Deaf and Hard of Hearing People

NAS Workshop on Public Response to Alerts and Warnings on Mobile Devices: Current Knowledge and Research Needs

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What resources do exist?

- Email or SMS alerting services (opt-in)
- Television coverage of emergencies has to provide details in text form (usually means captioning but captioning itself is not required)
- On-screen text and graphics have greatly increased on TV
- NOAA weather radio text display (however, text component provides limited information)
- Advanced Internet communications, social networking include video and text
- Web information can be used once existence of emergency is known
- Social networks of signing deaf people. Does not tend to apply to older people with hearing loss.

What are the challenges?

- Many conventional sources of emergency warning not accessible – especially out of the home
  - Radio
  - Bystander communication
  - Responder communication
  - Public Address systems
  - Sirens
  - Eyes-busy situations (computer use for example)
  - Fewer people have landline phones for telephone/TTY notification, and some localities have systems that can't call TTY anyway

CMAS

- Opt-out system should have advantages
- Initially text-based: Accessible to deaf and hard of hearing users
- Based on a small study at our institution (44 respondents), most people don't opt in to available alerts on their mobile devices.
- Significant effect on this by age:
  - 15% of those under age 25
  - 50% of those over age 25 subscribed in 2008.

CMAS: Getting the User's Attention

- 44 deaf and hard of hearing people who use vibration for alerting on their mobiles ("expert" users)

- All participants rated 4 vibratory temporal patterns presented on a mobile
  - No pattern (constant)
  - Even on-off
  - Long and short pattern similar to CMAS
  - Long an buzzy short pulses

- Each pattern quasi-randomly presented at 3 different lengths (4x3 = 12 signals rated per person)

- Respondents ask to rate for
  - Similarity to their default vibration pattern for email
  - Perceived effectiveness of signal for getting attention in emergency

Results

- Based on subjective ratings by experienced users,
  - Signal should be long; best ratings were for signals at about the length specified in FCC R&O and industry standards (roughly 12.5 seconds)
  - Signal should have a temporal pattern, specific pattern is secondary to length in importance
  - As devices become smaller, vibrations become weaker; reinforces need for length of signal
    - Note: Vibration strength was not varied as it is not variable on mobiles. Goal is to have CMAS on as many mobiles as possible.

Unknowns

Many unknowns parallel those for general population

Additional ones:

- Will specified auditory attention signal be effective for people with partial hearing?
- Will mobile internet access be dialed down for network management during emergency, or clogged, so that alternate visual sources of information are unavailable?
- Efficacy of auto displays for text and graphical information guiding motorists to diversions, shelters, etc. Examples: captioned radio, gps guidance

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