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Written Testimony

Effective Alerts and Warnings: Applying the Evidence to Improve Public Communications in Emergencies and Disasters.

Prepared by Dr. Jeannette Sutton

Associate Professor

Department of Emergency Management and Homeland Security

College of Emergency Preparedness, Homeland Security, and Cybersecurity

University at Albany, State University of New York

Summary

Disaster scholars have conducted research on alerts and warnings for more than 70 years. Alert and warning message effectiveness is not solely a result of technology; the message must include five key contents necessary to motivate action (source, hazard, location, time, and guidance). Fewer than 8.5% of Wireless Emergency Alerts issued from 2012-2022 were complete messages that align with evidence-based practices. This is unacceptable for communicating directly with the public when lives are at risk.

Evidence-based practices are not followed because there are deficient requirements for the use of IPAWS, absence of national standards for alerting authorities, and insufficient training opportunities. Alerting authorities presently have no requirements or obligations to change their practices to align with those that have been demonstrated to motivate action among the public.

The consequences of poor messaging include public experiences of over-alerting and warning fatigue, which can lead to individuals opting out of alerts and warnings. The individual actions of each alerting authority are part of a broader communication ecosystem with public alerting impacts beyond their jurisdiction.

Recommendations for improvement include additional research funding; establishing national standards for evidence-based messaging and training; requiring third-party emergency notification system software to include user prompts that will ensure complete and actionable messages.

Introduction

Good morning and thank you, Chairman Guthrie and Ranking Member Pallone for having me here today. It is an honor to testify before the committee today. This is such an important issue; I am grateful for a hearing on this topic.

My name is Jeannette Sutton. I have a PhD in sociology and am an associate professor in the College of Emergency Preparedness, Homeland Security and Cybersecurity at the University of Albany. My research focus is on effective warning messages for hazards, and I have been funded by the National Science Foundation, National Oceanic and Atmospheric Administration, US Geological Survey, Department of Homeland Security Science and Technology Directorate, and most recently FEMA's Integrated Public Alert and Warning System (IPAWS). As the Principal Investigator for the FEMA-IPAWS project, I co-designed a software platform called the Message Design Dashboard, that provides the contents and a systematic workflow for any alerting authority to use to write a complete and actionable message.

My comments today focus on three things: 1) what makes an alert and warning message effective; 2) why evidence-based practices are not followed and 3) the impacts of poor messaging.

Alert and Warning Effectiveness

One of the most difficult tasks of an alert and warning provider is to convince people that they are at risk and they need to take action to protect themselves. Our biases and experiences tell us that we are generally safe. Alerting people to inform them when they are

not safe is one of the most important tasks of an emergency manager. And yet the focus has primarily been on technology and technological systems**. Merely deploying a message does not guarantee that it will be effective.**

With more than 70 years of social and behavioral science research we know how to motivate people to take action without delay. It centers on the message and its contents.

Every warning, regardless of hazard type, should include **five primary elements**: the source – who the message is from; the hazard and its impacts; the location affected by the threat; the time of the threat; and guidance and instruction on how to protect oneself.[1] A review of the first decade of Wireless Emergency Alerts from 2012-2022 found that only 8.5% of messages issued included all five of these elements.[2]

Within the first decade of WEA messages, we also found a **significant use of technical language**, or jargon, that stands in for plain language descriptions of hazards and the actions people should take to protect themselves.[3] For instance, threat levels – level 1, level 2, and level 3 – are used to convey the severity of wildfire and flood, while also indicating actions such as be aware, prepare to evacuate, and evacuate. However, we also find neighboring jurisdictions using their own operational language to mean similar things such as Ready Status, Set Status, and Go Status; voluntary and mandatory evacuation; and

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[1] Sutton, J., Olson, M. K., & Waugh, N. A. (2024). The Warning Lexicon: A multiphased study to identify, design, and develop content for warning messages. *Natural Hazards Review*, *25*(1), 04023055.
[2] Olson, M. K., Sutton, J., Cain, L. B., & Waugh, N. (2024). A decade of wireless emergency alerts: A longitudinal assessment of message content and completeness. *Journal of Contingencies and Crisis Management*, *32*(1), e12518.
[3] Kuligowski, E. D., Waugh, N. A., Sutton, J., & Cova, T. J. (2023). Ember alerts: Assessing wireless emergency alert messages in wildfires using the warning response model. *Natural hazards review*, *24*(2), 04023009.

evacuation warning and evacuation order. Our study on public understanding of the terms evacuation warning and evacuation order found that a significant portion of respondents were unable to determine the relevant associated actions – prepare to evacuate or evacuate now.[4]

In addition to the technical language used to communicate about natural hazards, there has been a dramatic increase in the use of jargon for missing and endangered persons. Nationally, there are two recognized alerts for missing and endangered persons; the AMBER Alert and the Ashanti Alert. The AMBER Alert is designed for children under the age of 18 who have been abducted and are in imminent danger of serious bodily injury or death. The Ashanti Alert is designed for adults aged 18 and older who are missing due to abduction or other circumstances that put them in serious danger. Across the country, **different state legislatures have created more than 40 additional types of named alerts**, with more being added. Examples of state-specific alerts include the Athena Alert, Levi's Call, Purple Alert, Silver Alert, Senior Alert, CLEAR Alert, Ebony Alert, and Gold Alert. There is no consistency between the different alerts in the different states. In one state you can have a Gold Alert for a specific population and a few miles away, just across state lines it could be called a different alert.[5] Furthermore, IPAWS does not restrict organizations from sending any type of message through the WEA system.

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[4] Walpole, H. D., Olson, M., Sutton, J., Wood, M. M., & Cain, L. B. (2025). Burning Doubts: Effects of Jargon in Wildfire Emergency Messaging on Receivers With Differing Experience. *Risk Analysis*.
[5] Cain, L. B., Sutton, J., Olson, M., Waugh, N., & Bertola, E. (2025). Missing information: A content analysis of US missing persons alerts using the missing and endangered persons message framework. *Police Practice and Research*, 1-28.

While every missing person alert type that is created originates from an incident where a person has become lost or has been abducted, as named alerts they are unfamiliar and result in confusion when issued without the benefit of a plain language explanation about the person, or hazard, and the actions to take.[6]

Why are evidence-based messaging practices not followed?

Deficient requirements

The IPAWS program within FEMA is the only resource that provides the technological capability for federal, state, local, tribal, and territorial jurisdictions to broadcast geotargeted WEA messages to WEA-capable devices like cellular phones.

To access IPAWS, jurisdictions must purchase alert origination software from a third-party company. Then one person in the jurisdiction needs to complete a two-hour online course, and one person must demonstrate how to send a message through the IPAWS training environment. There are no requirements for an organization to have an internal policy or procedures on how to use the system, nor are there requirements for demonstrating a minimal capability of effective message writing, the creation of comprehensive templates, or establishing a training plan. This is most troubling because while multiple people within a jurisdiction may have access to the system, only one is required to complete the online training and send a test message, suggesting there will be a gap in individual capabilities.

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[6] Cain, L.B., Sutton, J., Walpole, H.D., & Olson, M. (under review) Improving AMBER Alerts: Results from a National Experimental Study of Wireless Emergency Alerts. *Police Practice and Research.*

While the updated IPAWS independent study curriculum now includes a section on effective messaging, it remains limited in scope and relies on the student to proactively apply the principles within their jurisdiction. Furthermore, IPAWS monthly proficiency demonstrations require alerting authorities to test their software capabilities, not their ability to communicate their message. A test message can be sent that simply states, 'Test, Test, Test.'

Notably, to date, alert origination software companies have not integrated the most recent message design research into their platforms as a routine service to their customers,[7] nor has IPAWS made this a requirement.

Absence of national standards

The Federal Communications Commission (FCC) creates rules for stakeholders involved in the message delivery process. These include broadcasters and cellular companies. **The FCC does not create rules that directly apply to the alerting authorities.** To improve technological dimensions of WEA, the FCC required cellular companies to increase WEA message length from 90-characters to 360-characters, to more narrowly geotarget message polygons, to present messages in English and Spanish, and add capabilities for including a URL. These changes made it possible for alerting authorities to significantly improve the messages they deliver to persons at risk; however no requirements were directed to alerting authorities as they make use of these new capabilities. In fact, many

[7] University at Albany. (2022) *Alert and Warning Software: A Current Practices Review Report.* [Unpublished Manuscript] Center for Technology and Government, University at Albany, SUNY.

messages are still issued only as 90-character alerts, a message length demonstrated to delay action among message receivers due to their incomplete nature.[8]

Insufficient training opportunities.

General training opportunities for alerts and warnings have been limited to those provided by FEMA IPAWS, the National Disaster Emergency Management University (NDEMU), Hawaii's Center for Disaster Preparedness (HCDP), and private consultants. The NDEMU and HCDP focus training on public information and external affairs officers and are delivered by advanced crisis communication practitioners and Public Information Officers. Alerts and Warnings are mentioned in the training, but only account for one sliver of what is provided. FEMA IPAWS and private consultants offer general training, but without consistency, and it is not widespread.

In 2022, with funding from FEMA IPAWS, my team at the University at Albany developed specialized software to help practitioners create messages that include the key communication elements described previously. This software is called the Message Design Dashboard and my team trained more than 500 emergency managers across the U.S. We taught them about the social and behavioral science of alerts and warnings and trained them how to use the software to write complete and effective messages. Our pre-post training analysis shows significant improvement in knowledge, skills, and abilities

[8] Bean, H., Liu, B. F., Madden, S., Sutton, J., Wood, M. M., & Mileti, D. S. (2016). Disaster warnings in your pocket: How audiences interpret mobile alerts for an unfamiliar hazard. *Journal of Contingencies and Crisis Management*, *24*(3), 136-147.

among emergency managers who completed the training.[9] That training concluded in May 2025 when our contract ended.

I continue to provide training and consultation to jurisdictions across the country and internationally through my small business, The Warn Room.[10]

Consequences of poor messaging

I would like to conclude by briefly describing what can happen when evidence-based practices are not followed. This is centered on concerns about warning fatigue. While we do not know if fatigue is the reason that individuals choose to opt out of alerts and warnings, there is one national study that provides evidence that they are closely related. This study, conducted by the Rand Corporation, followed the nationwide test of the WEA system in 2023 and found that the state with the highest opt-out rates is Texas.[11] It is important to note that each state is currently allowed to set their own standards and rules on how alerts are sent by those that fall within their jurisdiction. As such, even though Texas is the largest state in the contiguous United States, it activates the most AMBER Alerts which are routinely issued statewide.

Two technological fixes have been approved by the FCC to address these issues: first is to allow alerts to be sent without the signature alarm tone; the second is to create a new

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[9] Sutton, J., Olson, M., Walpole, H., Cain, L.B., Stanford, Z., Olivas, S., & Pollock, B.(In Press). Effective Alerts and Warnings: An Assessment of Knowledge, Skills, and Abilities Among Public Safety Communicators. Journal of Emergency Management.

[10] Sutton, J. (2025). *The Warn Room*. https://www.thewarnroom.com

[11] Parker, A.M., Steratore, R., Bradley, M.A., LaForce S., Woods, D., Setodji, C.M., Hassler, G.W., Tierney, D., Villegas, C.A., Cecchine, G. et al. (2024). Assessing Public Reach of the 2023 National Test of the Wireless Emergency Alerts (WEA) System: Results of a National Survey. Homeland Security Operational Analysis Center operated by the RAND Corporation.

Missing and Endangered Person event code (separate from AMBER Alert).[12] This new event code applies only to the Emergency Alert System (EAS), not WEA and the dates when both technological fixes will be fully adopted and applied at the user level are uncertain.

A second study conducted by me and my colleague Dr. Michele Wood, identified and defined the dimensions most relevant to over-alerting and warning fatigue. Practitioners and the public alike define alert relevancy, frequency, and content as the primary antecedents leading to various forms of fatigue, the consequences of which may be opting out of alerts altogether.[13]

These findings are important because every alerting authority who taps into IPAWS is using the same alerting ecosystem – if a poorly constructed message is issued statewide in the middle of the night in one state and people from that state choose to turn off WEA, they will not receive a WEA for an emergency when traveling in another state. In some instances, this can become a matter of life and death.

Recommendations

With this, I would like to propose three recommendations for the future of alerts and warnings in the United States. First, **funding for research to support the design of effective warning systems, including messages, remains vital**. In particular, researchers have yet to develop a deep knowledge of how to better reach and

[12] Federal Communications Commission. (2025). *Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System*. Washington, D.C. Retrieved from https://www.fcc.gov/document/fcc-makes-weas-more-responsive-public-safety-and-consumer-needs

[13] Sutton, J., & Wood, M. M. (2025). Opting Out: Over-Alerting and Warning Fatigue in the Era of Wireless Emergency Alerts. *Journal of Contingencies and Crisis Management*, *33*(3), e70076.

communicate dangers to persons with access and functional needs and language barriers. Furthermore, some sectors, like institutions of higher education, which routinely issue active threat messages to their campuses and systems, have had limited research attention.

Second, **national standards for evidence-based messaging** need to be adopted and implemented into training programs that are required for every person accessing the IPAWS system. With this type of attention, we can ensure the public receives messages that are complete and actionable when seconds and minutes matter.

And third, **third-party emergency notification systems can be required to include prompts within their software** directing alerting authorities to write messages that adhere to evidence-based practices. This guidance, even if it is not followed, will promote practices that elevate the quality of messages, to motivate action and reduce the loss of lives in emergencies and disasters.

Again, thank you for inviting me to speak before this committee, and I welcome your questions.