The Accessibility of Wireless Emergency Communications: Updates from the Wireless RERC

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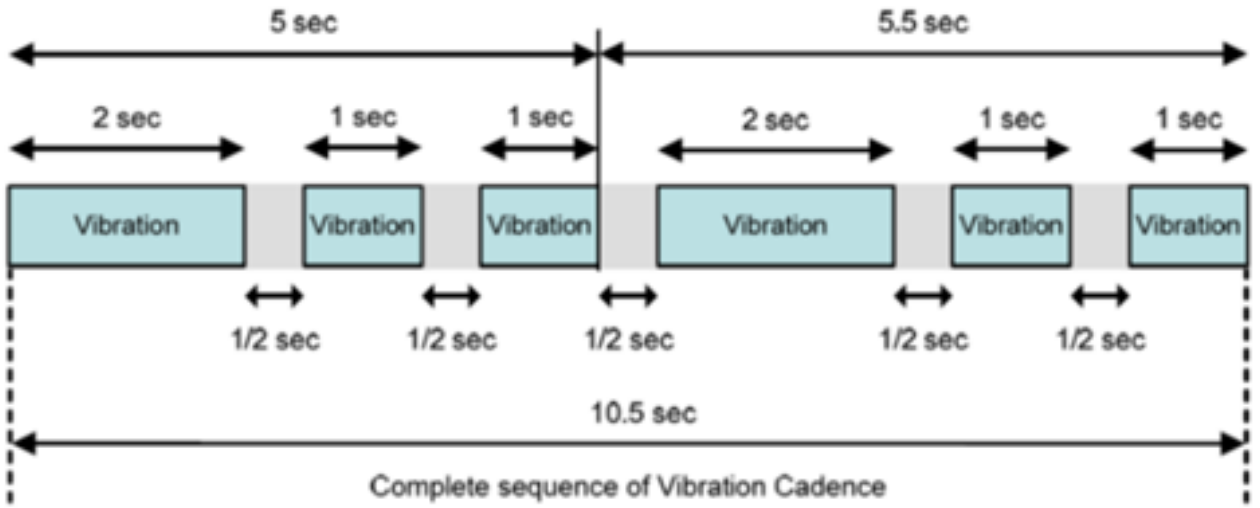
Impact of Disasters on People with Disabilities

- Higher Injury and Mortality Rates
- Barriers to Evacuation
- Barriers to Communication

Wireless Emergency Alerts (WEAs)

- WEA are part of the US Governments Emergency Alert System
- Common Alerting Protocol (CAP)
- Geo-Targeting
- WEA Notification



EMERGENCY LIFELINES PROJECT

NOTIFICATION SIGNALS

Prototype Design & Development

- Developed a Prototype System to Evaluate Vibration, Sound, and Light as alerting signals for incoming WEA messages.

Design

Laptop Control

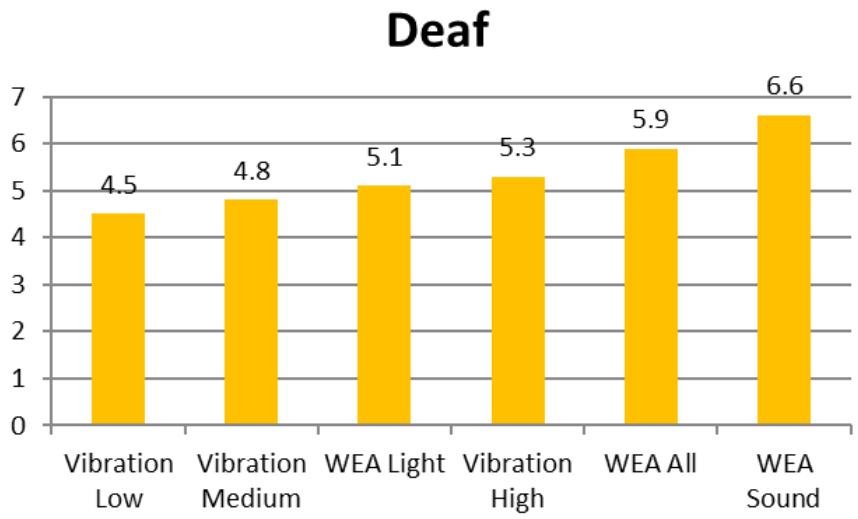
Prototype

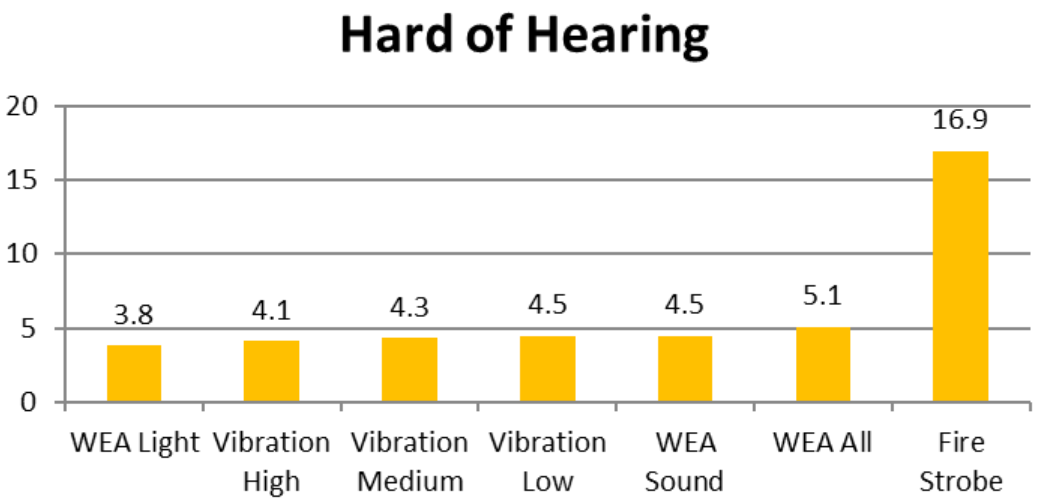
Usability Test Parameters

- Subjects were interviewed and exposed to each signal type in a quiet environment.
- Usability Testing in Simulated Environment.
- Forty-six subjects with sensory impairment participated over in 6 days
  - 20 subjects were deaf or hard of hearing
  - 22 subjects were blind or had low vision
  - 4 subjects were deaf –blind.

Response Time by Disability Type (Deaf & Hard of Hearing)

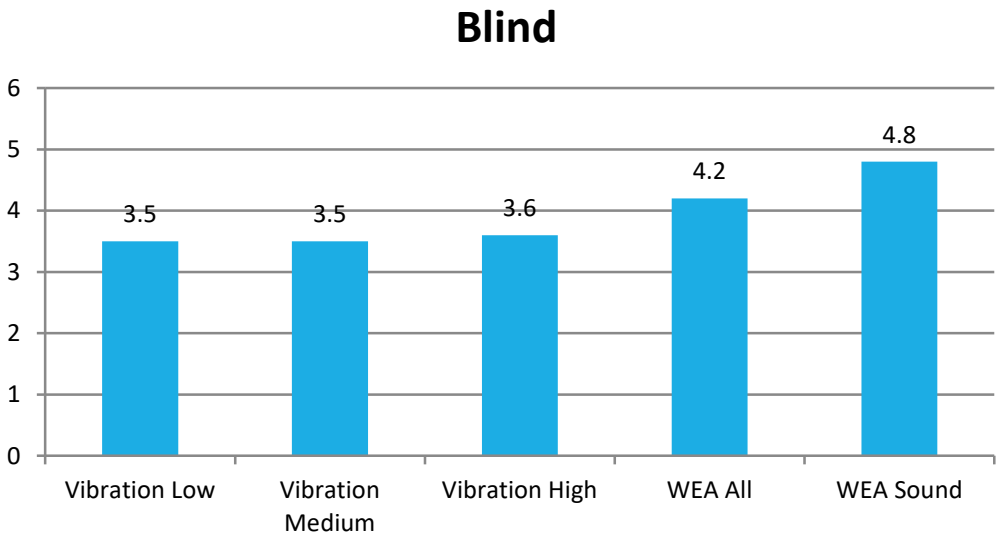
- Participants that were Deaf had the quickest response time to the low and medium vibrations, then the WEA light cadence.
- Participants that were Hard of Hearing had the quickest response time to the WEA Light cadence; high, medium and low vibrations; then the WEA sound.

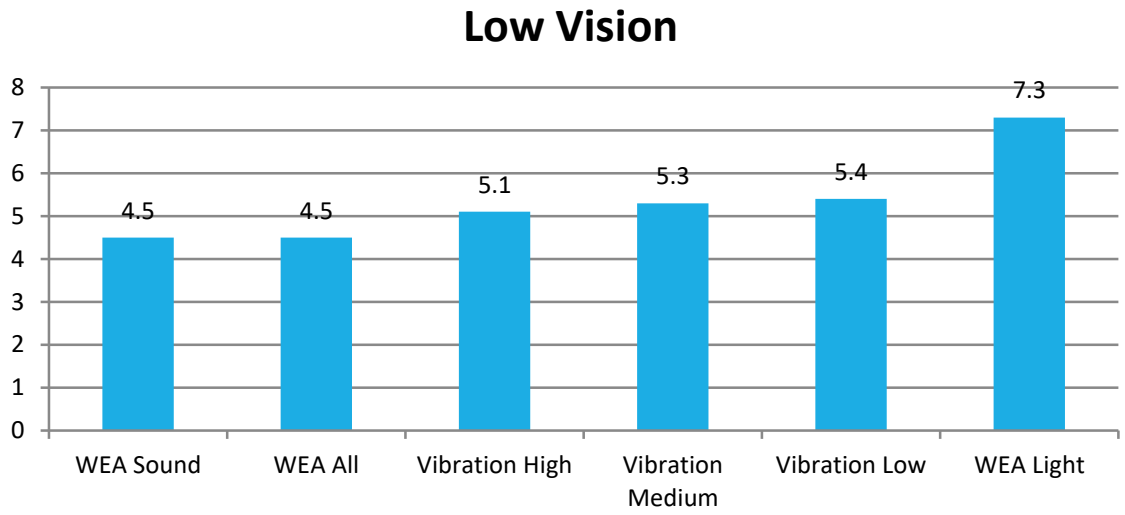




Response Time by Disability Type (Blind & Low Vision)

- Participants that were Blind responded most quickly to the vibration signals.
- Participants that were Low Vision responded most quickly to the WEA sound and WEA All signals.





Summation

- The Fire Strobe and the high magnitude vibration were the most noticed signals
- Vibration strength is a factor in response time to WEA messages, BUT the low vibration setting had the fastest response.
- Adding a WEA light cadence can increase response time to WEA messages for certain groups .
- Simultaneously activating all notification signals: sound, vibration and light, will increase timely receipt of WEA messages.
  - Why? The majority of participants (74%) carry their phone in a location that could negatively impact their perception of incoming WEA messages (i.e., purse, bag, briefcase, pants or jacket pocket).

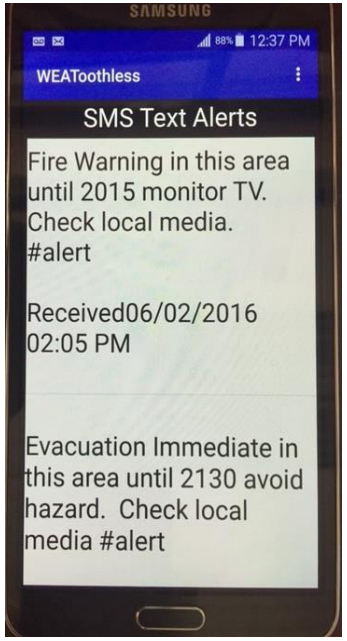
EMERGENCY LIFELINES PROJECT

MESSAGE CONTENT

Prototype Development & Testing

- Software APP developed on Android Platform
- ASL Video & Symbology Included
- Usability Study
  - 22 Deaf Participants whose primary language was ASL
  - Received three, randomly selected test messages in different formats
  - Asked:
    - What id the message say?
    - What would you do if you received this message?

Prototype Message Components



Results / Symbology

- 10% understood the entire text message by itself.
- Some of the symbols helped with text comprehension.

Recognized Symbols	Interpreted Symbols	Unknown Symbols
• Flood Warning • Hurricane Warning • Tornado Warning	Fire Alert: “Flame” (50%) Flash Flood: “Water is Rising” (40%) Shelter in Place: “It’s a house” (60%) Winter Storm: “Snow” (40%)	• Civil Emergency • Evacuation Immediate • Hazardous Materials

Results / ASL Video

- ASL Video was understood by all subjects
- Several subjects did not pay attention to the entire video.
- Participants recommendations to improve the video:
  - The video should start automatically
  - The video is too fast. Several subjects watched it more than once

Conclusions and Recommendations

- Continued Education is Important
  - None of the subjects understood that “All Clear” meant that the emergency was over – even when it was displayed to them in ASL.
  - Not all participants understood the message was geotargeted.
- Symbols add to comprehension, but don’t provide the whole message.
- ASL Videos are understood by the group, but the message components should be reorganized for this population.
- ASL Video implementation should allow for replay.

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