

WARNING MESSAGES AND PUBLIC RESPONSE

*SOCIAL SCIENCE RESEARCH FINDINGS &
APPLICATIONS FOR PRACTICE*

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DISCLAIMER

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- ▣ **However:**
 - Opinions, findings & conclusions are the author's and do not necessarily reflect the views of the U.S. Department of Homeland Security

PURPOSE

- ▣ **Distinguish between:**
 - Alerts and warnings (they're different)
- ▣ **Review evidence-based factors that impact:**
 - Public response to warnings & other information during actual events
- ▣ **Catalogue message attributes that:**
 - Play key roles in what the public thinks & does
- ▣ **Make recommendations for practitioners**

WHAT WE' LL COVER

- ▣ **How to effectively communicate to the public before & during disasters:**
 - FOCUS: Public warning messages that motivate public protective response taking
 - SPILL-OVER: Communication principles applicable to other types of “event-specific” public communications

- ▣ **Based entirely on research findings from social science investigations of:**
 - Actual people
 - Engaged in actual behavior
 - During actual disasters

FIRST: A FEW MYTHS

- ▣ **A myth exists when someone:**
 - **BELIEVES** its true (but its not)
 - Think they have **EVIDENCE** for it (but they don't)
 - **WON'T STOP BELIEVING** it (no matter what)

- ▣ **Here are three of them.....**

THE PANIC MYTH

- ▣ **Non-problem:**
 - ▣ Never occurred after a warning
- ▣ **Actual problem:**
 - ▣ “We didn’t issue a warning so we wouldn’t cause a panic”
- ▣ **Panic occurs when:**
 - ▣ Spaces are confined
 - ▣ Escape routes ARE available, but
 - ▣ People think: not enough time for everyone to use them, resulting in
 - ▣ People must: “compete to live”
- ▣ **Even then, panic is rare**



THE “KISS” MYTH

- ▣ **Definition:**
 - “Keep it short/simple stupid”

- ▣ **Myth:**
 - Applies to public warnings

- ▣ **Reality:**
 - Applies to advertising, not warnings
 - Warned people become “information starved”
 - If warnings don’t tell enough, they’ll find what they want to know someplace else & confusion results

THE CRY WOLF MYTH

- ▣ **Myth:**
 - People don't respond after false alarms

- ▣ **Reality:**
 - They do (perhaps differently)

- ▣ **False alarms:**
 - Can be productive for future response "if explained"
 - **REAL ISSUE:** their cost angers local government

- ▣ **Exception:**
 - People ignore sirens (especially if sounded frequently, e.g., for siren tests)

ABOUT ALERTS

- **STOP** ongoing life
- Get people's **ATTENTION**
- **CAPTURE** your audience first, then talk
- But keep in mind that....



PEOPLE DON'T REMEMBER INDICATORS

- ▣ **People:**
 - Don't remember meaning of:
 - ▣ Siren signals (wails, whoops, tones)
 - ▣ Color codes
 - Don't distinguish between:
 - ▣ Advisories, watches & warnings
- ▣ **Except:**
 - When signals/codes are “drilled into them”, e.g., weekly fire drills in schools



ALERTING ISN'T SIMPLE

- ▣ **Many isolate “themselves” from information**
 - Some are isolated by circumstance, e.g., poor
- ▣ **Even when signals blare, many:**
 - Think they’re “safe” &
 - Disasters happen to other people
- ▣ **Some sub-populations need unique alerts, e.g.,**
 - Hospitals in communities
 - Hearing impaired in buildings
 - Visitors & “out-of-towners”
 - Different language speakers



USE “OBTRUSIVE” ALERTS

- ▣ **Get people’s attention, e.g.,**
 - “Lights on” in theaters
 - Piercing sounds with TV crawlers
- ▣ **Wake people up, e.g.,**
 - Sleeping children & older adults
 - Hearing loss & under the influence
- ▣ **Outside devices loose effectiveness if:**
 - Windows shut & air/heat is on
 - 3 minute sounding 10 decibels over ambient outdoor siren has a 62% chance of waking someone up
- ▣ **Need indoor devices for alert at night:**
 - Fast moving community event
 - Fire in a hotel



INFORMAL ALERTING

- ▣ **Warning diffusion “among those warned”**
 - Always happens, count on it, & use it
- ▣ **9/11 example:**
 - Most in country learned about attack in 1 hour
 - Many in towers found out a plane hit from friends/relatives
- ▣ **Rule of thumb:**
 - 1 informal first warning for every 2 formal first warnings
- ▣ **Increasing with social media technologies**



*HOW WARNING MESSAGES INFLUENCE
PUBLIC RESPONSE*

PREDICTING PUBLIC BEHAVIOR

- ▣ **Predictions based on SCIENCE work:**
 - “A” causes “B”

- ▣ **Predictions based on NON-SCIENCE don't:**
 - What people did in past events:
 - ▣ Using a past “B” to predict a future “B”
 - Guesses, hunches, or personal experience
 - Intention surveys or focus groups:
 - ▣ Intentions & behavior are different
 - ▣ Public response determinants don't operate in pre-event surveys or focus groups & aren't known by respondents

FACTORS THAT INFLUENCE PUBLIC RESPONSE


- ▣ **Many “statistically significant” factors documented by research but....**

- ▣ **They vary in importance:**
 - Strong vs. weak relationships
 - Real vs. spurious effects
 - High vs. low supporting evidence

- ▣ **Solid evidence exists for what follows**

INFORMATION FACTORS

“About the warning message”



The screenshot shows a web browser window displaying a National Weather Service (NWS) warning message. The page header includes the NOAA logo, the text "National Oceanic and Atmospheric Administration's National Weather Service", and the "weather.gov" logo. The breadcrumb trail reads "Home > Products > National Data >". The message content is as follows:

000
WGUS83 KPAH 161620
FLSPAH
FLOOD STATEMENT
NATIONAL WEATHER SERVICE PADUCAH KENTUCKY
1120 AM CDT WED APR 16 2008

...THE FLOOD WARNING CONTINUES FOR PORTIONS OF THE WABASH RIVER IN ILLINOIS AND INDIANA...AFFECTING AREAS NEAR NEW HARMONY...

.WHILE RIVER LEVELS CONTINUE TO SLOWLY RECEDE, MINOR FLOODING WILL CONTINUE THROUGH THE WEEKEND.

SAFETY MESSAGE...

NEVER DRIVE CARS...TRUCKS OR SPORT UTILITY VEHICLES THROUGH FLOODED AREAS. THE WATER MAY BE TOO DEEP TO ALLOW SAFE PASSAGE. NEVER ALLOW CHILDREN TO PLAY IN OR NEAR FLOOD WATERS. STAY TUNED TO NOAA WEATHER RADIO OR YOUR LOCAL MEDIA FOR FURTHER STATEMENTS AND POSSIBLE UPDATED FORECASTS.

ADDITIONAL INFORMATION IS AVAILABLE AT

FACTOR 1: THE MESSAGE



FACTOR 1: THE MESSAGE

(cont' d)

- ▣ **Number of communication channels:**
 - The “more the better”

- ▣ **Type of communication channel:**
 - Personal channels work best
 - The “more the better”

- ▣ **Communication frequency:**
 - The “more” its repeated & heard the better:
 - ▣ Repetition fosters confirmation
 - ▣ Confirmation fosters belief
 - ▣ Belief fosters taking action

FACTOR 1: THE MESSAGE

(cont' d)

- ▣ **CONTENT (What to say):**
 - **WHAT:** Tell them what to do
 - **WHEN:** Tell them when (time) to do it
 - **WHERE:** Say who should & shouldn't do it
 - **WHY:** Tell about the hazard's consequences
 - **WHO:** Say who's talking (source):
 - ▣ There is NO single credible source, so use multiple sources for the same message

FACTOR 1: THE MESSAGE

(cont' d)

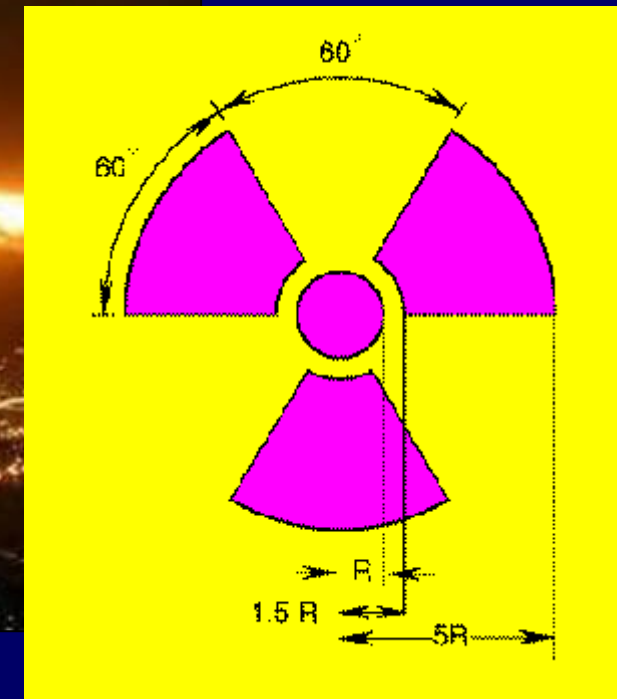
- ▣ **STYLE (How to say It):**
 - **CLEAR:** Simply worded is best
 - **SPECIFIC:** Precise & non-ambiguous
 - **ACCURATE:** Errors cause problems
 - **CERTAIN:** Authoritative and confident
 - **CONSISTENT:**
 - Externally: Explain changes from past messages & differences from what others are saying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

FACTOR 2: CUES *(Non-verbal Information)*

- ▣ **Social cues help:**
 - “Monkey see, monkey do”
 - ▣ What neighbors, friends, & relatives are doing
 - ▣ What organizations are doing

- ▣ **Physical cues help too:**
 - If confirm the risk (rain in flood warnings)

SOME HAZARDS HAVE CUES (fires)
SOME DON'T (radiation)



PEOPLE FACTORS



THE “HUMAN FILTER”

- ▣ **Everyone may “receive” the same warning message, but:**
 - Differences in the people who hear it result in it “meaning” different things to different people
- ▣ **Overcoming receiver “biases” is possible, but requires:**
 - Well-crafted warning messages
 - Well-designed warning delivery systems
- ▣ **The human filter includes....**

FACTOR 3: STATUSES *(worded as constraints)*

- ▣ **Socio-economic status:**
 - Having little money, education, employment
- ▣ **Age:**
 - Being young or old
- ▣ **Gender:**
 - Being male
- ▣ **Ethnicity:**
 - Being non-Anglo
- ▣ **Acculturation:**
 - Not speaking English, born in another country

FACTOR 4: ROLES *(worded as incentives)*

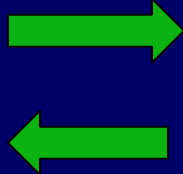
- ▣ **Roles of responsibility for others:**
 - Having children & larger family size
 - Having pets
 - More kin relationships
 - Family united
 - Greater community involvement

FACTOR 5: EXPERIENCE

- ▣ **People “normalize” warning information based on their experience:**
 - Think disasters faced will be like those experienced
 - Inclined to do what was appropriate in past events experienced

PROCESS FACTORS

- ▣ How message & people factors interact



FACTOR 6: BELIEF

- ▣ **There is NO single credible spokesperson:**
 - STOP LOOKING FOR ONE
 - Why? People have different ideas about who's credible

- ▣ **“Who's credible?” = wrong question:**
 - Many “think” spokesperson credibility = message belief
 - They're different & belief is what's important

- ▣ **How to achieve warning belief:**
 - ONE MESSAGE OVER DIVERSE CHANNELS
 - FROM A “PANEL” OF SPOKESPERSONS :
 - e.g., officials, Red Cross, scientists, familiar newscaster, & others
 - REPEATED MULTIPLE TIMES

- ▣ **Here's as good as single spokesperson gets....**

***FIREFIGHTERS = MOST CREDIBLE
SOURCE IN AMERICA (for 35%)***



FACTOR 7: KNOWLEDGE

- ▣ **Multi-faceted concept including:**
 - **PAST:** What people “import” into the event
 - **PRESENT:** What people “think” based on the information/cues they get during the event
 - **NATURAL INCLINATION:** “I’m safe, don’t tell me I’m not”

- ▣ **Not static & changes**

- ▣ **Manage it in warning messages:**
 - Provide warning information that “overcomes” differences in people’s past, present, & natural inclinations

FACTOR 8: PERCEIVED RISK

- ▣ **Its about perceived risk DURING the event:**
 - Different from pre-event risk perception

- ▣ **Usually a roadblock to taking action:**
 - People don't perceive they're at risk
 - People perceive they're safe
 - And search for information to confirm that they are

- ▣ **Moreover:**
 - People dichotomize risk into: do something vs. do nothing
 - They don't act in proportion to probability estimates
 - And they're inclined to:
 - "Normalize" the risk information they receive

FACTOR 9: MILLING

- ▣ **Milling/confirmation:**
 - The **KEY** to how warnings work

- ▣ **Few do something because they're told to:**
 - People need to think it's their own idea

- ▣ **People think it's their idea & then act after:**
 - **MILLING AROUND:** talking about it with others and confirming the risk and what they could do about it

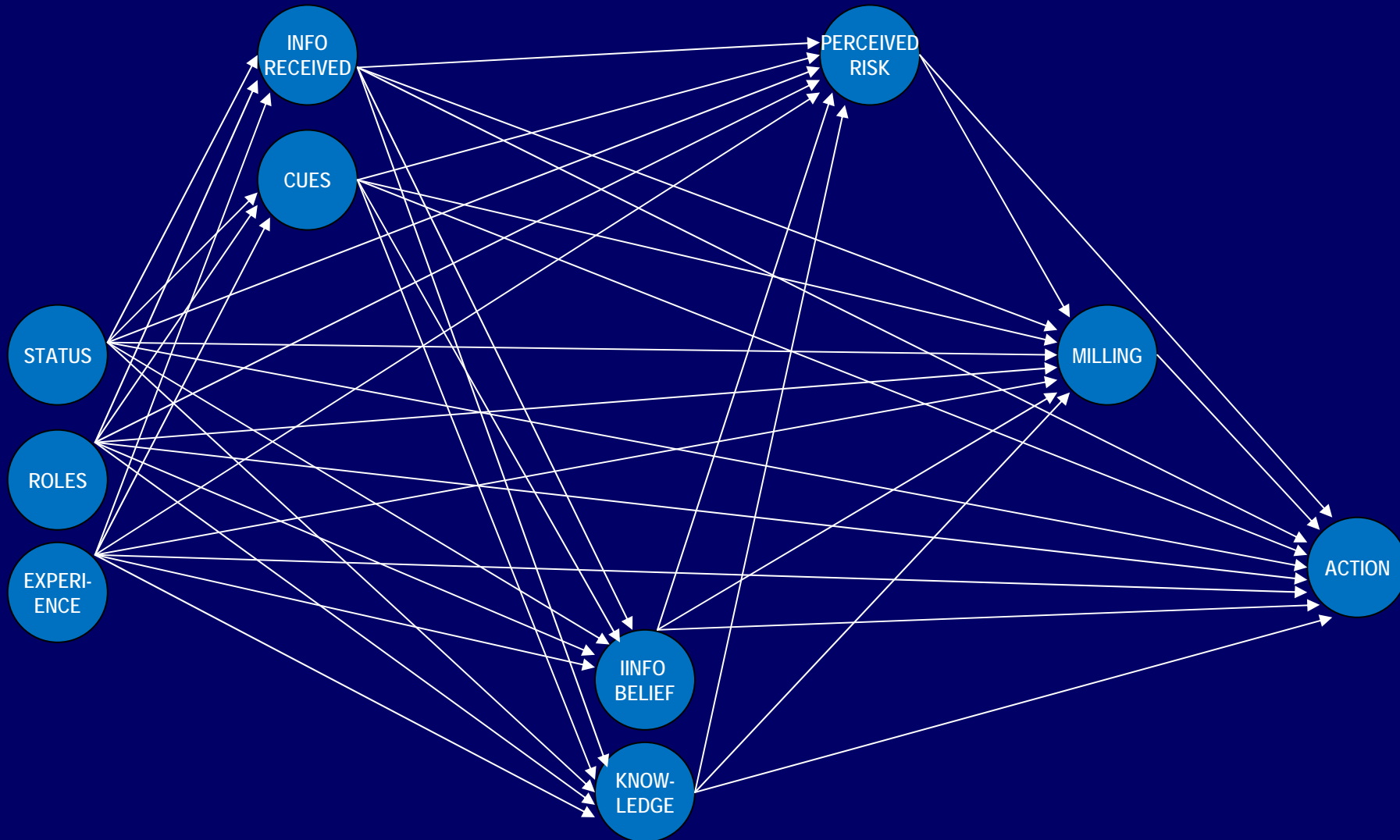
- ▣ **Before taking protective actions, people need to:**
 - Have confirmation (additional information)
 - Talk it over with others

*HOW THE FACTORS RELATE TO EACH
OTHER*

THE FACTORS SEQUENCED



THE FACTORS MODELED



THE MODEL REDUCED TO MATHEMATICS

- ▣ **Models are represented by equations:**
 - Called “simultaneous multiple regression equations”
- ▣ **Equations enable us to determine:**
 - Effect of every factor while controlling for the effects of everything else (good science)
- ▣ **The result is:**
 - Distinguish between what’s really important & what isn’t
- ▣ **When to get excited:**
 - When different studies reach the same conclusions
 - That’s where we are with research on public response to warnings for hazardous events

*EXAMINE SOME EQUATIONS (WTC Evacuation on 9/11)**

$$X_4 = \beta_{41}X_1 + \beta_{42}X_2 + \beta_{43}X_3 + e_4$$

$$X_5 = \beta_{51}X_1 + \beta_{52}X_2 + \beta_{53}X_3 + \beta_{54}X_4 + e_5$$

$$X_6 = \beta_{61}X_1 + \beta_{62}X_2 + \beta_{63}X_3 + \beta_{64}X_4 + \beta_{65}X_5 + e_6$$

$$X_7 = \beta_{71}X_1 + \beta_{72}X_2 + \beta_{73}X_3 + \beta_{74}X_4 + \beta_{75}X_5 + \beta_{76}X_6 + e_7$$

*Averill, J. D., D.S. Mileti, R.D. Peacock, E.D. Kuligowski, N. Groner, G. Proulx, P.A. Reneke, and H.E. Nelson. 2005. Federal Building and Fire Safety Investigation of the World Trade Center Disaster: Occupant Behavior, Egress, and Emergency Communications. *Report NCSTAR 1-7*, National Institute of Standards and Technology, Gaithersburg, MD. Available at:

<http://wtc.nist.gov/NISTNCSTAR1-7.pdf>

CONCLUSIONS FROM THE MATHEMATICS

- ▣ **All factors aren't equal**

- ▣ **Some factors are REALLY important:**
 - **CONTENT**: what the message says:
 - ▣ Especially what actions to take
 - **REPETITION**: Hearing same warning many times
 - **CUES**: Seeing things that confirm the message
 - **MILLING**: Confirming it with others

- ▣ **Other factors are LESS important:**
 - Demographics (unless information is poor)

GENERAL OBSERVATIONS

- ▣ **Message factors:**
 - Largest impact of all on public response

- ▣ **If “high quality” message factors:**
 - Influence of other factors decrease
 - Ability to manage public response can be high
 - Example: Nanticoke

- ▣ **If “low quality” message factors:**
 - Influence of other factors “increases”
 - Ability to manage public response can be lost
 - Example: Three Mile Island

GENERAL CONCLUSIONS

- ▣ **Sound public warning response doesn't happen naturally:**
 - Due to differences between people being warned
- ▣ **Influence of people differences:**
 - Can be overcome by providing evidence based warning messages
- ▣ **Evidence-based warning messages don't happen naturally:**
 - Don't make up what's in a warning "on the spot"
 - Message training & preparedness is needed

*WHAT WOULD PUBLIC WARNINGS SAY IF
THEY WERE RESEARCH EVIDENCE-BASED?*

WARNING MESSAGE EXAMPLE

(Mud Slides)

- ▣ This is a MANDATORY EVACUATION ORDER from the Yellow County Sheriff's Department AND Fire Authority. There's a high risk of CATASTROPHIC MUDSLIDES & DEBRIS FLOWS due to rain on BURNT SLOPES. After consulting with the U.S. Geological Survey and the National Weather Service, WE issue a mandatory evacuation order for the following people in Yellow County:
 - If you LIVE IN or ARE IN an area BELOW or NEAR burnt slopes, evacuate now. Do not delay. This is a MANDATORY EVACUATION ORDER. Evacuate. Evacuate NOW.
 - What we mean when we say evacuate is: GET OUT OF ALL CANYONS, and get out of them NOW.
 - If you don't live in or aren't in an area below or near burnt slopes, you don't need to do anything.

WARNING MESSAGE

(Cont' d)

- ▣ If you have **CHILDREN IN A SCHOOL** located in a canyon:
 - DO NOT GO THERE TO GET THEM. They won't be there when you arrive.
 - All school children in all canyon schools are currently being evacuated to (insert the name, address, and telephone number).
 - You can pick them up there once you have completed your own evacuation.

WARNING MESSAGE

(Cont' d)

- ▣ There's **HIGH RISK** of catastrophic mudslides and debris flows due to rain on **BURNT SLOPES**:
 - Mudslides and debris flows could occur **NOW**, and they could be large enough to **COMPLETELY BURY** homes, roads, and lives.
 - They can occur **WITHOUT NOTICE**.
 - The amount of rain needed to start a catastrophic mudslide or debris flow is **SMALL**. Don't think you're safe because the rainfall you see is slight.
 - The risk of catastrophic mudslides and debris flows below all burnt slopes in all Yellow Country is **REAL**.

WARNING MESSAGE

(Cont' d)

- ▣ **If you LIVE IN or ARE IN an area BELOW or NEAR burnt slopes EVACUATE NOW.**
 - Evacuate WITHOUT DELAY. Evacuate NOW.
 - This is a MANDATORY EVACUATION ORDER.
 - There's a Red Cross shelter at Monroe High School in the town of Yellow.
 - Bring your pets and keep them with you. Larger animals can be brought to the Yellow County Fairgrounds.
 - If you have questions or require assistance, please call 123-456-7890.
 - New information will be made available as it becomes available on this same station/channel.

*THE NEXT 2 SLIDES
SUMMARIZE IT ALL*

SUMMARY OF AN “EVIDENCE BASED” WARNING

▣ MESSAGE IS:

- ▣ 1. **CLEAR** (simply worded)
- ▣ 2. **SPECIFIC** (precise and non-ambiguous)
- ▣ 3. **ACCURATE** (no error)
- ▣ 4. **CERTAIN** (authoritative and confident)
- ▣ 5. **CONSISTENT** (within and between messages)

▣ ABOUT:

- ▣ 6. **WHAT** (what to do)
- ▣ 7. **WHEN** (when to do it)
- ▣ 8. **WHERE** (who should & shouldn't do it)
- ▣ 9. **WHY** (hazard & consequences)
- ▣ 10. **WHO** (who's giving the message)

▣ AND IS CONFIRMED:

- ▣ 11. **REPEATED** frequently
- ▣ 12. over **MULTIPLE COMMUNICATION CHANNELS**

EVIDENCE BASED WARNING MESSAGE TEMPLATE

- ▣ **Message label**
- ▣ **Who's speaking**
- ▣ **Who message is for (location)**
- ▣ **What they should do by when (who shouldn't)**
- ▣ **Why they should do it (risk/consequences)**
- ▣ **Repeat:**
 - **Who message is for**
 - **What they should do by when**
- ▣ **End: message label & pending information**

QUESTIONS?

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