



ADA National Network / FEMA
Webinar Series
December 8, 2016

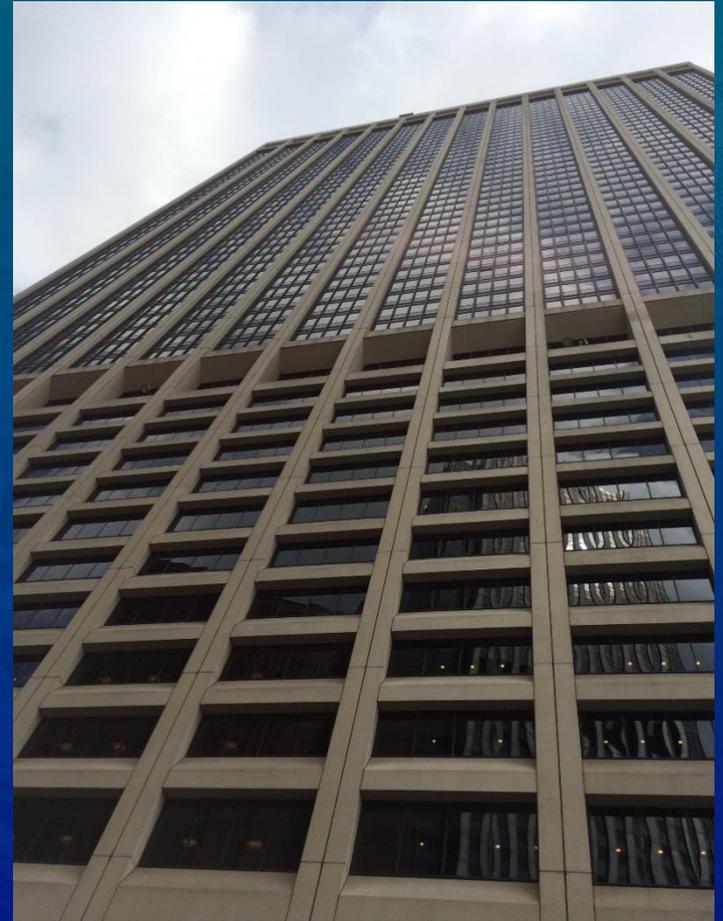
Perspectives of Occupants with Mobility Impairments on Fire Evacuation and Elevators

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Outline

- Background
- Study
 - Approach
 - Participants
- Evacuation
 - Experiences
 - Methods
 - Plans and training
- Occupant evacuation elevators
- Fire evacuation guidance



“If you make a good design for everyone, then
everyone will be happier.”



Background



- NIST work on elevators for firefighter use
- World Trade Center Investigation
- Occupant Evacuation Elevators
 - 2012/13 standards: ICC, NFPA, ASME

Development of data collection instruments and report sponsored by U.S. General Services Administration (GSA)



Focus:

- 1) To gain an understanding of how building occupants with mobility impairments currently evacuate multi-story buildings in the United States during fire emergencies, and
- 2) To learn about the concerns of persons with mobility impairments on using elevators during fire evacuations

Approach

Go to the source.

Research Questions

- 1) How do participants describe their everyday mobility while at work?
- 2) What experiences have the participants had during fire evacuations or fire emergencies while at work?
- 3) What do participants think about using elevators during a fire evacuation?

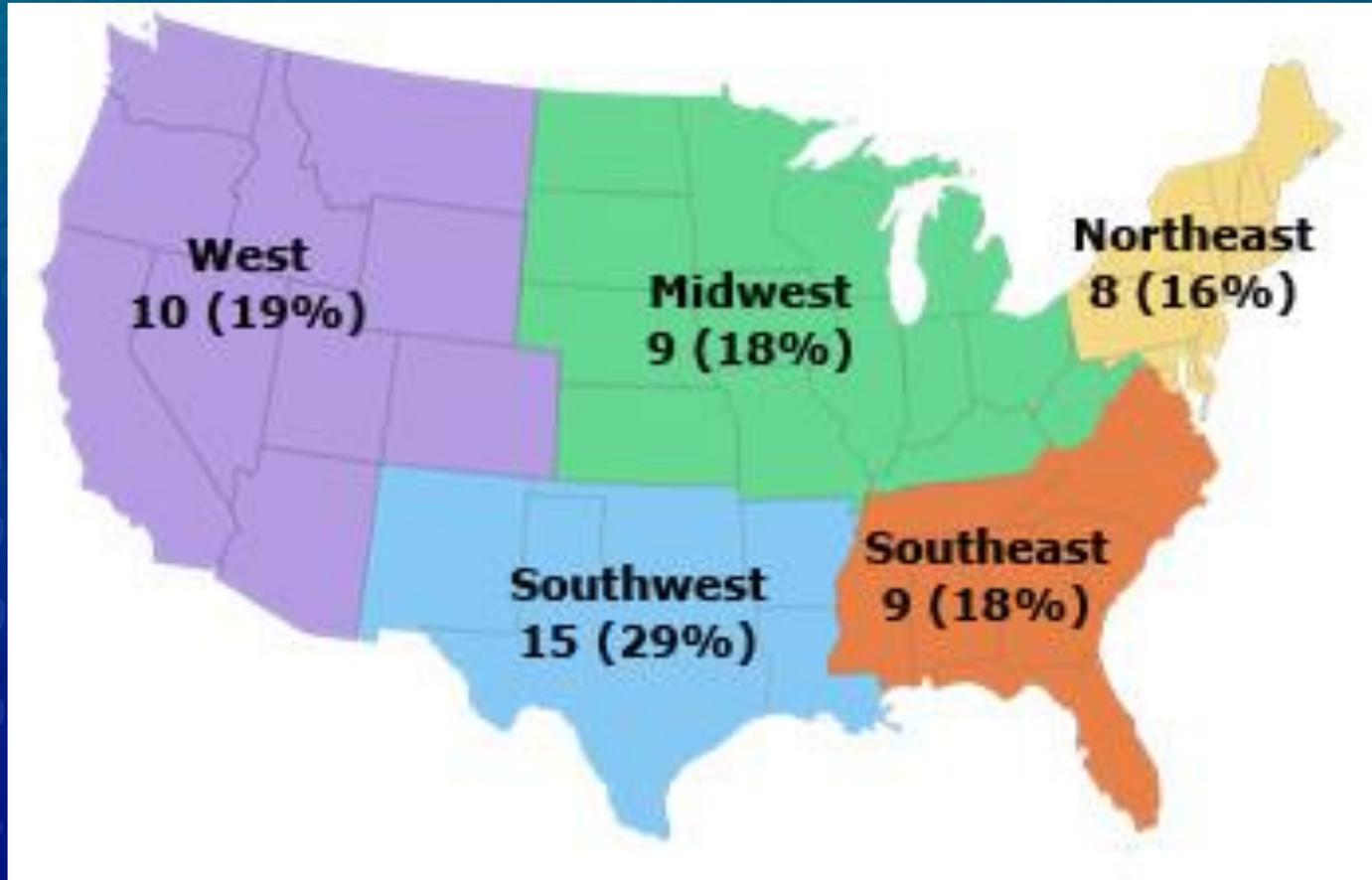


Interviews

- Demographic questions (age, gender)
- Background information
 - Workplace
 - Mobility
- In-depth questions
 - Everyday workplace activities
 - Fire evacuation experience, incl. evacuation methods
 - Fire evacuation procedures and training
 - Fire evacuation by elevator
 - Short video on OEEs

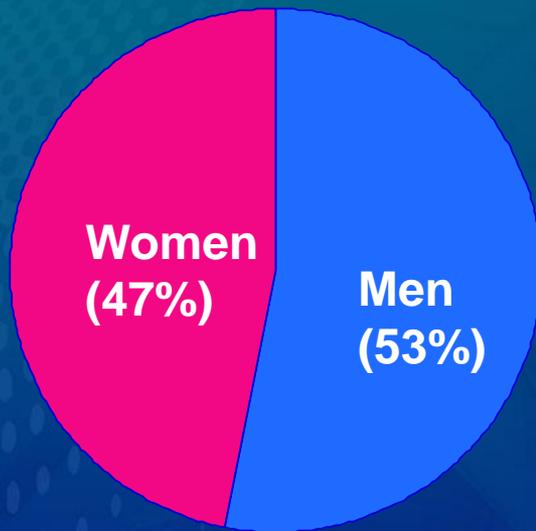


Recruitment

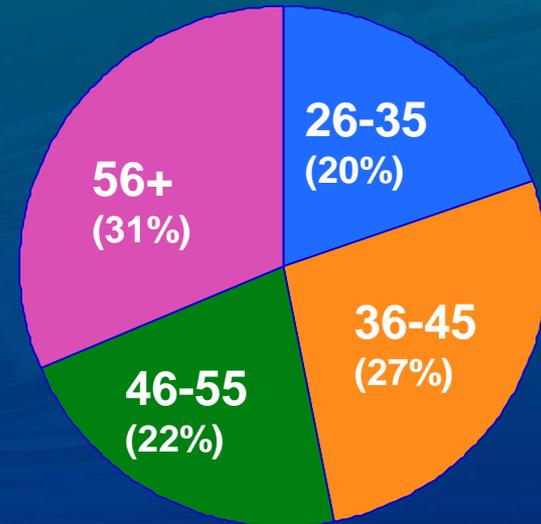


... with help from disability advocates

51 Participants

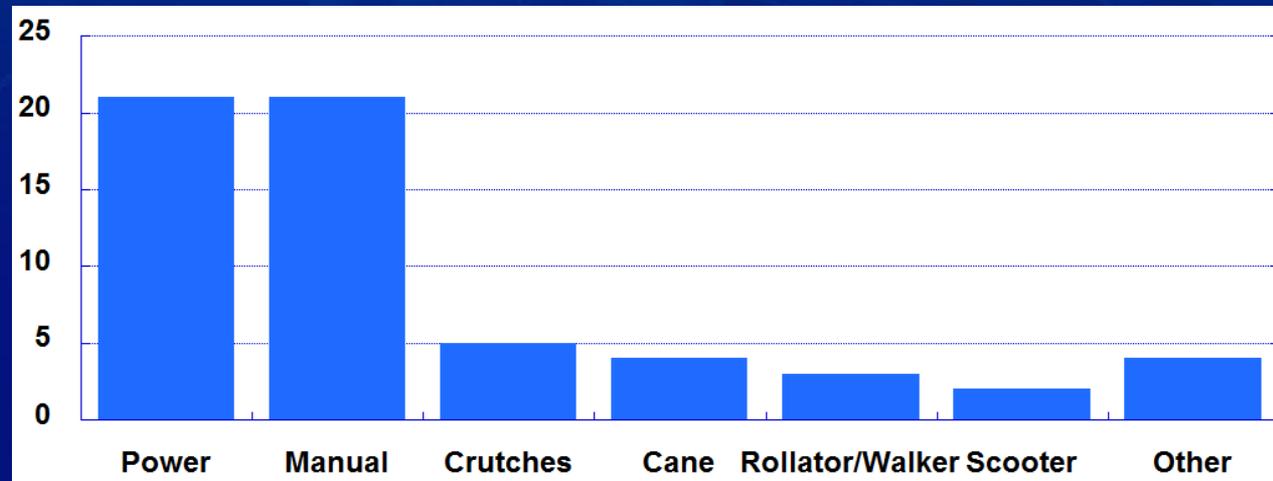


Gender



Age Range

Mobility Aid



Disability Status

Range of disability type
(often volunteered)

- At birth
- Later in life

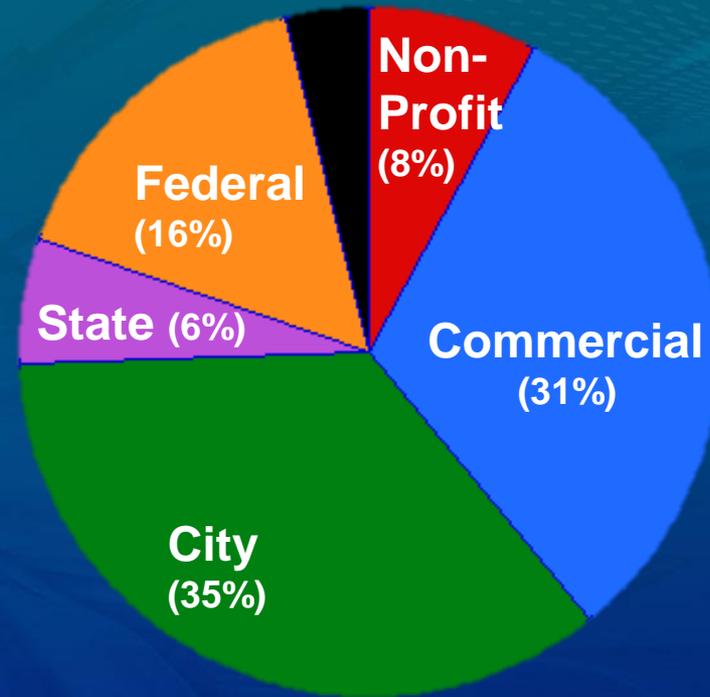


Range of capabilities and limitations:

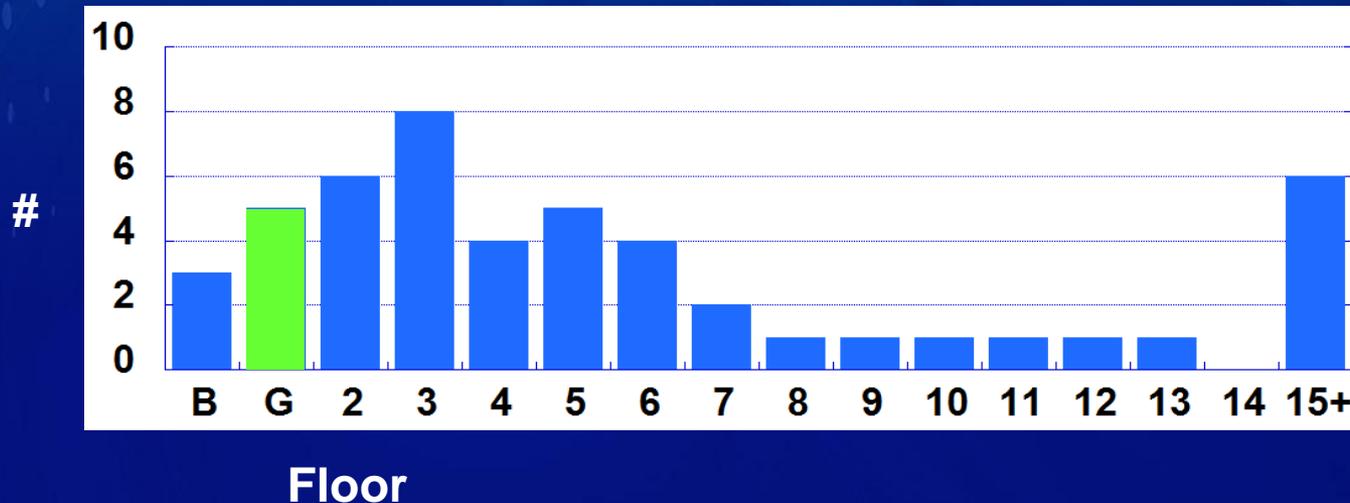
- Difficult to press buttons – reach, strength
- Good upper body strength
- May be injured if picked up wrong
- Change with time of day, with age



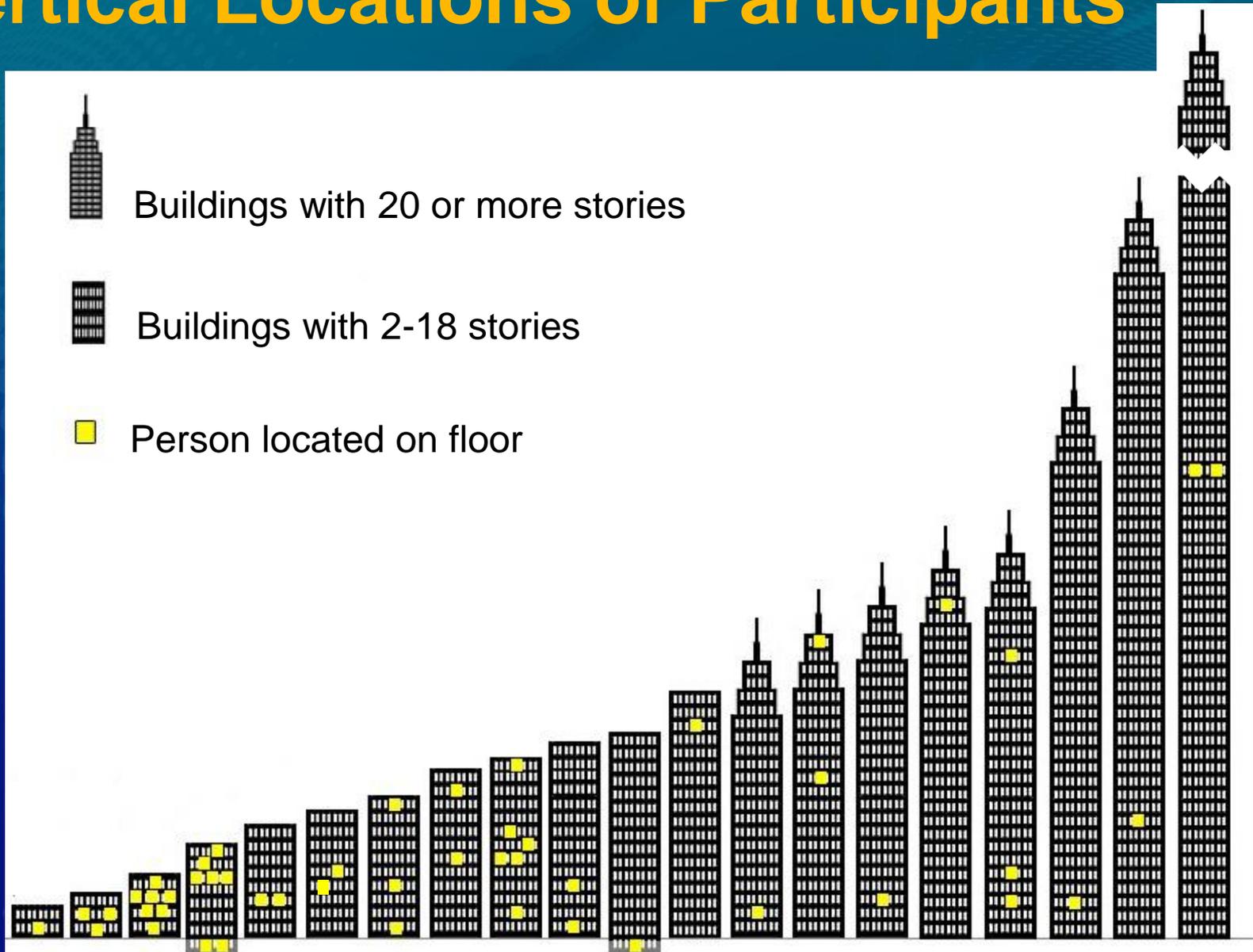
Ownership of participants' buildings



Floor on which participant works



Vertical Locations of Participants



Evacuation Experiences

Positive:

- Well-practiced plan is followed
- Coworkers stay, alert security, assist them to safety
- First responders ask for preferences, listen to answers

Negative:

- No plan, no drills
- Left alone without information / communication
- Carried in precarious position, bodily or in wheelchair

Example: Respectful assistance

“[They] called the fire department and the guys came, and they said, ‘Okay, how can we best help you?’ And...I told them what to do. And they took us down the stairs...Really, [asking] is critical because different people have different needs, different abilities and different comfort levels, and some people can become very anxious and frightened. ... So, some disability training for the emergency personnel is, I think, very important in what might be needed for different types of disabilities.”

Example: Never got out

After an earthquake: “I went to the designated room ... there wasn’t anyone who showed up. ... Eventually someone passed in the hall and I flagged them down so that they could help me use the phone to call the security desk to let them know that I was waiting. We did that twice, the security guard said that they would come around and have someone help me, and that never happened. I never got out of the building.”

Existing Evacuation Methods

- Existing elevator – before fire department arrives or as directed by first responders
- Existing freight or service elevator
- Walking down stairs – using crutches or holding railing
- Taking the stairs in (manual) wheelchair
- Crawling or sliding on stairs
- Being carried
- Emergency stair travel device
- Area of refuge

Existing passenger elevator

Benefits

Means to evacuate the building, quickly and easily

Familiar

Keep mobility device

Safety of others

Concerns

Fear and anxiety

Communication

Waiting time

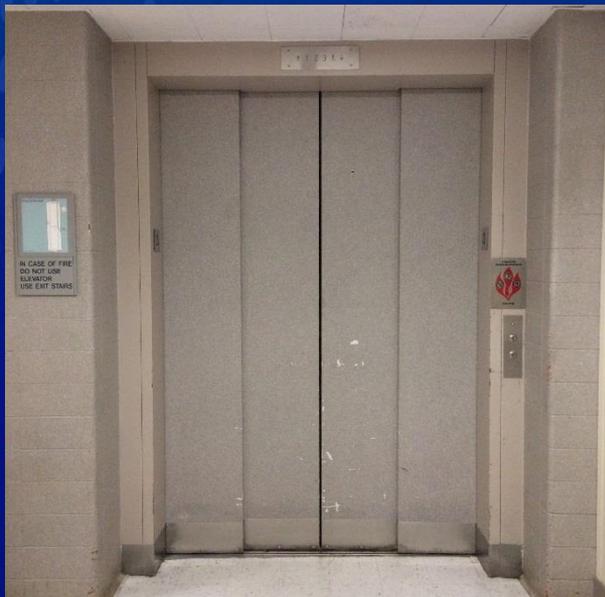
Stopping on other floors

Elevator size

Operation may require assistance

In some buildings, the elevator does not lead directly to an exit

Need for a backup plan



Issue: Physical safety

“I'm concerned...that the elevator being connected to the electricity, to the power supply, is it safe to use it? Would it be safe? So that's a concern. But, all things being equal, if it wouldn't be affected by an electrical problem then ... I wonder if, ‘Lord, could I quickly use the elevator before it's taken out of service?’”

Existing freight or service elevator

Benefits

Means to evacuate the building, quickly and easily

Familiar

Keep mobility device

Safety of others

Safety

Elevator size

May go directly to exit

Concerns

Fear and anxiety

Communication

Waiting time

Stopping on other floors

Operation may require assistance

Not readily available to occupants

May be inaccessible for occupants with mobility impairments

Unfamiliar



Walking down stairs

Benefits

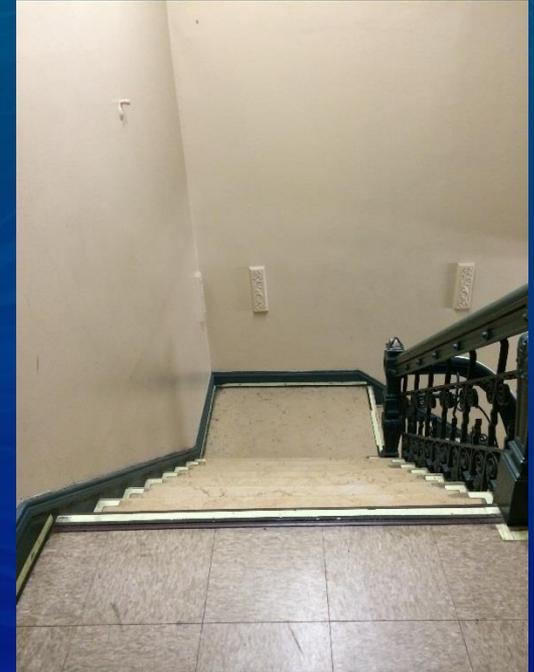
Independence and control

Concerns

Slow

Risk of injury or physical harm

Exertion and recovery time



Issue: Slow

“I would think [everyone else would evacuate first] because then we’re in the way of everybody. We know everybody’s really coming down fast. There’s really no way for us to get in the middle of that. ...We could lose our balance. We could fall. We would stall the people coming behind us. ...It’s not feasible to go down when everybody else is going down. So we have to wait.”

Taking the stairs in manual wheelchair

Benefits

Independence and control

Remain in wheelchair

Concerns

Risk of injury to self or others

Risk of damage to wheelchair



Benefit: Getting out

“I can just get somebody to pop my chair back on a wheelie and take me down the 15 stairs and get the hell out of the building on a moment's notice. So let's go fast and furious and leave. I have my helpers. Worst case, they grab the front and the back of the chair on either side, they pick it up, and we walk down.”

Issue: Risk of damage

“I don’t like to do it because it’s hard on the chair. It’s hard on the front wheels. So I don’t like to go down but so many [steps] to demonstrate. If I had to, if it’s burning, I’m going down. I don’t care what the front end looks like when I get down to the bottom.”

Crawling or sliding on stairs

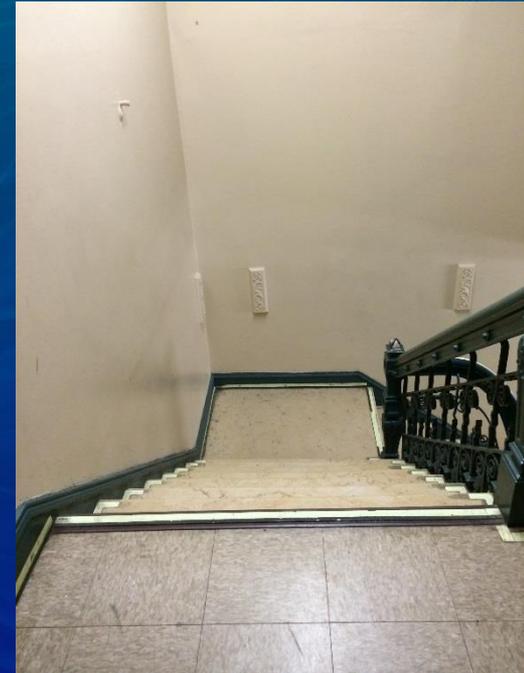
Benefits

Ability to evacuate the building

Independence and control

Concerns

Risk of injury or physical harm



Benefit: Independence

“I've had, in situations; just got out of my chair and crawled down steps and have had somebody take my wheelchair. So that would be what I would do. ...If I'm in [an emergency stair travel device], they're probably not bringing my chair with me. So, do I want to, when I get to the bottom, be stuck in the [emergency stair travel device]? No, I would much rather have my manual chair there to be able to move myself away to safety.”

Being carried on stairs

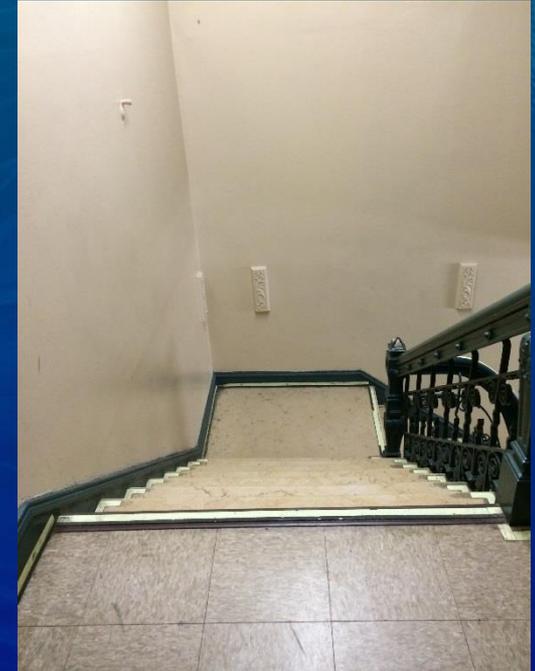
Benefits

Ability to evacuate the building

Concerns

Risk of injury or physical harm

Loss of mobility device



Benefit: Getting out

“I’m not a heavy individual, you know? I can be carried, safely, if somebody is physically able to do that. So if there wasn’t an evacuation chair, that would be an option for me. And I would rather take that option if somebody is able to do it, and willing to do it, than wait for help that may never come.”

Issue: Physical risk

“There’s never been a cause for me to evacuate, and I’m glad because had I been evacuated, I would have been injured. If someone tried to lift me, my body is pretty weak, so...if you didn't know how to lift someone like me properly, you'd hurt me. And, generally speaking, that's a big problem.....If you slung me over someone's back, you'd break my back.”



Emergency stair travel device

Benefits

Ability to evacuate the building

Physical safety

Can evacuate along with coworkers



Concerns

Loss of mobility device

Physical risk

Anxiety

Requires assistance

One emergency stair travel device per person per trip



Benefit: Evacuation with coworkers

“It's also a big cultural and ideological shift, I think, to go actually from ‘Disabled people are the special people who need to be specially evacuated by rescue personnel’ vs. ‘Disabled people can be integrated with their co-workers and be evacuated by their office mate or the cubie next to you.’ And I think that's one of the final points of integration, right? Because you don't want to be ‘special’ people who need ‘special handling.’”

Issue: Loss of mobility device

“It’s always an issue...letting go of my equipment because so much of my health, my mobility, and my independence is tied to a very customized piece of equipment. It’s not like – oh okay, I’ll go pick up an extra one at the grocery store ... It’s more than just we are being stubborn and we don’t want to leave our chairs behind. It’s a survival issue, quality of life, survival.”

“A mind shift has to happen. The equipment is part of the person and must be evacuated with the person.”

Area of refuge

Benefits

Safety in a known location while waiting for rescue

Communication with security and rescue personnel

Concerns

Fear and anxiety of being left behind (not evacuating the building)

May be inaccessible and unusable



Issue: Waiting and anxiety

“In the event of an actual emergency, I find it frightening to sit there and be waiting. Here’s smoke I smell, people are screaming by, you know, going, ‘Are you okay, are you okay?’ ‘Yes, I’m waiting for someone.’ I’m waiting for someone. I’m waiting for someone. I hope someone comes.”

Issue: Accessibility

“And I'm supposed to wait up in the stairwell, there's a designated spot up there and I'm supposed to grab the phone that's in there, which I can't reach, and someone in security is supposed to pick up and I'm supposed to let them know that I'm up here.”

Study participants agreed ...

...that evacuation methods should provide:

- A feeling of safety
- Independence and control
- The opportunity to remain with their mobility device
- A means to evacuate quickly
- A way to communicate with security and/or rescue personnel

Evacuation Plans and Training

Satisfaction

Detailed, well-organized,
and practiced plans

Evacuation options

Being included in planning
process

Dissatisfaction

No plan for people with
mobility impairments

Not consulted on evacuation
method or plan

Plan does not include
visitors such as clients or
meeting attendees

What works: “People know their roles, people know where they’re supposed to be, and people know how to use the equipment that they’ve been given.”

Drills are important

“It was always on the drills that you get that 'aha' moment, like maybe something is wrong. ... [W]e work with people with all disabilities. We have people who are blind, people who are deaf, people with mobility [problems], people [who are] blind AND deaf. ... And so [those drills allow us] to see how unprepared we are and the importance of becoming prepared because we never know who we are seeing that particular day and what obstacle or barrier they may have if we have to evacuate.”

Issue: Drills may be exhausting

People with mobility impairments may try to avoid them

“If I know there’s going to be a drill, I try to work from home, truthfully. It just saves so much headache. ...You don’t want to be forced to go down steps and stuff when you know that you’re going to pay for it for days afterwards. ...If someone has bad knees or...a bad back and neck, ... yes, you might make it down the steps, but you’re probably going to pay for it anywhere from the next two days to two weeks.”

Issue: Visiting an unfamiliar building

“My colleagues here, we have all worked together for a number of years, we know each other and I would trust them. But, how can you make yourself available to be helped by folks who maybe you've been to meetings with but you don't necessarily know? Especially with something so personal where I would require hands-on help.”

Issue: Official Plan vs. Personal Plan

If not consulted, people with mobility impairments may define their own plan

“Actually, I can do stairs. I have stairs at home. But not with the wheelchair, obviously. But I just get down out of the wheelchair and scoot myself down or climb up. So I could do stairs and, in an actual emergency, I'll tell you, I'm doing it because I'm not going to let them leave me behind.”

Occupant Evacuation Elevator (OEE)



ELEVATORS AVAILABLE FOR
OCCUPANT EVACUATION

Fire safety features:

- Elevator lobbies and shafts that are protected from heat, smoke, and water
- Two-way communication between lobby and fire command center
- Direct access to stairwells from elevator lobby
- Fire floor and adjacent floors evacuated first
- Direct transport to the main exit discharge floor



Occupant Evacuation Elevator

Benefits

Means to evacuate the building, quickly and easily

Familiarity and ease of use

Higher perceived safety levels

Feelings of comfort or relief

Independence – keep mobility device

Communication

Universal nature of the evacuation method

Concerns

Continued anxiety about physical danger (need evidence of safety and proper design)

Decades of warnings against using an elevator in a fire

Competition for space with those who can use stairs - Priority use



Benefits: Efficiency, independence

“That 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.”

“[The benefits include] the ability to, essentially, evacuate immediately without any separation from your wheelchair. So you leave with what you came with, you leave whole.”

Benefits: Ease of use

“I trust this elevator. It's fast, it's less work for everybody, myself included. Let's get the hell out of here and give it a shot.”

Issue: Decades of warnings

“I guess, because it’s so against what we’ve been trained and taught, you have that build-in hesitance. ...It’s almost like you’re trained, “Go and wait here,’ versus, ‘Go and get in that elevator.’ You’re almost trained that you’re safer to wait for assistance than to get into that elevator.”

Issue: Competition for space

“I think it doesn't address the crowding issue at all. In fact, I think...it'd be like a packed car already. And it wouldn't just be five people waiting for the elevator, it'd be like the whole floor or whatever. So I just don't think there's a way to manage that because I think most people are going to perceive that to be the fastest, easiest way to get out.”

Guidance for Evacuation Planning and Procedures

- An emergency evacuation plan is essential
- Include building occupants with mobility impairments as essential partners in developing the plan
- Provide multiple options for evacuation
- Include after-hour procedures and visitors in plan
- Work out solutions to training concerns with occupants
- Understand that building occupants with mobility impairments will leave the building if they can, and facilitate that as much as possible

Guidance for Existing Elevators

- Voice communication to augment signage
- Two-way communication with emergency responders
- If an option, educate on use of existing elevators during fire evacuation
- Preference for elevator use during evacuation to building occupants with mobility impairments
- Alternative evacuation options

Guidance for OEEs

- Elevators large enough for multiple wheelchairs
- Coordinated emergency communication on OEE availability
- Two-way communication with emergency personnel
- Education on why OEEs can be trusted
- Preference for elevator use during evacuation to building occupants with mobility impairments
- Alternative evacuation options

Closing Words

“With the time it takes to get me out of the wheelchair into the stair chair [and] get me down the steps – just the process involved and then the time, and then the danger of doing that to me and the people that are trying to help me – going down the elevator is a way, way better way to do it if it can be done.”

With many thanks to our recruiters and participants, without whom this study would not have been possible.

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Report at:

<http://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1923.pdf>