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Planning and taking protective actions in emergencies to reduce harm to both people and property is needed for all disaster events. Earthquakes, floods, hurricanes, wildfires or other natural phenomenon, as well as chemical releases, terrorist actions, or some other human-caused event. Evacuation and sheltering are two protective actions used in emergencies, sometimes in combination, sometimes alone. Some communities with large industrial complexes advise residents to shelter immediately when hearing an alert siren, and then listening for further instructions to either continue sheltering or to evacuate.

Evacuation is generally preferred and provides more protection than sheltering when it can be completed before the actual threat arrives. Sheltering in place is preferred when evacuation puts people at greater risk, such as during storms producing tornadoes or when a fast-moving chemical release means people could be evacuating in a toxic cloud. When the recommended protected action is evacuation of an entire geographic area, especially if it is a large urban or densely populated area, emergency management officials and planners must coordinate their efforts with law enforcement, fire and hazardous materials personnel, transportation engineers, special needs experts, search and recovery teams, and multiple local, state, and federal agencies.

Given today's changing world, planners and emergency officials must identify partners to aid in developing emergency evacuation plans. They should be prepared for normal hazards as well as those that have very little probability of occurring, but could result in great loss of life and property if they did occur. Having a plan to acquire additional resources to handle such events is critical. This aspect of planning may be difficult for emergency managers, but it is needed for catastrophic events. Over the years, evacuation has been an area of considerable multidisciplinary study and much has been learned about what makes an evacuation effective and what areas need improvement.

Because evacuation for hazards has been well researched, this training focuses on evacuation timing, transportation strategies, destinations, behavioral issues, and constraints to evacuating. We also will discuss how people respond to warnings. Issues related to non-compliance and planning for vulnerable and special needs populations. Transportation strategies that include estimating and modeling evacuation times, and the impact of false alarms on future hazards. Given America's increasing urbanization, the discussion focuses on community-level evacuations that involve a large number of diverse population groups.

In this video, we will talk with some of the leaders in evacuation research within their respective fields. This information will help emergency planners, elected officials, agency managers, public information personnel, and others who may need to plan and direct emergency evacuations. Armed with information contained in this video, these same people may find it easier to discuss the rationale for preparedness and for recommended protective actions with constituents, stakeholders, or people with special needs. The training material also may be used to initiate discussion with small focus groups or to enhance evacuation strategies after an event.

Often, there is a window of opportunity to incorporate lessons learned and innovative ideas into emergency plans following a major evacuation. Once the need for an evacuation is determined, officials must warn people at risk in time for them to take the necessary actions to evacuate. While radio and television are still obvious choices, improvements in communications and warning technologies have increased options to alert and notify residents of a potential threat such as the reverse 911 automated dialups. The special area message encoder or SAME technology has permitted NOAA weather forecasters to issue warnings to specific counties, reducing false alarms.

Warnings are also issued using the Internet to IP address devices such as computers, cell phones, and pagers. As technologies change and become widely adopted, planners should consider how they might aid in alert and notification efforts, and then planners need to consider that people technology does not reach. Planners and residents should also factor into their plans that outside resources may not arrive until as much as 72 hours after an event occurs. Households should prepare emergency plans and a disaster supply kit, including sufficient food and water for all household members, including animals, to last three days.

Public information specialists and media outlets should be involved in planning to disseminate critical information on what resources will be available to residents prior to and immediately following an event. These efforts should be supported by a pre-disaster public education program on preparedness for emergencies. The messages should include requests for those with special needs to identify themselves and their needs.

An effective warning system that gets people to evacuate is both an engineering and organizational process. Warning systems are more than technology, involving human communication,

management and decision-making, and coordination. As demonstrated by experiences of survivors of the 2001 World Trade Center disaster, warning systems also extend far beyond official systems, as most of the evacuees in the second building to be hit started to evacuate before they were told to by the building's public address system, which occurred one minute prior to the impact by the second plane.

Planning for an emergency starts with an assessment of a community's risks. A thorough vulnerability analysis will determine where facilities and infrastructure are sited that may present risks to residents if an accident occurred, or hazards that may impact the community at large.

Planners should also think of disastrous combinations that would result in residents and businesses being evacuated. For example, major chemical facilities or refineries may be clustered in an industrial park outside town that are serviced by a railroad running next to new housing developments. An earthen dam upstream of a community may not be safe in an earthquake or major flooding. A wildfire may occur near a large seasonal recreational resort that is reached by a single lane road.

Mike Lindell, a psychologist with the Hazard Reduction and Recovery Center at Texas A&M University, knows different populations respond differently to threats and evacuation orders.

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Once you've identified the areas that are exposed, then you need to go on to the next step of identifying the kinds of population segments that are in those vulnerable zones and the kinds of facilities that are there. Coming back to the issue of ethnicity, is it primarily African-American? Is it primarily Hispanic? Is it primarily Caucasian groups? What's the income level? What's the education level?

But that's only one part of the concern. Another is the special facilities. What kinds of schools, hospitals, nursing homes, jails, and other kinds of facilities are located in those vulnerable zones? So that you know how to communicate with those people as well. If you've got parks there that bring in people from out of the area, they might not know about the hazmat facilities and protective actions, and so you need to deal with those kinds of issues ahead of time. Think them through and figure out ways to post information for people that are picnicking or camping or boating.

*Male:* Public Law 106190, the Disaster Mitigation Act of 2000, amends the original Robert T. Stafford Relief and Emergency Act that provided disaster relief to communities. The amended Stafford Act requires that the community identify potential hazards to the health, safety, and well-being of its residents, and identify and prioritize actions that can be taken by the community to mitigate those hazards before disaster strikes.

For communities to remain eligible for hazard mitigation assistance from the federal government, they must first prepare a hazard mitigation plan.

Susan Cutter, director of Hazard Research Laboratory at the University of South Carolina.

*Female:* Under the Disaster Mitigation Act of 2000, all communities are required to have a hazard vulnerability assessment of their communities, and these hazard assessments look at the type of exposure that the community faces, from a variety of natural and technological events. And so the good ones really are place specific and look at where you have concentrations of chemical facilities, where you have your flood plains, where you might have low-lying areas subject to storm surge inundation, and these sorts of things.

And these hazard vulnerability assessments actually provide the basis for disaster mitigation plans that all communities are supposed to do. And all zoning is local, and all land use is local, and so those communities that are doing a good job are those that are looking at these sort of hazard zones, and they're making local land use decisions to keep people out of these hazard zones.

The communities that aren't doing such a good job are the ones that oftentimes are experiencing loss because they're allowing people to build in these high-risk areas. And this could be right along the shoreline. It could be right along flood plains. It could be potentially adjacent to major industrial facilities. So there's some things that the federal government can mandate in terms of developing these kind of risk-based hazard vulnerability assessments, but ultimately it's at the local level, as the community makes the decision on where people can live and where facilities can be located.

*Male:* The final step is to facilitate the movement of people out of the area using the most coordinated and comprehensive evacuation plans possible.

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