Study provides voice for evacuation needs of mobility impaired

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A new NIST study -- with findings based on the concerns, insights and opinions of people with mobility impairments voiced during interviews -- provides guidance for helping them get safely out of multistory buildings during emergencies, including the use of special evacuation elevators. Credit: J. Stoughton/NIST

A fire alarm sounds. An announcement comes over the office public address system: "A fire has been reported in the building. This is not a drill. Please move to the nearest stairwell and exit the building."

As your colleagues leave their desks, you loosen the wheel locks on your wheelchair and wonder, "Will I be able to get out of the building?"

This scenario is among the most common concerns reported in a new study conducted by the National Institute of Standards and Technology (NIST) detailing the challenges faced by people with mobility impairments during emergency evacuation from multistory buildings.

In general, participants in the study agreed that evacuation strategies and methods should address the challenges faced by people with mobility impairments by providing them with:

- a feeling of safety;
- independence and control;
- the opportunity to remain with their wheelchair or other mobility aid;
- a means to evacuate quickly; and
- a way to communicate with security and/or rescue personnel.

"We wanted to get recognition for a population with egress needs that often go unheard when evacuation procedures are designed, implemented and practiced," said Kathryn Butler, lead author on the NIST report, *Perspectives of Occupants with Mobility Impairments on Fire Evacuation and Elevators* (NIST Technical Note 1923).

Butler and her colleagues conducted face-to-face interviews in five major metropolitan areas with 51 persons who have mobility impairments (as a result of congenital conditions, progressive diseases or injuries). The study participants work in multistory buildings and for the

most part, use wheelchairs while on the job. They were asked three main questions:

- How would you describe your everyday mobility at work?
- What experiences have you had during fire drills or fire emergencies at work? (This included asking about their knowledge and understanding of evacuation procedures, the amount of training they received, and their comfort level and concerns regarding available options.)
- What do you currently think about using elevators as a means to leave a building during a fire evacuation?

The third question, says study co-author Erica Kuligowski, includes a specialized and dedicated egress system known as an occupant evacuation elevator (OEE) that has great potential for getting people with mobility impairments out of a building safely and quickly, without the assistance of others, and without having to leave behind their mobility devices (such as scooters, walkers and wheelchairs). "The effectiveness of this group using elevators for emergency exit, rather than the traditional 'take the stairs' approach, was dramatically shown in the findings from our [NIST's] investigation of the collapses of the World Trade Center [WTC] towers on 9/11," she said. "During the time between the two plane impacts, many occupants of WTC 2 [the second tower struck]—including some with mobility impairments—self-evacuated using the elevators and probably saved their lives."

Near the end of their interviews, participants in the NIST study were informed about the design features of an OEE and then asked for their comments. The concept of OEE was generally well received, as evidenced by this quote from the report: "This kind of elevator would be very useful in getting a building quickly evacuated because it takes time to go down those stairs and the more people you can get out quickly, especially from the higher levels, the less likely there is to be a real

disaster."

Overall, the interview responses detailed a wide variety of experiences, both positive and negative, and identified a number of potential issues surrounding the evacuation of building occupants with mobility impairments. For example, some respondents stated that they had received proper training, had clear instructions to follow and were confident that they would be assisted to safety. In contrast, other said they had received little or no training, were provided with conflicting or insufficient information to make decisions, and felt the need to make their own plans for getting out of the building—including negotiating stairs by walking slowly with crutches or assistance, crawling, sliding or seated in a manual wheelchair. The latter method was described by one participant who said, "I can go down backward, holding on, as long as it's a continuous handrail."

Butler and Kuligowski prepared the new NIST report primarily to serve as guidance for building designers, facility managers, safety officers, emergency personnel and others tasked with developing and implementing procedures for people with mobility impairments to use elevators (both traditional and OEE) when evacuating multistory structures. This guidance is especially relevant, they noted, because it is based upon concerns, insights and opinions provided by the study's participants.

"For too long, building evacuation plans have been put in place with measures that designers believe people with mobility impairments will need," Kuligowski said. "Our study shows that you can't do it properly without listening to what they actually do require."

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