

*Male:*

Evacuation generally means leaving an area of potential threat for a safer location. Usually this is a roundtrip process. But sometimes when a structure or area is severely damaged or destroyed or cannot be decontaminated effectively, return may be delayed for months, years or permanently. The anthrax-contaminated American Media Building in Boca Raton, Florida took several years and substantial private investment to become habitable again as office space.

Areas in Florida and Louisiana devastated by hurricanes and floods have been slow to recover. Most evacuations are precautionary, especially for events with long lead times such as hurricanes or major floods. Other evacuations are reactionary and take place after an event occurs such as after a train derails and a hazardous chemical is released from a tank car. Some people will evacuate in response to invitations from family, friends and others offering temporary refuge. Most evacuees prefer to stay at hotels, motels or with friends or family. Some people evacuate by default when they are kept from returning to a residence or workplace in an area that was evacuated while they were away.

Often those evacuated by default do not have any emergency supplies or other necessities with them. This type of evacuation can stress the community's emergency response capacity for providing relief and other supports such as caring for animals left unattended. Few communities have the physical or legal capacity to force people to leave, even when officially mandated. Some individuals will remain in the evacuation zone either because they cannot or choose not to leave. Evacuation plans should recognize that some people will have to shelter and emergency officials need to provide services to them if at all possible as soon as the danger has passed. Betty Hearne Morrow, Professor Emeritus, Florida International University.

*Female:*

The factors associated with leaving typically are income. People who have higher incomes are more apt to evacuate. Evacuation is expensive. The gasoline, the food, lodging if you need it, so that's an important factor. We found that if people live in an evacuation zone and know they do, they're more apt to evacuate. People tend to make rational decisions if they're given the information in a clear way, if they know that evacuation order has been given for their community.

And that gets us into the whole issue of warning messages that we have to be very clear in warning messages, exactly personalize it, you know, exactly who are we talking about here, you know, who

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needs to evacuate. What areas and give geographical locations and so forth. That's important to get people to evacuate. Men, in general, are less apt to evacuate if they're making the decision.

*Male:* How do people respond to warnings to evacuate? When people hear a warning, they generally try to find out more about the threat and check to make sure the warning is credible. People consult with family members, friends, coworkers, turn to a news channel or the Internet. After confirming the threat as real and they are at risk, they make choices concerning their personal safety. Some gather possessions and leave. Others will delay their decision and still others elect not to leave. Mike Lindell.

*Male:* It's important to understand that there are lots of different variables involved, that you have to understand what is the community's perception of the emergency manager and other public safety officials as an information source. You have to understand what are the advantages and disadvantages of different kinds of communication channels. You have to understand how to construct effective warning messages and you have to understand how it is that the different segments of the community will interpret the warning messages that they get. And the different kinds of circumstances that they're in that will influence their ability to evacuate or whatever other protection action you want them to take.

And it's also important to provide a feedback loop so that if people are unclear about the message or unclear about the hazard, unclear about the protective action, that what they can do is to call into a hotline or that they can log onto a Web site or that they can turn on a particular radio station or a particular television station. That there's some place that they can go to confirm the warning message and to get additional information. So all of those aspects are important and how the warning system gets designed for any given community is gonna depend upon all those different characteristics. The sources, the channels, the messages, the receivers and the feedback loops.

*Male:* Evacuations usually take place in a group context. Families will try to reunite to evacuate as a group. However, they may not travel in a single vehicle if two or more vehicles are owned and there was a prospect of severe damage from an event. In business settings, co-workers typically evacuate in groups.

*Female:* Increasingly we have more and more wealth moving to the coastal areas. And one of the large problems with evacuations that we've

seen based on some of our work here in South Carolina is people are reluctant to leave expensive automobiles. So instead of piling the family into one automobile, we know families evacuate as units. People will take as many cars as they have drives and so instead of having three people per car, you have three cars with one person each. And that adds to the amount of traffic on the transportation routes out of harm's way.

And so you have increasing volume of traffic as you have potentially increasing wealth in some of these communities. And that's going to increase the amount of time it's gonna take to clear these areas. And so I think emergency managers are starting to think about these sorts of things but I think more work needs to be done and more thought given to, okay, how many people are gonna actually leave and how many cars are they gonna take and what do we do about these populations that don't have the kind of resources get out of harm's way.

*Male:*

How fast do people mobilize? Mobilization time is measured from when people hear the first warning until exit behavior begins. It's important to remember that not all people can leave immediately when advised. Researchers have found that the timing of evacuation departure resembles an S shape or logistic curve. The shape of the curve is largely determined by the amount of time available to evacuate before the threat is present. In very fast-moving events such as a flash flood or hazardous material release, the curve is very steep. In slow-moving events such as hurricanes, the curve is flatter and may be influenced by the time of day. People are less likely to evacuate at night.

*Female:*

And if that over the weekend, they'll have more time to prepare and get ready. But if it happens quickly, a fast-moving event such as other hazard – you know, hazard spills and so forth, you know, that's a whole different situation. But with these long events, people will weigh it. They'll take their time. But if it should happen at night, very few people evacuate their homes at night. That's pretty rare.

And so maybe the case of sirens with tornadoes, we may have a little bit of that. But in general, people aren't watching the news, they aren't paying attention and we don't have sirens in most communities. We sort of did away with that particular mode of warning people that maybe we shouldn't have because nighttime is our issue. That's every emergency manager's horror to have something that happens fast and happens at night.

*Male:* Disaster researchers have studied issues associated with official orders to evacuate or not evacuate known as compliance. An evacuation compliance rate is the portion of the population who receives an official order to evacuate that leaves the area at risk within the specified time period. Evacuation rates may vary depending on whether the evacuation is mandatory or only recommended by officials. Studies have examined the evacuation rates in different events. Shadow evacuation, early or spontaneous evacuation and cry wolf effects.

*Female:* A shadow evacuation is a phenomenon that occurs when you have a targeted population that you're trying to get out of harm's way and you advise them to evacuate. And people not in the targeted area actually leave as well. So you have geographically an area that you're trying to move people out of harm's way. Let's say the barrier island, for example. But not only do the people on the barrier island evacuated the people living inland evacuate. And what we might think of is it creates a shadow.

One of the interesting things about the shadow evacuations is it seems to be more prominent with what we might call technological events such as chemical spills, train derailments, nuclear power plant accidents like Three Mile Island than what we see with natural disasters like hurricanes. And so that's kind of an interesting phenomenon that you get this larger shadow evacuation being produced by more technological kinds of events.

*Male:* In most evacuations, not everyone at risk participates in the evacuation. Reasons for noncompliance include not having access to transportation, and being mobility impaired, not being able to afford to evacuate, needing to work or provide care for others or thinking one's location is safe. Some individuals don't evacuate because of a concern for looting. Many of these reasons accounted for the noncompliance with evacuation orders in New Orleans during Hurricane Katrina in 2005. Others that may not be able to evacuate are individuals temporarily incapacitated by illness or people who have livestock, numerous pets or highly valued animals. Betty Hearne Morrow.

*Female:* Well certainly if you're talking about evacuation, there going to be some populations that are not only perhaps more at risk but aren't going to have a much more difficult time securing either their home or evacuating. And for those people, they tend to be people who for whatever reason aren't maybe a part of the mainstream society in terms of being incorporated into the community. They are more likely to live alone. We're talking about people who are

poor that may not have the resources and very elderly people who often are very reluctant to leave home even if they should and have the resources and people with special needs.

And so it behooves emergency managers and public officials to try to know as much about where these people live as possible. So almost every community will have some sort of a special needs registry that's usually now today, I think, usually GIS coded into their vulnerability assessment so that they know where these people are. But of course that means they need also to have some plans as to how they're going to get to them in an emergency.

*Male:* Spontaneous evacuation occurs in many situations when risk information is reaching the public before officials have made a decision on a protective action. In some instances, it helps facilitate official evacuation orders. In one study of a hazardous material accident, plant workers and first responders at the scene contacted friends and relatives thought to be at potential risk before the evacuation order was given by emergency officials. Susan Cutter.

*Female:* A spontaneous evacuation occurs when groups of individuals decide on their own to leave without any official advisory or mandatory order from emergency officials. Oftentimes spontaneous evacuations precede an advisory. People decide they don't want to wait for the official advisory to come out and therefore make their own arrangements to get out of harm's way. Oftentimes spontaneous evacuations occur because people have been through evacuations before and they're anticipating mandatory advisory coming out

Other times spontaneous evacuations occur because people have a very heightened sense of the risk of the threat source and fear and so what they want to do is put distance between themselves and the source of the threat.

*Male:* Many people evacuate with pets. Data suggests up to 25% of evacuating families will have animals. While residents can be urged to prearrange shelters for animals, most planners will have to facilitate such arrangements. This may include working with local veterinarians and humane societies to arrange accommodations. Bob Lennonberry, Professor Emeritus of University of Tennessee, College of Veterinary Medicine.

*Male:* People are always first. And irregardless of the disaster, people are always first. But you also have to consider the emotion level of the

person where if they're not going to evacuate because of their animal, the you do have to have that component in there to make the evacuation smoother. And that's one of the problems we had with Katrina was the fact that people said they weren't going to evacuate without their animals and they didn't provide the evacuation methods to evacuate people and animals. And it was a logical thing. They wanted to take care of the people first and a lot of the responders didn't have the knowledge or even the capability of evacuating both the person and the animal.

The people I've worked with have learned that this is part of their plan. If the people aren't satisfied their animals are gonna be taken care of, then they're not gonna be leaving and they don't want to leave and they can't force them to leave. And this is one of the things that we try to encourage Emergency Management to do is to use a plan and to get the people out to assure the people that those animals are gonna be taken care of.

*Male:* Both the American Veterinary Medical Association and FEMA recommend evacuees take animals with them. But Red Cross shelters are not pet friendly except for certified working companion animals. Urging evacuees to have identification on animals including rabies and licensed tags, name, home address and phone number where the owner can be reached facilitates reuniting evacuees with lost or rescued animals. Owners also should be encouraged to keep proof of ownership including photos of all current animals. Again, Bob Lennonberry.

*Male:* We do what we call resource assessment and in any community, we try to have the people who are setting up a response plan to make sure that all the people have been invited to participate. The motels, a number of times we've gone through an area and just telephone canvassing and ask if they would receive the dogs with the people if they're allowed to stay and what conditions. If there are special conditions, how long they're able to stay and a number of things like that. And so they were very accommodating.

Most of the motels that I've worked with have been very accommodating and usually have a no pet policy but they're willing to waive it in the face of a disaster. The other things like knowing where critical food supplies are, human and animal and where we have the memorandum of understanding with those suppliers that we can access food as we need it. We also have things like the university here that a lot of communities don't have this but they also have veterinary hospitals and making sure they're with them on the plan.

*Male:* Evacuation rates. The percentage of people who comply with evacuation orders vary for different hazards. Evacuation rates depend on the timing of the impact of a hazard, the individual's perceived severity of the hazard's impact and their susceptibility and anticipated cost of evacuating. Evacuation rates are very high for most hazardous material accidents where compliance may be in the 90% range.

Evacuation rates are typically low for slow onset events such as flooding along major rivers. In hurricanes, studies show that evacuation rates varied depending on the strength of the storm, how fast it is moving and where the residence is located. In high hazard storm surge areas, evacuation rates may be as high as 90% when a major storm is forecast. Evacuation rates are much lower for smaller hurricanes and in zones of lower risk further inland. Again Susan Cutter.

*Female:* From an emergency management perspective, you have to have some sense of what the sources of threat are in your community. And some sense of a potential population at risk from those threat sources. In addition to that, I think you need to understand a little bit about how people might behave if an evacuation order is given and that's going to be a function of the type of the threat, the experience that people have had with that type of hazard or risk. It'll be a function of their individual perception of the risk and it will be a function of the warning information that they're given and their perception of how credible that warning information is as well. And so you have to have a fairly good handle on your community and the people who live there in order to get a good compliance with evacuation. And that's what the bottom line is.

If you're gonna order an evacuation as an emergency manager, you want to get as close to 100% as you can out of that area. And for some hazards, we know you're gonna get a very good compliance. This is particularly true around nuclear power plant accidents and chemical emergencies because of factors that we've talked about such as the perception of the risk and in proximity. In other instances like for hurricanes, compliance with hurricane orders is quite variable and that compliance can go from really low, 20% or so to relatively high. But there are so many other factors that come into play along the hurricane coast that influence them.

*Male:* Protecting the public while building and keeping their trust is of utmost importance in dispersing emergency information. This is especially important because often evacuations are precautionary

and either no event occurs or the event impacts another area. Some officials fear that false alarms will adversely affect people's responses to future evacuation warnings but studies show that it is not generally true. Two issues regarding false alarms are important.

The first concerns a false alarm that leads to the people unnecessarily evacuating. In this case, if the basis for the warning and reasons for the miss are explained to the public and understood by them, people's trust in the integrity of the warning system will continue. Contrary to popular belief, studies of hurricane evacuations indicate that false alarms do not stop people from evacuating in the future if they feel there was a reasonable explanation for the previous false alarms.

The second issue is termed the cry wolf or warning fatigue syndrome that may happen after repeated activation of the warning signal. If such false alarms occur and no attempt is made to explain why they were false, there could be a negative effect on public response to a warning in a real emergency. This is particularly true if sirens sound frequently because of malfunctioning or are used for other purposes such as to signal a shift change at an industrial site. Jay Baker of Florida State University.

*Male:*

Emergency Management officials sometimes worry more than they need to about some things and less than they need to about other things. And the sorts of things I have in mind that are legitimate concerns but they worry too much about are crying wolf, which means telling people to leave and the event misses and then they're afraid that people won't leave the next time.

Something called evacuation fatigue, which is a new term that came up a couple of years ago when people had to evacuate multiple times in one year in Florida. And the concern was that they just got so tired of evacuating that they refused to evacuate in subsequent hurricanes. And in fact there is very little evidence of that in subsequent hurricanes that year among people who said in the later season hurricanes that they were told to evacuate. They evacuated in just as large a number as people who evacuated in earlier hurricanes who said they had been told to evacuate. The big difference was whether or not officials were successful in reaching everyone with the evacuation notice.

*[End of Audio]*