED (MED-01) to reach the person responsible for the BCA review process. These point of contacts can assist MTFs with the preparation and submittal requirements for a BCA package.

Mid Year Review:
Finally, MTF Commanders have the mid-year review process to request current year resources or unfunded items. A mid-year review item may be submitted either "before the fact" or "after the fact." In the first case, the MTF is faced with an emergent, additional requirement for disaster preparedness, or a response to an external threat. In the second case, the disaster has already happened, and the MTF documents the actual, fact-of-life costs that were expended in response to it. The MTF's true unfunded category then becomes those resources that had to be diverted in order to pay for the disaster. Mid-year review guidance will be issued to all MTFs through their Healthcare Support Offices by MED-01. To obtain a sample of a mid-year review submitted for an unfunded item, contact Mr. Charles Martin (MED-11) at 202-762-3588.

APPENDIX B

NW Resource List

Primary Military Medical Response Teams:

Armed Forces Radiobiology Institute (AFRRI)'s Medical Radiological Assessment Team (MRAT) – The AFRRI MRAT, located on the grounds of our National Naval Medical Center, may be contacted at 301-295-0316/0530 for 24 h/worldwide support. It consists of 4 physicians, 7 health physicists, 1 nuclear engineer, and significant scientific back-up support. They can also provide "real-time" radioactive plume modeling for worldwide sites, via the Hazard Predication and Assessment Capability (HPAC) software package.

Army Radiological Advisory Medical Team (RAMT) – The Army RAMT can support incidents or accidents involving radioactive materials. AR 40-13 establishes the RAMT as part of the Federal Radiological Emergency Response Plan 50FR46542 and DoD 3150.8-M Radiological Response Procedures Manual. There are currently two RAMT's: one at Walter Reed Army Medical Center and one at CHPPM Europe. During duty hours call: (202) 356-0058. If the call is not answered or after duty hours, contact the following:

Name	Pager Number	Pager PIN#
NCO	1-800-759-8888	1575812
Physicist	1-800-759-8888	1575809
Physician	1-800-759-8888	1575808

A typical team consists of 2 physicians (Nuclear Medicine and Radiation Oncology physicians), 2 health physicists, and 3 health physics technologists.

Air Force Radiation Assessment Team (AFRAT): This health physics team (no physicians) is stationed at Brooks AFB in Texas. During duty hours call: DSN 240-3486 or Comm. 210-536-3486. After duty hours, call: DSN 240-3278 or Comm. 210-536-3278.

Navy Medical Department Support: All four Navy Environmental and Preventive Medicine Units (NEPMUs) can provide radiological monitoring support. To contact the nearest NEPMU call:

NEPMU-2	Norfolk, VA	(757) 444-7671 X 306 DSN 564
NEPMU-5	San Diego, CA	(619) 556-7070, DSN: 526
NEPMU-6	Pearl Harbor, HI	(808) 473-0555, DSN: 473
NEPMU-7	Sigonella, IT	011- 39-095-56-3783

Radiation Emergency Assistance Center (REAC/TS), Oak Ridge Institute for Science and Education, Oak Ridge, TN. Phone Number: 423-241-6429

Military Team Capabilities:

	AFRRI MRAT	Army RAMT	Air Force AFRAT	Navy EPMU's
Responder Radiological Training	X	X	X	X
Radiation Risk Communication	X	X	X	X
Personnel Dose Estimation	X	X	X	X
Radiation Medicine Physician	X	X		
Chelation Therapy	X	X		
Emetics/Cathartics	X	X		
Protectants	X	X		
Therapeutics	X	X		
Psychological Awareness	X	X		
Hand Held Nuclide Identification	X	X	X	X
Field Surveys - Quantitative			X	X
Laboratory Nuclide Analysis				
Air Samples			X	
Water Samples			X	
Soil Samples			X	
Flora and Fauna			X	
Low Energy Photon Analysis			X	
Beta and Alpha Analysis			X	
Internal Deposition Assessment				
Lung Counting		X	X	
Whole Body Counting				
Human Urine and Feces			X	
Bulk Dosimetry Issue			X	
Personnel Decon (External)				
Perform			X	X
Manage	X	X	X	X
Personnel Decon (Internal)	X	X	X	
Personnel Decon (Wounds)	X	X		
Site Restoration Software	X	X		
HPAC				
Plume Prediction	X	X	X	
Health Physics Interpretation	X	X	X	
Casualty Tracking Software	X	X		
Waste Disposal Advice	X	X	X	X

DoD / Federal Emergency Response Agencies

Emergency Support Operations Center, DSCP (215) 737-2112 (24 hours)
National Response Center (800) 424-8802 (24 hrs)
FBI (contact nearest field office to MTF). See list attached.
For OCONUS, call U.S. Embassy / Consulate (U.S. Dept of State is Lead Agency)
Domestic Preparedness Helpline: 1-800-368-6498 (24 hrs)

Secondary Military Response Assets

Emergency Support Operations Center, Defense Supply Center Philadelphia. After initial notification is made: 215 737-2112 (24 hrs), the ESOC offers a 24-48 hour reach back capability for transportation of CBRNE prophylaxis and supplies. The ESOC website is at: http://www.dscp.dla.mil

References

Presidential Decision Directive 39 (PDD 39). White House. June 1995. The PDD website is found at http://www.fas.org/irp/offdocs/pdd39.htm.

Military Support to Civil Authorities (MSCA). DODD 3025.1. This and other DoD Directives and Instructions are available at http://www.dtic.mil/whs/directives.

National Guard WMD Civil Support Teams. National Guard WMD Civil Support Teams article: "Defense Leaders Commentary: The facts on WMD Civil Support Teams" Armed Forces Press Service. Charles Cragin, Principal Deputy, ASD Reserve Affairs, April 6, 2000.

- Provides a description of mission and current listing (August 2000) of the 27 National Guard WMD CSTs located in the following states: Alaska, Arizona, Arkansas, California (2), Colorado, Florida, Georgia, Hawaii, Illinois, Idaho, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Missouri, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Virginia and Washington. (Tentative plans include adding up to 5 more teams by 2002)

- **Important Note**: These state National Guard WMD CSTs are deployed only after a declaration of emergency assistance and specific request by the state governor. MTF commanders cannot directly request the support of these unique state response teams.

Other Federal Emergency Response Agencies and Information

Presidential Decision Directive 39 (PDD 39). White House. June 1995. The PDD 39 website is found at: http://www.fas.org/irp/offdocs/pdd39.htm.

- Gives U.S. policy on counter-terrorism and outlines Lead Federal Agency roles for crisis management and consequence management efforts during a declared emergency.

Federal Response Plan (FRP) at: http://www.fema.gov/r-n-r/frp/frpbpln.htm.

Federal Emergency Management Agency (FEMA) website at: http://www.fema.gov

- Identifies FEMA as Lead Federal Agency for Consequence Management. Provides information on implementation of the FRP and its potential impact on the MTF during a CBRNE event. Gives the responsibility of the Emergency Support Functions (ESF) listed by each federal agency outlined in the FRP.

Environmental Protection Agency (EPA) website at: http://epa.gov.

- Provides information on EPA response capabilities

National Disaster Medical System (NDMS). Disaster and emergency response capabilities of NDMS are found at: http://ndms.dhhs.gov.

- Explains the roles of various NDMS response team (e.g. teams for medical response, mortuary assistance, etc.) and the oversight role of NDMS from the Office of Emergency Preparedness (OEP) and U.S. Public Health Service.

BUMED Information

BUMED and NEHC subject matter experts developed a WMD preparedness and response resource tool available on CD-ROM. The CD covers an exhaustive listing of disaster preparedness, terrorism and WMD resources current as of April 2001. The listed resources on CD are also available on the BUMED (MED-27) homepage at: http://bumed.med.navy.mil/MED27/

- The CD was first developed for the Surgeon General's Flag Day Bioterrorism Wargame "Attack on Onslow" (August 2000). The CD and MED-27 homepage link was updated in May 2001.

BUMEDINST 3440.4 Activity Disaster Preparedness Plans and Material for Disaster Preparedness Teams at: http://navymedicine.med.navy.mil/instructions/external/external.htm**.**

- Outlines basic requirements for disaster and emergency preparedness activities at MTFs (This instruction is being completely revised and updated.)

State and Local Information

State and Local Guide for All-Hazards Emergency Operations Planning. FEMA. Emmitsburg, MD. 1996. Available at: http://www.fema.gov/library/allhzpln.htm.

- Most comprehensive FEMA guide available covering entire spectrum of preparedness and response for all CBRNE events.

Statewide Disaster Medical Standards Development Project: Final Report. California Emergency Medical Services Authority. August 2000. Available at: http://www.mvemsa.com/Final%20DMS%20Report.htm.

- Important look at how California provides disaster response

Joint Commission on Accreditation of Healthcare Organizations:

New JCAHO Standards for 2001: EC 1.6 Emergency Management website:
http://www.jcaho.org/standards_frm.html.

- Effective 01 Jan 2001, JCAHO establishes new standards for emergency management (Environment of Care-EC standards)

American Hospital Association (AHA):

AHA, with support of Office of Emergency Preparedness (OEP) and Dept of Health and Human Services (DHHS) produced the document "Hospital Preparedness for Mass Casualties-Final Report August 2000".

- Provides AHA recommendations for mass casualty events at hospitals

Individual Protective Equipment (IPE), Collective Protection, Decontamination, Mission Oriented Protective Posture (MOPP) and Universal Precautions

Techniques for expedient collective protection, personal protection, and evacuation at:
http://www.firefighting.com/default.asp?GoTo=namID938.

- Offers good overview of collective protection requirements, including options evacuation, shelter-in-place, and protective shelter in any CBRNE environment

Hospital planning for contaminated casualties:
http://jama.ama-assn.org/issues/v282n2/ffull.jsc90100.html

- JAMA special communication on effective planning for health care facilities

Preparedness for WMD events:
http://jama.ama-assn.org/issues/v283n2/fful/jed90095.html

- JAMA editorial on domestic preparedness for WMD events

Mission Oriented Protective Posture (MOPP) at:
http://www.gulflink.osd.mil/mopp
Explains the military MOPP levels for use in any CBRNE environment

NW EDUCATION/TRAINING INFORMATION

Note: For a comprehensive listing of CBRNE training/education courses available from various federal government sources go to the following website: http://www.ndpo.gov/compenium.pdf.

National Interagency Civil-Military Institute (805) 782-6739
Community Response Emergency Simulation Training (CREST).
Preparing for and Managing Consequences of Terrorism.

U.S. Army Soldier & Biological Chemical Command (SBCCOM) (800) 368-6498

NBC Domestic Preparedness-Basic Awareness.
NBC Domestic Preparedness-Incident Command.
NBC Domestic Preparedness-Senior Officers/Officials.

FEMA/Emergency Management Institute/National Fire Academy:

Emergency Management Information System (EMIS). (800) 238-3358.
Emergency Planners Companion (CD-ROM's). (202) 646-2734.
Personal Protective Equipment (video). (202) 646-2734.
Incident Command System/Emergency Operations Center (ICS/EOP). (301) 447-1249.
Integrated Emergency Management: Consequences of Terrorism. (301) 447-1249.
Mass Fatalities Incident. (301) 447-1249.
Emergency Response to Terrorism: Self-Study. (301) 447-1060.

DoD Emergency Preparedness Course: Further information available at FEMA's website: http://fema.gov/emi/iemc_01.htm.

NEHC/NEPMUs. Currently offer 1 and 3 day courses in CBRNE. This course includes a radiological component. Call NEHC at (757) 462-5404 / 2178 or call the nearest NEPMU:

NEPMU-2	Norfolk, VA	(757) 444-7671 X 306 DSN 564
NEPMU-5	San Diego, CA	(619) 556-7070, DSN: 526
NEPMU-6	Pearl Harbor, HI	(808) 473-0555, DSN: 473
NEPMU-7	Sigonella, IT	011- 39-095-56-3783

AFRRI – Medical Effects of Ionizing Radiation course. For details see: http://www.afrri.usuhs.mil/

Other Services/Publications/Software on Nuclear Terrorism

The BUMED (MED-27) homepage at: https://bumed.med.navy.mil/MED27/ provides electronic versions of many of the following references:

Primary Clinical/Technical Manuals:

Army FM 4-02.283/Navy NTRP 4-02.21/Air Force AFMAN 44-161(I)/Marine Corps MCRP 4-11.1B Treatment of Nuclear and Radiological Casualties, 20 December 2001.

Armed Forces Radiobiology Research Institute, "Medical Management of Radiological Casualties" First Edition, December 1999.
http:www.afrri.usuhs.mil/www/outreach/pdf/radiologicalhandbook.sp99-2.pdf

NATO Handbook on the Medical Aspects of NBC Defense Operations
http://www.fas.org/nuke/guide/usa/doctrine/dod/fm8-9/1toc.htm

BUMEDINST 6470.10A, "Initial Management of Irradiated or Radioactively Contaminated Patients" December 1998.

National Council on Radiation Protection and Measurements (NCRP) Report 138, "Management of Terrorist Events Involving Radioactive Material" December 2001, $50.00; available at: http://www.ncrp.com ***-This is a "MUST HAVE"-***

Secondary Guidance:

BUMEDINST 3440.4 Activity Disaster Preparedness Plans and Material for Disaster Preparedness Teams at: http://navymedicine.med.navy.mil/instructions/external/external.htm

- Outlines basic requirements for disaster and emergency preparedness activities at MTFs (This instruction is being completely revised and updated.)

Military Support To Civil Authorities (MSCA). DODD 3025.1. This and other DoD Directives and Instructions are available at http://www.dtic.mil/whs/directives.

- Provides MTF Commanders with authority to provide "Immediate Response" actions with regard to CBRNE terrorist actions in the civilian community.

NCRP Report No. 111, "Developing Radiation Emergency Plans for Academic, Medical or Industrial Facilities" August 1991, $35.00.

The Effects of Nuclear Weapons, Glasstone, S. and Dolan P. (1977) Published by the Department of Defense and Department of Energy.

Weapons of Mass Destruction Emergency Care, DeLorenzo, R. and Porter, R. (1999) Prentice Hall Health Publishers.

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Federal Bureau of Investigation Field Offices

FIELD OFFICE	STREET ADDRESS	ZIP CODE	TELEPHONE No.
Albany, NY	200 McCarty Avenue	12209	518/465-7551
Albuquerque, NM	415 Silver Avenue, SW, Suite 300	87102	505/224-2000
Anchorage, AK	101 E. 6th Avenue	99501	907/258-5322
Atlanta, GA	2635 Century Parkway, NE, Suite 400	30345	404/679-9000
Baltimore, MD	7142 Ambassador Road	21244	410/265-8080
Birmingham, AL	2121 8th Avenue, N., Room 1400	35203	205/326-6166
Boston, MA	One Center Plaza, Suite 600	02108	617/742-5533
Buffalo, NY	One FBI Plaza	14202	716/856-7800
Charlotte, NC	400 S. Tryon Street, Suite 900, Wachovia Blvd.	28285	704/377-9200
Chicago, IL	219 S. Dearborn Street, Room 905	60604	312/431-1333
Cincinnati, OH	550 Main Street, Room 9000	45202	513/421-4310
Cleveland, OH	1240 East 9th Street, Room 3005	44199	216/522-1400
Columbia, SC	151 Westpark Blvd.	29210	803/551-1200
Dallas, TX	1801 N. Lamar, Suite 300	75202	214/720-2200
Denver, CO	1961 Stout Street, Room 1823, FOB	80294	303/629-7171
Detroit, MI	477 Michigan Avenue, P.V. McNamara FOB, 26th Floor	48226	313/965-2323
El Paso, TX	Suite 3000, 660 South Mesa Hills Drive	79912	915/832-5000
Honolulu, HI	300 Ala Moana Blvd., Room 4-230, Kalanianaole FOB	96850	808/521-1411
Houston, TX	2500 East T.C. Jester	77008	713/693-5000
Indianapolis, IN	575 N. Pennsylvania St., Room 679, FOB	46204	317/639-3301
Jackson, MS	100 W. Capitol Street, Suite 1553, FOB	39269	601/948-5000
Jacksonville, FL	7829 Arlington Expy. Suite 200	32211	904/721-1211
Kansas City, MO	1300 Summit Street	64105	816/221-6100
Knoxville, TN	710 Locust Street, Suite 600	37902	423/544-0751
Las Vegas, NV	John Lawrence Bailey Bldg., 700 E. Charleston Blvd.	89104	702/385-1281
Little Rock, AR	10825 Financial Center Pkwy., Suite 200	72211	501/221-9100
Los Angeles, CA	11000 Wilshire Blvd., Suite 1700 FOB	90024	310/477-6565
Louisville, KY	600 Martin Luther King Jr. Pl., Room 500	40202	502/583-3941
Memphis, TN	225 North Humphries Blvd., Suite 3000, Eagle Crest Bldg.	38120	901/747-4300
Miami, FL	16320 NW 2nd Avenue, N. Miami Beach	33169	305/944-9101
Milwaukee, WI	330 E. Kilbourne Avenue, Suite 600	53202	414/276-4684
Minneapolis, MN	111 Washington Avenue South, Suite 1100	55401	612/376-3200
Mobile, AL	One St. Louis Street, 3rd Floor, One St. Louis Centre	36602	334/438-3674

New Haven, CT	150 Court Street, Room 535 FOB	06510	203/777-6311
New Orleans, LA	1250 Poydras Street, Suite 2200	70113	504/522-4671
New York City, NY	26 Federal Plaza, 23rd Floor	10278	212/384-1000
Newark, NJ	One Gateway Center	07102	973/622-5613
Norfolk, VA	150 Corporate Blvd.	23502	757/455-0100
Oklahoma City, OK	50 Penn Place, Suite 1600	73118	405/290-7770
Omaha, NE	10755 Burt Street	68114	402/493-8688
Philadelphia, PA	600 Arch Street, 8th Floor, William J. Green, Jr., FOB	19106	215/418-4000
Phoenix, AZ	201 E. Indianola Avenue, Suite 400	85012	602/279-5511
Pittsburgh, PA	700 Grant Street, Suite 300 USPO	15219	412/471-2000
Portland, OR	1500 S. W. 1st Avenue, Suite 400; Crown Plaza Bldg.	97201	503/224-4181
Richmond, VA	111 Greencourt Road	23228	804/261-1044
Sacramento, CA	4500 Orange Grove Avenue	95841	916/481-9110
Salt Lake City, UT	257 East 200 South, Suite 1200	84111	801/579-1400
San Antonio, TX	615 E. Houston Street, Suite 200; US Post Office & Courthouse Bldg.	78205	210/225-6741
San Diego, CA	9797 Aero Drive	97123	619/565-1255
San Francisco, CA	450 Golden Gate Avenue, 13th Floor	94102	415/553-7400
San Juan, PR	150 Carloa Chardon, Room 526; U. S. Federal Building, Hato Roy, PR	00918	787/754-6000
Seattle, WA	915 Second Avenue, Room 710	98174	206/622-0460
Springfield, IL	400 W. Monroe Street, Suite 400	62704	217/522-9675
St. Louis, MO	2222 Market Street	63103	314/231-4324
Tampa, FL	500 E. Zack Street, Suite 610 FOB	33602	813/273-4566
Washington D. C.	601 4th Street, N. W.	20535	202/278-2000

STATE / TERRITORIAL PUBLIC HEALTH AGENCIES

Alabama
Alabama Department of Public Health
State Health Officer
Phone No. (334) 206-5200
Fax No. (334) 206-2008

Alaska
Division of Public Health
Alaska Department of Health and Social Svcs
Director
Phone No. (907) 465-3090
Fax No. (907) 586-1877

American Samoa
Department of Health
American Samoa Government
Director
Phone No. (684) 633-4606
Fax No. (684) 633-5379

Arizona
Arizona Department of Health Services
Director
Phone No. (602) 542-1025 / (800) 411-2336 (24 hrs)
Fax No. (602) 542-1062

Arkansas
Arkansas Department of Health
Director
Phone No. (501) 661-2417
Fax No. (501) 671-1450

California
California Department of Health Services
State Health Officer
Phone No. (916) 657-1493 / (916) 262-1621 (24 hrs)
Fax No. (916) 657-3089

Colorado
Colorado Department of Public Health & Environment
Executive Director
Phone No. (303) 692-2011
Fax No. (303) 691-7702

Connecticut
Connecticut Department of Public Health
Commissioner
Phone No. (860) 509-7101 / (860) 566-3180 (24 hrs)
Fax No. (860) 509-7111

Delaware
Division of Public Health
Delaware Department of Health and Social Services
Director
Phone No. (302) 739-4700
Fax No. (302) 739-6659

District of Columbia
DC Department of Health
Acting Director
Phone No. (202) 645-5556
Fax No. (202) 645-0526

Florida
Florida Department of Health
Secretary and State Health Officer
Phone No. (850) 487-2945 / (800) 320-0519 (24 hrs)
Fax No. (850) 487-3729

Georgia
Division of Public Health
Georgia Department of Human Resources
Director
Phone No. (404) 657-2700 / (800) 879-4362 (24 hrs)
Fax No. (404) 657-2715

Guam
Department of Public Health & Social Services
Government of Guam
Director of Health
Phone No. (67l) 735-7102
Fax No. (671) 734-5910

Hawaii
Hawaii Department of Health
Director
Phone No. (808) 586-4410
Fax No. (808) 586-4444

DRAFT

Idaho
Division of Health
Idaho Department of Health and Welfare
Administrator
Phone No. (208) 334-5945
Fax No. (208) 334-6581

Illinois
Illinois Department of Public Health
Director of Public Health
Phone No. (217) 782-4977 / (800) 782-7860 (24 hrs)
Fax No. (217) 782-3987

Indiana
Indiana State Department of Health
State Health Commissioner
Phone No. (317) 233-7400
Fax No. (317) 233-7387

Iowa
Iowa Department of Public Health
Director of Public Health
Phone No. (515) 281-5605
Fax No. (515) 281-4958

Kansas
Kansas Department of Health and Environment
Director of Health
Phone No. (785) 296-1343
Fax No. (785) 296-1562

Kentucky
Kentucky Department for Public Health
Commissioner
Phone No. (502) 564-3970
Fax No. (502) 564-6533

Louisiana
Louisiana Department of Health and Hospitals
Asst Secretary and State Health Officer
Phone No. (504) 342-8093 / (225) 342-5470 (24 hrs)
Fax No. (504) 342-8098

Maine
Maine Bureau of Health
Maine Department of Human Services
Director
Phone No. (207) 287-3201 / (800) 452-4664 (24 hrs)
Fax No. (207) 287-4631

Mariana Islands
Department of Public Health & Environmental Services
Commonwealth of the Northern Mariana Islands
Secretary of Health and Environmental Services
Phone No. (670) 234-8950
Fax No. (670) 234-8930

Marshall Islands
Republic of the Marshall Islands
Majuro Hospital
Minister of Health & Environmental Services
Phone No. (692) 625-3355
Fax No. (692) 625-3432

Maryland
Maryland Dept of Health and Mental Hygiene
Secretary
Phone No. (410) 767-6505 / (877) 463-3464 (24 hrs)
Fax No. (410) 767-6489

Massachusetts
Massachusetts Department of Public Health
Commissioner
Phone No. (617) 624-5200
Fax No. (617) 624-5206

Michigan
Community Public Health Agency
Michigan Department of Community Health
Chief Executive and Medical Officer
Phone No. (517) 335-8024
Fax No. (517) 335-9476

Micronesia
Department of Health Services
FSM National Government
Secretary of Health
Phone No. (691) 320-2619
Fax No. (691) 320-5263

Minnesota
Minnesota Department of Health
Commissioner of Health
Phone No. (651) 296-8401
Fax No. (651) 215-5801

Mississippi
Mississippi State Department of Health
State Health Officer and Chief Executive
Phone No. (601) 576-7634 / (601) 576-7400 (24 hrs)
Fax No. (601) 960-7931

Missouri
Missouri Department of Health
Director
Phone No. (573) 751-6001
Fax No. (573) 751-6041

Montana
Montana Department of Public Health & Human Services
Director
Phone No. (406) 444-5622
Fax No. (406) 444-1970

Nebraska
Nebraska Health and Human Services System
Chief Medical Officer
Phone No. (402) 471-8399
Fax No. (402) 471-9449

Nevada
Division of Health
Nevada State Department of Human Resources
State Health Officer
Phone No. (702) 687-3786
Fax No. (702) 687-3859

New Hampshire
New Hampshire Department of Health & Human Services
Medical Director
Phone No. (603) 271-8560 / (603) 271-3636 (24 hrs)
Fax No. (603) 271-4827

New Jersey
New Jersey Department of Health & Senior Services
Commissioner of Health
Phone No. (609) 292-7837
Fax No. (609) 292-0053

New Mexico
New Mexico Department of Health
Secretary
Phone No. (505) 827-2613
Fax No. (505) 827-2530

New York
New York State Department of Health
ESP-Corning Tower, 14th Floor
Albany, NY 12237
Commissioner of Health
Phone No. (518) 474-2011
Fax No. (518) 474-5450

North Carolina
NC Department of Health and Human Services
State Health Director
Phone No. (919) 733-4392 / (800) 858-0368 (24 hrs)
Fax No. (919) 715-4645

North Dakota
North Dakota Department of Health
State Health Officer
Phone No. (701) 328-2372
Fax No. (701) 328-4727

Ohio
Ohio Department of Health
Director of Health
Phone No. (614) 466-2253
Fax No. (614) 644-0085

Oklahoma
Oklahoma State Department of Health
Commissioner of Health
Phone No. (405) 271-4200
Fax No. (405) 271-3431

Oregon
Oregon Health Division
Oregon Department of Human Resources
Administrator
Phone No. (503) 731-4000
Fax No. (503) 731-4078

Palau, Republic of
Ministry of Health
Republic of Palau
Minister of Health
Phone No. (680) 488-2813
Fax No. (680) 488-1211

Pennsylvania
Pennsylvania Department of Health
Secretary of Health
Phone No. (717) 787-6436
Fax No. (717) 787-0191

Puerto Rico
Puerto Rico Department of Health
Secretary of Health
Phone No. (787) 274-7602
Fax No. (787) 250-6547

Rhode Island
Rhode Island Department of Health
Director of Health
Phone No. (401) 277-2231
Fax No. (401) 277-6548

South Carolina
SC Department of Health and Environmental Control
Commissioner
Phone No. (803) 734-4880
Fax No. (803) 734-4620

South Dakota
South Dakota State Department of Health
Secretary of Health
Phone No. (605) 773-3361
Fax No. (605) 773-5683

Tennessee
Tennessee Department of Health
State Health Officer
Phone No. (615) 741-3111
Fax No. (615) 741-2491

Texas
Texas Department of Health
Commissioner of Health
Phone No. (512) 458-7375
Fax No. (512) 458-7477

Utah
Utah Department of Health
Director
Phone No. (801) 538-6111
Fax No. (801) 538-6306

Vermont
Vermont Department of Health
Commissioner
Phone No. (802) 863-7280
Fax No. (802) 865-7754

Virgin Islands
Virgin Islands Department of Health
Commissioner of Health
Phone No. (340) 774-0117; Fax No. (340) 777-4001

Virginia
Virginia Department of Health
State Health Commissioner
Phone No. (800) 523-6019 / (800) 523-6019 / (804) 674-2400 (24 hrs)
Fax No. (804) 786-4616

Washington
Washington State Department of Health
Acting Secretary of Health
Phone No. (360) 753-5871
Fax No. (360) 586-7424

West Virginia
Bureau for Public Health
WV Department of Health & Human Resources
Commissioner of Health
Phone No. (304) 558-2971
Fax No. (304) 558-1035

Wisconsin
Division of Health
Wisconsin Department of Health and Family Services
Administrator
Phone No. (608) 266-1511
Fax No. (608) 267-2832

Wyoming
Wyoming Department of Health
Director
Phone No. (307) 777-7656
Fax No. (307) 777-7439