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*[Music plays]*

*Male:* In most evacuations, vehicles are the main modes of transportation for evacuees with access to a personal vehicle. In major urban areas, people will likely use other means of transport. During the September 11, 2001, evacuations of Manhattan, New York, and Washington D.C., many people walked while others used buses, subways, and trains. In New York boats both commercial and private were used to evacuate a large number of people from lower Manhattan to New Jersey. Two measures. Persons per vehicle and vehicles per household are used to determine vehicle use and occupancy during evacuations. Vehicle use is greater during daytime evacuations or slow-onset events and for events that may damage or destroy vehicles. Jay Baker.

*Male:* It's amazingly consistent that in hurricane evacuations in about 90 percent of the cases, between 65 and 75 percent of the vehicles that are available to a household are used in the evacuation. Now that doesn't mean much on a per-household basis, but it means that for a community if you take the total number of vehicles that are available, add it up all over the household, and you take the number of vehicles that were used in the evacuation in almost all evacuations it ranges between 65 and 75 percent of all of those that are available.

*Male:* People without vehicles must rely on transportation supplied by others including emergency officials or institutional managers who may have to order commercial or school buses to facilitate evacuation. Some nursing homes rely on rental trucks to move equipment and supplies for dependent care evacuees. Others who don't drive include the frail elderly, the handicap, or those with severely limited incomes. Most tend to rely on neighbors or relatives or public transportation but may need busing in a disaster. Busing strategies are largely untested in rapid moving events, except for clients in special facilities.

Coordinated planning between agencies and local and state jurisdictions is essential to ensure every resident has the means to evacuate and that resources can be quickly geared up to accommodate everyone's needs. In events of great magnitude or which cascade into other disasters such as occurred with Hurricane Katrina, transportation systems both public and private can be quickly overwhelmed stranding people in harm's way and complicating subsequent search and rescue operations. Once the exit trip begins, the time to reach a destination or a safe distance

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from the hazard is called the clearance time. It can be measured for individual vehicles or aggregated for an area.

Most calculations involve evacuation time estimation models. Clearance times are not necessarily related to the size of population evacuated, because populated areas have greater infrastructure to facilitate movement. Clearance times, however, can be lengthy or densely populated urban areas with limited egress routes or barrier islands with large seasonal tourist populations connected by bridges to the mainland. Traffic accident rates actually diminish in evacuations with rates as much as ten times lower than normal. Direct traffic fatalities are also rare. Possible explanations include lower vehicle speeds, one-directional traffic movement, increased driver vigilance, and altruistic behavior. The fatalities associated directly with evacuations are generally related to drivers being caught in flood waters and in drowning.

How are evacuation routes chosen? In some locations emergency management agencies have conducted studies to determine the quickest and safest routes for people to use and then mark them with permanent signs. This is particularly useful for people and visitors unfamiliar with the area. Studies show that residents tend to select evacuation routes they normally would use in everyday travel and will not necessarily follow designed routes if those do not conform to those routes. People will seek alternatives if routes are blocked or congested or may give up the evacuation process all together. Susan Cutter.

*Female:*

We did a very nice study of Hurricane Floyd in South Carolina. One of the things we found in people coming out from Charleston was people's situational and locational awareness is not very good, and they only knew how to get out of Charleston one way, which was on the interstate even though there are parallel roads that they could have taken. Even though they had maps with them, they didn't use them. And so a trip that normally takes maybe two hours was taking people eight, ten, twelve hours to get from Charleston here to Columbia, because they did not bother to get off the interstate and take the alternative routes.

*Male:*

Where do people go when they evacuate? Destinations vary by event and individual characteristics of the evacuee. Most people do not go to official shelters preferring to stay with friends and relatives even those out of state and its significant distances. Some stay in hotels or motels. Higher public shelter use occurs when shelter availability is publicized, when there is an older population, when residents ordered to leave are economically disadvantaged

and cannot afford to evacuate, when the population is urban, or when a large geographical area is expected to be impacted.

Studies also show that people with weak social or family ties such as an elderly person living alone may also choose to evacuate to a public shelter. These attributes work well to define the large urban population that used the Superdome in New Orleans as refuge during Hurricane Katrina in 2005. What is critical is evacuation planners have all the necessary resources available for immediate deployment at the shelters as well as security forces to ensure evacuees are protected in the unfamiliar situation.

In the last two decades, there has been a greater focus on the various groups that require special attention from emergency planners in events involving evacuations. These include people living in assisted care facilities or nursing homes, school children, daycare centers, or high-rise building occupants. Within the emergency management field, special needs is defined in a variety of ways often focusing on groups such as the elderly and children or people with disabilities.

Important groups often overlooked are people with disabilities that are not as evident such as those with mental illnesses or impairments, people with visual, hearing, or mobility limitations, or those who may have difficulty going outside the home. It's important to consider those with special needs, because some evacuees may need assistance in physically moving up or down stairs or boarding buses for transport. Those dependent on respiratory devices, wheelchairs, or walkers will need to have vehicles that can accommodate their equipment.

The mentally impaired may need to be assigned a caretaker, because they may not understand the warning to evacuate or how to orient themselves at a shelter. Security may have to be provided to ensure such evacuees are not harassed or exploited at shelters. People with special needs may be congregated in a facility or dispersed throughout the community. Healthcare facilities may need help both in planning for evacuations and in physically helping clients evacuate during an emergency. Those facilities should have realistic and customized plans, not boiler plate, that include prior arrangements for transportation and care commensurate with client needs.

Evacuation plans should be exercised regularly to acquaint staff and residents with evacuation procedures. Remember that shelters chosen for special needs adults should not have stairs or child-

sized furniture. Planners can help facility managers by examining all evacuation plans to ensure they do not rely on the same resources when evacuating. Managers of healthcare facilities might plan to use a special needs shelter or medical needs shelter instead of a general population shelter for their clients. Such a shelter can provide a higher level of care and more support services than the minimal first aid care provided in general shelters.

Most schools have plans to evacuate children in a community emergency. Two planning strategies most frequently used by schools include early dismissal with children who will not have a caretaker at home sheltered at the school or busing where the entire school population is relocated to a pre-designated shelter. Relocation may be the only option in fast-moving events but may create problems in reuniting children with families or caretakers later on if the information on where children were taken is not well publicized.

In emergencies where the time to impact is fairly long, some parents will likely attempt to pick up students at school. This rarely interferes with the evacuation process. In rapid moving events, children are evacuated before parents have the opportunity to pick up children. Exercises suggest that schools can evacuate in 10 to 20 minutes following the decision to move students out of harm's way. Understanding how vulnerability affects people's ability to evacuate is also important in planning. Vulnerability refers to the characteristics of a persons or group situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a hazardous event.

Frequently a disadvantaged socioeconomic situation can place a person in an unsafe living or work situation and can impact their ability to take a protective action. Terms like fragile, unsafe, and hazardous refer to livelihoods, buildings, settlement locations, or infrastructure, not people. Betty Hernmoree.

*Female:*

I think women tend to be at some disadvantage throughout the process, but certainly some women are much more vulnerable than others. You know poor women, minority women, recent immigrant women, elderly women, women with disabilities. You know these kinds of risk factor or vulnerability factors often are confounded so that you have people who are very vulnerable at the bottom of the scale.

*Male:*

Institutionalized populations and special needs facilities are frequently considered homogenous when in reality they exhibit many characteristics that differ by physical or geographical constraints. For example, prison populations vary widely by age, physical ability, and education while residing in a secured environment. As individuals they cannot respond directly to evacuation warnings even though they may not have any physical constraints. Tourist populations and temporary visitors such as day workers or travelers in vehicles through an area at risk should not be overlooked. They may not be familiar with community hazards and ignore or misunderstand warning messages.

Foreign speaking individuals may not understand what evacuation means while those raised in other cultures may not respond as officials recommend. It is recommended that emergency officials and planners provide information materials in foreign language when a segment of the population exceeds one percent of the total population. The Red Cross translated many of their brochures on protective actions into several languages that are available from local Red Cross chapters or on the internet.

Understanding the types of foreign languages spoken in a community ensures those groups will be adequately informed in an emergency. Individuals with special needs who are dispersed among the general population may be unknown to emergency planners or social agencies unless they self-identify. Developing a database of such individuals is difficult because the information must constantly be updated. Privacy concerns forbid such information being routinely collected by agencies, so much of the information is on a self-report basis. Another problem is the single elderly resident who may shun interaction with others and remain isolated even with the best of agency efforts.

Planners should make every effort to reach these individuals with appropriate information that meets their specific need. Some people will always lag behind or refuse to evacuate from a sense of powerlessness, a feeling of social isolation, or from a perception the event doesn't warrant the effort. This can place later rescue workers at risk if the impacts are severe. Planners can minimize this type of behavior with good emergency information that is timely and detailed.

*[End of Audio]*