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Report on the National Association of County and City Health Officials/Centers for Disease Control and Prevention Workshop on Operating Public Shelters during a Radiation Emergency



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Report on the NACCHO/CDC Workshop on Operating Public Shelters during a Radiation Emergency

Prepared for the Centers for Disease Control and Prevention (CDC) by the National Association of County and City Health Officials (NACCHO)

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DISCLAIMER

This document has been developed by NACCHO based on comments from meeting participants during the CDC/NACCHO Workshop on Operating Public Shelters during a Radiation Emergency. The views and opinions expressed in this document are solely those of the participants from the workshop and may not necessarily represent the views of the entire membership of NACCHO. Although the views and opinions expressed in this report will be used to help CDC develop effective public health guidance, responses expressed in this report do not constitute endorsement by CDC or agreement by CDC with these opinions.

ACKNOWLEDGMENTS

The authors wish to thank Captain D. Lynn Evans, MS, and Armin Ansari, PhD, of the CDC for their support and leadership in the planning of this workshop and improving the public health response to public sheltering during a radiation emergency. The authors also wish to thank Charles Miller, PhD, of the CDC for his support of this workshop as the chief of the radiation studies branch.

The authors acknowledge Mr. Ronald Edmond for his expert facilitation of this workshop and his collaboration with NACCHO and CDC staff in determining the facilitation methods that would create the best participant engagement and allow staff to capture comments sufficiently. The authors also wish to thank Ms. Lise Martel for her support during the planning of this workshop.

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EXECUTIVE SUMMARY

Public sheltering during a radiation emergency has become an increasingly important topic among emergency preparedness and public health professionals as a result of heightened concerns about the likelihood of a radiation incident following the terrorist attacks of Sept. 11, 2001. Past experiences with public sheltering during other public emergencies, such as natural disasters, have provided guidelines for how to effectively operate general public sheltering efforts, but the unique needs that would be presented by a radiation emergency would require specific standardized guidelines for shelter operation in order to ensure the safe and effective public sheltering of affected populations. The *Workshop on Operating Public Shelters during a Radiation Emergency* was convened on Feb. 3–4, 2010 in Atlanta, GA to gather input from federal and state agencies including state departments of health, local health departments (LHDs), and non-governmental organization (NGO) partners about the resources and processes needed to provide the public with acceptable shelter during a radiation emergency.

This workshop brought together diverse stakeholder groups to provide comments about three topic areas within the scope of public sheltering: decontamination, registration and tracking, and risk communication. Participants listed and described the functions necessary to accomplish each of these responsibilities. Recommendations were provided regarding stakeholder needs for public sheltering and how these needs should be addressed. The recommendations were separately reviewed by federal, state, local, and NGO participants to ensure that they were valid, plausible, and worthy of consideration to be acted upon. Based on these vetted recommendations, this report was produced in order to provide readers with an understanding of the key recommendations stemming from this workshop.

Decontamination at public sheltering locations will require the development of professional education courses for training related to radiation sheltering, increased public communication, development of an operational guide for decontamination and contamination control, and coordinated decontamination planning at the state and federal level. Recommendations for professional education and training included the development of an American Red Cross (ARC) introductory radiation course, an advanced course for specialists such as emergency medical responders, and a just-in-time training for operating specialized instrumentation. Recommendations for public communication included improved threat communication on intentional radiation emergencies, development of health education communications through social media and other avenues, and determining the most effective place to house decontamination information online. Meeting participants strongly recommended an operational guide for decontamination and contamination control that could include or be combined with a screening form as an addendum to the current Department of Health and Human Services (HHS) intake form and shelter criteria for radiation response assessment forms. Finally, participants recommended increased coordination efforts from state and federal agencies through the development of state volunteer coordination, state contact lists for volunteers and shelters, and preparedness grants for LHDs to develop sheltering plans.

Key recommendations for registration and tracking efforts at public sheltering locations included better resource management, federal leadership, and standardizing processes, training, planning, and partnering. Funding was identified as a key need in the development or application of each of these recommendations. Participants recommended that standards be put into practice relating to sheltering process, forms, training, health assessments, and tracking. Additionally, training will need to be provided to ensure professionals and volunteers are able to register and track the public and can adhere to Incident Command System (ICS) protocol. Partners should be involved early in the planning process so that each stakeholder is aware of their role and responsibilities. Resource management was also identified as a critical component to public sheltering efforts during radiation emergencies, including radiation-specific equipment accessibility and use, better implementation of resource typing, and the identification and protection of technical support resources. Finally, participants suggested that federal leadership may be necessary for the establishment of standards, organization of federal partners, planning for the distribution of federal resources, and assistance with cross-jurisdictional tracking.

Recommendations for improving risk communication included focusing on education, communication through the media, partnerships, and decision-makers. Grade-level modules should be introduced in K-12 schools relating to radiation and nuclear safety. In addition to school education, public service announcements (PSAs) and community education sessions should be created to teach the public about sheltering in place. Education about radiation sheltering should also be included in all-hazards plans and discussions. Population-specific fact sheets would be useful for communicating risk with specific populations such as the elderly. Participants recommended communicating with local editorial boards about radiation plan updates and in-the-field exercises, partnering with broadcaster associations. Additionally, social media was cited as an important component to effective communication and should be developed in partnership with youth groups and schools or journalism. Partnerships should be developed with Medical Reserve Corps Hospital Preparedness (MRC-HP), LHDs, NGOs, and government agencies in developing plans. Planning and other acting agencies should also partner with community groups (such as churches or other local groups). Participants also noted that it is important to educate and influence governmental groups at the local and state levels, including local health officers, so they are aware of the resources available to their jurisdiction because they make important decisions during a radiation incident.

Public sheltering for a radiation emergency will require action at the local, state, and federal levels in order for these efforts to function as effectively as possible. Based on these recommendations and the resulting action plans, this report will explore the priority recommendations that should be acted upon to provide LHDs and emergency staff with the ability to provide the public with the most effective public sheltering during a radiation emergency.

INTRODUCTION

To better prepare the local public health system in the United States for public sheltering needs following a radiation emergency, the Centers for Disease Control and Prevention (CDC) tasked the National Association of County and City Health Officials (NACCHO) with convening the “Workshop on Operating Public Shelters during a Radiation Emergency” on February 3–4, 2010, in Atlanta, GA. This workshop brought together representatives from local health departments (LHDs), state health departments, federal agencies, and key non-governmental organizations such as the ARC to help develop clear guidelines and action plans for stakeholders in terms of public sheltering preparedness, specifically for LHDs, in response to radiation emergencies. Based on the findings from this workshop, this report provides recommendations about next steps that should be taken in order to create clear guidelines and protocols for the public health system for public sheltering during a radiation emergency. The workshop aimed to identify guidelines for the following key areas.



This workshop convened more than 30 representatives from the various stakeholder groups. For a complete list of the meeting participants, refer to Appendix C. For the complete workshop agenda, refer to Appendix A.

The workshop began with introductory presentations from several of the participating agencies. These presentations were given by the following organizations:

- CDC
- NACCHO
- Federal Emergency Management Agency (FEMA)
- ARC
- Multnomah County (OR) Health Department

Each presenting organization was asked to address the following questions in their background presentation:

1. Define your role in management or operation of shelters.
2. What tools and/or guidance documents provide the basis for your plans and procedures for management/operation of shelters?

3. What are your concerns regarding operation of shelters during a nuclear/radiological incident?

INTRODUCTORY PRESENTATIONS

Charles Miller, Ph.D.

Chief, Radiation Studies Branch, CDC

Charles W. Miller, Ph.D., Chief of the Radiation Studies Branch of the CDC's National Center for Environmental Health, Division of Environmental Hazards and Health Effects, welcomed participants and reviewed the purpose and objectives of the workshop. Dr. Miller acknowledged the wide range of stakeholders at the meeting and reminded participants that radiation is an issue that will impact all Americans as a result of post-incident migration and travelling radiation fallout. In order to respond to a radiation emergency effectively, the government will need to be prepared to leverage all the help it can get from federal agencies, state and local governments, and NGO partners. Dr. Miller spoke about the problematic ambiguity of responsibilities for the Department of Health and Human Services (HHS) in the event of such an emergency because public health disasters such as hurricanes, radiation incidents, and even the recent h1n1 outbreak are the shared responsibility of several agencies and organizations. However, the agency responsibilities for a radiation emergency are important to determine separately because of the unique needs of affected populations after such an incident. Identifying, screening, and monitoring people for exposure to radiation or contamination with radioactive materials are essential to effectively addressing a radiation incident. This requires the evaluation of potentially affected populations for radiation contamination, medical care, intake of radioactive materials, radiation dose and resulting health risks, and long-term issues.

A radiation incident such as a nuclear emergency will begin locally and become national quickly because of post-incident population migration. Contamination and sheltering will need to take place across the country and not just in the immediate area. As a result of this population movement, those who think they will not be targeted for a nuclear detonation should also be prepared for an incident and be aware of contamination and decontamination issues and protocol. If a nuclear detonation occurred, the effects would be even more wide spread. Evidence of past incidents such as nuclear device detonation testing that occurred on March 12, 1955 in Nevada has proven this to be true. The mix of volatilized debris and radioactive materials from the detonation travel high into the atmosphere, possibly reaching the stratosphere. The mix can meet with upper atmospheric winds and spread over a global range. The radioactive particles descend and deposit on the ground surface by force of gravity or are brought down by rain. Public health departments need to be ready for such a scenario because they will be asked questions by the public regarding what to do to protect themselves and their families.

Current Federal Emergency Management Agency (FEMA) planning guidance for a nuclear or radiation emergency requires that 20 percent of the potentially affected population be monitored within 12 hours of the incident. Emergency response staff could use many different types of monitoring to do this. In addition to FEMA and other federal agencies, the planning guidance sets forth that population-monitoring is the responsibility of state, local, and tribal governments. A population monitoring working group exists at the federal level in order to help federal, state, local, and tribal emergency response agencies prepare for radiation emergencies and the population monitoring responsibilities of emergency response personnel. The focus of this working group is mass casualties, and it has been working under the assumption that local infrastructure will be intact in a nuclear incident. One of the guiding principles in the FEMA guidance for population monitoring during a nuclear or radiation incident is to respond to and treat the injured first because contamination is not immediately life threatening. Initial population monitoring activities should focus on preventing acute radiation health effects and cross contamination effects. HHS assists states with internal contamination monitoring, administering drugs for internal contamination, creating registries, dose reconstruction, long-term monitoring, and coordinates federal support for external contamination monitoring.

The goals of this workshop are to identify issues associated with mass care, sheltering, and feeding. Once these issues have been identified, they will need to be prioritized in order to subsequently develop action plans for dealing with the most important issues. The action plans and recommendations that are made during this workshop will help to inform future decisions about the roles and responsibilities of federal, state, local, tribal, and NGO stakeholders during a radiation emergency.

Costanza Galastri

Senior Analyst, Public Health Preparedness, NACCHO

NACCHO has committees, teams, workgroups, and LHD practitioners specifically tasked with engaging nuclear and radiation issues. Further, NACCHO is in charge of the Advanced Practice Centers (APC) program in which eight LHDs are tasked with developing tools and resources for other LHDs on a number of pertinent public health topics. The APC Manager for Tarrant County Public Health (TX), Bill Stephens, works on nuclear and radiation preparedness guides and training courses that are targeted to different communities. Project Public Health Ready (PPHR) is a program at NACCHO that assesses preparedness of LHDs and is continually updated regarding nuclear and radiation preparedness. Conducting the 2010 Annual Preparedness Survey will further assist NACCHO in assessing LHD preparedness regarding nuclear and radiation issues.

In approaching issues of nuclear and radiation preparedness, NACCHO participates in many different partnerships. Part of this effort includes trying to bridge an information gap with FEMA so that the FEMA lessons learned info sharing website is used by more local health departments. Another effective partnership is the National Alliance for Radiation Readiness, which consists of the Association of State and Territorial Health Officials (ASTHO), NACCHO, the Council of State and Territorial Epidemiologists, and others. This alliance was created to expand

radiological preparedness, increase capacity for radiological response within state/local public health agencies, and to share resources, tools, and information. This is a new partnership that holds the potential to be greatly beneficial to all groups involved and to nuclear and radiation public health preparedness efforts in general.

Armin Ansari, Ph.D.

Health Physicist, Radiation Studies Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC

Workshop participants completed a radiation emergency knowledge self-assessment prior to the workshop. Many participants rated at the high end of the scale, indicating a high level of knowledge. However, input from those who rated themselves as less knowledgeable on this subject will raise comments that will be very important to the outcome of this workshop because many of those who will be tasked with public sheltering during a radiation emergency will have a lower level of knowledge on the subject.

Dr. Ansari then presented a brief introduction to radiation and radiation protection by describing the difference between radioactive contamination and radiation exposure, and the difference between external and internal contamination. He then demonstrated how to screen for radioactive contamination and how to perform effective decontamination. More detailed information can be found in presentation slides in Appendix B.

Shelters are often viewed as cocoons of zero radioactivity, but this perception is false. In a large nuclear or radiological incident, there will always be some residual contamination, but that does not mean that there will be dangerous levels of radiation. The more a contaminated person moves around, the less contamination they will have on them as it rubs off on the surrounding environment. One million people or more may be displaced after a nuclear or radiation incident. Sheltering problems for disasters are all similar, but nuclear or radiation incidents have a few separate and specific needs. Public shelters will impact all communities. Several questions will need to be answered in order to effectively plan for such shelters in a radiation emergency.

One key question is where to set up shelters. Sick people need help within 20 miles from the incident, but up to 2,000 miles away will have evacuees who are also in need of help. In addition to these locations, places in between will be necessary in order to help those in the middle. Developing protocols for rapid screening for contamination will be necessary. In order to prepare for radiation screening at shelters, plan how to have adequate staff for screening, and contingency plans on what to do if there is less than adequate or no staff available. Community reception centers could be located adjacent to shelters with training and staffing information. Radiation expertise come from MRC units in hospitals and can help staff shelters in nuclear/radiation emergencies. The Conference of Radiation Control Program Directors has a pilot project in a number of states to recruit MRC radiation professionals for such incidents.

Communication messages about self-decontamination are sent to the public so they know what to do in contamination situations, such as removing clothing and showering. Convincing people

that they can self-decontaminate is difficult due to the fear around radiation. Public communication has been improved through the use of focus groups, fact sheets, and interviews to see how the public reacts and responds to radiation information. In order for communication messages to be the most effective, leaders need to understand and believe the messages that they are providing to the public.

Mark Tinsman

Support Specialist, ESF #6 Mass Care & Emergency Assistance, FEMA

The federal role in radiation emergencies is to support state and local operations and coordinate federal resources. Support for sheltering organizational structure is shared through a multi-organizational task force. FEMA mainly supports states. Evacuation tracking systems are becoming electronic and are focusing on the gulf coast states since Hurricane Katrina in 2006.

Tools and resources are shared and posted to FEMA's website. Additional tools will be released in the future, including the Mega-Shelter Guidance. Please reference the FEMA presentation slides in Appendix B for more information about tools that have already been made available. Tools such as the Mega-Shelter Guidance will be offered to states, then locals will be able to get the tools from the states. Resources are being thought about differently now with contracts being done beforehand with specified packages of medical supplies, or food, or others that can be shipped to the site more quickly than resources have typically arrived. The International Association of Assembly Managers (IAAM) has partnered with the ARC and is working on the Mega-Shelter Guide, which will be available in 2010. Concerns were raised about the lack of integration with past tools or other tools being produced. Easy access to these tools from locals is the desired effect. FEMA stated that these tools are not meant to supplant the ARC guidance document but rather supplement them during planning.

Services are likely to be delivered for mass care outside the hot zone to ensure safety. Concerns about shelter safety also include shelter security. For more detail on these concerns, please refer to the presentation slides in Appendix B.

Jeanne Spears

Senior Leadership Volunteer, Health Services, Disaster Services, American Red Cross

The American Red Cross (ARC), through its Congressional charter and other federal statutes, has both a legal and moral mandate to provide disaster relief services in every community across the nation. Local ARC chapters work with local government and community partners for disaster planning. In the most visible of its core services, ARC responds to the immediate needs of disaster-impacted communities by opening, operating, and supporting shelters that provide a safe, secure, and temporary environment for as many people as possible. ARC is the nation's primary sheltering organization.

Shelters are established after a disaster incident when people have been displaced from their homes and cannot return for an extended period of time. ARC shelters provide for the basic

needs of those affected by an incident, including people of varying age groups and differing needs. The shelter becomes their temporary home. Shelters feed staff, provide disaster health and mental health services, and become a micro community. There are large and small shelters. There are also community shelters where ARC provides assistance and support.

Core activities in a shelter include the following:

- Registration;
- Dormitory management;
- Feeding;
- Bulk distribution;
- Client casework and recovery planning;
- Disaster health and mental health services;
- Welfare information and family reunification support; and
- Recreation.

Health services during a disaster response include identifying health needs, replacing medical equipment and medication, and utilizing community partners and services to meet the health needs of those being sheltered. For a full list of the disaster health services during a disaster, please refer to the presentation slides in Appendix B. To meet the healthcare needs of those who are sheltered, ARC works closely with Medical Reserve Corps volunteers, community groups, and others.

The Initial Intake and Assessment Tool (IIAT) was developed by ARC following Hurricane Katrina for shelters in conjunction with HHS. This tool helps to determine whether a person is appropriate for a shelter. Shelter registration staff assist someone seeking shelter through the first nine questions of the IIAT. If the person answers yes to any of the nine questions, they are sent to disaster health services or mental services. The IIAT is used in a shelter environment and is electronic when used internally by ARC. The IIAT was updated in 2008 but has not been used since 2007. It can be modified to adapt to a particular incident.

Shelter staff health is vital to the process of setting up a shelter. Staff communicates with management and recommends any other staff members that may need to be released or sent home early to tend to their health. Shelter tools and guidance that are used during the setting up of the shelter include the following:

- Mass care standards and indicators;
- Shelter operations and simulation training; and
- Shelter Operations Management Toolkit.

CDC also has an environmental health shelter assessment tool that would be useful in a sheltering incident. To download the tool, visit www.cdc.gov and search for “shelter tool.” The ARC’s shelter operation tool is also posted on the FEMA website.

James Spitzer

Emergency Preparedness Manager, Multnomah County Health Department, OR

LHDs typically will not have a lead role in establishing and operating public shelters for evacuated populations after a radiation incident, but public health does have a role. For example, when Multnomah County prepared to receive Hurricane Katrina victims, public health worked with the ARC since they operated shelters. This effort was done with the support of other organizations.

Slides were shown of Mr. Spitzer's tour of the 2003 major wildland fires in Southern California where some 50,000 people were evacuated and as many as 10,000 were accommodated in public shelters. The largest ARC shelters housed over 1,000 evacuees and provided many services including child care, recreation, food services, phone banks, pet shelters, mental and substance abuse staffing, a pharmacy, and a medical clinic. Public health was represented in the San Bernardino Emergency Operations Center and insisted on services at shelters such as accommodating a Loma Linda Medical School clinic in the large Norton Air Force Base shelter (after ARC declared they did not want a collocated clinic), providing environmental health support, and coordinating EMS/medical support of shelters with agencies and hospitals providing those services. However, public health did not operate the shelter.

Multnomah County's (Portland, Oregon) participation in the 2007 national Top Officials exercise (a "dirty bomb" scenario requiring tens of thousands of people in the blast area and under the plume to be evacuated) was described. During this presentation, a more detailed description of the national exercise that the Multnomah County Health Department participated in was provided. Mass care points and rapid screening points were set to expand emergency room capacity and screen possibly exposed persons who would otherwise flood emergency rooms. The evolution of a growing response organization led by a Unified Command and joined by many agencies over a period of four days was shown. Throughout the presentation, it was stressed that although public health did not have lead roles in sheltering operations, it had important roles.

FACILITATED DISCUSSION

Following the introductory presentations, a facilitated discussion was held where participants were asked to discuss the basic functions that public health professionals and other public sheltering staff members would need to perform during an emergency. Based on feedback from workshop participants during this discussion, the functions that are regularly performed in a shelter during any emergency include the following.

- Feeding
- Conditioned space
- Counseling
- Hygiene
- Health services
- Pet care
- Children's care
- Special needs

- Information dispersal
- Discharge planning upon arrival
- Information gathering
- Security
- Sanitation
- Transportation
- Clothing
- Medical
- Registration
- Storage of personal effects
- Recreation
- Medical support functions (i.e., diabetes, oxygen)
- Administration and staff support
- Epidemiological support
- Social services
- Facilitate communication to the outside world
- Sleeping area
- Food preparation
- Water
- Triage/evaluation for eligibility
- Standards for operating a shelter

In addition to these typical functions performed in a shelter during a non-radiation emergency, additional functions that would need to be performed specific to a radiation emergency include the following:

- Extra monitoring capabilities
- Knowledge of decontamination
- Screening
- Medical oversight
- Way to deal with concerned public
- Collaboration with reception centers, population monitoring reception centers, and decontamination stations
- Extra showers
- Coordination and differentiation of shelter operations
- Sheltering contracts (incorporating risks associated with radiation exposure)
- Modification of triage
- Documentation of radiation-specific issues
- Standards of care and altered care
- Security at shelter entrance
- Resources for decontamination
- Knowledge, contact, and package for radiation answers
- Isolation of areas within the shelter for the sick people
- Who will open shelters
- Different types of shelters
- Training and job action sheets
- Coordinating response activities and best practices before a radiation/nuclear incident
- Surge capacity
- Standards for operating a shelter
- Public information on exposure
- Waste management
- Resource management
- Staff health/safety
- Population prioritization
- Medical support for people waiting in the in-take line (intake services, managing allocations)
- Shelters should be trained on decontamination, but shouldn't expect to do the majority of the decontamination effort

Workshop participants participated in a pre-workshop survey to determine the most important public health (PH) functions for public sheltering during a radiation emergency. Based on the responses to this survey, participants identified three critical PH functions for such an incident: decontamination, registration/tracking, and risk communication. Through the facilitated discussion, participants identified several functions within each of these three umbrella functions. Based on the functions identified during this discussion, participants were then able to present recommendations to address these needs. The following summarizes the participant comments during this section of the workshop.

FUNCTIONS

Decontamination

Pre-Planning: Logistics and Capacity

In order to effectively decontaminate individuals seeking public sheltering, much of the work must be done in the pre-planning stages to determine logistics and develop capacity. The first thing that must be established is the shelter location. The location of the shelter should be close enough to the incident so that it is safe and accessible to victims of the emergency.

Personnel support for decontamination must be planned well in advance to ensure that the capacity to perform the function will be present at the shelter. Sufficient personal protection equipment (PPE) for shelter personnel, including booties and gloves, should be available. In addition to PPE, planners must determine where and how they will get decontamination tools, resources, and capabilities. This includes the coordination and ensuring the availability of radiological equipment. In the event that resources are depleted more than expected, shelters should have fail-safe decontamination techniques that can be accomplished without decontamination monitors, meters, or other devices.

The shelter must include areas set aside for those who will not go through decontamination procedures as a result of cultural or social sensitivities. Such set aside areas could be part of broader plans to establish clean and contaminated areas within the shelter that are clearly divided and blocked off.

Many individuals seeking shelter will arrive in vehicles that may be contaminated. There need to be plans in place to park contaminated vehicles in separate locations to avoid additional or continued contamination. Plans to decontaminate vehicles might also be desirable and might include the use of public works facilities.

Showering will be one of the first processes when victims arrive at the shelter and one of the most important steps in the decontamination process. Shelters should provide showering for contaminated and non-contaminated individuals. These showers must be separated so that

showers used for decontamination are not used by individuals who are not contaminated. Many shelter locations will not have showers already built into them. In these locations, enough portable showers must be brought in to accommodate the largest number of individuals that the shelter will be able to hold.

When contaminated individuals are being decontaminated by showers, shelter staff will need to sequester contaminated personal belongings, including clothes, and should not be in contact with the sheltering population. As such, secure locations should be established where shelter operators can store contaminated valuables while providing confidence that these valuables will not be lost or stolen. Planning for this process should include a system that involves shelter staff bagging valuables and clothes and providing new clothing following decontamination procedures.

Decontaminating individuals and then bringing them into a shelter requires that the shelter itself is decontaminated and remains decontaminated during and after public sheltering. Several aspects of the shelter building must be pre-planned to ensure that this is the case. First, the shelter must be sufficiently decontaminated before any sheltering activities take place. These plans should also include provisions to decontaminate the shelter location after the incident and after sheltering is complete. Respiratory protection must also be provided in the shelter by planning to ensure adequate ventilation for both staff members and sheltered emergency victims and their families. Many radioactive materials will also need to be disposed of during the decontamination process. Shelters will need to have efficient methods for the waste management of these materials.

In preparation for personal care needs after decontamination, shelter operators should plan for staffing and resources beforehand to ensure the availability and proper handling of medical equipment, wheel chairs, and people. Shelter planners must ensure that there are adequate supplies onsite including wipes, hand sanitizer, towels, clothing, duct tape, gauze, soap, and water. For more specialized care needs, shelters should plan for personal care needs through relevant agencies and mandates. Additionally, these plans can include the use of licensed private sector healthcare personnel to staff decontamination shelters at times of particular need, such as when high levels of radioactivity at a particular location force shelters to move.

Communication is an important part of the decontamination process. Rapid communication of the footprint of radioactive fallout must be provided so people know when or if they need to undergo decontamination again. An important aspect of communication is ensuring that shelter and decontamination staff members are sufficiently multi-lingual to communicate with the shelter population. During decontamination, points of contact should be established for subject matter experts to answer questions. This process could involve preliminary communication with frequently asked questions to all people seeking shelter and decontamination. It is important to communicate with staff so that they are communicating the same messages, such as the fact that that people do not need to take off non-absorbent personal articles such as rings and bracelets and gauze, soap, and water are better for decontamination than baby wipes.

Before decontamination efforts can occur, sheltering and decontamination staff must be aware of and knowledgeable about the basic operating procedures for decontamination and the minimal standard for what is considered a “clean” individual. This knowledge must include the proper protocol for looking for radiation effects and internal contamination and the identification of people who have already been through decontamination. During this pre-planning and staff training phase of decontamination, there must be a clear, unified understanding of how to use intake forms, including the need for exposure information. How long and where in the contaminated area the individual was are also important bits of information to obtain. If all staff have the same knowledge about these needs, then it will be a consistent and smooth process. Shelter staff need to be trained on acceptable decontamination techniques when decontamination equipment is depleted, unavailable, or inaccessible. Staff members should be trained about alternate procedures so people can shower and be considered decontaminated without the use of verification equipment such as decontamination monitors.

Security can be an issue at shelters, and any sheltering plans must have a security component to them in order to be effective. Security, including the identification of strategic security points, a multi-lingual security staff if necessary, and a determination of how many security staff will be needed and what agency or organization will be providing the security, should be planned ahead of time.

Implementation Activities

Once the shelter location has been established, implementation activities can begin. The first step in this process will be the decontamination of the shelter, including providing staff and victims with respiratory protection through ventilation if there is none already in the shelter. Once the physical shelter is fully prepped for decontamination, supplies for decontamination including tools, resources, and capabilities should be arranged in order to facilitate the decontamination process. During this setup, staff should once again ensure that there are adequate supplies including wipes, hand sanitizer, towels, clothing, duct tape, gauze, soap, and water.

It will then be necessary to place decontamination personnel to ensure that the process can begin and function effectively. Coordination and communication among the staff is a critical component of a successful decontamination process. Staffing considerations that must be taken into account are where to place security staff, identifying multi-lingual contamination staff, and identifying licensed private sector healthcare personnel. Decontamination staff must communicate so that procedures occur consistently throughout the shelter. All staff should be performing the same basic operating procedures for decontamination and following the same protocol for looking for radiation effects and internal contamination. Staff members should also be aware of the techniques that will be put into practice if the shelter is left without decontamination monitors/meters and devices because of a meter shortage.

When decontamination begins to occur, staff should lead emergency victims to the provided showering stations. Since many shelters do not have showers, many shelters will need to do this part of the process using portable showers that have been brought to the shelter. Once the individuals seeking shelter have gone through the showering process or refuse to because of cultural or social sensitivities, individuals should be led to separate areas for those who are decontaminated and those who are not. These clean and dirty areas should be clearly divided and blocked off as to prevent cross-contamination.

Staff should all be aware of basic decontamination guidelines, including the use of gauze, soap, and water for decontamination rather than baby wipes. Staff should all be using the same forms during decontamination so that staff stationed inside the shelter can ensure that individuals have a form saying that they've been decontaminated. Similarly, any objects or materials that have not been treated for contamination will need to be referred to decontamination or treated by sheltering staff. If decontamination is impossible or impractical, staff will need to have a consistent, safe method for waste management. Additionally, staff should be identified to specifically handle medical equipment, wheel chairs, and people during the implementation of decontamination efforts.

While decontamination is occurring, staff will need to be in constant communication with those who are being decontaminated and those waiting in line. Part of this process will include rapid communication with the public about the footprint of radiation fall out so people know when they need re-decontamination. While the public is waiting in line for decontamination, the shelter should set up points of contact for subject matter experts to answer questions. As individuals are going through this process, the use of the decontamination forms must be enforced for every individual to ensure that staff are able to identify people who have and have not been through decontamination. Finally, as people enter the shelter and begin to settle in, staff members must have methods of determining levels of contamination within the shelter to constantly monitor that the sheltering conditions are safe.

Screening and Decontamination: Victims, Responders, and Receivers

One of the preliminary steps that should be taken to improve the decontamination process for victims, responders, and receivers is to determine the minimal standard for what is considered clean. This will allow responders and shelter operators to better determine the threshold for allowing individuals into the shelter and determining the amount of decontamination they need to perform in order to adequately treat individuals. Decontamination should be provided before arriving to the shelter or at the shelter, with clear processes in place to ensure that those who enter the shelter have been decontaminated sufficiently. At the shelter site, it will be important for shelter operators to provide showering, including separate showers for decontamination. Additionally, it is essential that the shelter has separate areas for those who will not go through decontamination.

Screening and Decontamination: Pets and Service Animals

Pets and service animals can be an important part of the decontamination process, so they should not be overlooked during initial planning. Screening pets and service animals should

occur during the screening of their owners if possible. Decontamination of pets and service animals must also be planned for. As part of this process, the minimal standard for what is considered clean for pets and service animals must be determined.

Screening and Decontamination: Valuables, Personal Effects, Responder's Tools, and Facilities

Personal effects and other objects can pose significant barriers to an effective decontamination process. Sheltering planners must adequately plan for the decontamination of jewelry, police guns, and personal valuables that individuals will be hesitant to relinquish possession of. However, it needs to be clearly communicated that people do not need to give up non-absorbent personal articles such as rings and bracelets. The shelter must have a system in place to securely bag valuables and clothes and provide new clothing inside shelters following decontamination procedures. In addition to smaller valuables, vehicle decontamination must be considered when establishing the decontamination system for the shelter. One opportunity for taking care of contaminated vehicles would be to use public works facilities for vehicle decontamination. The shelter itself must be decontaminated in order for it to function effectively. The shelter must be clean before and after sheltering people. All of these efforts must be defined by clear minimal standards for what is considered to be clean and decontaminated for all of these objects.

Registration and Tracking

One of the first steps in developing effective registration and tracking for public sheltering is determining the systems that will be used to do so. Participants at the meeting strongly encouraged the implementation of compatible electronic systems that would integrate federal/state/local systems, creating a standard procedure. These compatible electronic systems should be produced or implemented with FEMA, HHS, and ARC at the same table in order to facilitate the broadest and most effective information sharing. Centralizing this information is of great benefit to the shelter registration and tracking processes. These information systems should also incorporate electronic intake forms to be used at the shelters, allowing the transfer of information from the shelters to other shelters or locations in the inevitable event of population movement. Another potential idea for improving the registration and tracking process is to incorporate a barcoded bracelet system that could be interfaced with the registration information.

One of the first challenges in operating the shelter will be to get it up and running in short amount of time. It may not only take longer than the public expects to get the shelter open, but due to gridlock traffic it may be impossible to get personnel and supplies to open it for days. This could be important to know in the planning phase for registration and tracking. Traffic control staff or processes could help to alleviate this problem. In addition to the process of getting people into the shelter despite transportation issues, the shelter should have plans for transporting individuals out of the sheltering area if necessary. This could include arrangements for a bus, train, or other mode of transportation to bring individuals to an alternate city or from the triage area to a shelter.

ICS should be used to run the shelter, including during the registration and tracking processes. During registration, there should be security at each door. Security will be important for a number of reasons. During this process, shelter staff will try to prevent contaminated individuals from entering the shelter and may need security's assistance with those who are uncooperative. Additionally, there should be safeguards in place during the registration process to identify "sexual predators" using databases from state registries, creating an additional need for security if these individuals are identified and will not be allowed to take advantage of the public shelter because of legal requirements.

Meeting participants suggested that a radiation-specific component of health assessments be included with the already established Red Cross standard health assessment guidelines and is performed by sheltering staff after the incident. This health assessment should determine the person's proximity to the accident, the potential for a large amount of internal contamination that would warrant blood test or biopsy, and their symptoms related to an acute dose of radiation. Once the registration process begins, staff members will need to determine the needs of the shelter based on the people that are being registered. This information will include any communicable diseases and chronic diseases such as diabetes and blood pressure problems. Quick/Rapid (3 pt) structure and tracking where people came from (Modeling) will also be important parts of the registration and tracking process. Registering individuals will also involve determining the levels of radiation each person has been exposed to and triaging as necessary. Triage should be set up for all family members, and triage areas should be similar for all incidents. Additionally, tracking people should involve hospital visits. Much of this process could be made easier with the coded bracelet system referenced earlier in this section. Issues that sheltering staff need to be aware of include concerns over publicly sharing information and the need to count sheltered persons at meal time.

PPE should be a priority at all times to maintain sheltering and registration capacity. Part of this process includes ensuring that tools and objects that staff come into contact with are decontaminated. Training should have taken place to ensure that all staff members know the protocol for every phase of the registration process, including where to refer individuals who pose a contamination risk to the shelter, what to do with contaminated tools or objects, and how to work in conjunction with security for individuals who need to be moved involuntarily or any other problems that occur.

During this process, staff should be prepared to help or provide information to help individuals find or communicate with their family members. Many families will be split up during such an emergency and may be at different shelters, requiring sheltering staff performing registration services to provide location assistance. In addition to helping locate family members, registration and tracking staff should be prepared to help with other support services. Mental health services are a large component of this process, specifically in response to an incident as traumatic as a radiation emergency. Therefore, mental support services should be provided or located at the shelter. Additionally, there should be mental services for others who are worried or concerned. Additional services such as caring for pets and service animals may be necessary.

Once initial registration has occurred, longer-term tracking needs can receive more focus. First, discharge plans must be completed quickly to ensure those who do not need to stay at the shelter are not grouped with those who need further assistance. This is a vital part of the process since people cannot live in the shelter forever. Ongoing monitoring of the sheltered population will need to be performed after people return home or permanently relocate and will include long-term follow up for possible health effects such as cancer. When planning for these aspects of the tracking process, it is important to consider the resource limitations for performing long-term tracking. These include staffing, resource, jurisdictional, and financial limitations.

Finally, communicating with the public about the registration and tracking process will also be important. This communication will need to begin before the sheltering actually occurs. This can include media images to point people in the right direction and provide them with some guidelines for what to do in preparation for sheltering registration. Coordination with risk communicators should occur to ensure that the public receives information about where to go, the gravity of the situation, and where to find information about sheltering without publicizing the shelter location.

Risk Communication

Communicating with the public is one of the most important aspects of preparing and running an effective shelter during a radiation emergency. The first group that must be communicated with is the shelter staff. Pre-education should occur for all stakeholders who need to team up for running any shelter. This includes pre-education for other groups with shelters. This communication process would be greatly helped by a radiation shelter guidance/operating procedure (ARC/CDC written). Additionally, this training could use an on-time standardized training if one is developed in the near future. Just-in-time training tear sheets of information may also be useful. Shelter operators should also be provided with a list of subject matter experts/points of contact for radiation questions in shelters.

Communication with the public following the incident is critical and should use multiple strategies to reach the broadest audience possible. Partnering with the media is an important component of diversifying the risk communication abilities of the public health system. These partnerships can facilitate the transfer of information to the public quickly through television and radio. Working with media early to detail what government agencies are doing through an already established good working relationship can preemptively provide the public with valuable information. Additionally, some media partnerships can pass information along through Twitter, Google, CNN PSAs, television crawlers, and reverse 911. Social media networking risk communication efforts will be very important as well, with increased usage of Facebook and Twitter providing additional avenues for passing along information immediately following the radiation incident.

Communicating with the public on this subject can be difficult because the average American does not comprehend information regarding the radiation issue. Therefore, it would be beneficial to have educational fact sheets to hand out on the day of the incident. This education

can include information in multiple languages about residual contamination levels and ways to deal with pets. There will also be public education needs for specific populations. For example, communications will be necessary for elderly victims concerning medication interaction with medical counter measures such as Potassium iodide (KI), Prussian blue, and DTPA (calcium and zinc). In addition to the elderly, communications for pregnant mothers may be necessary for information regarding unnecessary abortions and general maternal health.

Sheltering in place is another topic that will need to be communicated clearly and widely. However, there is not yet a clear consensus on sheltering in place, so there may be a need for selective education in this case. Sheltering in place communication should also be specified so that information is given to people with people on medical devices including feeding tubes, dialysis, or those with other medical assistance needs. Evacuation information also needs to be communicated clearly so that people are aware of where to go. This information could help prevent roadblocks and traffic jams and facilitate a smoother evacuation for the public.

Communicating with communities through community leaders can be an effective part of reaching the public. Relationship development and messaging early on with communities that may be resistant to sheltering methods, such as women removing burkas, may be very important. Therefore, efforts should be made to partner with churches, clergymen, other religious leaders, and community leaders. Once these partnerships have been established, use these leaders who run places of worship and shelters as partners to get messages out through public service announcements, interactions with local decision makers, and any other avenues available to those partners.

Dealing with misinformation and rumor-laden communication before and at shelters was identified as an important component of the risk communication process. First, participants suggested that there must be a broad method of performing rumor control for the public. One method of doing this would be to establish a rumor control website and outlet. Communication within shelters is vital, and rumor control and education are important components of communicating at shelters. Therefore, shelters need a plan and designated individuals and protocols for shelter rumor control.

RECOMMENDATIONS

Decontamination

In order to develop effective decontamination processes at public shelters following a radiation incident, several stages of planning will need to occur. Workshop participants strongly recommended the formation of a workgroup to develop standards for public sheltering following a radiation incident. This workgroup would help develop standards for decontamination, registration and tracking, risk communication, and all other aspects of public sheltering specific to a radiation incident. At the local level, LHDs do not have the resources necessary to adequately plan for decontamination after such an incident. In order to help solve

this problem, funding language should be modified to ensure local health departments are funded while funding through the State Health Departments. This change in funding language is important because funding local health department funding is important, but should be issued to the state with requirements to fund local health departments because some states have centralized Public Health, efforts can then be coordinated with state plans, and a radiation incident will not just affect a single county requiring a coordinated response. At the state level, each state should create a contact list for volunteers and SMEs (agencies) for shelters. These contact lists should then be distributed by CDC when necessary. In addition to these contact lists, state volunteer coordination should be developed and encouraged.

Many of the issues participants voiced regarding barriers to effective decontamination efforts centered on the standardization of forms. Participants voiced a need for a federal agency such as CDC to develop a shelter criteria for radiation response assessment form (or addendum to CDC environmental health rapid assessment form). Additionally, an agency such as HHS should develop a screening form as an addendum to the current HHS intake form. Most importantly, there is a strong need for the development of an operational guide for decontamination and contamination control. This guide would help standardize decontamination efforts at public shelters and help to ensure that all public shelters are decontaminating effectively.

In order to ensure that these standardized forms are used consistently and correctly, training will need to be performed for staff members and those involved in the process. One aspect of training that would be beneficial for decontamination efforts would be an ARC introduction and radiation course as well as an advanced course for specialists such as one given by the Emergency Management Institute. Participants also voiced a strong need for the development of a just-in-time training for operating instrumentation.

Communication will be an important aspect of decontamination efforts. Strategic messages will need to be communicated with the public before and during decontamination. Beforehand, the public must be made aware of the risks posed by intentional radiation emergencies through threat communication. Part of this effort should include the development of health education to communicate through social media and marketing. Additionally, it will be essential to determine where decontamination information, guidelines, and materials should be posted on the Web because this needs to be a coordinated message. During decontamination, there must be clear messages present in order to calm people down, provide them with information, and ensure the decontamination efforts can function effectively.

Registration and Tracking

In order for public health to be able to perform public sheltering during a radiation emergency most effectively, there needs to be clear standards in place to promote quality and consistency throughout these processes. Standards should be created and implemented for the total process so that it is easy to follow and planning can occur in a more seamless manner. Standard forms should also be created and distributed to create consistency for such an incident. In order to ensure that these standards are implemented in the same manner, there should also

be standardized trainings that sheltering planners and staff should receive. As part of this effort to standardize forms, special attention should be paid to health assessments and tracking. In order to ensure these standards are created and implemented country-wide, money will need to be allocated specifically for their development, distribution, and training.

Training will be an important aspect of improving registration and tracking efforts. Currently, registration and tracking would be done in a non-consistent manner, making cross-jurisdictional tracking much more difficult, time-consuming, and expensive. To remedy this problem, standard trainings should be implemented to ensure that sheltering and emergency planning staff are going to be registering and tracking sheltered populations in a similar way. One key portion of this training would be to ensure that all staff are trained on ICS and their role within the structure. In order to accomplish these trainings, funding would need to be provided as these trainings are not currently supported by existing funding.

The planning that goes into sheltering processes is integral to their efficacy. Without clearly establishing roles and responsibilities beforehand, the registration and tracking process would be impossible to complete in an adequate manner. This planning must begin well in advance of any incident in order to be most effective. Relationship building and partnerships should be formed as soon as possible with as many of the key stakeholders in the sheltering process as possible. This includes active participation in regional events and exercises. Plans should be created to determine what shelters would need to be open (how many and where), and who would be in charge of these shelters. There may be ARC support in the area, and government-run shelters may be necessary. Part of this planning process would include identifying what supplies are available and who would have access to which supplies. Additionally, plans should be put into place for the registration and tracking process at the shelter. More specifically, planning should occur to ensure that messaging before and at the shelter is consistent and effective. Planning should also occur so that there is clear tracking of decontamination efforts at the shelter, tracking of all people at the shelter, and who will be doing this registration and tracking. In order to accomplish all of these plans, funding will need to be provided specifically for the planning process as it related to registration and tracking.

Partners will play a key role in this process for a number of reasons. Considering limits in resources and staffing, partnering can stretch resources and provide necessary leadership and/or expertise to a situation. Partnering will be important for registration and tracking because it will be essential to plan ahead of time and know who will be involved and what their roles and responsibilities will be, including who will be in charge of the shelter and who will be in charge of registration and tracking. This process will need to be done with multiple partners who all have a stake in the sheltering activities, including those who have equipment and resources, those who have volunteer staff, the Emergency Management Association Coalition, and any necessary government agencies whose involvement is needed. The partnership process will need to be completed both at the local, state, and federal levels. Using the Multiagency Coordination Systems (MACS) process as a model, this level of cooperation can be coordinated and achieved. At the federal level, agencies must be aware of what resources are available, such as those the Department of Defense has control of, and clearly plan on how to mobilize all

resources in the quickest, most efficient manner. This may be easier to do if standards are set for organizational responsibilities and response.

Resources for registration and tracking must be better managed in order to have the best public sheltering system possible. There must first be a clear understanding of who has the resources and how these resources will be mobilized. Additionally, there must be better implementation of resource typing. Finally, there must be technical support provided to create a more integrated tracking and registration system. This support should include automated systems, back-up power systems, and any other information technology support that is determined to be necessary during the planning process to implement successful registration and tracking efforts.

Risk Communication

Participants recommended several actions for improving risk communication in regards to sheltering during a radiation emergency. The first recommendation is to improve education on this issue. To do so, several steps must be taken to ensure a broad public understanding of the issues. First, it is necessary to teach school-age children about chemical, biological, radiological, nuclear, and high-yield explosives based on grade level- modules on various issues related to radiation and nuclear incidents. Additionally, there should be shelter in place PSAs and community education sessions to educate adults. These education sessions should be included as part of all-hazards plans and discussions. Finally, educating the public through the development of tear sheets for specific health-related groups including the elderly, children, and those with chronic illness/disease is an important component of communication. The general public, volunteers, and community leaders must all be educated. Public health agencies should create a document about radiation for volunteers and others for shelter response. For community leaders, there should be a toolkit for communities about radiation preparedness and response.

In addition to public education, LHDs should connect with the media to reach the public. In order to do this most effectively, health officials should talk with local editorial panels and provide them with radiation plan updates and information about any exercises that will be occurring. In addition to newspapers, radio and television may be an important method of communication with the public before or during a radiation incident. In preparation for this, health officials should work with broadcaster associations to develop partnerships. Finally, public health agencies should use social media in order to reach the broadest audience possible. The development of these social media outreach tools should be done with youth groups and schools of journalism to maximize resources and to ensure effective messaging.

Creating partnerships with the broadcaster associations can be an important part of the effort to communicate risk more effectively. In addition to partnerships with the media, several other key partnerships would provide value to the public health system as it relates to sheltering during a radiation incident. LHDs should form partnerships with MRC units. NGOs should partner with government agencies in developing plans for radiation and nuclear incidents.

Partnerships must also be formed with community churches, groups, and other organizations in order to provide information to the community in the most optimal environments, namely places where the community gathers.

Finally, decision-makers must be educated on these issues. Their responses to questions, public speaking engagements, and other opportunities make their messages widely heard and often trusted. Decision-makers should be educated so that they are knowledgeable on the subject and for the risk communication that they will provide to the greater public. In order to do this, public health agencies should attempt to educate and influence governmental groups at the local and state levels through whatever avenues are most advantageous for those particular decision-makers. It is also important to inform health officers that radiation is an important issue to their community and to educate them about what resources are available in the local community.

CONCLUSIONS

Public sheltering during a radiation emergency has become an increasingly important topic as a result of experiences from sheltering in other public emergencies such as natural disasters and the unique needs that would be presented by a radiation emergency. The *Workshop on Operating Public Shelters during a Radiation Emergency* was convened to gather input from federal and state agencies including state departments of health, local health departments, and NGO partners. Stakeholders discussed the resources and processes needed during a radiation emergency in order to provide the public with acceptable shelter during such an incident.

This workshop brought together diverse stakeholder groups to provide comments about three topic areas within the scope of public sheltering: decontamination, registration and tracking, and risk communication. Participants listed and described the functions necessary to accomplish each of these responsibilities. Recommendations were provided regarding stakeholder needs for public sheltering and how these needs should be addressed. The recommendations were separately reviewed by federal, state, local, and NGO participants to ensure that they were valid, plausible, and worthy of consideration to be acted upon. Based on these vetted recommendations, this report was produced in order to provide readers with an understanding of the key recommendations stemming from this workshop.

Workshop participants strongly recommended the formation of a workgroup to develop standards for public sheltering following a radiation incident. This workgroup would help develop standards for decontamination, registration and tracking, risk communication, and all other aspects of public sheltering specific to a radiation incident. The workgroup would be convened by federal stakeholders, including the CDC and FEMA, and would include members from these federal agencies, other federal stakeholders, state health departments, LHDs, ARC, state and local emergency management representatives, and any other stakeholders that are determined to be necessary to the development of radiation-specific sheltering standards.

Decontamination at public sheltering locations will require the development of professional education courses for training related to radiation sheltering, increased public communication, development of an operational guide for decontamination and contamination control, and coordinated decontamination planning at the state and federal level. Recommendations for professional education and training included the development of an American Red Cross (ARC) introductory radiation course, an advanced course for specialists such as emergency medical responders, and a just-in-time training for operating specialized instrumentation. Recommendations for public communication included improved threat communication on intentional radiation emergencies, development of health education communications through social media and other avenues, and determining the most effective place to house decontamination information online. Meeting participants strongly recommended an operational guide for decontamination and contamination control that could include or be combined with a screening form as an addendum to the current Department of Health and Human Services (HHS) intake form and shelter criteria for radiation response assessment forms.

Finally, participants recommended increased coordination efforts from state and federal agencies through the development of state volunteer coordination, state contact lists for volunteers and shelters, and preparedness grants for LHDs to develop sheltering plans.

Additionally, participants provided key recommendations about registration and tracking efforts at public sheltering locations. These recommendations included standardizing several processes, training, planning and partnering, better resource management, and federal leadership. Funding was identified as a key need in the development or application of each of these recommendations. Participants recommended that standards be put into practice relating to the sheltering process, forms to use, training, health assessments, and tracking. Additionally, training will need be provided to ensure professionals and volunteers are able to register and track the public and can adhere to ICS protocol. Partners should be involved early in the planning process so that each stakeholder is aware of their role and responsibility. By planning with partners, roles will be better defined in relation to messaging, sheltering staff, equipment, and continued tracking efforts. Resource management was also identified as a critical component to public sheltering efforts during radiation emergencies. Participants suggested that important components of resource management included radiation-specific equipment accessibility and use, better implementation of resource typing, and the identification and protection of technical support resources. Finally, participants suggested that federal leadership may be necessary for the establishment of standards, organization of federal partners, planning for the distribution of federal resources, and assistance with cross-jurisdictional tracking.

In relation to risk communication, participants recommended a multi-faceted approach. Recommendations included focusing on education, communication through the media, partnerships, and decision-makers. Education is an important facet of risk communication and should begin in schools in grades K-12. Grade-level modules should be introduced in schools relating to radiation and nuclear safety. In addition to school education, PSAs and community education sessions should be created to teach the public about sheltering in place. Education about radiation sheltering should also be included in all-hazards plans and discussions. Population-specific fact sheets would also be useful for communicating risk with specific populations such as the elderly. In order to communicate through the media more effectively, participants recommended communicating with local editorial boards about radiation plan updates and in-the-field exercises, partnering with broadcaster associations. Additionally, social media was cited as an important component to effective communication and should be developed in partnership with youth groups and schools or journalism. Tools for public sheltering during radiation emergencies would also be a key communication strategy and could include a toolkit for communities about radiation preparedness and response and a document about radiation for volunteers and others for shelter response. Partnerships should be developed with MRC-HP and LHDs, NGOs with government agencies in developing plans, and planning and other acting agencies should partner with community groups (such as churches or other local groups). Participants also noted that it is important to educate and influence governmental groups at the local and state levels because they often make the important decisions. As such, it is also important to educate and influence health officers about the

importance of radiation issues to their communities and ensure that they are aware of the resources available to their jurisdiction in the case of an emergency.

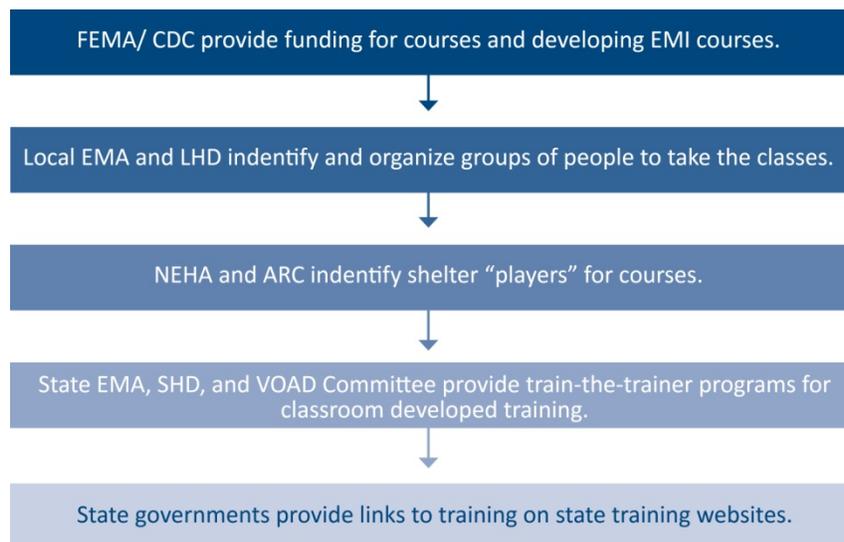
It is clear that public sheltering for a radiation emergency will require action at the local, state, and the federal levels in order for these efforts to run as effectively as possible. Based on the recommendations and action plans provided and developed during this workshop, this report can be used to develop guidance for activities or plans to provide the full range of actors, including LHDs, with the ability to provide the public with the most effective public sheltering possible during a radiation emergency. The recommendations and action plans from this workshop will be further detailed and vetted by a newly formed workgroup. This workgroup will consist of several participants from the workshop and some additional key individuals who should have input into this process. The workgroup will review and finalize the recommendations and action plans from the workshop by mid-2011.

ACTION PLANS AS SUGGESTED BY MEETING PARTICIPANTS

Five action plans were created for each of the three topical categories during the Workshop on Operating Public Shelters during a Radiation Emergency. Each of the action plans contains a list of actions or responsibilities differentiated by federal, state, local, and NGO actions. Following each list, a chronological graphic of each action plan is presented. Although the suggested action plans are presented chronologically, it is important to note that they are presented in the order that they would be ideally completed. In reality, the actions of states, locals, and NGOs do not depend exclusively on the completion of federal action. Therefore, each of these subsequent actions can begin to be independently addressed before or during the completion of actions that are presented earlier in the process graphics.

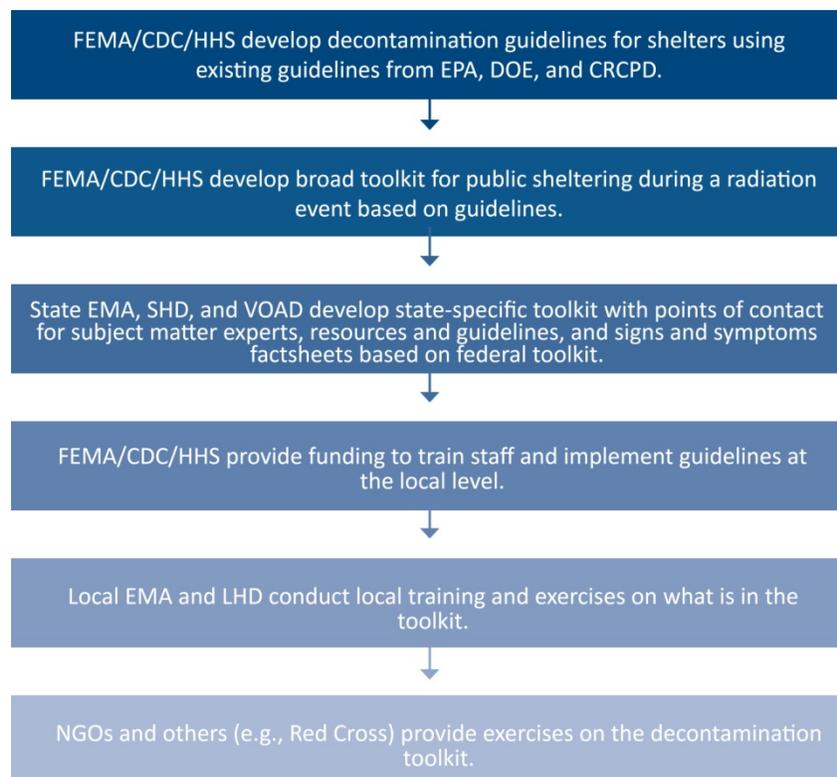
Decontamination

- 1) Develop an introductory and advanced radiation/decontamination course for shelter operators and health professionals (in both online and classroom formats).
 - a. Federal action (FEMA/CDC)
 - i. Provide funding for courses and developing EMI courses.
 - b. State action (emergency management agency (EMA), state health department (SHD), and state voluntary organizations active in disaster (VOAD) committee)
 - i. Provide train-the-trainer programs for classroom developed training.
 - ii. Provide links to training on the state training websites.
 - c. Local action (EMA/LHD)
 - i. Identify and organize groups of people to take the classes.
 - d. NGOs/others (National Environmental Health Association/ARC)
 - i. Identify shelter 'players' for courses.

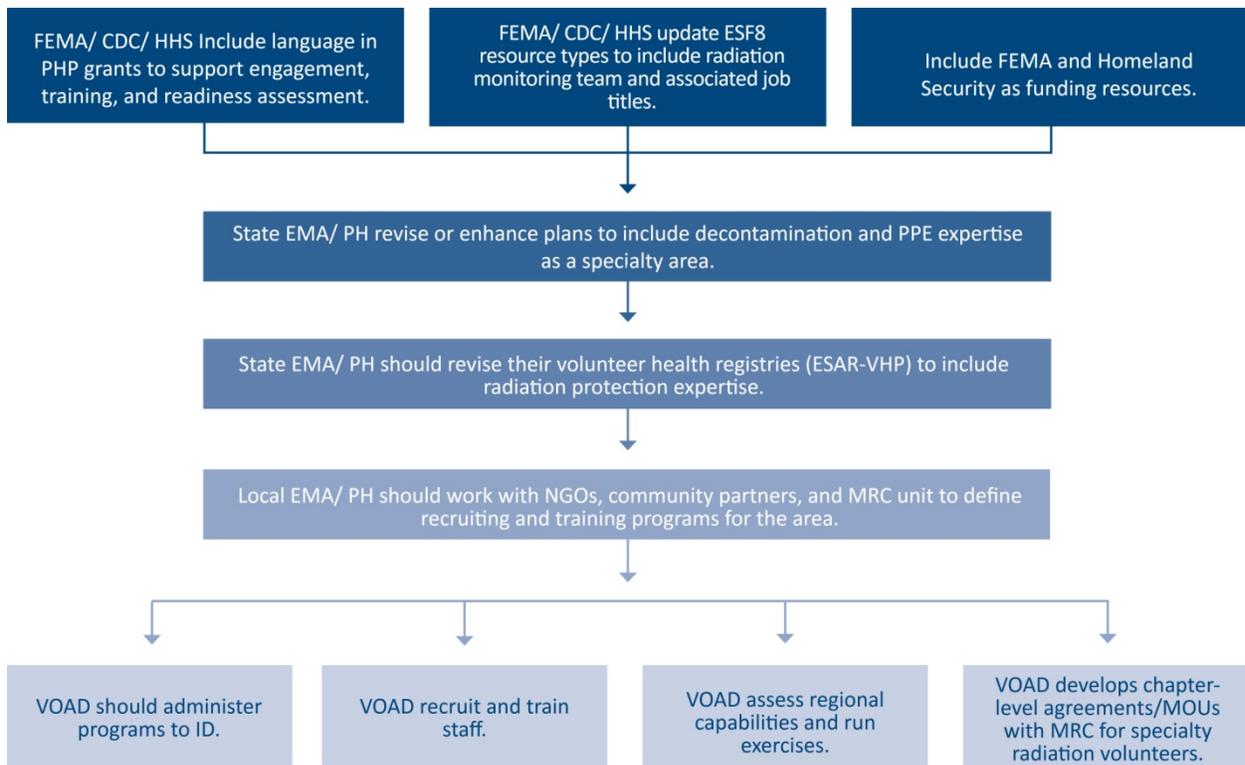


2) Develop standardized operating plan for decontamination in shelters.

- a. Federal action (FEMA/CDC/HHS)
 - i. Develop decontamination guidelines for shelters using existing guidelines from Environmental Protection Agency, Department of Energy, and CRCPD.
 - ii. Provide funding to train staff and implement guidelines at the local level.
 - iii. Develop toolkit for public sheltering during a radiation incident based on guidelines.
- b. State action (emergency management and SHD, VOAD)
 - i. Develop toolkit with point of contacts for subject matter experts, resources and guidelines, and signs and symptoms fact sheets.
- c. Local action (LHD and emergency management)
 - i. Conduct local training and exercises on what is in the toolkit.
- d. NGO/Others (ARC)
 - i. Provide exercises on the decontamination toolkit.

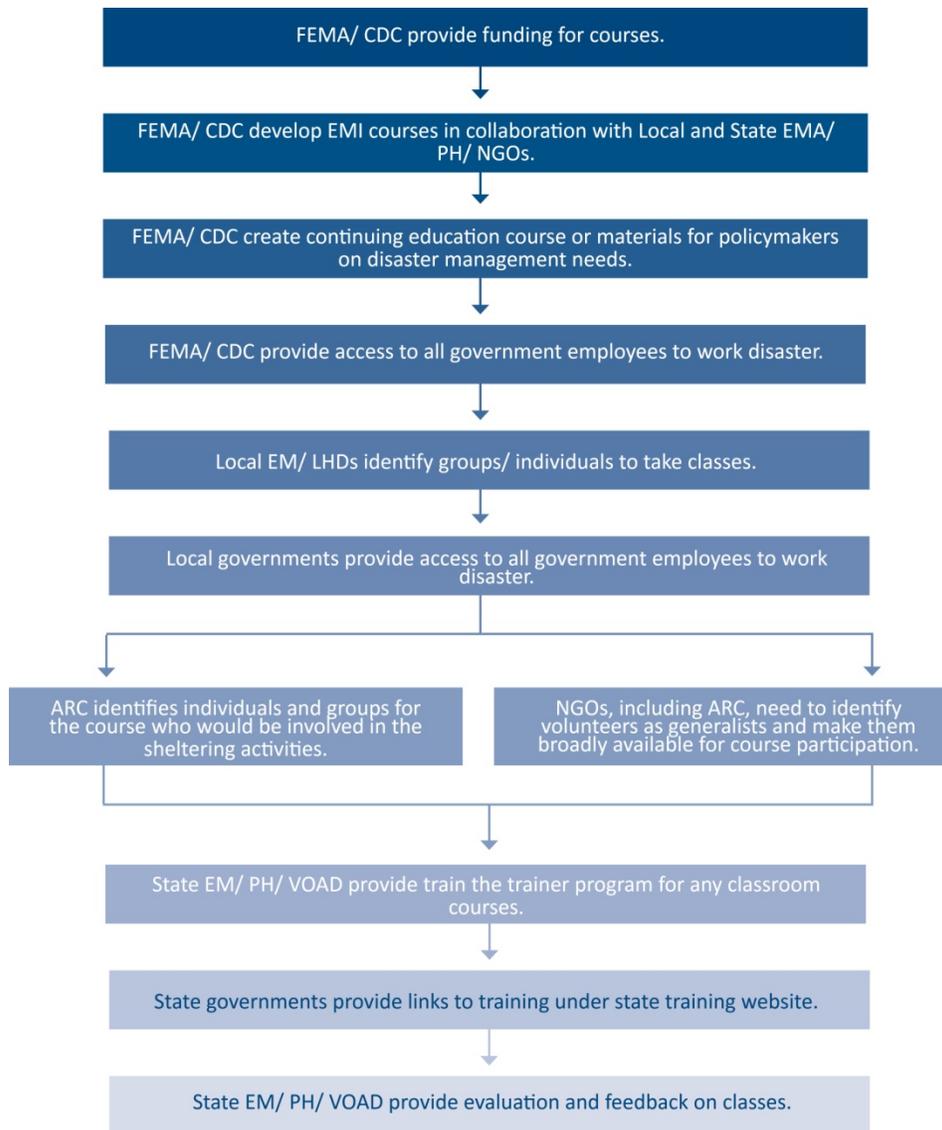


- 3) Develop specialized staffing workforce to create enough decontamination support staff to effectively conduct mass decontamination.
- a. Federal action (FEMA/CDC/HHS)
 - i. Include language in public health preparedness (PHP) grants to support engagement, training, and readiness assessment.
 - ii. Update ESF-8 resource types to include radiation monitoring team and associated job titles.
 - iii. Include FEMA and Homeland Security as funding resources.
 - b. State action (emergency management (EM)/ public health (PH))
 - i. Revise or enhance plans to include decontamination and personal protective equipment (PPE) expertise as a specialty area.
 - ii. Revise volunteer health registries (ESAR-VHP) to include radiation protection expertise.
 - c. Local action (EM/PH)
 - i. Work with NGOs, community partners, and MRC unit to define recruiting and training programs for the area.
 - d. NGO action (VOAD)
 - i. Administer programs to ID.
 - ii. Recruit and train staff.
 - iii. Assess regional capabilities and run exercises.
 - iv. Develop chapter-level agreements/memorandums of understanding (MOUs) with MRC for specialty radiation volunteers.

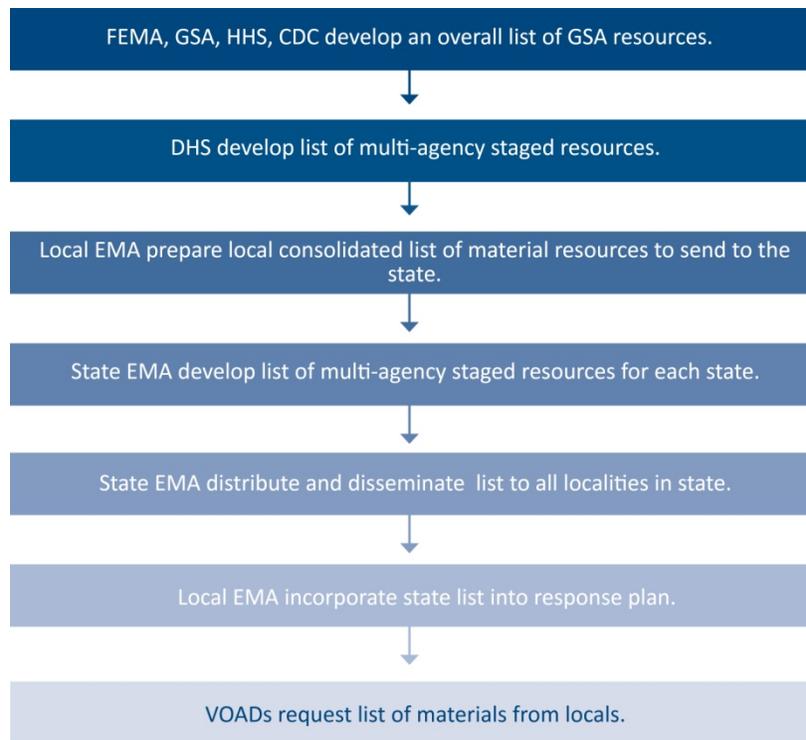


- 4) Ensure that local communities are knowledgeable in decontamination efforts when operating a shelter in a radiation incident by developing introductory and advanced radiation and decontamination course for shelter operators and health professionals.
 - a. Federal action (FEMA/CDC/ARC)
 - i. Provide funding for courses.
 - ii. Develop Emergency Management Institute (EMI) courses in collaboration with EM/PH/ local and state/ NGOs.
 - iii. Develop continuing education for policy-makers on disaster management needs.
 - iv. Provide access to all government employees to work disaster.
 - b. State action (EM/PH/VOAD)
 - i. Provide train the trainer program for any classroom courses.
 - ii. Provide links to training under state training website.
 - iii. Provide evaluation and feedback on classes.
 - c. Local action (EM/LHDs)
 - i. Identify groups to take classes.
 - d. NGO action
 - i. Identify individuals and groups for the course who would be involved in the sheltering activities.
 - ii. Identify volunteers as generalists and make them broadly available for course participation.

(Graphic on following page)



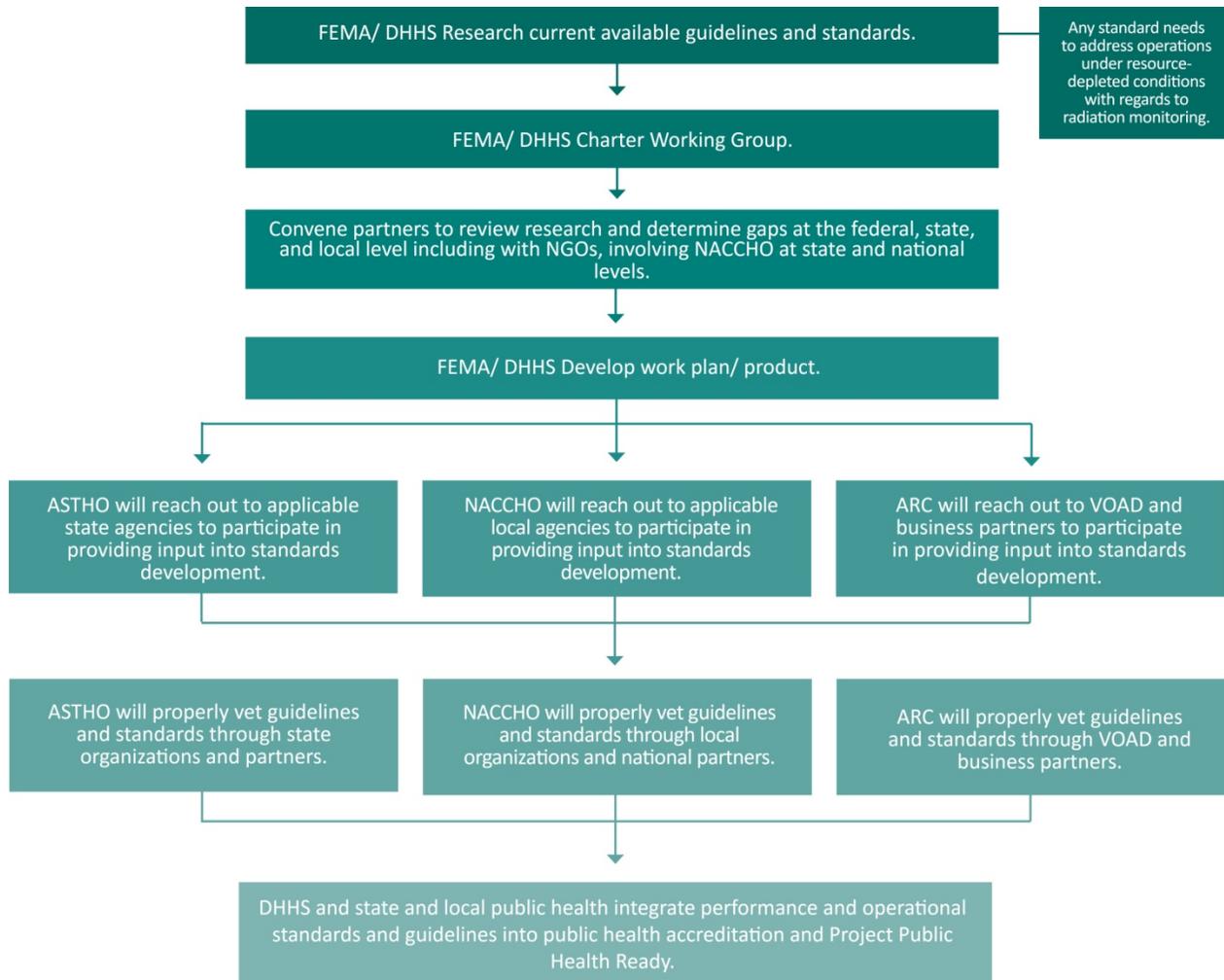
- 5) Develop a state-by-state list of material resources to support operations.
- a. Federal action (FEMA/General Services Administration (GSA)/HHS/CDC)
 - i. Develop an overall list of GSA resources.
 - ii. Develop list of multi-agency staged resources.
 - b. State action (state EMA)
 - i. Develop list of multi-agency staged resources for each state.
 - ii. Distribute and disseminate list to all localities in state.
 - c. Local action (local EMA)
 - i. Prepare local consolidated list of material resources to send to the state.
 - ii. Incorporate state list into response plan.
 - d. NGO/others (VOAD)
 - i. Request list of materials from locals.



Registration and Tracking

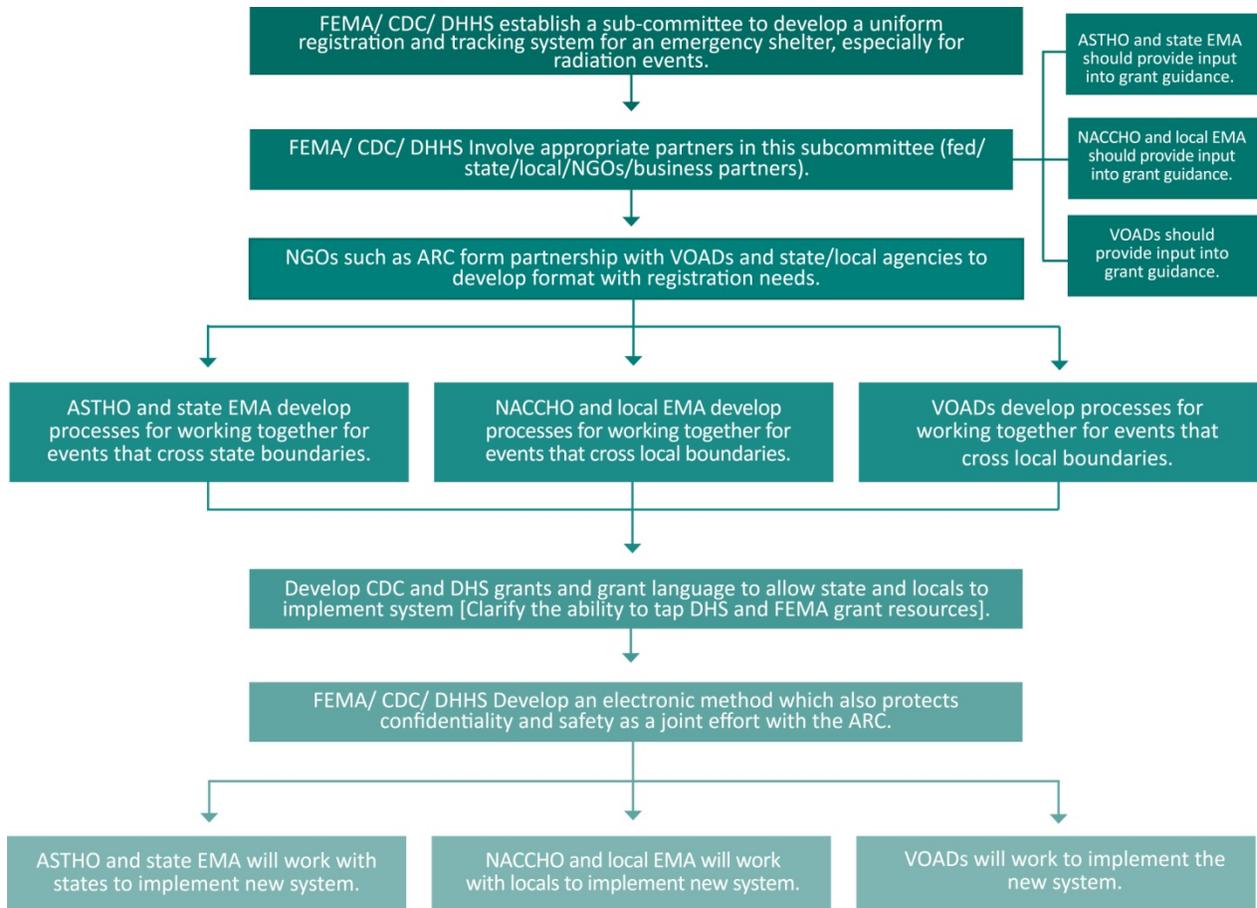
- 1) Develop nationally recognized performance and operational standards and guidelines for emergency sheltering specifically for radiation incidents.
 - a. Federal action (FEMA/HHS)
 - i. Charter working group.
 - ii. Research current available guidelines and standards.
 - iii. Develop work plan/ product that also addresses operations under resource-depleted conditions with regards to radiation monitoring.
 - iv. Convene partners to review research and determine gaps at the federal, state, and local level including with NGOs, while involving NACCHO at state and national levels.
 - b. State action (ASTHO)
 - i. ASTHO will reach out to applicable state agencies to participate in providing input into standards development.
 - ii. ASTHO will properly vet guidelines and standards through state organizations and partners.
 - iii. Integrate performance and operational standards into public health accreditation and Project Public Health Ready.
 - c. Local action (NACCHO)
 - i. NACCHO will reach out to applicable local agencies to participate in providing input into standards development.
 - ii. NACCHO will properly vet guidelines and standards through local organizations and national partners.
 - d. NGO action
 - i. ARC will reach out to VOAD and business partners to participate in providing input into standards development.
 - ii. ASTHO will properly vet guidelines and standards through VOAD and business partners.

(Graphic on following page)



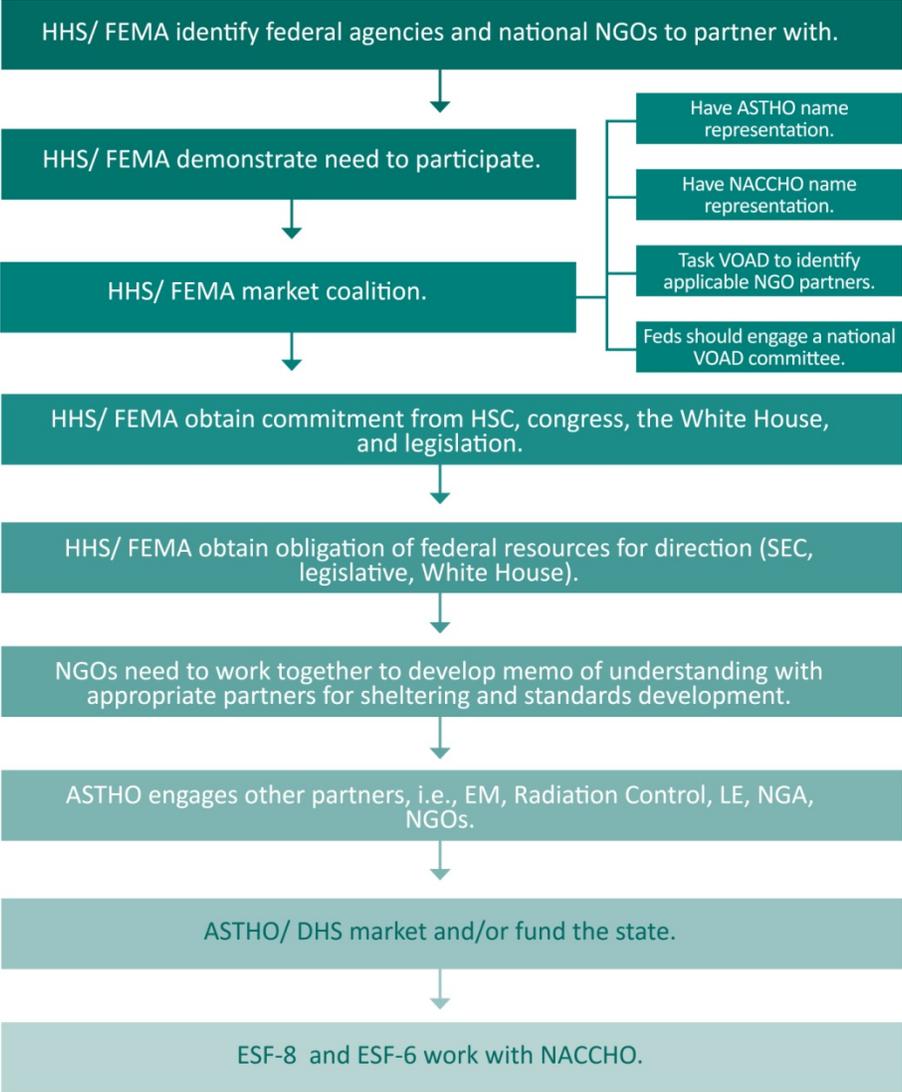
- 2) Develop uniform registration and tracking system for emergency shelters specifically for radiation incidents.
 - a. Federal action (FEMA/CDC/HHS)
 - i. Establish a sub-committee to develop a uniform registration and tracking system for an emergency shelter, especially for radiation incidents.
 - ii. Involve appropriate partners in this subcommittee (federal/state/local/NGOs/business partners).
 - iii. Develop CDC and Department of Homeland Security (DHS) grants and grant language to allow state and locals to implement system, clarifying the ability to tap DHS and FEMA grant resources.
 - iv. Develop an electronic method which also protects confidentiality and safety as a joint effort with the ARC.
 - b. State action (ASTHO/EMA)
 - i. ASTHO and state EMA should provide input into grant guidance.
 - ii. ASTHO and state EMA will work with states to implement new system.
 - iii. Develop processes for working together for incidents that cross state boundaries.
 - iv. Evaluate current systems being used.
 - c. Local action (NACCHO/local EMA)
 - i. NACCHO and local EMA should provide input into grant guidance.
 - ii. NACCHO and local EMA will work with locals to implement new system.
 - iii. Develop processes for working together for incidents that cross local boundaries.
 - d. NGO action
 - i. VOADs should provide input into grant guidance.
 - ii. VOADs will work to implement the new system.
 - iii. Develop processes for working together for incidents that cross local boundaries.
 - iv. Partnership between VOADs and state/local agencies to develop format with registration needs.

(Graphic on following page)



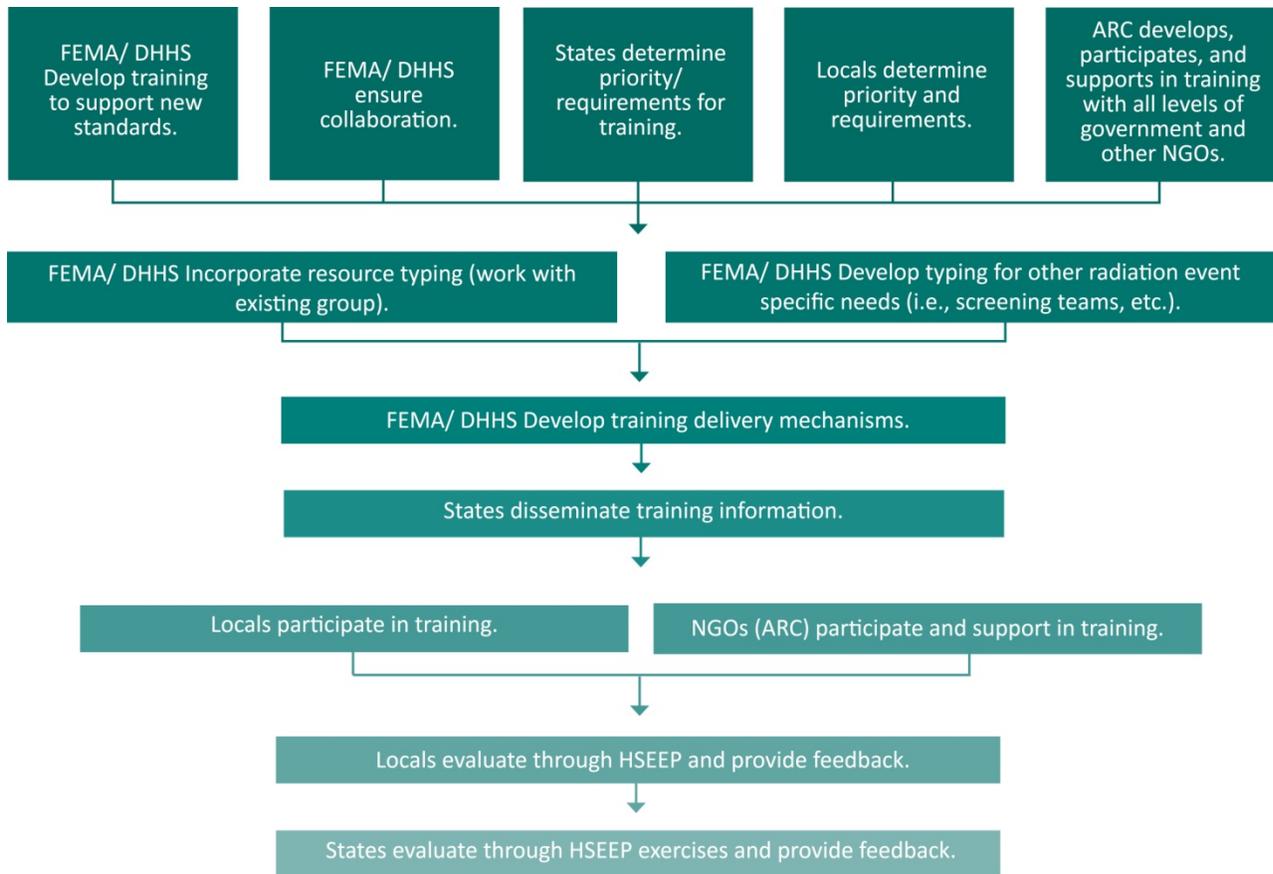
- 3) Identify partners and get commitment to the process of a national standard for emergency sheltering, specific to radiation incidents, that's collaborative with state and local government and NGOs.
 - a. Federal actions (HHS/ FEMA)
 - i. Identify federal agencies and national NGOs to partner with.
 - ii. Demonstrate the need to participate in this process.
 - iii. Market the coalition to gain participation and commitment.
 - iv. Obtain commitment from HSC, Congress, the White House, and Legislation.
 - v. Obtain obligation of federal resources for direction (Securities and Exchange Commission, legislative, White House).
 - b. State action (ASTHO/ [DHS])
 - i. Have ASTHO name representation.
 - ii. ASTHO engages other partners, i.e., EM, radiation control, LE, NGA, NGOs).
 - iii. Market and/or fund states.
 - c. Local action (NACCHO)
 - i. Have NACCHO name representation.
 - ii. ESF-8 and 6 work with NACCHO.
 - d. NGO action (VOADs)
 - i. Task VOAD to identify applicable NGO partners.
 - ii. Feds should engage a national VOAD committee.
 - iii. NGOs need to work together to develop memo of understanding with appropriate partners for sheltering and standards development.

(Graphic on following page)

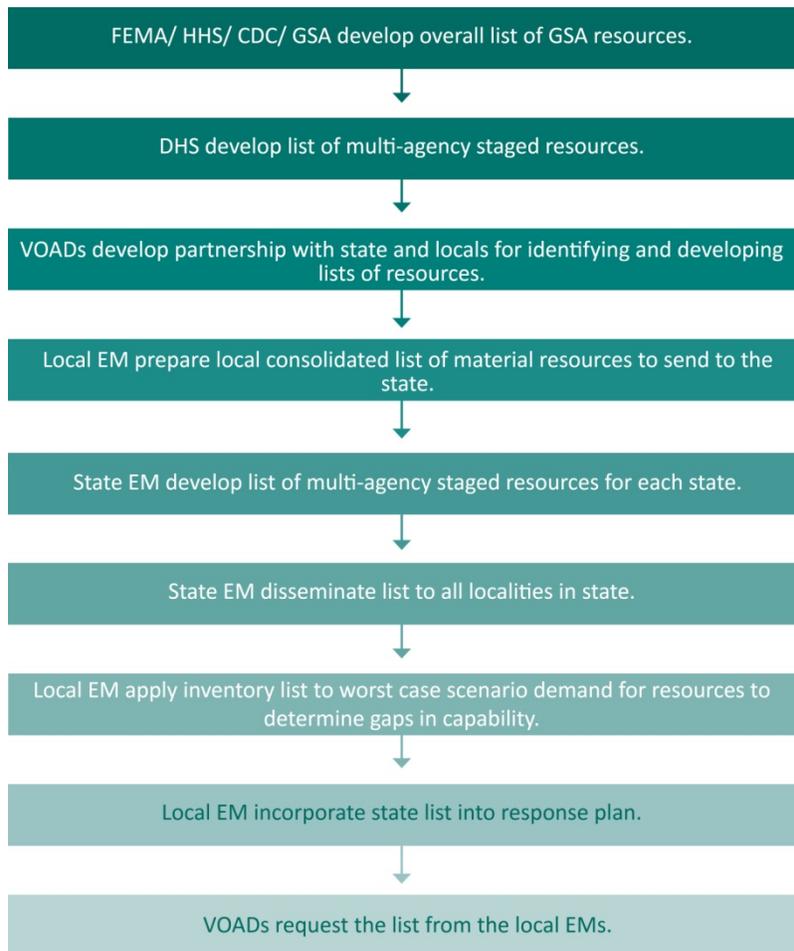


- 4) Develop NIMS/ ICS compliant multi-agency coordination shelter training specific to radiation incidents.
 - a. Federal Action (FEMA/HHS)
 - i. Develop training to support new standards.
 - ii. Incorporate resource typing by working with the existing group.
 - iii. Develop typing for other radiation incident specific needs (i.e., screening teams, etc.).
 - iv. Develop training delivery mechanisms.
 - v. Ensure collaboration.
 - vi. Ensure that the training is also HSOOR compliant.
 - b. State action
 - i. Distribute training information.
 - ii. Determine priority and requirements for training.
 - iii. Evaluate the training through Homeland Security Exercise and Evaluation (HSEEP) exercises and provide feedback.
 - c. Local action
 - i. Participate in training.
 - ii. Evaluate the training through HSEEP and provide feedback.
 - iii. Determine priority and requirements for training.
 - d. NGO action
 - i. Participate and support in training.
 - ii. Develop, participate, and support in training with all levels of government and other NGOs.

(Graphic on following page)



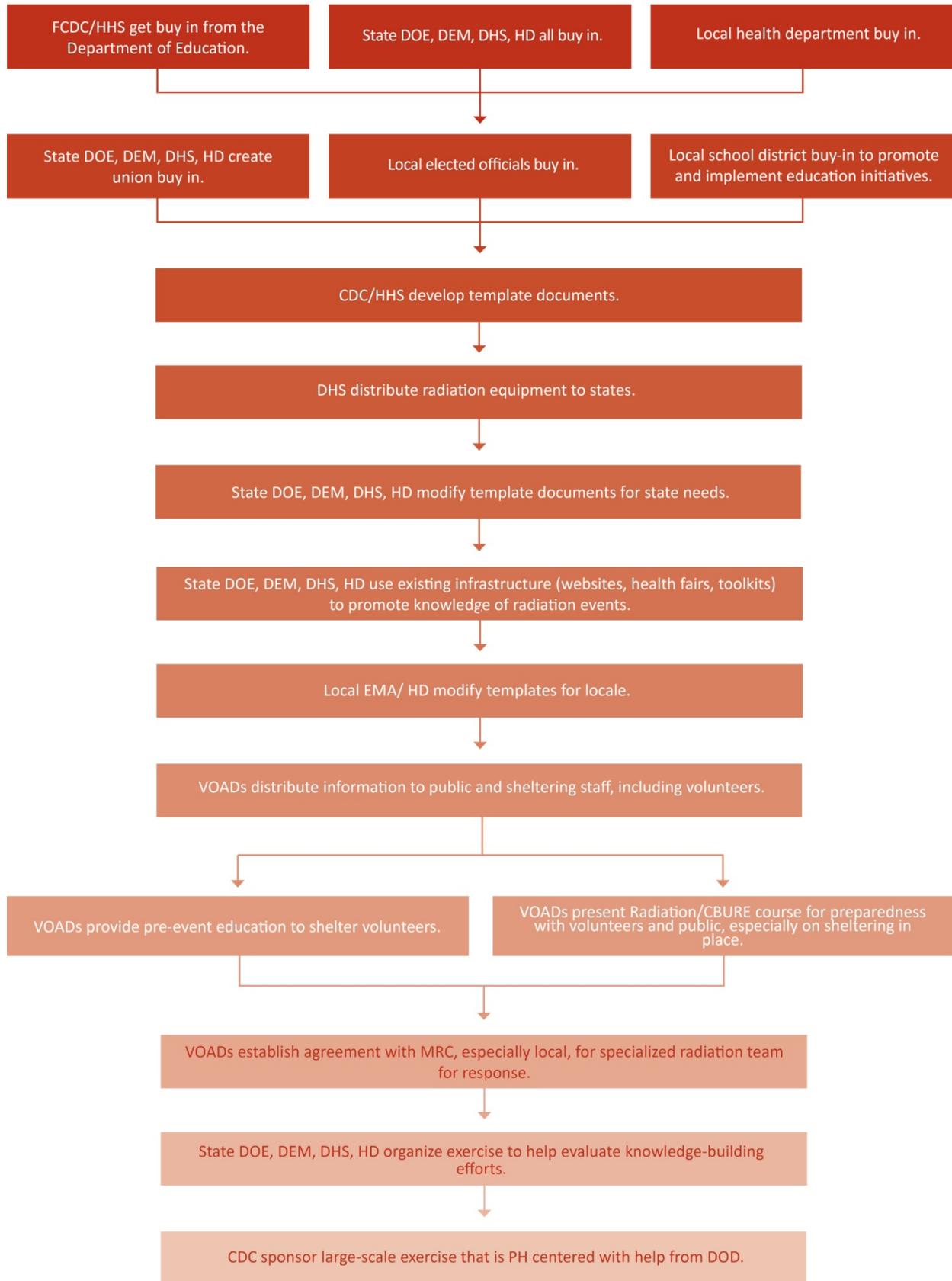
- 5) Develop a state-by-state list of material resources to support radiation-specific operations
- a. Federal action (FEMA/HHS/CDC/GSA/DHS)
 - i. Develop an overall list of GSA resources.
 - ii. Develop a list of multi-agency staged resources.
 - b. State action (state EM)
 - i. Develop and distribute a list of multi-agency staged resources for each state.
 - ii. Disseminate the list to all localities in state.
 - c. Local action (local EM)
 - i. Prepare a local consolidated list of material resources to send to the state.
 - ii. Apply an inventory list to worst case scenario demand for resources to determine gaps in capability.
 - iii. Incorporate the state list into response plans.
 - d. NGO action (VOADs)
 - i. Request the list from the local EMS.
 - ii. Develop a partnership with state and locals for identifying and developing lists of resources.



Risk Communication

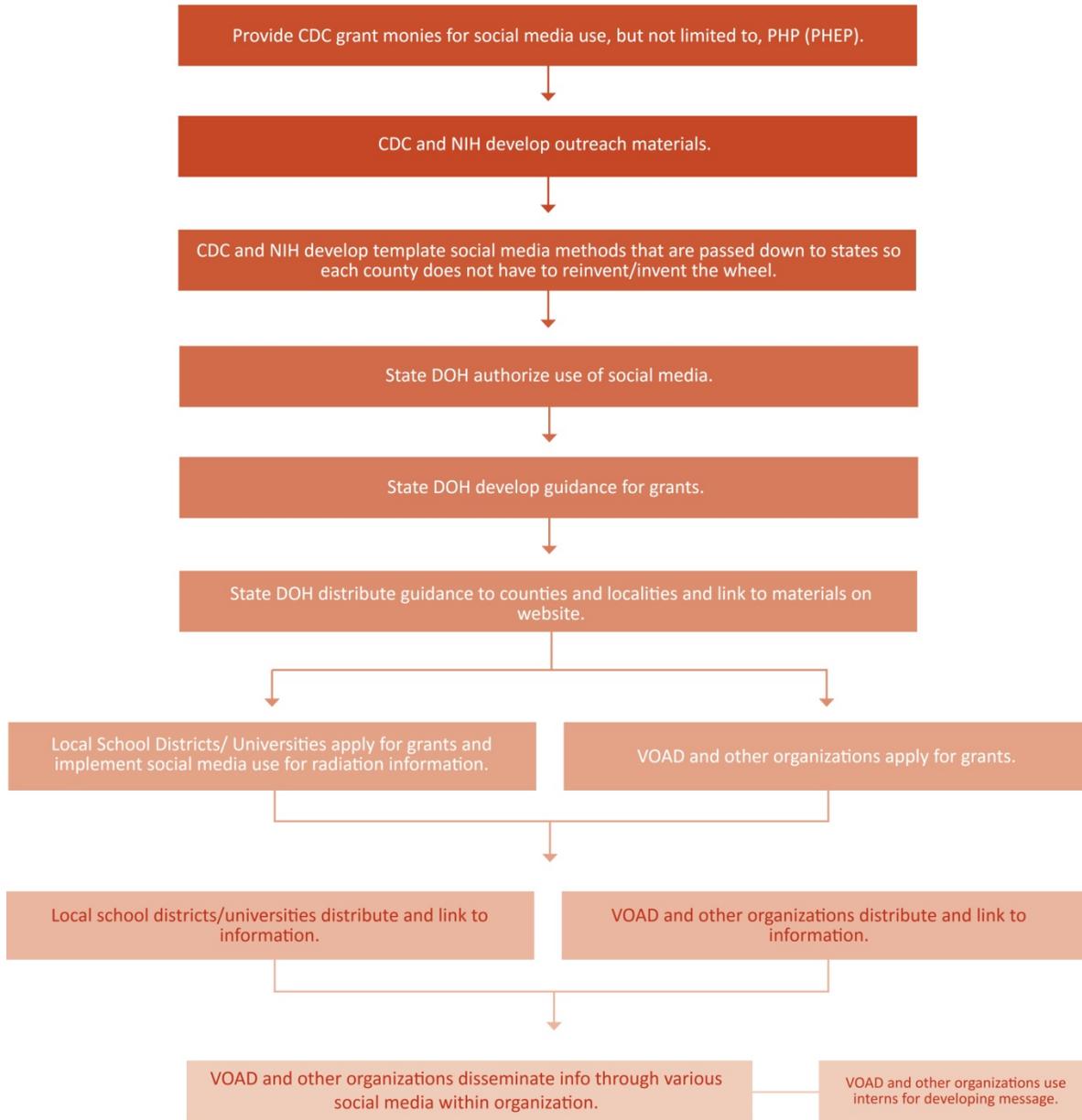
- 1) Increase knowledge about radiation incidents.
 - a. Federal action (CDC/HHS)
 - i. Get buy-in from the Department of Education.
 - ii. CDC sponsor large-scale public health exercise.
 - iii. Department of Defense provides help in increasing knowledge about these incidents
 - iv. DHS distribute radiation equipment.
 - v. Create template documents to share with states, locals, and NGOs.
 - b. State Action (DOH/DEM)/DHS)
 - i. State DOE, DEM, DHS, health department all buy into the need for increased knowledge on this subject.
 - ii. Create union buy in.
 - iii. Modify template documents to fit state needs.
 - iv. Organize exercise to help evaluate knowledge-building efforts.
 - v. Use existing infrastructure (websites, health fairs, toolkits) to promote knowledge of radiation incidents.
 - vi. Create buy in from local and state health officials.
 - c. Local Action (EMA/Health and school district)
 - i. School districts buy into the need for this knowledge and then promote and implement educational initiatives.
 - ii. Local elected officials buy into the need for this knowledge.
 - iii. Modify templates for locales.
 - d. NGO/others (VOAD)
 - i. Support source.
 - ii. Disseminate information to public and sheltering staff, including volunteers VOAD.
 - iii. Provide pre-incident education to shelter volunteers.
 - iv. VOADs present radiation/CBURE course for preparedness with volunteers and public, especially on sheltering in place.
 - v. VOADs establish agreement with MRC, especially local, for specialized radiation team for response.

(Graphic on following page)



- 2) Promote the use of social media to adequately support the dissemination of radiation information.
 - a. Federal action (CDC)
 - i. Provide CDC grant monies for social media using PHP
 - ii. Develop outreach materials.
 - iii. Develop template social media methods that are passed down so each county does not have to reinvent/invent the wheel.
 - b. State action (DOH)
 - i. Authorize use of social media.
 - ii. Develop guidance for grants.
 - iii. Distribute and link to materials.
 - c. Local action (school district/ University)
 - i. Apply for grants and implement social media use for radiation information.
 - ii. Distribute and link to information.
 - d. NGO/others (scouting)
 - i. Distribute information through various social media within organization.
 - ii. Apply for grants.
 - iii. Distribute and link to information.
 - iv. Use interns to develop message.

(Graphic on following page)



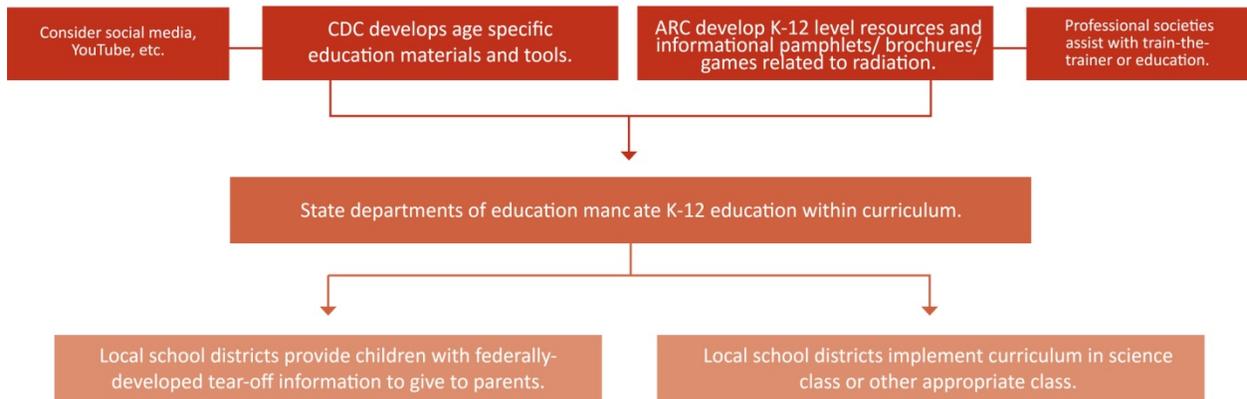
- 3) Create and provide access to adequate information on all aspects of sheltering.
 - a. Federal action (DHS/DOE/Nuclear Regulatory Commission)
 - i. Develop “tear-off” information sheets for shelter-in-place trainings.
 - ii. Define sheltering types (shelter-in-place, congregate, medical).
 - iii. Make this information widely available.
 - iv. Identify and provide information about acceptable decontamination levels, i.e., safe/non-safe for RC and others, especially with sheltering.
 - b. State action (EM/HS/elderly affairs)
 - i. Pass laws setting up all types of shelters.
 - ii. Provide information on evacuation routes to shelters in unaffected areas.
 - iii. Provide information about acceptable decontamination levels, i.e., safe/ non-safe for RC and others, especially with sheltering.
 - iv. Develop standards around the acceptable decontamination levels.
 - c. Local action (EM/PH)
 - i. Designate shelter types and locations.
 - ii. Designate CRC locations.
 - iii. Provide information on evacuation routes.
 - iv. Provide information on when to leave shelter-in-place and where to go.
 - v. Provide information about acceptable decontamination levels, i.e., safe/ non-safe for RC and others, especially with sheltering.
 - d. NGO action (ARC)
 - i. Educate volunteers on radiation.
 - ii. Work collaboratively with locals to identify shelter locations.
 - iii. Identify needs for shelters which may be different than natural disasters.

(Graphic on following page)

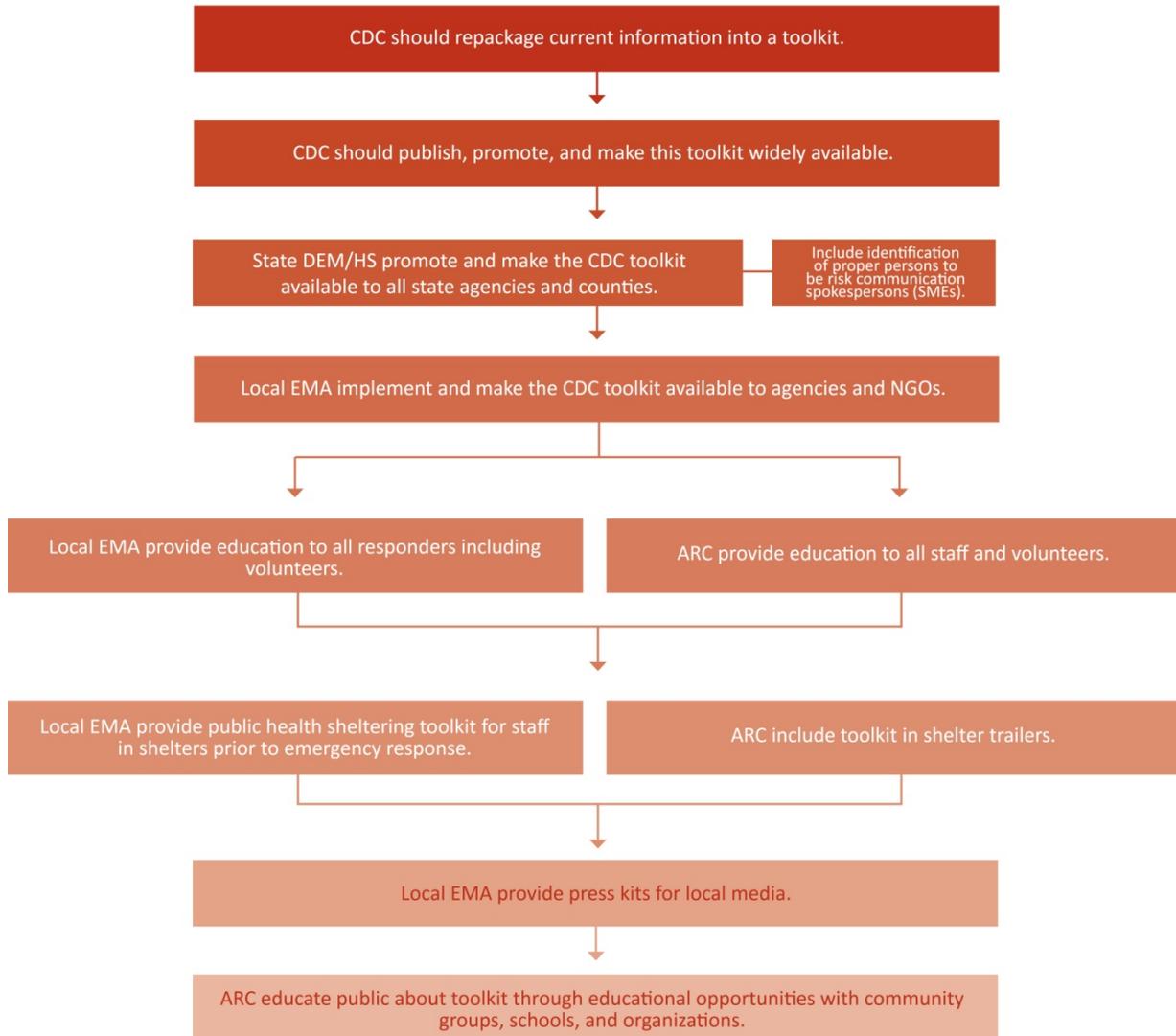


4) Develop adequate educational materials for K-12.

- a. Federal action (CDC)
 - i. CDC develops age specific education materials and tools.
 - 1. Consider social media, YouTube, etc.
- b. State action (Department of Education)
 - i. Mandate K-12 Education within curriculum.
 - ii. Provide children with tear-off information to give to their parents.
- c. Local action (school district)
 - i. Implement curriculum in science class or other appropriate class.
- d. NGO action (Health Physics Society)
 - i. Professional societies assist with train-the-trainer or education.
 - ii. ARC develop K-12 level resources and informational pamphlets/ brochures/ games related to radiation.



- 5) Develop radiation specific toolkits.
 - a. Federal action (CDC/HHS/DHS)
 - i. Educate volunteers and the public including shelter.
 - ii. CDC should repackage current information into a toolkit.
 - iii. CDC should publish, promote, and make this toolkit widely available.
 - b. State action (DEM/DHS)
 - i. Promote and make the CDC toolkit available to all state agencies and counties.
 - ii. Include identification of proper persons to be risk communication spokespersons.
 - c. Local action (EMA)
 - i. Implement and make the CDC toolkit available to agencies and NGOs.
 - ii. Provide education to all responders including volunteers.
 - iii. Public health sheltering toolkit for staff in shelters prior to emergency response.
 - iv. Provide press kits for local media.
 - d. NGO action (ARC)
 - i. Provide education to staff and volunteers with toolkit.
 - ii. Include toolkit in shelter trailers.
 - iii. Educate public about toolkit through education opportunities with community groups, schools, and organizations.



APPENDIX A: Workshop Agenda

Centers for Disease Control and Prevention (CDC)
and
National Association of County and City Health Officials (NACCHO)

CDC/NACCHO Workshop on Operating Public Shelters during a Radiation Emergency

Marriott Atlanta Downtown Hotel
160 Spring Street NW
Atlanta, GA 30303
Phone (404) 688-8600 Fax (404) 524-5543
Workshop Room: Centennial B

February 3-4, 2010

Wednesday, February 3, 2010

7:30 a.m. – 8:30 a.m.

Breakfast

8:30 a.m. – 8:45 a.m.

Welcome

Jennifer Li
Director, Environmental Health
NACCHO

Charles W. Miller
Chief, Radiation Studies Branch
Division of Environmental Hazards and Health Effects
National Center for Environmental Health, CDC

8:45 a.m. – 9:15 a.m.

Workshop Purpose and Objectives

Charles W. Miller
Chief, Radiation Studies Branch
Division of Environmental Hazards and Health Effects

National Center for Environmental Health, CDC

9:15 a.m. – 9:30 a.m.

Workshop Logistics/Administrative Matters

*Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE*

9:30 a.m. – 10:00 a.m.

Introductions

Participants

10:00 a.m. – 10:15 a.m.

BREAK

10:15 a.m. – 10:30 a.m.

NACCHO's Current Related Radiation Activities and Projects

*Costanza Galastri
Senior Analyst, Public Health Preparedness
NACCHO*

10:30 a.m. – 11:00 a.m.

**Radiation Primer: Defining the Radiation Hazard when
Managing/Operating Shelters and Current CDC Related Activities and
Projects**

*Armin Ansari
Health Physicist, Radiation Studies Branch
Division of Environmental Hazards and Health Effects
National Center for Environmental Health, CDC*

11:00 a.m. – 11:45 a.m.

Background Presentations on Shelters and Radiation

11:00 a.m. – 11:15 a.m.

FEMA

*Mark Tinsman
Support Specialist, ESF #6 Mass Care & Emergency Assistance
Federal Emergency Management Agency (FEMA)*

11:15 a.m. – 11:30 a.m.

American Red Cross

*Jeanne Spears
Sr. Leadership Volunteer, Health Services, Disaster Services
American Red Cross (ARC)*

- 11:30 a.m. – 11:45 a.m. **Multnomah County Health Department**
James Spitzer
Emergency Preparedness Manager
Multnomah County Health Department, OR
- 11:45 a.m. – 1:00 p.m. **LUNCH**
- 1:00 p.m. – 4:45 p.m. **Facilitated Discussion**
- 1:00 p.m. – 3:30 p.m. **Ground Rules and Facilitated Discussion on Functions**
Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE
- 3:30 p.m. – 4:45 p.m. **Facilitated Discussion on Solutions**
Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE
- 4:45 p.m. – 5:00 p.m. **Preliminary Report from Facilitated Discussion**
Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE
- 5:00 p.m. **Adjourn**

Thursday, February 4, 2010

- 7:30 a.m. – 8:30 a.m. **Breakfast**
- 8:30 a.m. – 8:45 a.m. **Welcome Back and Administrative Matters**
Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE
- 8:45 a.m. – 11:15 a.m. **Facilitated Discussion (continued)**

11:15 a.m. – 12:30 p.m.

Lunch

12:30 p.m. – 1:45 p.m.

Action Plans

*Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE*

1:45 p.m. – 2:30 p.m.

Next Steps: Where Do We Go from Here?

*Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE*

2:30 p.m. – 2:45 p.m.

Workshop Summary

*Ronald Edmond, Workshop Facilitator
Oak Ridge Institute for Science and Education, ORISE*

2:45 p.m. – 3:00 p.m.

Closing Remarks

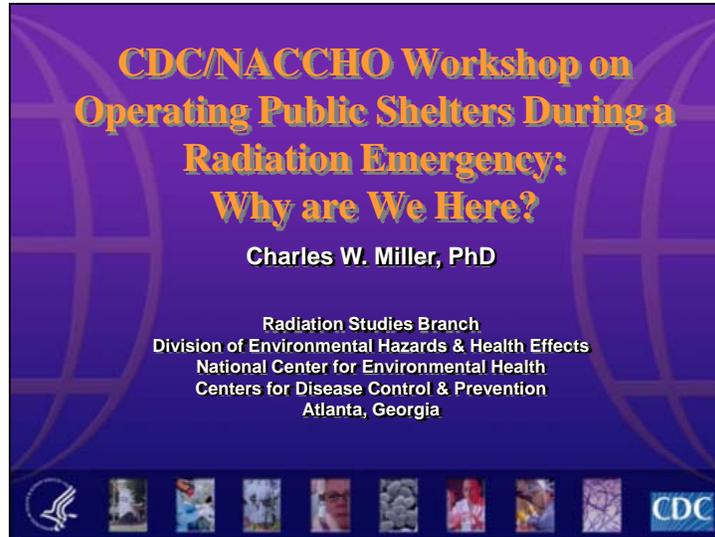
*Charles W. Miller
Chief, Radiation Studies Branch
Division of Environmental Hazards and Health Effects
National Center for Environmental Health, CDC*

*Jennifer Li
Director, Environmental Health
NACCHO*

3:00 p.m.

Adjourn

APPENDIX B: Workshop Presentations

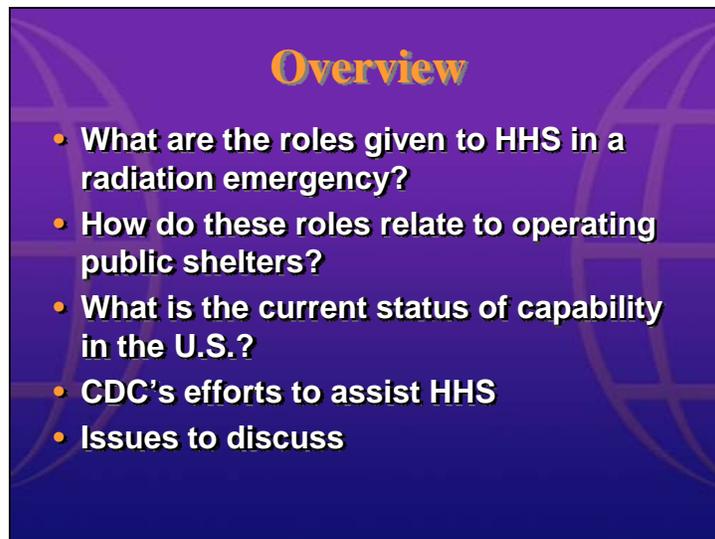


**CDC/NACCHO Workshop on
Operating Public Shelters During a
Radiation Emergency:
Why are We Here?**

Charles W. Miller, PhD

Radiation Studies Branch
Division of Environmental Hazards & Health Effects
National Center for Environmental Health
Centers for Disease Control & Prevention
Atlanta, Georgia

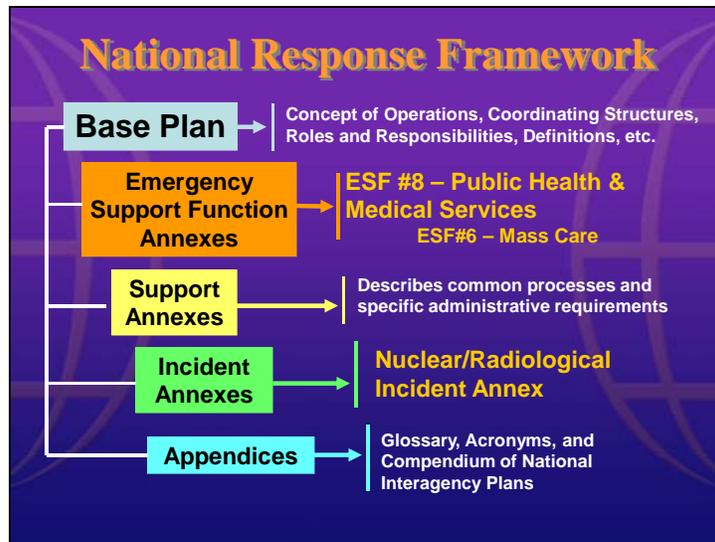
The slide features a purple background with a faint globe graphic. At the bottom, there is a row of small icons including the CDC logo, a person, a radiation symbol, a person in a lab coat, a person in a hard hat, a person in a red shirt, a person in a blue shirt, and a person in a white shirt.



Overview

- What are the roles given to HHS in a radiation emergency?
- How do these roles relate to operating public shelters?
- What is the current status of capability in the U.S.?
- CDC's efforts to assist HHS
- Issues to discuss

The slide features a purple background with a faint globe graphic.



- ## Public Health Issues After Any Disaster
- Rapid Assessment of Community Health/Medical Needs
 - Delivery of Health and Medical Care
 - Pharmaceutical Supply
 - Potable Water, Safe Food, and Sanitation and Hygiene
 - Injury and illness Surveillance
 - Vector Control
 - Solid Waste
 - Hazardous Materials
 - Registry
 - Mental Health
 - Sheltering and Housing
 - Mass Congregation
 - Handling of the Deceased (humans and animals)
 - Staffing
 - Rumor Control
 - Public Service Announcements/Media

Population Monitoring



The process of identifying, screening, and monitoring people for exposure to radiation or contamination with radioactive materials.

Population Monitoring



Evaluate potentially-affected population for:

- Needed medical treatment (both rad and non-rad related)
- Presence of contamination on body or clothing.
- Intake of radioactive materials
- Removal of external or internal contamination (decontamination)
- Radiation dose received and the resulting health risk from the exposure
- Long-term health effects (registry)

Potential Impacts

- **Nuclear Detonation**
 - Hundreds of thousands of fatalities
 - Hundreds of thousands contaminated
- **Explosive Radiological Dispersal Device**
 - Hundreds of fatalities
 - Thousands contaminated

American Red Cross Sheltering/Contamination Issues

During the TOPOFF 2 exercise in Seattle, WA in 2003...

“Before evacuated residents could enter the shelter, they first had to be examined for radioactive material”

http://www.redcross.org/article/0,1072,0_332_1153,00.html

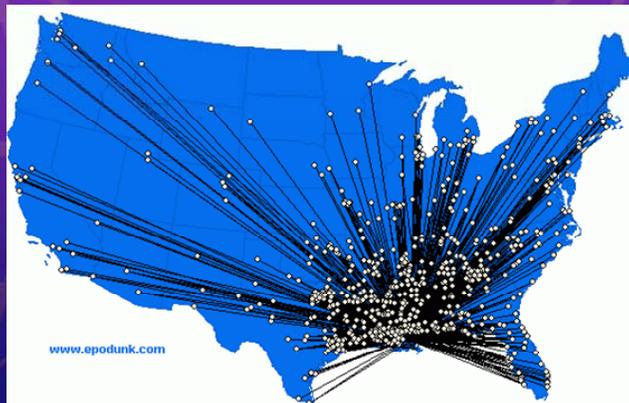


Department of Defense Supports Transport of Victims



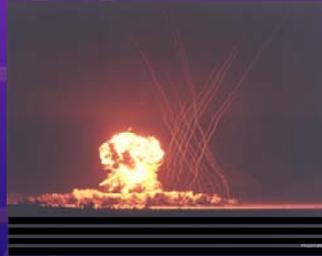
**Victims must be
stable and
decontaminated
before they will
be accepted for
movement**

Communities Affected Post Katrina



www.epodunk.com/top10/diaspora/index.html

A Nuclear Detonation Could Potentially Impact Many People



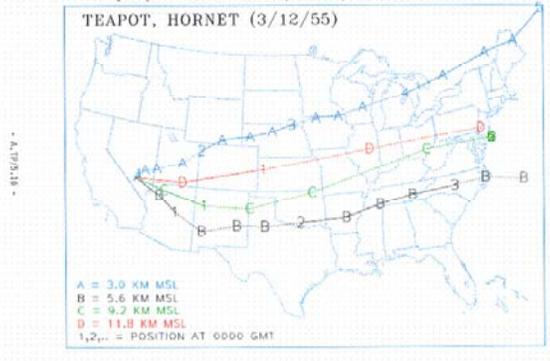
Teapot Hornet

- Detonated at the Nevada Test Site, March 12, 1955
- 300 foot tower shot
- Yield of four kilotons

Fallout travelled across the country

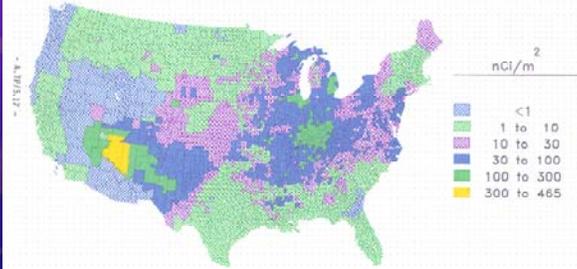
Figure TPJ/5/1. Estimated trajectories, at several altitudes, of the radioactive cloud resulting from the test HORNET of 12 March 1955. Numbers indicate the position of each trajectory at 0000 GMT for several days following the explosion.

TEAPOT, HORNET (3/12/55)



Deposition was uneven

Figure TP/5/F. ACTIVITIES OF I-131 DEPOSITED PER UNIT AREA OF GROUND:
TEST SERIES: TEAPOT TEST: HORNET



Citizens Have Radiation Monitoring Instruments

ebay Home / register / sign in / site map
Buy Sell My eBay Community Help

Back to list of items Listed in category Business & Industrial > Industrial Electrical & Test > Test Equipment >

Civil Defense CDV-777-2 RADIATION DETECTOR KIT
No Home Should Be Without This Survival Must

Buyer or seller of this item? Sign in for your status

Buy it Now price: **US \$26.00**
Buy it Now >

Time left: **3 days**
7-day listing. Ends Nov-10-05 08:08:59 PST

Start time: Nov-03-05 06:08:59 PST

Quantity: 12 available

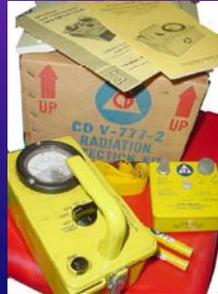
History: [Purchase](#)

Item location: Steubenville, OH
United States

Ships to: N. and S. America, Europe, Asia, Australia

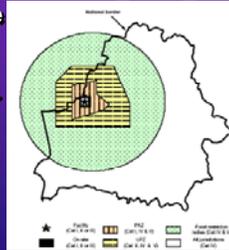
Shipping costs: US \$12.00 - US Postal Service Priority Mail®

[Shipping, payment, return and refund policy](#)



Current Planning Guidance

The Federal Emergency Management Agency has exercise evaluation criteria requiring that state emergency response plans demonstrate the ability to monitor 20% of the potentially exposed population within 12 hours upon arrival at a relocation center.



Reference: Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in support of Nuclear Power Plants (NUREG 0645/FEMA-REP-1 Rev 11)

How is this demonstrated?

For nuclear power facilities, affected populations could range from a few hundred to several hundred thousand individuals. Most state and local health departments attempt to demonstrate this with:

- Hand-held radiation survey instruments
- Portal monitors (for only beta/gamma monitoring) are used by only a handful of state agencies (the DOE has 13 deployable with the FRMAC assets)
- Alpha portal monitors have limited capabilities and are not easily transportable



External only

National Response Framework

Nuclear/Radiological Incident Annex



Decontamination/Population Monitoring are:

“the responsibility of State, local, and tribal governments.”

Current State/Federal Capabilities*

- External monitoring
- Internal monitoring
- Bioassay
- Biodosimetry

Marginal



Extremely limited

*States with nuclear power plants *somewhat* better prepared.

Default Thinking on Dealing with "Contaminated" Public



Hose These People Down?!

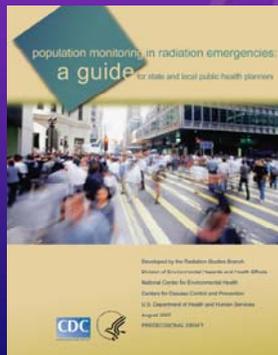


Population Monitoring Working Group

- HHS/CDC
- HHS/FDA
- USEPA
- USNRC
- DOE/NNSA
- California Department of Health
- Conference of Radiation Control Program Directors
- REAC/TS
- ORISE
- American Red Cross

CDC Guidance

- **Target audience:**
 - State and local public health and emergency preparedness personnel
- **Focus**
 - Incidents involving mass casualties
- **Scope**
 - Assumes local infrastructure is intact
 - Principles apply to all radiation incidents



Purpose

- **State/local emergency response and public health authorities can use this Guide to:**
 - Evaluate their emergency response plans
 - Identify/prioritize staffing needs, training requirements, and necessary material assets.
 - Further develop mutual assistance programs
 - Be better prepared to prioritize allocation of existing resources in actual response

Guiding Principles

- **The first priority is to save lives: respond to and treat the injured first.**
- **Contamination with radioactive materials is not immediately life-threatening.**
- **Initial population monitoring activities should focus on preventing acute radiation health effects.**
 - Cross contamination issues are a secondary concern

National Response Framework

Nuclear/Radiological Incident Annex



HHS assists and supports State, local, and tribal governments in performing monitoring for **internal contamination** and administering available pharmaceuticals for **internal decontamination**, as deemed necessary by State health officials.

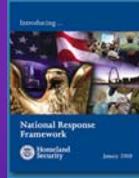
National Response Framework

Nuclear/Radiological Incident Annex



HHS assists local and State health departments in establishing a **registry** of potentially exposed individuals, performing **dose reconstruction**, and conducting **long-term monitoring** of this population for potential long-term health effects.

National Response Framework Nuclear/Radiological Incident Annex



HHS, through ESF #8 and in consultation with the coordinating agency, **coordinates** Federal support for **external monitoring** of people and **decontamination**.

Potential Federal Assets for External Population Monitoring

- Department of Energy – Mandated by Nuc/Rad Annex, but limited resources
- U.S. Public Health Service?
- Emergency Support Function #8, “Public Health and Medical Services Annex,” Support Agencies ?
 - Agriculture Defense Homeland Security
 - Interior Justice Labor
 - State Transportation VA
 - EPA GSA USAID
 - USPS Red Cross

Some Issues for Discussion

- **Who supports Red Cross and DoD requirements?**
- **How are *limited* assets to be prioritized (e.g., environmental vs. people monitoring)?**
- **When is a person “clean”?**

Goals of this Workshop

- **Identify the issues associated with mass care, sheltering, and feeding the displaced population after a nuclear or radiological event**
- **Prioritize the list of issues identified**
- **Develop an action plan for dealing with these issues**

THANK YOU

<http://emergency.cdc.gov/radiation>

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Charles W. Miller

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Nuclear and Radiological Emergencies: NACCHO Analysis, Activities, and Projects

Costanza Galastri

Wednesday, February 3, 2010



NACCHO | *The National Connection for Local Public Health*



NACCHO works to support efforts that protect and improve the health of all people and all communities by promoting national policy, developing resources and programs, seeking health equity and supporting effective local public health practice and systems.

Incidents Begin and End Locally... (NRF)



Advanced Practice Centers (APC) Program

To promote innovative and practical solutions that enhance the capabilities of all local health departments and the public health system to prepare for, respond to, and recover from public health emergencies.



APC Areas of Focus:

Tools, Training, and Technical assistance

- Vulnerable populations
- Biosurveillance
- CBRNE
- Environmental health/ food safety
- Rural health
- Personal preparedness
- Dispensing issues
- Volunteers
- Pan flu preparedness
- Risk communication
- Mass fatality
- Mutual aid



Tarrant County APC

Planning and Implementing a Public Health Exercise for Radiological Events: An Exercise Guide

Responding to Chemical and Radiological Disasters – A Self-Paced Training Course

Responding to Chemical/Radiological Terrorism: Training Manual

PPE, Decontamination, and Mass Triage: A Short Course



Project Public Health Ready (PPHR)

PPHR criteria:

- The only known national standards for public health preparedness
- Continuously updated to incorporate the most recent federal initiatives

... "A competency-based training and recognition program that assesses preparedness and assists local health departments or groups of local health departments working collaboratively as a region to respond to emergencies."



Expertise

- NACCHO committees, teams, and workgroups
- LHD practitioners
- Future activity: *2010 Annual Preparedness Survey*
 - LHD capacities and capabilities to respond to nuclear and radiological emergencies



Partnerships and Activities

- National Conference on Radiological and Nuclear Preparedness Working Group
- National Center for Disaster Preparedness, Mailman School of Public Health, Columbia University
- CDC Preparedness and Emergency Response Research Center (PERRC), at the Center for Infectious Diseases and Emergency Readiness (CIDER), UC Berkeley School of Public Health
- Institute of Medicine of the National Academies
- Lessons Learned Information Sharing (*LLIS.gov*)
- District of Columbia Fire and Emergency Medical Services Department
- The National Alliance for Radiation Readiness (NARR)



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CDC/NACCHO Workshop on Operating Public Shelters
During a Radiation Emergency Feb 3-4, 2010

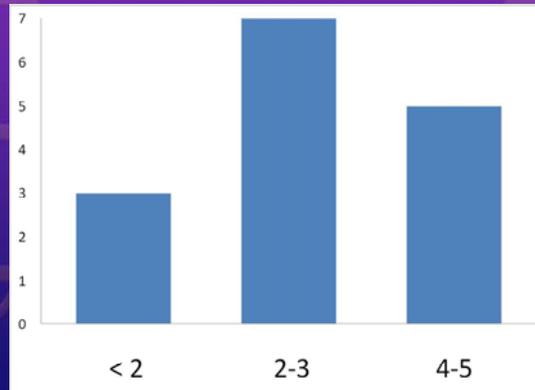
Radiation Primer: Defining the radiation hazard when managing/operating shelters and current CDC-related activities and projects

Armin Ansari, PhD. CHP

Radiation Studies Branch
Division of Environmental Hazards & Health Effects
National Center for Environmental Health
Centers for Disease Control & Prevention
Atlanta, Georgia



Your self assessment for knowledge of radiation issues (scale of 1 to 5)



If only 1 slide allowed to cover radiation basics!

Difference between:

- Radioactive material
- Radiation

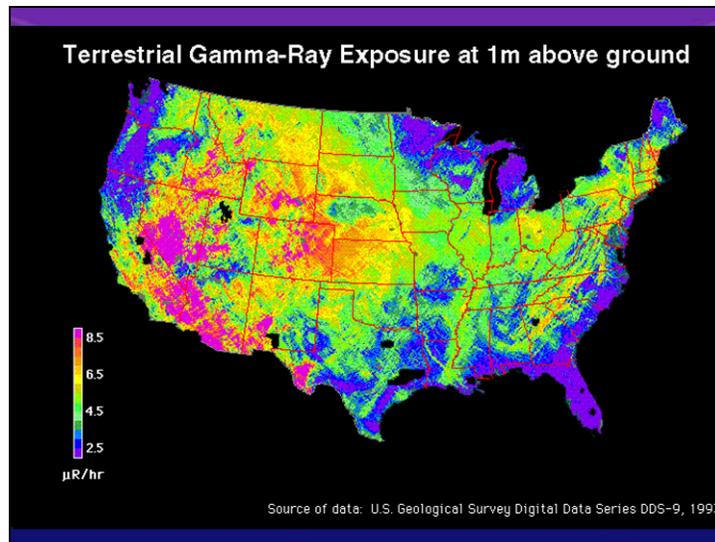
Difference between being:

- Contaminated → External & Internal
- Irradiated (exposed)

Unknown Radioactive Substance

- Contains
 - Cesium-137 (3.7 Bq/kg)
 - Uranium-238 (50 Bq/kg)
 - Thorium-232 (24 Bq/kg)
 - Radium-226 (37 Bq/kg)



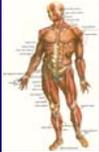


Accidental Ingestion of Radioactive Material

- 12 Bq (disintegrations per second)?
720 dpm (disintegrations per minute)

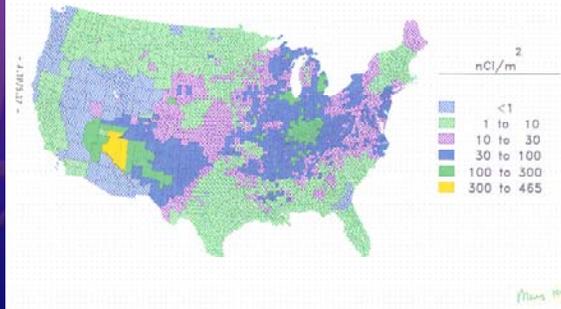


How about 5500 Bq?



Fallout Deposition from Teapot Hornet – 3/12/1955

Figure TP/S/F. ACTIVITIES OF I-131 DEPOSITED PER UNIT AREA OF GROUND:
TEST SERIES: TEAPOT TEST: HORNET



Public Shelters

- Cocoons of zero radioactivity?
- How about other public facilities?

Past Experiences



vítimas da radiação



10

Scenario : Nuclear Detonation – 10-kiloton Improvised Nuclear Device

- Casualties
 - Hundreds of thousands
- Evacuations/Displaced Persons
 - 100,000 in affected area seek shelter in safe areas (decontamination needed)
 - 250,000 instructed to shelter-in-place as plume moves across region(s)
 - 1 million+ self-evacuate from major urban areas

11

Hurricane Katrina, 2005

- ~ 1,500 fatalities
- > 1 million people evacuated
 - ~ 800,000 people displaced
 - ~ 300,000 in evacuation centers
- ~ 100,000 people remained
 - Civil unrest
 - Health hazards
 - Infrastructure failure



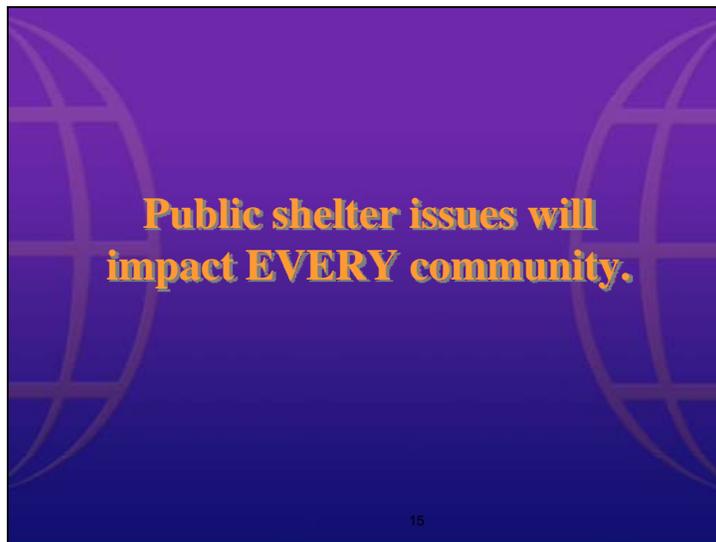
Source: Louisiana Department of Health and Hospitals, Hurricane Katrina, Deceased Reports
Source: The Federal Response to Hurricane Katrina, Lessons Learned, February 2006

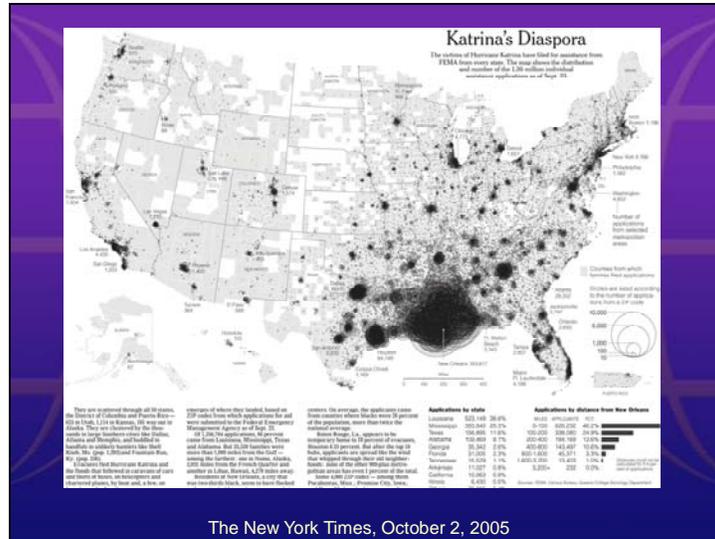
New Orleans 2005





We know the relative radiation hazards – you know everything else!





Planning for IND Response

- Public shelter locations
 - 20 miles from Ground Zero
 - 2000 miles from Ground Zero
 - Places in between
- Radiation screening staff and equipment
 - Adequate
 - Less than adequate
 - None!

Example

The case of potentially-contaminated in-laws knocking on your door!

**CDC Related Products,
Activities, and Projects**

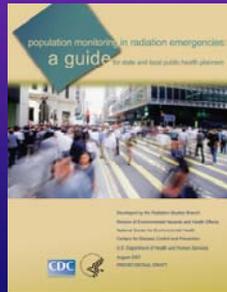
Tool Kits

- For Emergency Services Clinicians
- For Public Health Officials

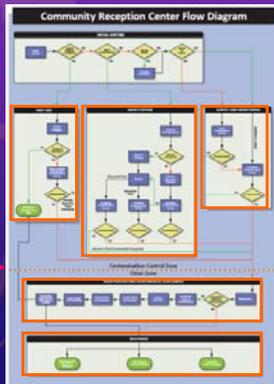


Population Monitoring

*Population Monitoring in Radiation Emergencies: A Guide
for State and Local Public Health Planners*
<http://emergency.cdc.gov>



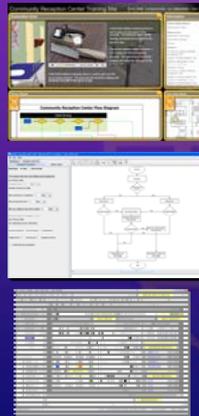
Community Reception Centers (CRC) Process Flow



- Could be co-located with shelters
- 6 Main Process Areas
 - Initial Sorting
 - First Aid
 - Survey and Monitoring
 - Wash Station
 - Registration and Dose/Medical Assessment
 - Discharge

CRC Resources

- Virtual CRC, an interactive web-based training
- RealOpt–CRC optimization software
- CRC STEP, Simulation Tool for Evaluation and Planning



Modeling and Measurements

- Developing protocols for rapid screening and prioritization of internally contaminated patients using:
 - Hand-held radiation survey instruments
 - Thyroid uptake scanners
 - Radiation portal monitors
 - Gamma cameras
- Modeling radiation dose to care providers



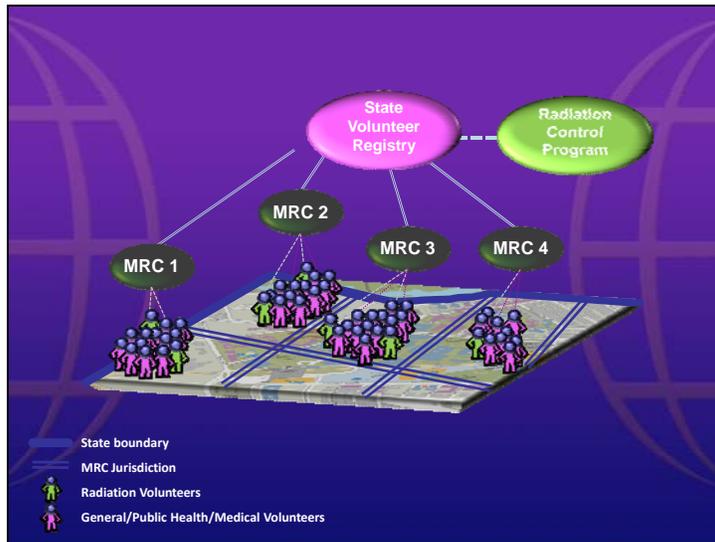
Where Does Radiation Expertise Come From?

State?

Federal?

Mutual Aid?

Local community resources



MRC GEM – July 2009
Community Reception Center at
Peachtree Ridge High School (POD) in Suwanee, GA



CDC/CRCPD
Pilot Project 2010

- Local radiation volunteers recruited into MRC units
- Six states + New York City

NIMS Resource Typing

DRAFT - August 31, 2009

Resource:		Public Health and Medical: Radiation Monitoring Team		
Category:	Health and Medical	Kind:	Team: This team conducts population monitoring in response to a radiation emergency	
Minimum Capabilities		Type I	Type II	Type III
Component	Metric			
Team Type	Capability	Team that can perform the following activities under the Authority Having Jurisdiction: - monitor areas for external contamination - assist with decontamination services - assess exposure - assess internal contamination	Team that can perform the following activities under the Authority Having Jurisdiction: - monitor areas for external contamination - assist with decontamination services	
Personnel	Team Composition per 12-hour Coverage	- 1 Radiation Monitoring Team Leader - 3 Radiation Protection Specialists - At least 8 Radiation Monitoring Staff - 1 Radiation Measur Operator	- 1 Radiation Monitoring Team Leader - 2 Radiation Protection Specialists - At least 6 Radiation Monitoring Staff	
Equipment/Supplies	Will Vary by Team Type	- Radiation monitoring equipment to survey for external contamination - Personal Protective Equipment (PPE) as appropriate - Tablets for time and handlogs - Radiation monitoring equipment to access for internal contamination - Communication tools to communicate in secured and unsecured environments - Maps on external, internal, and other monitoring capabilities (GPS/computer, printer, etc.)	- Radiation monitoring equipment to survey for external contamination - Personal Protective Equipment (PPE) as appropriate - Tablets for time and handlogs - Communication tools to communicate in secured and unsecured environments - Relevant software, hardware, and other monitoring capabilities (GPS/computer, printer, etc.)	
Comments:				

Radiation Alliance

- Recently formed coalition of organizations dedicated to advancing the nation's ability to prepare, respond and recover from radiological emergencies at the local, state and national levels
- Founding members – ASTHO, NACCHO, CRCPD, CSTE, APHL, CDC (advisory)
- Proposed activities: population monitoring, registry issues, resource sharing, plan development, etc.
- Proposed name: National Alliance for Radiation Readiness (NARR)

Public Communication

Audience Research (2002-present)

- Focus group testing of knowledge, attitudes, and behaviors (KAB) and CDC materials
- Secondary research of public KAB related to radiation/radiological emergencies
- Cognitive interviews related to public messages for a rad/nuc emergency event
- Message testing with public health workers
- Survey of knowledge and attitudes related to radiation concepts

Thank You

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Mass Care / Emergency Assistance Support for Sheltering



February, 2010



FEMA

Mass Care / Emergency Assistance Support for Sheltering

National Response Framework (NRF)

Mass Care

- Sheltering
- Feeding
- Bulk Distribution
- Basic First Aid
- Disaster Welfare Information (e.g. Red Cross, Safe & Well)

Note: While designated as Emergency Assistance in the NRF, the bullets to the right, represent the VAL and Donations Mgmt Unit's role

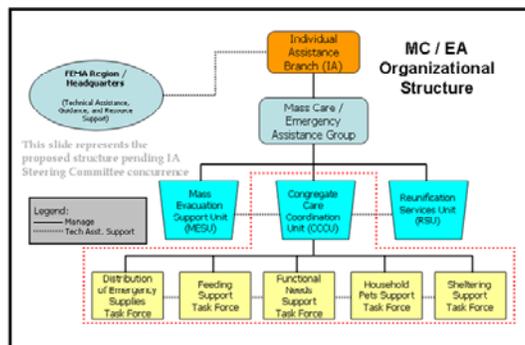
Emergency Assistance

- Mass Evacuation
- Family Reunification
- Household Pets and Service Animals
- Functional Needs (Special Needs), Medical and Non-conventional Sheltering
- Voluntary Organization Coordination
- Support for Management of Unaffiliated Volunteers and Unsolicited Donations



FEMA

Mass Care / Emergency Assistance Support for Sheltering



Mass Care / Emergency Assistance Support for Sheltering

MC/EA New Tools and Resources

- Multi-Agency Feeding Template
- Shelter Assessment Template
- Evacuation Tracking Systems
- Functional Needs SOP/Training



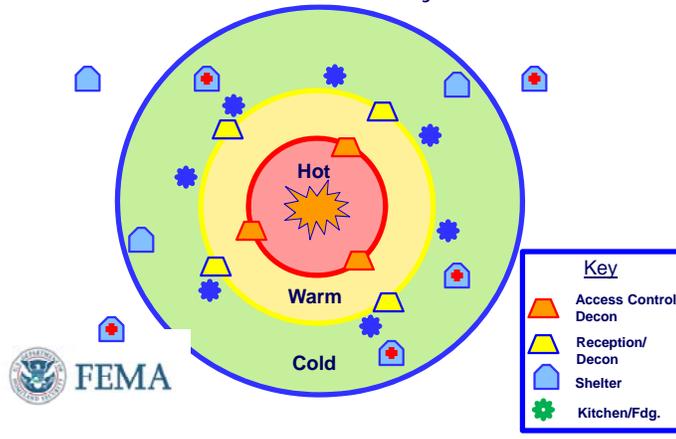
**Mass Care / Emergency Assistance
Support for Sheltering**

MC/EA New Tools and Resources

- Blanket Purchase Agreements (BPA)
 - Food, Durable Medical Equipment and shelter kits
- Cambro® Purchase Agreement
- Pre-Scripted Mission Assignments (PSMA)
 - APHIS, Animal Care; CNCS; HHS; FNS
- American Red Cross/FEMA contract
 - Regionally based specialists



**Mass Care / Emergency Assistance
Support for Sheltering**
Where are MC/EA services likely to be delivered?



**Mass Care / Emergency Assistance
Support for Sheltering**

MC/EA Concerns

- Clear definition of operating “zones” (*Hot, Warm, Cold*) and what that means to Shelters and Shelter operators
 - Early establishment of “Zones” and shelter identification
 - Shelters should only operate within and/or outside Cold Zones
- Shelters should only permit entry for people (and their household pets and service animals) who have been identified as “Clear” (*i.e., No radiological contamination issues or concerns*)
 - General recommendation of what a “Clear” approval document should look like and what it will document?
 - Recommendations for utilization of Shelter Security





 American Red Cross

American Red Cross Sheltering



1



 American Red Cross

The American Red Cross, through its Congressional charter and other federal statutes, has both a legal and moral mandate to provide disaster relief services in every community across the nation.

In the most visible of its core services, the Red Cross responds to the immediate needs of disaster-impacted communities by opening, operating, and supporting shelters that provide a safe, secure, temporary environment for as many people as possible.

2



Red Cross Shelters

Red Cross is the nation's primary sheltering organization.

Local Red Cross Chapters work with local government and community partners for disaster planning.

Shelters are established after a disaster incident when people have been displaced from their homes and cannot return for an extended period of time.

3



Red Cross Shelters

Red Cross Shelters provide those affected by disaster a safe place to stay before, during and after a disaster. Sheltering provides for the basic needs of disaster victims including a place to rest and sleep, hygiene items, and meals. In addition, shelter clients have opportunities to enjoy recreational activities, receive updated disaster information, and take part in Red Cross and community services to begin their recovery.

4



Core Shelter Activities

- Registration
- Dormitory Management
- Feeding
- Bulk Distribution
- Client Casework and Recovery Planning
- Disaster Health & Mental Health Services
- Welfare Information and family reunification support
- Recreation

5



Disaster Health Services during a Disaster Response

- Provide Disaster Health Services support in shelters and other service delivery sites
- Identify disaster-related health needs of clients
- Provide replacement of medications, equipment and/or medical services
- Utilize community services and partners to meet the disaster-related healthcare needs
- Collaboration with public health agencies and the medical/nursing communities
- Provide CDC public health surveillance of injuries and illnesses within a shelter and other service delivery sites

6



Staff Health – Ensuring a Healthy Workforce

- Worker education on pertinent health issues during orientation/training
- Advice on maintaining a safe and healthy working environment.
- Consultation regarding health hazards and environmental issues
- Consultation regarding Americans with Disabilities accommodation
- Documentation of worker illnesses/injuries for epidemiologic review
- Evaluation of individual's current health status during in-processing
- Recommendations for appropriate assignments based on current health status
- Appropriate first aid and medical intervention
- After hours emergency health care coverage
- Follow-up care to workers confined to quarters
- Refer staff to health resources/ accompany staff to medical facilities
- Recommendations to relief operation management concerning release of ill or injured staff

9



Shelter Tools & Guidance

- Mass Care Standards & Indicators
 - adopted by National VOAD
- Shelter Operations and Simulation training
 - basic level courses designed to give an overview of the American Red Cross policies and procedures for setting up, running and closing a shelter during a disaster.
- Shelter Operations Management Toolkit
 - Internal guidance for Shelter Managers

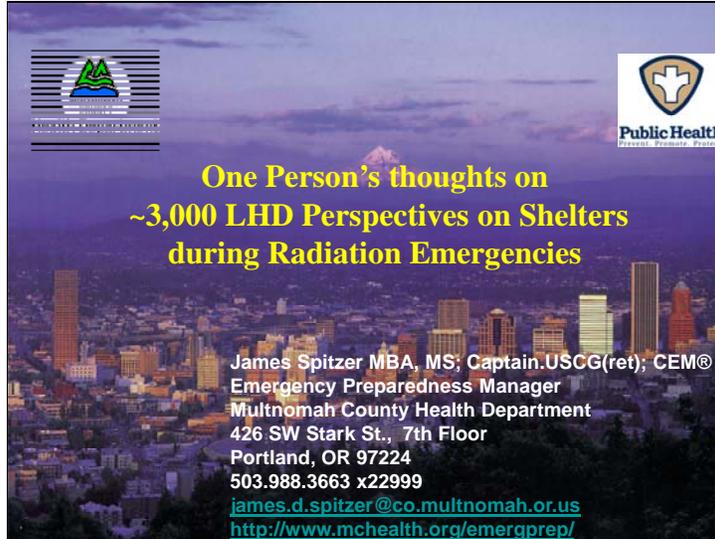
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Shelter Concerns during a Nuclear Event

- Reporting the disaster - timeliness and dissemination
- Issues around setting up a shelter in a safe zone – time, coordination, communication, location, ...
- Decontamination – both prior to and after entering shelters
- Guidance on triage evaluation of potentially contaminated individuals
- Identification used for “clean” residents and resources
- Guidance on responding to a contaminated shelter, in part or whole
- Security – panic, limiting mobility of residents, ...
- Potassium iodide dissemination

11






One Person's thoughts on ~3,000 LHD Perspectives on Shelters during Radiation Emergencies

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The LHD Role in Shelter Operations during a Radiation Emergency: One Person's Mental Simulation of the Issue and the Perspectives of ~3,000 LHDs

Introduction

Our County & Health EOPs
 about the other ~3,000 LHDs?
 sans Radiation, e.g.

NOLA
 2 in Call
 ~50,000

**Radiation Screening and Medical
Operations (virtual shelters), e.g. Shelter**

Rapid Screening Points and Medical Care Points of the
 National Top Officials Exercise of 2007, at the
 Portland, OR, venue

Conclusions - Part 1

National lead agency and AEC standards for shelters
and State Human Services always/usually have
Human Services and Public Health in a single agency
the scope of public health agencies are highly
variable, often not including mental
human services programs. Sheltering
responsibility of HS agencies or of
Emergency Management

- Scope of LHD operations makes for widely variable visions of the LHD's sheltering and sheltering responses. If no accepted, exercised plan, execution of the vision is highly incident specific

Conclusions Part 2: Spitzer's Ratios of Persons Needing Shelters Relative to Radiation Screening

- N = residents of evacuated area requiring public shelters and radiation screening
- $N \times .5$ = total residents evacuated and needing screening with ~80% not needing public shelter
- $N \times .10$ = number requiring radiation screening with ~50% not living in the evacuated area
- Since sheltered people must be screened, most needing screening will not need shelter, and screening resources will be scarce, perhaps best to conduct separate mass screening, with evidence of screening required for admission to shelter.

Conclusions - Part 3

- Small or highly specialized shelters can accept select clients matched to the services they will need.
- Shelters that accept evacuated people as they cope with the many challenges that they bring, need a variety of services, e.g.:

- Transportation
- Recreation/morale
- Access control
- Insurance Claims adjusters
- Telephones
- Pet boarding
- Interpretation/communication
- Status of and reentry to evacuated areas
- Relocation to more permanent temporary shelter



For more information:

1. After Action Report on 'dirty bomb' Unified Command, Rapid Screening Point, Medical Care Point & other information at <http://www.mchealth.org/emergprep/topoff/index.shtml>
RSP & MSP mini-documentaries & time-lapse videos at <http://www.mchealth.org/emergprep/media.shtml>
2. Health EOP at: <http://www.mchealth.org/emergprep/>
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Multnomah County preparedness efforts are partially funded by United States Centers for Disease Control Bioterrorism Grants.

APPENDIX C: Workshop Participants

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