

ALERTING POPULATIONS ABOUT EMERGENCIES

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by

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**NATIONAL CONSORTIUM FOR THE
STUDY OF TERRORISM AND RESPONSES TO TERRORISM**

A CENTER OF EXCELLENCE OF THE
U.S. DEPARTMENT OF HOMELAND SECURITY
BASED AT THE UNIVERSITY OF MARYLAND

THE PROBLEM

▣ How Can We:

- *Get timely warnings **OUT** to everyone*
- *Reduce the **GAP** time people spend delaying action-taking after receiving a warning*
- ***MOTIVATE** appropriate and minimize inappropriate public actions for.....*

TERRORIST ATTACKS



TECHNOLOGICAL EVENTS



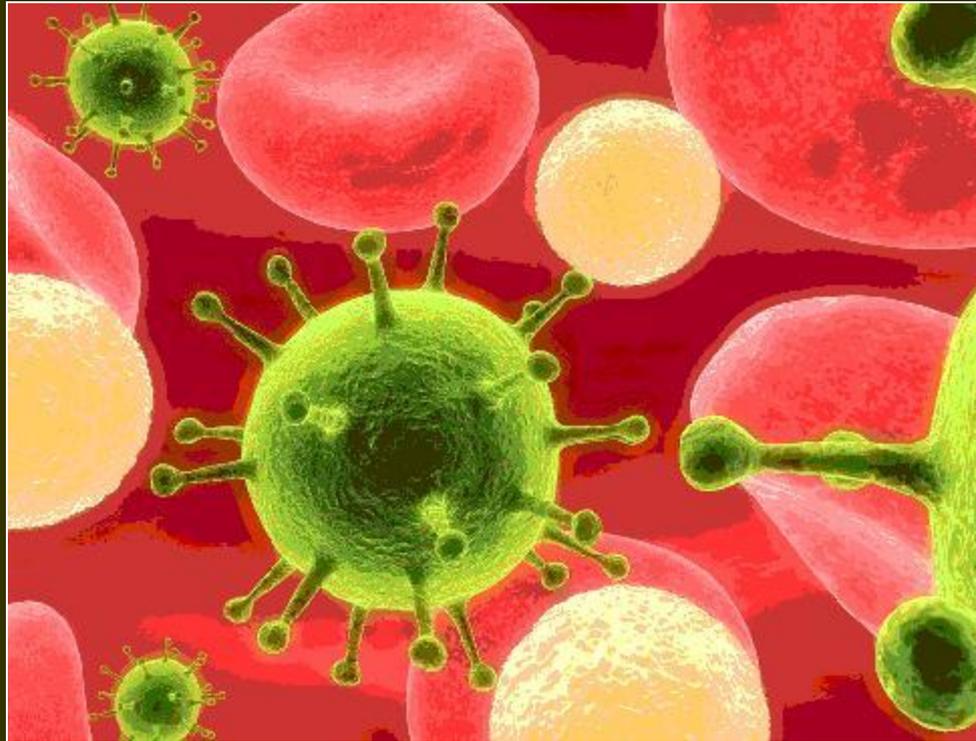
NATURAL DISASTERS



BUILDING FIRES



BIOLOGICAL HAZARDS



HAZARDOUS MATERIALS AND MORE....



*INCLUDING PROTECTIVE
BEHAVIORS SUCH AS....*

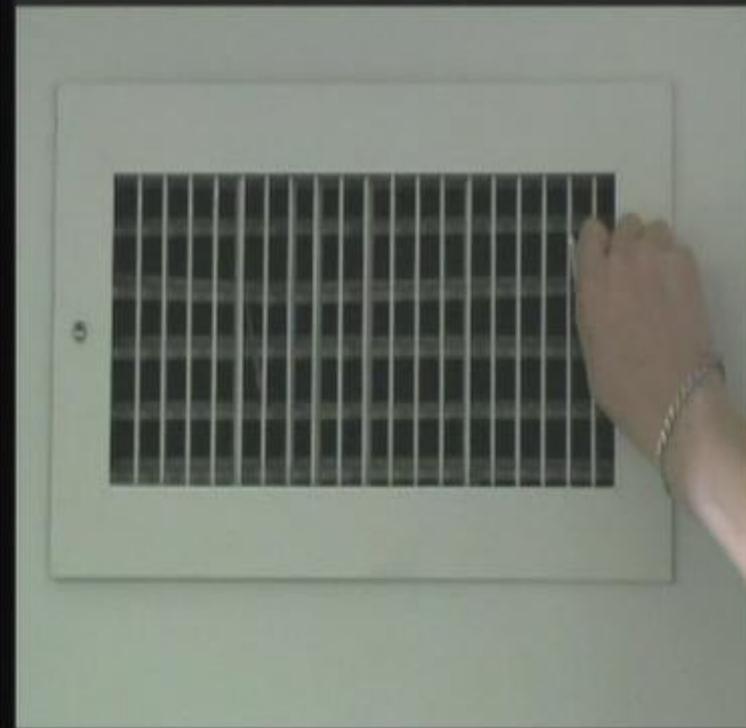
VEHICLE EVACUATION



PEDESTRIAN & OCCUPANT EVACUATION



SHELTERING IN PLACE



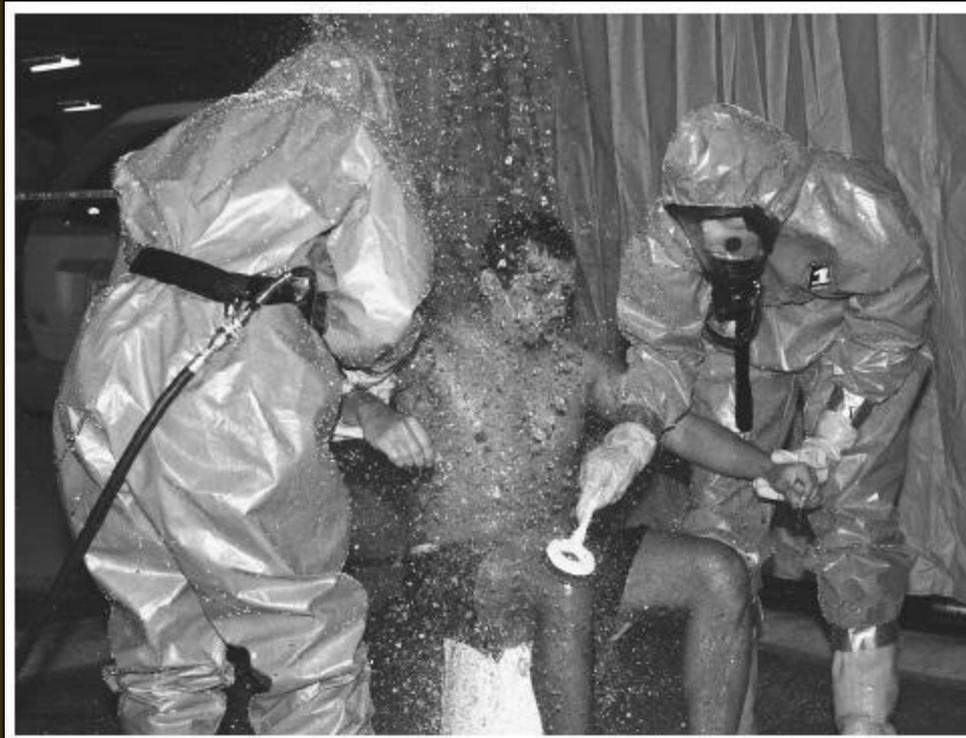
**Turn Off Fans,
Heating & Air
Conditioning
Systems That
Bring In Air
From Outside**

BREATHING PROTECTION



**Helps Keep Radioactive Dust or
Smoke From Entering Your Body**

DECONTAMINATION



AVOIDANCE

UNSAFE
DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)

This structure has been inspected, found to be seriously damaged and is unsafe to occupy, as described below:

Do not enter, except as specifically authorized in writing by jurisdiction. Entry may result in death or injury.

Facility Name and Address:

Date _____

Time _____

This facility was inspected under emergency conditions for:

(Jurisdiction)

Inspector ID / Agency

Do Not Remove, Alter, or Cover this Placard until Authorized by Governing Authority

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GIVEN COMPLEXITIES IN

▣ *Time to impact:*

- None, minutes, hours, days

▣ *Audience(s):*

- Single (one audience)
- Multiple (different actions/populations at same time)

▣ *Protective Action(s):*

- Single (one action)
- Overlapping (multiple actions at same time)
- Sequenced (different actions in a row)

WHAT WE'LL COVER

- ▣ Reasonable conclusions about:
 - Public warning response behavior
 - Warning system reliability

- ▣ Based on a detailed:
 - Synthesis of findings from some 500 research publications spanning 50 years

ABOUT THE RESEARCH

RESEARCH BASE

▣ Half-century social science research:

- Hazards & disasters research literature
- U.S. emphasis--but not exclusively
- Protective actions studied:
 - ▣ Some a lot, others a little, some not at all

▣ Example events studied:

- Natural: Hurricane Camille, Mt. St. Helens
- Terrorism: World Trade Center 1993 & 9/11
- Hazardous Materials: Mississauga, Nanticoke
- Technology: Three Mile Island
- Building Fire: MGM Grand, Cook County Hospital

RESEARCH IN COMMUNITIES



- ❑ REFERENCES: 350 page annotated bibliography available at:
- ❑ <http://www.colorado.edu/hazards/publications/informer/infrmr2/pubhazbibann.pdf>

RESEARCH IN BUILDINGS



- *REFERENCES*: 150 entry bibliography available at:
- <http://www.colorado.edu/hazards/library/BuildingsEvacBib2007.doc>

RESEARCH APPROACHES

- ▣ Studies on “hypothetical” events:
 - Can yield *wrong* response conclusions:
 - Situational determinants of behavior NOT operating
 - Preferences & intentions = little predictive weight
 - Useful for some specialized topics, e.g.,
 - Which words are/aren't understandable
- ▣ Studies of “actual” events:
 - Yield more *realistic* response conclusions:
 - Situational determinants of behavior ARE operating
 - Real people & events = real warnings & response

DEFINITIONS

(for presentation purposes)

ALERTING

- ▣ **Definition:**
 - Get people's attention
- ▣ **Old fashioned approach:**
 - Air raid sirens
- ▣ **Contemporary approach:**
 - CAP
 - CMAS via EAS (related to IPAWS)
 - Use cell phones & other ways to get people's attention & provide messages

WARNINGS

▣ Definition:

- Emergency information that motivates timely & appropriate public behavior

▣ Alerting & warning are different:

- Alerting = get people's attention
- Warning = motivate behavior
- Distinction between them is being blurred in today's world

*TWO SIDES TO THE
BEHAVIOR COIN*

PUBLIC BEHAVIOR

- ▣ **Public warning response is predictable:**
 - About 40% explained variance (as good as it gets)
- ▣ **The factors that predict it are known:**
 - Apply across hazards & events
 - In mathematical equations (tested & retested)
- ▣ **Public warning behavior:**
 - Varies across events because of variation in the factors that influence it
 - Is malleable & somewhat manageable:
 - By managing the factors that influence it
 - But some people will always do the wrong thing

WARNING PROVIDER BEHAVIOR

- ▣ Research also includes:
 - Predicting the behavior of warning providers
 - The “*sender*” part of warnings
 - Based on historical event investigations

- ▣ Influences on warning provider behavior:
 - Relatively well understood
 - Variation across events
 - Is malleable and manageable:
 - Also by managing factors that influence it

PUBLIC RESPONSE
BEHAVIOR

HUMAN “HARD WIRE”

(a basic discovery)

- ▣ “Objective” reality for people = what they think is real
- ▣ What people think comes from interacting with others
- ▣ Most people go through life thinking they’re safe
- ▣ Warnings tell them they’re not & consequently
- ▣ Compel most people to mill around:
 - Interact with others & get more information & search for confirming information to form new ideas about safety & risk
- ▣ “Milling” (some call it “sense-making”) intervenes between warning receipt & protective action-taking
- ▣ Results in public protective action-taking delay
- ▣ Part of being human & will never change

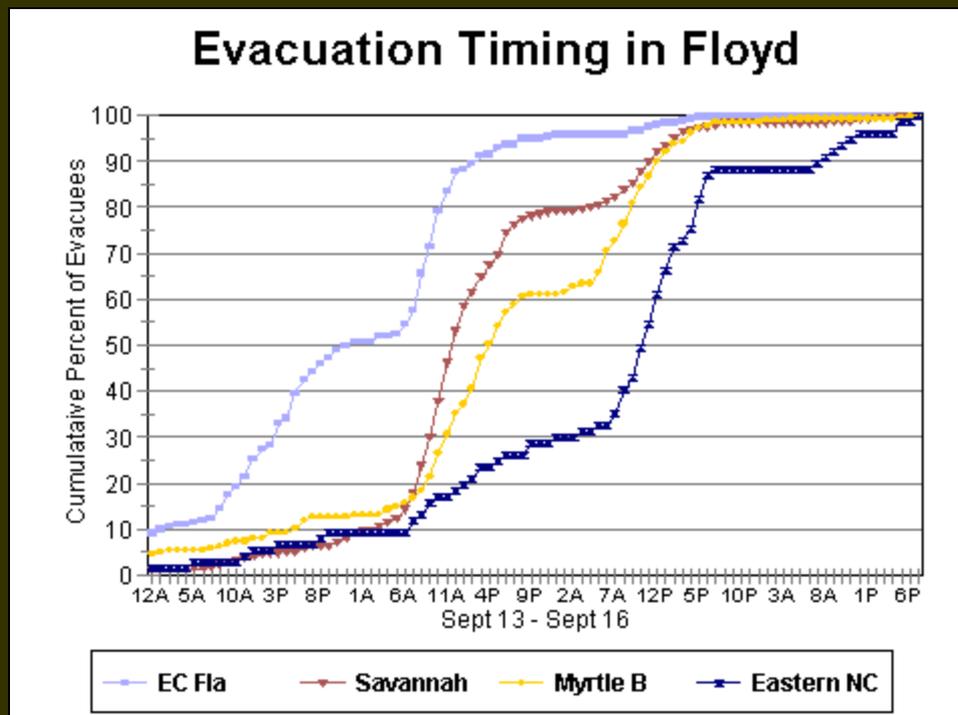
CONSEQUENCE

- ▣ Human beings are.....
 - *“the hardest animal of all on the planet to warn”*

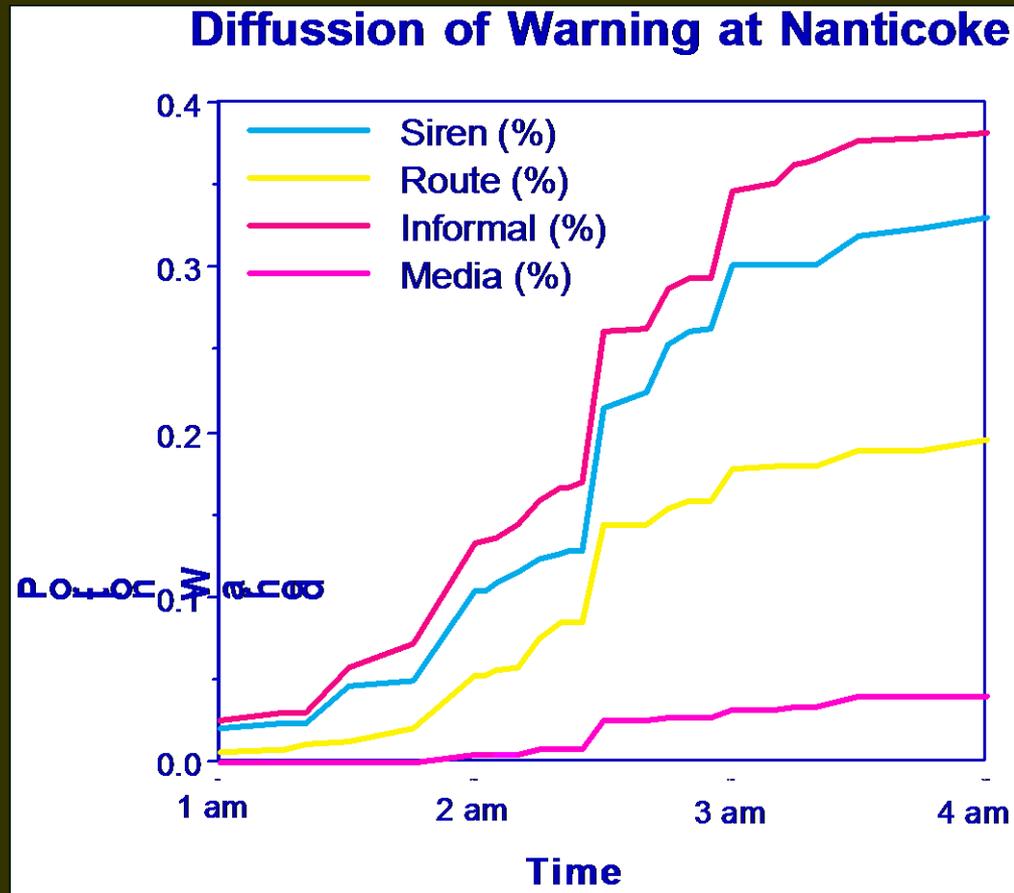
- ▣ An *“exaggerated”* example:
 - While all the forest animals are running away from the flames.....most people are talking about it with neighbors, looking at TV coverage, texting, & rubber necking trying to find out what it means & deciding what to do

- ▣ Creates a public warning GAP:
 - Few are skilled at shortening the time people spend delaying protective action resulting in some unknowingly doing things that increase it

THE RESPONSE GAP



THE DIFFUSION GAP



MESSAGE FILTER

- ▣ Audience factors impact what people hear, how they interpret it & what they do:
 - Statuses (gender, sex, age, ethnicity, SES)
 - Roles (children, family united, pets, kinship)
 - Not just demographics:
 - Experience, knowledge, perceptions & beliefs
 - Environmental and social cues
- ▣ Effects of audience factors vary:
 - Significant but not large with poor warning messages
 - Many weaken in presence of strong warning messages
- ▣ Some constrain communication & response:
 - Special needs sub-populations (*unique effects*)
 - Special communication channels (*for sub-populations*)

MESSAGE CONTENT

▣ Topics that matter (what to say):

- WHAT: Tell them what to do
- WHEN: Tell them by when (time) to do it
- WHERE: Say who should & shouldn't do it
- WHY: Tell about the impact's consequence & how
what you're asking them to do reduces it
- WHO: Say who's talking (source):
 - ▣ There is NO single credible source, local firefighters are best, but a panel of multiple sources works better

MESSAGE STYLE

▣ *Style matters too (how to say it):*

- *CLEAR*: Simply worded
- *SPECIFIC*: Precise & non-ambiguous
- *ACCURATE*: Errors cause problems
- *CERTAIN*: Be authoritative and confident
- *CONSISTENT*:
 - ▣ *Externally*: Explain changes from past messages & differences from what others are saying
 - ▣ *Internally*: Never say “attack will occur soon, don’t worry”

MESSAGE DELIVERY

- ▣ Number of communication channels:
 - More channels work better than fewer channels
 - Some subpopulations need unique channels

- ▣ Type of communication channels
 - Personal delivery channels work best
 - Channel “diversity” (multi-media) helps too

- ▣ Frequency of communications:
 - The more its repeated & heard the better:
 - Repetition fosters confirmation which yields taking action

INFORMATION MANAGEMENT

- ▣ It's not just about warning messages:
 - Public receives information from many sources

- ▣ Public in an “*information soup*” when warned:
 - Many formal & informal information sources
 - Some information is correct & some is not
 - Inconsistencies slow protective action-taking

- ▣ What works best = *deliver warnings AND manage the soup*:
 - Put good information in & take bad information out

WHAT THAT LOOKS LIKE

- ▣ **Managed warning information includes:**
 - Use evidence-based messages (pre-scripted & vetted)
 - Take audience factors into account for delivery
 - Actions to reduce public milling & response delay
 - ▣ Match messages across information providers
 - ▣ Distribute messages repetitively over diverse channels
 - ▣ Send the messages to other providers + JIC
 - Inform people not at risk to reduce “response creep”
 - Monitor public response (people at & not at risk)
 - Listen for wrong information & then
 - Re-warn with adjusted messages based on what people are + aren't doing, wrong information, & any changed protective actions recommendations plus
 - Q & A provide & staff a call-in number

THE BOTTOM LINE

- ▣ Even great public warning messages:
 - Aren't silver bullets that work well on their own

- ▣ Public warning messaging impacts public response most effectively when:
 - *“Its a process of public message & information management based on plans, procedures and training”*

- ▣ Bottom line:
 - Emergency communication planning works, not planning doesn't work quite as well

*WARNING PROVIDER
BEHAVIOR*

WARNING “SYSTEMS”

- ▣ Public warnings involve a *system* of people, agencies & organizations:
 - A systems perspective helps “see” all the parts

- ▣ Public “warning preparedness” helps to:
 - Design, plan, train & exercise to create a more “*highly reliable warning system*”
 - In place long before an actual event occurs

SYSTEM FUNCTIONS

RISK

Natural Environment
Technological
Civil

MANAGEMENT

Interpretation
Decision to Warn
Warning Content &
Protective Action Selection
Warning Method & Channel
Response Monitoring
Warning Feedback

DETECTION

Monitoring
Risk Detection
Data Assessment & Analysis
Prediction
Informing

PUBLIC RESPONSE

Interpretation
Confirmation & Milling
Response
Warn Others

SYSTEM ACTORS

RISK

Nature
Technology
Terrorists & more

MANAGEMENT

Government
(Local, State, Tribal)
Building Operators

DETECTION

Scientific Agencies
Law Enforcement
(Police, DHS, CIA, FBI)
Public

RESPONSE

General Public
Racial & Ethnic Minorities
Visitors & Transients
Special Needs Groups
Organizations & Facilities

SYSTEM RELIABILITY

- ▣ Warning system failures can occur anywhere in the system:
 - Many links across functions & actors
 - Historical examples of non-failures & failures
 - Reasons for historical failures documented

- ▣ Warning preparedness:
 - Integrates all parts of the system resulting in a “more reliable” system with lower odds of failing

EXAMPLE SYSTEM FAILURES

▣ **SYSTEM DESIGN FLAWS:**

- Warning system design, preparedness, training lacking
- Un-reliable system linkages, e.g., detectors to managers
- Actor's personality not removed with procedures
- Fail safe solutions for technological problems missing
- Problems of non-communication not addressed

▣ **MESSAGING FLAWS:**

- Evidence-based messages not used
- Everyone at risk not reached
- People not at risk not communicated to
- Repetitive message dissemination absent
- Message management missing

A KEY SYSTEM LINKAGE

- ▣ The link between:
 - Risk detectors & local warning providers

- ▣ Ready local warning providers to receive information from risk detectors with:
 - *“Planned triggers & procedures” about when to warn and what public protective actions to recommend to whom*

- ▣ Ad hoc approaches have historically been a root cause of warning system failures

BELIEF IMPEDIMENTS

- ▣ Warning messages should be short
- ▣ People may panic
- ▣ One-way delivery is communication
- ▣ People will understand the message
- ▣ Messages can't be changed
- ▣ There's one public
- ▣ A credible message source exists
- ▣ People blindly follow instructions
- ▣ One channel delivery works
- ▣ Great messages guarantee great response

PUBLIC EDUCATION

- ▣ *Don't confuse with preparedness education*
- ▣ **Pre-event public “warning” education:**
 - Doesn't much influence response in an actual event
 - Why: warning response is largely determined “*in situ*”
- ▣ **Use to teach people:**
 - Hazard exists, warning system & source, etc.
- ▣ **And to acquaint people with:**
 - Protective actions, e.g., don't pick kids up at school
- ▣ **In other words:**
 - *It can prime the public* by removing surprises and reducing confusion in future warning events

RESEARCH-PRACTICE GAP

- ▣ **Community warning metric:**
 - Assess social science knowledge implementation
- ▣ **Measured in several UASI areas:**
 - Washington, D.C., New York, & Los Angeles
- ▣ **Key findings:**
 - Application lags behind knowledge
 - What is applied is done so unevenly
- ▣ **Narrowing the gap:**
 - Plan development & training for practitioners
 - Modernized guidance
 - Pre-scripted (& pre-vetted) warning messages

GAME CHANGERS

MODERNIZATION

- ▣ **New approaches & new technology:**
 - CAP (Common Alerting Protocol)
 - IPAWS (Integrate Public Alert & Warning System)
 - CMAS (Commercial Mobile Alert System)
 - All hold great promise

- ▣ **Message length limited:**
 - By carrying capacity of local distribution systems, e.g., Emergency Alert System (EAS) character limits
 - *Research is needed*

MOBILE DELIVERY DEVICES

- ▣ “Sirens in our pockets”
- ▣ Combines alerting & warning:
 - Blurs distinction (calls them both alerting)
- ▣ Message length limits:
 - 90 characters (not words) long (not long)
- ▣ Holds promise & raises hypotheses:
 - Decrease diffusion time?
 - Increase milling & response delay time?
 - Enhance risk personalization?
 - *Research is needed*

SOCIAL MEDIA



- ▣ **Won't change some things:**
 - How people are “hard wired”
 - Strong impact of message factors on public response behavior

- ▣ **Will change other things (hypotheses):**
 - Accelerate milling, confirmation, informal notification
 - How public response can be monitored
 - Evidence so far = is mixed (about actual use)
 - Role & use likely to change over time
 - Holds promise
 - *Research is needed*

END NOTES

KEEP IN MIND

- ▣ We only “*hit the highlights*”:
 - More could be said about everything:
 - ▣ This was a speech (not a semester-long course)
- ▣ Social science knowledge can’t:
 - Provide guarantees about public response or
 - Solve all public warning & response problems
- ▣ But it can:
 - Help solve some problems and
 - Point to planning & training needs

SUMMING UP

“The key determinant of public warning response has more to do with what public information providers give the public than anything to do with the public itself”

QUESTIONS?

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