

RISK COMMUNICATION INVOLVING VULNERABLE POPULATIONS

AN ANNOTATED BIBLIOGRAPHY

Risk Communication Involving Vulnerable Populations: An Annotated Bibliography

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Natural Hazards Center University of Colorado Boulder 1440 15th Street Boulder, CO 80309-0483 <u>hazctr@colorado.edu</u> hazards.colorado.edu

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Overview

This document is intended to be used as a resource bibliography for in-depth reading about risk communication best practices. It summarizes academic research and practical guidance on the topic of hazards and disaster risk communication, with a particular focus on socially vulnerable populations. It is organized around three primary sections, including:

- 1) General Risk Communication Guidance
- 2) Risk Communication and Social Vulnerability
- 3) Risk Communication Across the Disaster Lifecycle

This bibliography identifies widely accepted risk communication principles that apply across the disaster lifecycle; however, the focus on social vulnerability sets it apart from other published resources on the topic of risk communication. It highlights materials that demonstrate how risk communication insights apply to a diverse array of socially vulnerable groups—defined here as those who face disproportionate disaster risk due to a variety of historical, social, economic, and political conditions.

Organization of this Document

The Resource Matrix in the following section lists all entries from the bibliography, organized by author. It also features a single sentence about each entry that describes its implications for risk communication practice. The page numbers link to the full entries. Next, entries in the annotated bibliography provide detail about each resource. The entries include full citations to locate the resource, followed by lists of keywords and "Take-Home Messages." The "Key Findings" synthesize each resource's content into primary conclusions of interest to risk communicators, followed by an abstract. Following the bibliography is an index organized by topics, populations of interest, and phases of the disaster lifecycle.

- Resource Matrix, pages iii-ix
- General Risk Communication Guidance, pages
- Risk Communication and Social Vulnerability
- Risk Communication Across the Disaster Lifecycle
- Index

For additional resources including best practices and academic research relating to this topic, see *Principles of Risk Communication: A Guide to Communicating with Socially Vulnerable Populations Across the Disaster Lifecycle*, a guide that serves as a companion to this document.

Resource Matrix

| Citation | Implications for Practice | Page Number |
|--|--|-------------|
| Bodoque, J. M., A. Díez-Herrero, M. Amerigo, J. A. García, and J. Olcina. 2019. "Enhancing Flash Flood Risk Perception and Awareness of Mitigation actions through Risk Communication: A Pre-Post Survey Design." Journal of Hydrology 568:769–79. | Interactive contests, maps, storytelling, and multimedia presentations may be particularly effective tools for raising awareness and appropriately adjusting flood risk perception. | 43 |
| Brittingham, Rochelle, and Mary Goepfert. 2014. "Access and Functional Needs." In Critical Issues in Disaster Science and Management: A Dialogue Between Researchers and Practitioners, eds. Joseph Trainor and Tony Subbio. Emmitsburg, MD: FEMA Higher Education Project, 110–53. http://udspace.udel.edu/handle/19716/13433 (October 10, 2019). | People with access and functional needs should not be relegated to the ambiguous "special needs" spaces, but rather their particular needs should be addressed alongside the rest of the population. | 17 |
| Brown, Vankita, Stephanie Fauver, Denna Geppi, Aisha Heynes, Kim Klockow, and Danielle Nagele. 2016. "Risk Communication and Behavior: Best Practices and Research Findings." NOAA Social Science Committee. | Risk communication should be considered as a process (as opposed to a product) that requires relationship-building and the use of proven strategies designed to prompt effective action. | 1 |
| Burger, Joanna and Michael Gochfeld. 2019. "Involving Community Members in Preparedness and Resiliency Involves Bi- Directional and Iterative Communication and Actions: A Case Study of Vulnerable Populations in New Jersey Following Superstorm Sandy." Journal of Risk Research 23: 1–16. | Targeted warning information is critical for members of vulnerable communities, including low-income populations and those with language barriers. | 18 |

| Citation | Implications for Practice | Page Number |
|--|---|-------------|
| Campbell, Nnenia. 2018. "Integrating Access and Functional Needs in Community Planning for Natural Hazards." Oxford Research Encyclopedia of Natural Hazard Science. | Emergency management practitioners should seek to interact with and understand individuals with access and functional needs in order to tailor alternative response measures to their variable situations. | 19 |
| Cole, Julie M. and Brenda L. Murphy. 2014. "Rural Hazard Risk Communication and Public Education: Strategic and Tactical Best Practices." International Journal of Disaster Risk Reduction 10:292–304. | Public risk communication plans should seek to address obstacles in rural environments—such as limited road access and communication capabilities—through strategic partnerships in the community. | 20 |
| Donovan, Amy Rosamund, Maud Anais Heloise Borie, and Sophie Elizabeth Blackburn. 2019. "Changing the Paradigm for Risk Communication: Integrating Sciences to Understand Cultures." in Global Assessment Report on Disaster Risk Reduction (GAR2019) (Contributing papers for GAR 2019). United Nations Office for Disaster Risk Reduction (UNDRR). | Risk communication cannot be viewed as an add-on to risk assessment and decision- making: it must be part of the risk assessment process and requires a participatory approach. | 21 |
| Dillon, Robin L., Catherine H. Tinsley, and Matthew Cronin. 2011. "Why Near-Miss Events Can Decrease an Individual's Protective Response to Hurricanes." Risk Analysis: An Official Publication of the Society for Risk Analysis 31(3):440–49. | As near-miss experiences with disasters can lead people to underestimate risks in future events, risk communicators must actively seek to personalize messages to help people reinterpret these experiences. | |

| Citation | Implications for Practice | Page Number |
|--|--|-------------|
| Eisenman, David P., Kristina M. Cordasco, Steve Asch, Joya F. Golden, and Deborah Glik. 2007. "Disaster Planning and Risk Communication with Vulnerable Communities: Lessons from Hurricane Katrina." American Journal of Public Health 97(Suppl 1):S109–15. | Risk communication efforts should consider social implications such as limited access to resources, cognitive reasoning, and sociocultural factors in order to form a more comprehensive plan for vulnerable populations. | 22 |
| Federal Emergency Management Agency. 2005. "Effective Communication." U.S. Department of Homeland Security. | This independent study in risk communication strategies by FEMA is split into eight units, each of which develops a greater understanding of best practices in risk communication through activities, tips, and "knowledge checks" designed to evaluate understanding. | 4 |
| Federal Emergency Management Agency. 2019. "FEMA Flood Risk Communication Toolkit for Community Officials: Social Media Guide." U.S. Department of Homeland Security. | Leveraged thoughtfully, social media can be a powerful force for risk communication. | 5 |
| Food and Agriculture Organization of the United Nations. 2015. "Planning Communication for Agricultural Disaster Risk Management." United Nations, Rome. | Disaster risk management methods can be employed to reduce the overall harm to vulnerable agricultural populations through risk communication that utilizes effective community development strategies. | 2 |

| Citation | Implications for Practice | Page Number |
|---|--|-------------|
| Galarce, Ezequiel M. and K. Viswanath. 2012. "Crisis Communication: An Inequalities Perspective on the 2010 Boston Water Crisis." Disaster Medicine and Public Health Preparedness; Philadelphia 6(4):349–56. | Risk communication messages may fail to be received and acted on if they are not timely, clear, or from a trusted and respected source. | 23 |
| Kiefer, John, Jay Mancini, Betty Morrow, Hugh Gladwin, and Terina Stewart. 2008. Providing Access to Resilience-Enhancing Technologies for Disadvantaged Communities and Vulnerable Populations. Institute for Advanced Biometrics and Social Systems Studies. | Technology can play an important role in building resilience among vulnerable populations, but it must be deployed thoughtfully. Five principles can help in evaluating their potential. | 24 |
| Klaiman, Tamar, Deborah Knorr, Shannon Fitzgerald, Philip DeMara, Chad Thomas, George Heake, and Alice Hausman. 2010. "Locating and Communicating with At-Risk Populations About Emergency Preparedness: The Vulnerable Populations Outreach Model." Disaster Medicine and Public Health Preparedness 4(3):246–51. | Using a vulnerable populations outreach model, risk practitioners can better address the needs and accommodations necessary for particularly vulnerable groups. | 25 |
| Kousky, Carolyn and Leonard Shabman. 2015. Understanding Flood Risk Decisionmaking: Implications for Flood Risk Communication Program Design. SSRN Scholarly Paper. ID 2561374. Rochester, NY: Social Science Research Network. | By understanding the heuristic decision- making processes of individuals, homeowners, and business owners, emergency communication practitioners can tailor their efforts to the most common cognitive processes. | 6 |

| Citation | Implications for Practice | Page Number |
|--|---|-------------|
| Kwan, Crystal and Christine A. Walsh. 2017. "Seniors' Disaster Resilience: A Scoping Review of the Literature." International Journal of Disaster Risk Reduction 25:259–273. | In order to ensure accessibility, it is necessary for risk communicators to consider age-appropriate outreach models and communication channels. | 26 |
| Lee, Hsiang-Chieh and Hongey Chen. 2019. "Implementing the Sendai Framework for Disaster Risk Reduction 2015–2030: Disaster Governance Strategies for Persons with Disabilities in Taiwan." International Journal of Disaster Risk Reduction 41:101284. | The Sendai Framework articulates helpful guidance on the importance of engaging individuals with access and functional needs. | 27 |
| MacIntyre, Elaina, Sanjay Khanna, Anthea Darychuk, Ray Copes, and Brian Schwartz. 2019. "Evidence Synthesis Evaluating Risk Communication during Extreme Weather and Climate Change: A Scoping Review." Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice 39(4):142– 56. | There are three crucial themes to effective risk communication: risk perception, prioritizing vulnerable populations, and community engagement. | 28 |
| MacKinnon, J., N. Heldsinger, and S. Peddle. 2018. A Community Guide for Effective Flood Risk Communication. Waterloo, Ontario: Partners for Action. | The "five Ls" (listen, localize, link, lean, and learn) of flood risk communication may be an effective alternative to the typical, top- down approach to risk communication by increasing community involvement and the dissemination of vital information. | 7 |

| Citation | Implications for Practice | Page Number |
|---|--|-------------|
| Matherly, Deborah and Jane Mobley. 2011. "Transportation and Emergency Management Tool Kit for Communications with Vulnerable Populations: Key Research Findings." Transportation Research Record 2234(1):62–70. | Best practices for risk communications involving vulnerable populations in the context of transportation include: building necessary community relationships; securing and managing information from a transportation perspective; and understanding requirements and desires of other agencies and community-based organizations. | 30 |
| Meredith, Lisa S., Lisa R. Shugarman, Anita Chandra, Stephanie L. Taylor, Stefanie Howard, Ellen Burke Beckjord, Andrew M. Parker, and Terri Tanielian. 2008. Analysis of Risk Communication Strategies and Approaches with At-Risk Populations to Enhance Emergency Preparedness, Response, and Recovery. RAND Corporation. Retrieved November 20, 2019 (https://www.rand.org/pubs/working_papers/WR598.html). | Community participation and involvement strengthens preparedness and response strategies for vulnerable populations, as individuals from those populations can make sure the messages are crafted and shared in a way that is effective for those populations. | 31 |
| Mileti, Dennis and Paul O'Brien. 1992. "Warnings during Disaster: Normalizing Communicated Risk." <i>Social Problems</i> 39(1):40–57. | Perceived risk has a profound impact on public responses to risk information and is a direct function of the warning information received and the personal characteristics of the warning recipient. | 8 |
| Mileti, Dennis S. and John H. Sorensen. 2015. A Guide to Public Alerts and Warnings for Dam and Levee Emergencies. U.S. Army Corps of Engineers. | Certain forms of messages (long texts, short texts, calls, alarms, etc.) are appropriate for different audiences and circumstances when communicating risk in relation to levee and dam breakage. | 9 |

| Citation | Implications for Practice | Page Number |
|---|--|-------------|
| Millet, Barbara, Andrew Carter, Kenneth Broad, Alberto Cairo, Scotney Evans, and Sharanya J. Majumdar. 2019. "Hurricane Risk Communication: Visualization and Behavioral Science Concepts." Weather, Climate, and Society. | Visual models that communicate relevant information tailored to a target audience may help to promote appropriate action in response to hurricane risks; however, communicators must also consider the capacities and constraints faced by message recipients. | 32 |
| Neuhauser, Linda, Susan L. Ivey, Debbie Huang, Alina Engelman, Winston Tseng, Donna Dahrouge, Sidhanta Gurung, and Melissa Kealey. 2013. "Availability and Readability of Emergency Preparedness Materials for Deaf and Hard-of-Hearing and Older Adult Populations: Issues and Assessments." PLOS ONE 8(2):e55614. | Emergency preparedness materials often fail to conform to recommended literacy levels, placing older adults and Deaf or Hard of Hearing populations at a disadvantage. | 33 |
| Novak, Julie, Ashleigh Day, Pradeep Sopory, Lee Wilkins, Donyale Padgett, Stine Eckert, Jane Noyes, Tomas Allen, Nyka Alexander, Marsha Vanderford, and Gaya Gamhewage. 2019. "Engaging Communities in Emergency Risk and Crisis Communication: Mixed-Method Systematic Review and Evidence Synthesis." Journal of International Crisis and Risk Communication Research 2(1). | Community participation in risk communication planning during, before, and after disaster events is essential for effective risk communication strategies involving vulnerable groups. | 34 |
| Parker, Dennis John. 2017. "Flood Warning Systems and Their Performance." Oxford Research Encyclopedia of Natural Hazard Science. | In communicating flood risk, it is important to create pre-event awareness within the community using multimedia education programs and messaging systems. | 10 |

| Citation | Implications for Practice | Page Number |
|--|---|-------------|
| Pennington-Gray, Lori, Kiki Kaplanidou, and Ashley Schroeder. 2013. "Drivers of Social Media Use among African Americans in the Event of a Crisis." Natural Hazards 66(1):77–95. | Tourists and travelers are vulnerable populations in disaster circumstances because they have skewed risk perceptions and little access to information, especially in states with official languages different from their own. | 35 |
| Robinson, Lisa. 2017. Public Communication for Disaster Risk Reduction. New York, New York: United Nations Office for Disaster Risk Reduction. | The United Nations Office for Disaster Risk Reduction (UNISDR) provides a rudimentary framework for how to communicate about risk in pre- and post- event settings. | 11 |
| Seeger, Matthew W. 2006. "Best Practices in Crisis Communication: An Expert Panel Process." Journal of Applied Communication Research 34(3):232–44. | A panel of expert emergency management practitioners identifies 10 best practices for effective crisis communication. | 11 |
| Sheppard, Ben, Melissa Janoske, and Brooke Liu. 2012. "Understanding Risk Theory: A for Emergency Managers and Communicators." Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate. University of Maryland: U.S. Department of Homeland Security. | Inclusion of social risk theories in emergency management best practices may help to supplement the current standard for risk communication and public dissemination. | 46 |
| Shiu-Thornton, Sharyne, Joseph Balabis, Kirsten Senturia, Aracely Tamayo, and Mark Oberle. 2007. "Disaster Preparedness for Limited English Proficient Communities: Medical Interpreters as Cultural Brokers and Gatekeepers." Public Health Reports 122(4):466–71. | A range of community resources can be utilized to facilitate outreach and communication with Limited English Proficient communities, including medical interpreters, ethnic markets/shops, and community-based organizations | 37 |

| Citation | Implications for Practice | Page Number |
|---|---|-------------|
| Siddiqui, Nadia J., Jonathan P. Purtle, and Dennis P. Andrulis. 2011. "Ethnicity and Minority Status Effects on Preparedness." Pp. 176–77 in Encyclopedia of Disaster Relief. Thousand Oaks: SAGE Publications, Inc. | To address the unique challenges that racial and ethnic minorities face in the context of risk communication, emergency planners should actively engage these communities in planning, implementation, and evaluation. | 36 |
| Steelman, Toddi A. and Sarah McCaffrey. 2013. "Best Practices in Risk and Crisis Communication: Implications for Natural Hazards Management." Natural Hazards 65(1):683–705. | Honest and frequent community engagement efforts pre- and post-event are important in maintaining public satisfaction with and participation in risk communication programs. | 12 |
| Teo, Melissa, Ashantha Goonetilleke, Alireza Ahankoob, Kaveh Deilami, and Marion Lawie. 2018. "Disaster Awareness and Information Seeking Behaviour among Residents from Low Socio- Economic Backgrounds." International Journal of Disaster Risk Reduction 31:1121–31. | Individuals of low socioeconomic status often have limited options for receiving warning messages, which can limit their capacity to follow guidance in risk communications. | 39 |
| Teo, Melissa, Ashantha Goonetilleke, Kaveh Deilami, Alireza Ahankoob, and Marion Lawie. 2019. "Engaging Residents from Different Ethnic and Language Backgrounds in Disaster Preparedness." International Journal of Disaster Risk Reduction 39:101245. | Ethnic and language background influence levels of disaster awareness and preparedness, so inclusive risk communication requires consideration of the unique needs of these communities. | 38 |
| Tinker, Timothy and Gerald Galloway. 2008. How Do You Effectively Communicate Flood Risks? Looking to the Future. Booz Allen Hamilton. | Seven practices provide a framework for skillful interpersonal communication between practitioners and the public. | 14 |

| Citation | Implications for Practice | Page Number |
|--|---|-------------|
| Tyler, Jenna, Abdul-Akeem Sadiq, and Douglas S. Noonan. 2019. "A Review of the Community Flood Risk Management Literature in the USA: Lessons for Improving Community Resilience to Floods." Natural Hazards 96(3):1223–48. | Flood management decision-makers need to create plans that consider, build trust with, and are helpful to vulnerable populations across all stages of the disaster lifecycle. | 40 |
| U.S. Army Corps of Engineers Institute for Water Resources. N.D. "Flood Risk Communications Toolbox." | An extensive list of articles, guidebooks, and research on flood risk communication developed by the U.S. Army Corps of Engineers provides practitioners with resources and best practices to communicate effectively with various audiences about flood risk management activities. | 15 |
| Yamada, Fumihiko, Ryuji Kakimoto, Miyuki Yamamoto, Toshio Fujimi, and Naoto Tanaka. 2011. "Implementation of Community Flood Risk Communication in Kumamoto, Japan." Journal of Advanced Transportation 45(2):117–28. | Community-based flood risk communication is assessed through a series of workshops and flood drills based on a theorized four-step cycle named "PDCA": plan, do, check, action. | 16 |
| Yeo, Jungwon, Claire Connolly Knox, and Kyujin Jung. 2018. "Unveiling Cultures in Emergency Response Communication Networks on Social Media: Following the 2016 Louisiana Floods." Quality & Quantity 52(2):519–35. | Emergency responders should consider using real-time social media data to identify influential stakeholders and keywords that can help with understanding the needs of affected communities over time. | 41 |

General Risk Communication Guidance

Brown, Vankita, Stephanie Fauver, Denna Geppi, Aisha Heynes, Kim Klockow, and Danielle Nagele. 2016. "Risk Communication and Behavior: Best Practices and Research Findings." NOAA Social Science Committee.

<u>Keywords</u>

General Risk Communication, Public Health, Flood Risk

Key Findings

- The article lays out seven risk communication best practices, including:
 - Have an Informed Plan
 - Speak to Their Interests, Not Yours
 - Explain the Risk
 - O Offer Options for Reducing Risk
 - Work with Trusted Sources and the Public
 - o Test Messages or Products; Evaluate Performance
 - Use Multiple Ways to Communicate
- Additional information is provided about how to apply these principles to specific hazard conditions, including a range of weather-related and other environmental hazards.

Abstract

Risk communication is a process, not merely a product. To make communities more resilient, messaging strategies for hazardous events must draw on knowledge from the social, behavioral and economic sciences, and especially research on risk communication and behavior. These areas of study explain and predict the ways people receive, share, understand, and respond to information about risk. When weather forecasters or coastal managers encounter situations where their message does not lead to the desired action, they often turn to social scientists to help improve the products they issue. Products such as warnings, watches, etc. are key components of NOAA weather risk communication, and social scientists can offer useful input on product improvement. However, this report focuses on the many actions taken outside of product creation. These actions include the relationships built with community partners, emergency management, and broadcast meteorologists well ahead of a given event or any specific product being issued, and are all part of the risk communication process. Communication strategies for hazardous events must draw on the social sciences to effectively communicate risk.

This report provides guidance on the processes involved in risk communication for those in NOAA who communicate risk, including those responsible for creating policies, programs, or products. Highlighting risk communication best practices in Part IV; this report also provides a discussion of contemporary research topics. This report concludes with a discussion of implementation

Take-Home Message

Risk communication should be understood as a process (as opposed to a product) that requires relationship-building and the use of proven strategies designed to prompt effective action. recommendations that can be used by practitioners at NOAA. This review provides motivation and insights for NOAA staff to come to a deeper understanding of the many things they can do to strengthen the effectiveness and efficiency of their risk communication processes, while also highlighting areas of active research where researchers are working on applied problems that have not yet been solved. This report reviews risk communication and public response research literature within the context of key episodic hazards relevant to NOAA's mission. It covers three weather hazards (tornados/severe winds, floods, and tropical cyclones), findings for general weather, and four other environmental hazards (tsunamis, volcano, wildfire, and fisheriesrelated). These specific hazards were chosen for their relevance to NOAA's mission, priorities, and vision for the future.

Dillon, Robin L., Catherine H. Tinsley, and Matthew Cronin. 2011. "Why Near-Miss Events Can Decrease an Individual's Protective Response to Hurricanes." Risk Analysis: An Official Publication of the Society for Risk Analysis 31(3):440–49.

Keywords

Hurricane. Risk Communication. General Risk Perception

Key Findings

- "Good" (non-damaging) outcomes of disaster can skew risk perception for future disasters.
- People with near miss experience are more likely to choose a risky option than those with no near miss experience.
- Risk communication messaging needs to take into account the personal experience on

Take-Home Message

As near-miss experiences with disasters can lead people to underestimate risks in future events, risk communicators must actively seek to personalize messages to help people reinterpret these experiences.

which recipients are developing their risk perceptions.

• Tailoring messages to communicate risk clearly and encourage people to perceive it accurately is an effective defense against this issue.

Abstract

Prior research shows that when people perceive the risk of some hazardous event to be low, they are unlikely to engage in mitigation activities for the potential hazard. We believe one factor that can lower inappropriately (from a normative perspective) people's perception of the risk of a hazard is information about prior near-miss events. A near-miss occurs when an event (such as a hurricane), which had some nontrivial probability of ending in disaster (loss of life, property damage), does not because good fortune intervenes. People appear to mistake such good fortune as an indicator of resiliency. In our first study, people with nearmiss information were less likely to purchase flood insurance, and this was shown for both participants from the general population and individuals with specific interests in risk and natural disasters. In our second study, we consider a different mitigation decision, that is, to

evacuate from a hurricane, and vary the level of statistical probability of hurricane damage. We still found a strong effect for near-miss information. Our research thus shows how people who have experienced a similar situation but escape damage because of chance will make decisions consistent with a perception that the situation is less risky than those without the past experience. We end by discussing the implications for risk communication.

Food and Agriculture Organization of the United Nations. 2015. "Planning Communication for Agricultural Disaster Risk Management." United Nations, Rome.

<u>Keywords</u>

Agriculture Disasters, General Risk Communication, Rural Populations

Key Findings

- This paper contains a 6-phase plan for developing an effective Communication for Development (ComDev) strategy:
 - Phase 0 Preparation (page 12)
 - Phase 1 Situational Analysis (page 16)
 - Phase 2 Validation of Findings with Stakeholders (page 32)
 - Phase 3 Design of ComDev Strategy and Plan (page 44)

Take-Home Message

Disaster Risk Management methods can be employed to reduce the overall harm to vulnerable agricultural populations through community development in risk communication by utilizing the phases of effective community development strategies laid out in this paper.

- Phase 4 Implementation of Communication Strategies (page 60)
- Phase 5 Monitoring and Final Evaluation (page 68)
- The Annexes after page 72 contain materials such as budget guides, communication checklists, guiding questions, and other useful materials to walk the practitioner through the ComDev process.

Abstract

Planning Communication for Agricultural Disaster Risk Management (ADRM) provides a guide for designing and implementing communication activities in support of ADRM. It focuses primarily on experiences gained in the English Caribbean region that have been also validated elsewhere. This field guide provides a complete overview of the Communication for Development (ComDev) planning in the context of the ADRM process, as well as concrete recommendations for its implementation. It can be used to orient ADRM teams and concerned rural stakeholders on how to go about designing ComDev strategies and plans to support ADRM. It also provides guidance on how to apply ComDev to enhance the overall ADRM participatory planning and result monitoring processes, ensuring multi-stakeholder dialogue and participation.

Federal Emergency Management Agency. 2005. "Effective Communication." U.S. Department of Homeland Security.

<u>Keywords</u>

Technology, General Risk Communication, Emergency Management

Key Findings

- The course is split into eight units designed to aid emergency management professionals in effective communication efforts. These units explore ideas as follows:
 - Unit 1 Offers an overview of the course content.
 - Unit 2 Discusses basic communication skills and styles.

Take-Home Message

This independent study in risk communication strategies by FEMA is split into eight units, each of which develops a greater understanding of best practices in risk communication through activities, tips, and "knowledge checks" designed to evaluate understanding.

- Unit 3 Examines communication during emergency situations.
- Unit 4 Addresses community-specific communication needs and the particular needs, risks, sensitivities, expectations and norms that are relevant to disaster communication.
- Unit 5 Presents both low- and high-technology communication tools and discusses how to choose among them.
- Unit 6 Focuses on effective oral communication, the role of nonverbal cues, and ways to match your message to your audience.
- Unit 7 Discusses how to develop a successful oral presentation.
- Unit 8 Summarizes the course content.
- A final examination of this course is available on FEMA's website in order to receive credit for the course and evaluate comprehension

<u>Abstract</u>

Emergency managers must be skilled communicators. They are required to convey information to a broad audience that includes public and private sector organizations, the media, disaster victims, and co-responders. Even during non-emergency situations, they will need to rely on strong communication skills to coordinate with staff and to promote safety awareness. **Federal Emergency Management Agency.** 2019. "FEMA Flood Risk Communication Toolkit for Community Officials: Social Media Guide." U.S. Department of Homeland Security.

<u>Keywords</u>

Emergency Management, Social Media, Flood Risk

Key Findings

- This article is split into two sections: Social Media Best Practices and Community Management.
- The "Social Media Best Practices" section focuses on establishing a trusted social media presence pre-event and striking the right tone with communication considering six rules:
 - o Be human
 - Be knowledgeable
 - o Be current
 - o Be friendly and open
 - o Be consistent
 - Be accurate and truthful
- The "Community Management" section focuses on how to develop and disseminate multimedia resources for the target audience such as maps, pamphlets, and risk communication messages.

Abstract

The role of a community official includes communicating with a variety of audiences about their risk from natural hazards and steps that can be taken to minimize these risks or their impact. One important tool for this communication is social media platforms. The Federal Emergency Management Agency's (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program provides flood maps and informational tools for communities to better assess their flood risks. The Social Media Guide is one component of the Flood Risk Communication Toolkit for community officials. This Toolkit can help community officials communicate with the public about flood risk during the flood mapping process. The Toolkit also includes ideas and best practices for raising and sustaining awareness of flood risk and other natural hazards outside of a map update.

Take-Home Message

Leveraged thoughtfully, social media can be a powerful force for risk communication.

Kousky, Carolyn and Leonard Shabman. 2015.

"Understanding Flood Risk Decisionmaking: Implications for Flood Risk Communication Program Design." Rochester, NY: Social Science Research Network.

<u>Keywords</u>

Flood Risk, General Risk Communication, Decision Making

Key Findings

 The first part of this paper focuses on developing an understanding of how home and business owners decide on where to locate and how the local

Take-Home Message

By understanding the heuristic decision-making processes of individuals, homeowners, and business owners, emergency communication practitioners can tailor their efforts to the most common cognitive processes.

- owners decide on where to locate and how the local government dictates the parameters of these decisions based on flood risk.
- The next part explores two different systems of decision making. System 1 decision making is based on intuition and mental shortcuts and is generally the system that the public follows in risk scenarios. System 2 decision making, on the other hand, is based on a complex analysis of the situation and is generally used by emergency managers.
- The last part focuses on the heuristics of system 1 decision making and how a better understanding of these mental shortcuts can help practitioners tailor their messages to these common cognitive processes.

<u>Abstract</u>

Floodplain land-use decisions are made by individuals in households, businesses, and local governments. Whatever the venue, the decisions made are the outcome of multiple interacting influences, with one being consideration of flood risk. The goal of a flood risk communication program may be to improve the understanding of flood risk among those making decisions. An alternative goal may be to change the decisions made. Understanding how individuals make decisions and the mental strategies they employ, as well as understanding the larger context of decisionmaking, will contribute to better defining the goals of a flood risk communication program and then designing a program that will secure those goals.

MacKinnon, Jessica, Natalie Heldsinger, and Shawna Peddle. 2018. *A Community Guide for Effective Flood Risk Communication*. Waterloo, Ontario: Partners for Action.

Keywords

Flood Risk, General Risk Communication, Emergency Management

Key Findings

- This paper focuses on community participation as an effective emergency management tool in flood risk communication, emphasized a system called the "five Ls":
 - Listen to those you are communicating with
 - Localize communications for reference
 - Link local challenges to larger goals
 - Lean on communities for personal responsibility
 - o Learn which strategies have been most successful
- The article also describes some tactile tools that can be used in community engagement such as visual stories, face-to-face engagement, social media, geovisual resources, and print materials.
- The article also promotes the use of "social marketing" for emergency management practitioners, which involves working with smaller communities to identify what they want to learn and how they can take responsibility for risk reduction.

<u>Abstract</u>

Flooding is becoming increasingly prevalent in Canada, yet many Canadians are unaware of, and unprepared for, the risks related to this natural disaster. While most Canadians believe that homeowners are responsible for preparing themselves for flooding, few homeowners are aware of their personal flood risk and how they can prepare their homes and families for these events. This vulnerability to flooding among the Canadian public could be lessened by targeted and consistent risk communication. It is common practice to communicate risk using a top-down approach, which assumes that if people are presented with information about their vulnerability, they will act accordingly and adapt to the risk. Research continually shows that this top-down approach is not an effective way to communicate risk to communities. Instead, a bottom-up strategy is needed, which focuses on community needs and capacity, and employs best practices and effective approaches to flood risk communication. It is only by working with empowered communities that we can begin to create a flood prepared Canada.

Take-Home Message

The "five Ls" (listen, localize, link, lean, and learn) of flood risk communication may be an effective alternative to the typical, top-down approach of risk communication by increasing community involvement and the dissemination of vital information. **Mileti, Dennis and Paul O'Brien.** 1992. "Warnings during Disaster: Normalizing Communicated Risk." *Social Problems* 39(1):40–57.

<u>Keywords</u>

General Risk Communication, Risk Perception, Earthquake

Key Findings

• This article sought to understand the risk communication audience's reactions to messages in the aftermath of the Loma Prieta Earthquake.

Take-Home Message

Perceived risk has a profound impact on public responses to risk information and is a direct function of the warning information received and the personal characteristics of the warning recipient.

- The authors identify four main takeaways:
 - 1. The amount of perceived risk has a positive impact for populations responding to communications with protective action,
 - 2. The quality and quantity of warning information had a positive effect on response and risk perception,
 - 3. Pre-disaster communications improves civilian responses, and
 - 4. Certain demographic characteristics may decrease risk perception and the likelihood of warning response.

<u>Abstract</u>

The theory of risk communication was tested with data on public perception of risk and response to after-shock warnings during the post-impact Loma Prieta earthquake emergency. Findings from samples of households in Santa Cruz and San Francisco Counties were consistent, confirm established propositions, and suggest theoretical refinement. It was concluded that the social psychological process which explains post-impact public warning response is not identical to the one which explains public response to pre-impact warnings. The lack of mainshock damage created a "normalization bias" for non-victims. This bias constrained perception of risk to damaging aftershocks and protective response to warnings. **Mileti, Dennis and John H. Sorensen.** 2015. A Guide to Public Alerts and Warnings for Dam and Levee Emergencies. U.S. Army Corps of Engineers.

<u>Keywords</u>

Flood Risk, General Risk Communication, Technology

Key Findings

- In 8 chapters, this handbook presents practitioners with methods to develop strategic emergency messaging systems:
 - Chapter 1 has three main takeaways:
 (1) people's initial belief is "it is not happening to me," (2) people do not automatically act on warnings and (3) information given to the public at the

Take-Home Message

Certain forms of messages (long texts, short texts, calls, alarms, etc.) are appropriate for different audiences and circumstances when communicating risk in relation to levee and dam breakage.

time of the emergency is instrumental in their deciding what to do and how quickly to do it.

- Chapter 2 describes seven steps to follow in order to match the threat to the desired public response
- Chapter 3 explains how to avoid emergency messaging delays by preparing broadcasts before the event.
- Chapter 4 addresses how to accelerate the diffusion of alerts through multiple channels.
- Chapter 5 considers methods for increasing public response to emergency messages.
- Chapter 6 provides a toolkit with various templates and checklists for designing an effective emergency message.
- Chapter 7 describes the efficacy and use of different channels for disseminating emergency messages.
- Chapter 8 ties all of the previous chapters together in providing examples and templates for proper communication styles, channels, and response measures.

<u>Abstract</u>

This guidebook's purpose is to inform emergency management practitioners about the behavior of civilians during a crisis and how to issue effective warning messages for man-made floods such as dam and levee breaches. The guide goes through eight chapters, each of which is designed to walk practitioners through effective warning communication processes. While all of the chapters are instrumental to effective warning design, the most salient may be Chapter 6: "Emergency Messaging Toolkit" on page 15. This section contains intuitive visual aids and templates that show tested and true emergency messaging techniques and how they can be adapted to certain flood-risk situations. For example, this section distinguishes between long messages and short messages for risk communication, with the long messages taking the format of "source, threat,

location, guidance and time, and message expiration time" while the short messages should take the form of "source, guidance and time, threat, and location." These various templates provide risk communication practitioners with the tools to efficiently communicate emergency messages in a timely and effective manner. The guide also contains subject such as: best channels for communicating risk (CH. 7), communication technologies (CH. 4), ways to match risk-level with intended public response (CH. 2), as well as myths about risk communication throughout the entire book, such as the myth that communities will suffer mass panic in response to risk communication efforts. As a general tool, this guidebook would serve as a great resource for rudimentary risk communication guidelines and methodologies in man-made flood scenarios and even beyond its predetermined scope.

Parker, Dennis John. 2017. "Flood Warning Systems and Their Performance." Oxford Research Encyclopedia of Natural Hazard Science.

<u>Keywords</u>

Flood Risk, Technology, Emergency Management, General Risk Communication

Key Findings

- Flood risk communication is most effective when it is specific, accurate, consistent, and clear.
- It is best to avoid overly technical language when sending out warning messages.

Take-Home Message

In communicating flood risk, it is important to create pre-event awareness within the community using multimedia education programs and messaging systems.

Instead, simplify them to what the hazard is and what actions the community should take.
Risk communication should come from one reliable source and be spread through multiple media channels, such as texts, television, and social media.

<u>Abstract</u>

Humankind is becoming increasingly dependent on timely flood warnings. Dependence is being driven by an increasing frequency and intensity of heavy rainfall events, a growing number of disruptive and damaging floods, and rising sea levels associated with climate change. At the same time, the population living in flood-risk areas and the value of urban and rural assets exposed to floods are growing rapidly. Flood warnings are an important means of adapting to growing flood risk and learning to live with it by avoiding damage, loss of life, and injury. Such warnings are increasingly being employed in combination with other flood-risk management measures, including large-scale mobile flood barriers and property-level protection measures. Given that lives may well depend on effective flood warnings and appropriate warning responses, it is crucial that the warnings perform satisfactorily, particularly by being accurate, reliable, and timely. A sufficiently long warning lead time to allow precautions to be taken and property and people to be moved out of harm's way is particularly important. However, flood warnings are heavily

dependent on the other components of flood forecasting, warning, and response systems of which they are a central part. These other components—flood detection, flood forecasting, warning communication, and warning response—form a system that is characterized as a chain, each link of which depends on the other links for effective outcomes. Inherent weaknesses exist in chainlike processes and are often the basis of warning underperformance when it occurs.

Robinson, Lisa. 2017. *Public Communication for Disaster Risk Reduction*. New York, New York: United Nations Office for Disaster Risk Reduction. Retrieved October 5, 2019 (<u>https://www.iwr.usace.army.mil/Portals/70/docs/risk/Flood_Risk_Communications_To</u>olbox.pdf#page=4?ver=2018-07-03-195151-883).

<u>Keywords</u>

Technology, General Risk Communication

Key Findings

- Make risk communication "clear, relevant, engaging, and practical" by taking complex technical issues and making them simple and relatable to the target audience.
- Risk communicators should engage in conversations with their audience and respond to input from the general public.

Take-Home Message

This concise guide by the United Nations Office for Disaster Risk Reduction (UNISDR) provides a rudimentary framework on how to communicate about risk in pre and post-event settings.

- Building relationships among professionals from media, science, government, the private sector, and civil society can result in more effective communication.
- The practical questions section includes questions for the practitioner to ask themselves, such as: "What capacity exists to communicate about risk in a truly engaging way that appeals to target audiences?"

<u>Abstract</u>

Advances in technology have improved scientific risk information dramatically in recent years. Yet this valuable information can too easily go to waste if it's not effectively communicated to people who need it to make decisions. Effective communication helps technical experts develop and share data, it enables professional users to understand the data, and it influences how ordinary people take actions to reduce risk in their everyday lives. Communication is a process and should be considered throughout every stage of risk assessments. This section focuses on communication with the general public. It provides guidance on how government officials and other professionals can communicate with general audiences to reduce the risk of disasters.

Seeger, Matthew W. 2006. "Best Practices in Crisis Communication: An Expert Panel Process." *Journal of Applied Communication Research* 34(3):232–44.

<u>Keywords</u>

General Risk Communication

Key Findings

- The 10 best practices described in this article are:
 - Process approaches and policy development
 - Pre-event planning
 - Partnerships with the public
 - Listen to the public's concern and understand the audience
 - Honesty, candor, and openness
 - Collaborate and coordinate with credible sources
 - Meet the needs of the media and remain accessible
 - o Communicate with concern, compassion, and empathy
 - Accept uncertainty and ambiguity
 - Messages of self-efficacy

<u>Abstract</u>

The description of "best practices" is widely used to improve organizational and professional practice. This analysis describes best practices in crisis communication as a form of grounded theoretical approach for improving the effectiveness of crisis communication specifically within the context of large publicly-managed crises. The results of a panel of crisis communication experts are reviewed. Ten best practices for effective crisis communication, which were synthesized from this process, are presented and described.

Steelman, Toddi and Sarah McCaffrey. 2013. "Best Practices in Risk and Crisis Communication: Implications for Natural Hazards Management." *Natural Hazards* 65(1):683–705.

<u>Keywords</u>

Wildfire Risk, General Risk Communication, Technology, Emergency Management

Key Findings

- Through the analysis of three fire events, researchers determined 5 best practices for emergency management practitioners:
 - Engage in interactive processes or dialogue to understand risk perspectives and how they might be addressed

Take-Home Message

This analysis describes 10 best practices for effective crisis communication decided on by a panel of expert emergency management practitioners.

- Strive to understand the social context so that messages and content can fit the appropriate circumstances
- Provide honest, timely, accurate, and reliable information
- Work with credible sources that have local legitimacy
- Communicate before and during crises to leverage existing relationships

Take-Home Message

Honest and frequent community engagement efforts pre- and post-event are important in maintaining public satisfaction with and participation in risk communication programs.

• Members of communities where these best practices were implemented reported being more satisfied with emergency communications and more prepared to take action in the face of the hazard.

Abstract

As societies evolve, often the most appropriate response to the hazard must also evolve. However, such shifts in appropriate response to a hazard, whether at the individual or at the societal level, are rarely straightforward: Closing the gap between desired practice and current practice requires effective communication. Although there is a significant literature on how to encourage adaptation before an event and how to communicate during an event, there is less work tying the two together or on how to communicate shifts in larger scale societal response to a natural hazard. In this article, we bring together the best practices and theoretical literature from risk communication and crisis communication and empirical literature on wildfire communication to derive the key characteristics associated with best communication practices. We then use this framework on three case studies of wildfires in California, Montana, and Wyoming, each of which used a different strategy for managing the fire, to understand whether approaching communication more holistically can lead to more desired natural hazard management outcomes. Our working hypothesis was as follows: effective communication before and during a fire would be associated with acceptance of more flexible fire management strategies. The findings indicate how a type of desired management change (more flexible fire management) is associated with more effective communication practices before and during the event.

Tinker, Timothy and Gerald Galloway. 2008. How Do You Effectively Communicate Flood Risks? Looking to the Future. Booz Allen Hamilton.

<u>Keywords</u>

General Risk Communication, Flood Risk

Key Findings

 Use multiple forms of communication to deliver risk messages so that various members of the population are more likely to respond with decisive action.

Take-Home Message

These seven practices provide a framework for skillful interpersonal communication between practitioners and the public.

- Understand how stress can negatively impact risk perception and decision making practices, which can possibly hinder communication efforts.
- Understand the influence of public perception and values in disaster scenarios in order to more effectively determine risk.
- Recognize and address the public's fear and anger responses in risk scenarios and to empathize with these emotional reactions.
- Acknowledge and address uncertainty in risk predictions and to openly communicate this uncertainty with the public in order to cultivate trust.
- Explain complex and technical information at a language level that can be broadly understood.
- Anticipate, prepare, and practice for media interaction by rehearsing predicted questions and the information the practitioner wishes to relay to the public.

<u>Abstract</u>

In dealing with a public and policymakers who often demand absolute answers, explaining and getting them to act on risk messages is probably the biggest challenge facing flood risk management professionals today. Conflicting messages, controversial and emotionally charged issues, and disagreement on the extent of the risk and how to assess it present key communications challenges. This thought paper is designed to open a dialogue on the topic and share our ideas as to how we might collectively better understand the basic principles of risk communication and use these principles to improve the communication of risk to the audiences we serve before, during, and after a flood.

Before Hurricane Katrina struck, why did most New Orleans residents not understand the risk they faced and not do something about it? Why do those same people not see the risks they still face? Why does the public clamor to move into new developments in California that will be under

20 feet of water when the adjacent levees fail or are overtopped? Issues of flood risk mitigation and protection have become front-burner issues for some decision-makers and media, but do not seem to be on the minds of the flood-prone public nationwide. Recent studies and headlines questioned the safety of the nation's levees and identified the thousands of lives and billions of dollars of property value at stake, but were largely treated in a ho-hum fashion by the public. This speaks to the need for better understanding how a risk communication strategy and skills can positively influence the perceptions, decisions, and actions of the public and policy makers and get them to move to action.

While we, as flood management professionals, understand our technical and operational role in managing flood hazards, most of us still struggle with our risk communication capabilities. As a result, we might be leaving key audiences in a precarious environment when better understanding of this communication effort could prevent ineffective and potentially damaging media and public responses. Simply put, poor communication can jeopardize the trust we have established and the credibility we need with decision-makers, the media, and the public we serve.

USACE Institute for Water Resources. <u>N.D. Flood Risk Communications Toolbox</u>. Washington, D.C.: USACE.

<u>Keywords</u>

General Risk Communication, Flood Risk

Key Findings

- Extensive list of articles, guidebooks, and research on flood warnings by the U.S. Army Corps of Engineers.
- The first section provides a list of links to guidance on USACE policies, methods developed by the Corps, methods developed by external organizations, and academic research articles on risk communication.

Take-Home Message

An extensive list of articles, guidebooks, and research on flood risk communication developed by the U.S. Army Corps of Engineers to provide practitioners with resources and best practices to communicate effectively with various audiences about flood risk management activities

- The second section provides resources and materials such as pamphlets, handouts, and presentations to communicate and educate the public.
- The third section includes links to multiple academic research articles on the efficacy of risk communication methods using qualitative and quantitative data.

Abstract

This toolbox provides resources that can help USACE District personnel effectively communicate with their sponsors, stakeholders, and the public about flood risk and flood risk management projects. It features information about the principles and best practices of risk communication, as well as materials that can be distributed directly to the public. The Toolbox provides

information that will be helpful to a wide range of District staff, including Planners, Silver Jackets Coordinators, Project Managers, Public Affairs Officers, Levee and Dam Safety Officers and Program Managers, and others.

Yamada, Fumihiko, Ryuji Kakimoto, Miyuki Yamamoto, Toshio Fujimi, and Naoto Tanaka. 2011. "Implementation of Community Flood Risk Communication in Kumamoto, Japan." *Journal of Advanced Transportation* 45(2):117–28.

<u>Keywords</u>

Flood Risk, General Risk Communication

Key Findings

 Assesses community-based flood risk communication through a series of workshops and flood drills based on a theorized 4-step cycle named "PDCA": plan, do, check, action.

Take-Home Message

This research paper assesses community-based flood risk communication through a series of workshops and flood drills based on a theorized 4-step cycle named "PDCA": plan, do, check, action.

- The "plan" phase involves planning evacuation routes and disaster prevention countermeasures.
- The "do" phase initiates the "plan."
- The "check" phase is based on assessing the efficacy of the evacuation routes and countermeasure.
- The "action" phase presents the results from the "check" phase to the public and the proper authorities for constructive feedback.
- Community-based flood risk communication is effective in enhancing risk perception and collective knowledge.

<u>Abstract</u>

To enhance local flood disaster mitigation, participatory approaches for community-based flood risk communication are proposed using the workshops based on a Plan-Do-Check-Action (PDCA) cycle. In our case study, risk communication for floods due to heavy rain and river flooding was implemented at the Kosen community in Kumamoto City, Japan, during 2006–2007. A community-based flood hazard and evacuation route map were produced during the workshops and verified through virtual desktop evacuation drills. The fundamental resident flood evacuation data was obtained through the evacuation drills and analyzed with respect to the timing of the announcement of evacuation information, walking speed during evacuation, and the locations of evacuation centers. Implementation of flood risk communication was found to be effective for the enhancement of residents' awareness of both self- and mutual-help efforts in community-based flood risk mitigation.

Risk Communication and Social Vulnerability

Brittingham, Rochelle, and Mary Goepfert. 2014. "Access and Functional Needs." In *Critical Issues in Disaster Science and Management: A Dialogue Between Researchers and Practitioners*, eds. Joseph Trainor and Tony Subbio. Emmitsburg, MD: FEMA Higher Education Project, 110–53. <u>http://udspace.udel.edu/handle/19716/13433</u> (October 10, 2019).

<u>Keywords</u>

Access and Functional Needs

Key Findings

 Access and functional needs (AFN) are not limited to individuals with what are typically defined as disabilities; rather this term can apply to every individual in a community to varying degrees.

Take-Home Message

People with access and functional needs should not be relegated to the ambiguous "special needs" spaces, but rather their particular needs should be addressed alongside the rest of the population.

- Inadequate evacuation and shelter assistance often increase disaster risk among Individuals with AFN.
- Agencies should not relegate persons with AFN to "special needs" spaces, but rather accommodate their particular needs alongside the rest of the population.

Abstract

Access and functional needs (AFN) are increasingly emphasized in disaster policy and practices. People with AFN have legal and moral rights to services, but have historically been underserved or omitted with regard to disaster-related activity. A recent change in disaster policies and planning moves from a focus on groups with "special needs" to an "access and functional needs" approach focused on fulfilling functional needs. Any member of a community may have AFN, as AFN are not limited to specific groups. Indeed, disasters may increase the number of people who have AFN. In this chapter to investigate issues surrounding AFN, a researcher and a practitioner discuss the state of research and practice, respectively, and explore areas of agreement, conflict, and tension. **Burger, Joanna and Michael Gochfeld.** 2019. "Involving Community Members in Preparedness and Resiliency Involves Bi-Directional and Iterative Communication and Actions: A Case Study of Vulnerable Populations in New Jersey Following Superstorm Sandy." *Journal of Risk Research* 23:1–16.

<u>Keywords</u>

Resilience, Hurricane, General Risk Communication, Low-Income Populations, Disaster Preparedness, Linguistic Minorities

Key Findings

 This study recorded survey results from members of vulnerable populations affected by Hurricane Sandy 100 days after the storm and again about three years later.

Take-Home Message

Targeted warning information is critical for members of vulnerable communities, including low-income populations and those with language barriers.

• Targeted warning information is critical for members of vulnerable communities, including low-income populations and those with language barriers.

Abstract

Recent increases in hurricanes and other weather events have brought to light the importance of understanding what people think should be done to improve recovery and resiliency in their communities. While most studies focus only on perceptions of concerns, effects, medical issues and personal preparedness, herein subjects in New Jersey were interviewed to determine future actions they intend to follow, the actions they think agencies or others should be taking, and present a conceptual model for involvement of vulnerable community members in their own protection for future catastrophic events. The emphasis was on government and community actions. It is a bottom-up approach rather than a top-down approach to reduction of future risk. The case study involved subjects interviewed immediately following Sandy (general affected public; N = 756) and 2–3 years after Sandy (vulnerable population, N = 586). Concerns of subjects within 100 days related to friends, family, safety and survival, food and water and medical concerns as well as recovery, repairs on their property, and community safety. Two to three years later, subjects remembered being significantly more concerned about family, friends, safety and survival, food and water and medical concerns than subjects interviewed within 100 days. Memories (or concern) also faded with respect to future preparedness; significantly more subjects interviewed 2–3 years after Sandy were going to do nothing, were less concerned about protecting family, community, and possessions than subjects interviewed within 100 days of Sandy. In contrast, the same percentage were going to evacuate and buy supplies, so it is not just a matter of forgetting the whole event. The data from open-ended questions indicated that subjects believed that recovery and preparation for a future severe storm event involved complicated and iterative activities of many different individuals, organizations, and governmental agencies. Thus we present an iterative, interactive model, and provide examples of how subjects viewed the interactions necessary to provide resiliency to their communities. We

discuss the value-added of a bottoms-up approach to understanding risk reduction, preparedness and resiliency.

Campbell, Nnenia. 2018. "Integrating Access and Functional Needs in Community Planning for Natural Hazards." *Oxford Research Encyclopedia of Natural Hazard Science*.

<u>Keywords</u>

Access and Functional Needs, Social Vulnerability, General Risk Communication, Disaster Preparedness

Key Findings

- The actions recommended in risk communication may be difficult or impossible for those with access and functional needs to follow.
- Planners should provide alternate instructions for those that may have limitations that make traditional guidance infeasible.

Take-Home Message

Emergency management practitioners should seek to interact and understand individuals with access and functional needs in order to tailor alternative response measures to their variable situations.

- Institutions involved in disaster planning must be cognizant of places and individuals that are at higher risk, such as retirement homes and older adults.
- Interaction and understanding are keys to more effective disaster preparedness for individuals with AFN.

<u>Abstract</u>

Populations that are rendered socially invisible by their relegation to realms that are excluded either physically or experientially—from the rest of society tend to similarly be left out of community disaster planning, often with dire consequences. Older adults, persons with disabilities, linguistic minorities, and other socially marginalized groups face amplified risks that translate into disproportionately negative outcomes when disasters strike. Moreover, these disparities are often reproduced in the aftermath of disasters, further reinforcing preexisting inequities. Even well-intentioned approaches to disaster service delivery have historically homogenized and segregated distinct populations under the generic moniker of "special needs," thereby undermining their own effectiveness at serving those in need.

The access and functional needs perspective has been promoted within the emergency management field as a practical and inclusive means of accommodating a range of functional capacities in disaster planning. This framework calls for operationalizing needs into specific mechanisms of functional support that can be applied at each stage of the disaster lifecycle. Additionally, experts have emphasized the need to engage advocacy groups, organizations that routinely serve socially marginalized populations, and persons with activity limitations

themselves to identify support needs. Incorporating these diverse entities into the planning process can help to build stronger, more resilient communities.

Cole, Julie M. and Brenda L. Murphy. 2014. "Rural Hazard Risk Communication and Public Education: Strategic and Tactical Best Practices." *International Journal of Disaster Risk Reduction* 10:292–304.

<u>Keywords</u>

Rural Populations, General Risk Communication

Key Findings

- Unique challenges such as low population density necessitate specific risk communication plans for rural populations.
- Economic challenges preclude robust governments and tax-funded systems and resources are limited.

Take-Home Message

Public risk communication plans should seek to address obstacles in rural environments - such as limited road access and communication capabilities through strategic partnerships in the community.

- Individuals in rural environments face challenges such as limited road access and lack of communication with the local municipality. Public risk communication plans do not acknowledge such challenges.
- Public education and the creation of partnerships can help build capacity and reduce these burdens.

<u>Abstract</u>

This study examines the public education practices of emergency management practitioners in small communities in rural Northern Ontario. The strengths and challenges associated with those practices are investigated in order to develop effective strategic and tactical best practice recommendations for public hazard risk communication and disaster risk reduction (DRR) education. Municipalities involved in this research were selected according to geographic location (Northern Ontario) and population size (<10,000 residents). The findings reveal that the most significant challenges are associated with role sharing and include a lack of resources, both human and financial, and correlated time management pressures while the strengths include strong community cohesion and an embedded culture of emergency preparedness. The paper concludes by recommending the following best practices: 1) build on existing strengths in rural communities to increase DRR, 2) mimic the fire prevention education strategy, 3) use available media venues to their maximum potential, 4) develop targeted DRR public education through collaborative partnerships, 5) create partnerships with local organizations to assist in DRR public education responsibilities in a way that minimizes the impact of role sharing, 7) adjust legislation and the

role of provincial/state level emergency management agencies to accommodate the needs of rural communities.

Donovan, Amy Rosamund, Maud Anais Heloise Borie, and Sophie Elizabeth Blackburn. 2019. "Changing the Paradigm for Risk Communication: Integrating Sciences to Understand Cultures." in *Global Assessment Report on Disaster Risk Reduction (GAR2019) (Contributing papers for GAR 2019)*. United Nations Office for Disaster Risk Reduction (UNDRR).

<u>Keywords</u>

Emergency Management, Decision Making, General Risk Communication

Take-Home Message

Risk communication cannot be viewed as an add-on to risk assessment and decision-making: it is formulated within the risk assessment process and requires a participatory process.

Key Findings

- Risk communication cannot be viewed as an add-on to risk assessment and decisionmaking: it is formulated within the risk assessment process, and that process must itself be reflexive.
- The involvement of diverse perspectives improves risk communication strategies and their integration.
- The Sendai Framework for Disaster Risk Reduction provides guidance on these considerations.

Abstract

This paper uses case studies from around the world to examine the integration of social and physical sciences in service of risk communication. It argues for a holistic view of risk from assessment to communication, suggesting that post-normal science as applied in risk assessment works best when both physical and social sciences are involved throughout. The involvement of social sciences in risk assessment can significantly improve the communication of risk both to stakeholders and to wider communities. This is in part because science itself has cultures and it approaches risk in different ways according to those cultures: some scientists prefer deterministic approaches and others argue for probabilistic ones, for example. These scientific debates have implications for risk communication. The paper considers case studies from the Caribbean, Latin America, East Asia, India and others to propose a framework for the provision of expert advice to governments and the subsequent communication of risk to populations. It also considers cultural aspects that differ between regions, as communication of risk may be diverse even in neighbouring countries affected by the same hazard event but who assess and respond to risk differently. Complex and systemic risks, such as those considered by the Sendai Framework, require consideration of the effect of international borders on public receipt of risk messages: risk communication is not one-size-fits-all. Furthermore, research has shown that risk

perception is not clearly linked to people taking action (the "risk perception paradox"). Empowering or motivating people to act is thus also a function of the risk communication process, and greater attention is needed to the cross-scale social, political and institutional factors that support or inhibit the relative agency of risk management stakeholders (including the public) to respond to known risks and the relative prioritisation of one risk over another. Thus, the paper argues for a paradigm shift away from the old model of risk communication as a bolt-on to risk assessment and decision-making, towards an integrated and holistic approach to risk communication.

Eisenman, David P., Kristina M. Cordasco, Steve Asch, Joya F. Golden, and Deborah Glik. 2007. "Disaster Planning and Risk Communication With Vulnerable Communities: Lessons From Hurricane Katrina." *American Journal of Public Health* 97(Suppl 1):S109– 15.

<u>Keywords</u>

Hurricane, Low-Income Populations, Racial/Ethnic Minorities, General Risk Communication, Social Vulnerability

Key Findings

- This study explores the factors that shaped evacuation behavior that should be considered by risk communicators.
- Limited access to resources (e.g., monetary, transportation); cognitive reasoning (e.g.,

Take-Home Message

Risk communication efforts should consider social implications such as limited access to resources, cognitive reasoning, and sociocultural factors in order to form a more comprehensive plan for vulnerable populations.

evacuation message receipt and interpretation); and sociocultural factors (e.g., beliefs and attitudes), were particularly important within the study population.

• Practitioners must take into account the complex social vulnerabilities and circumstances that shape evacuation behavior.

<u>Abstract</u>

Objectives. We studied the experience of Hurricane Katrina evacuees to better understand factors influencing evacuation decisions in impoverished, mainly minority communities that were most severely affected by the disaster.

Methods. We performed qualitative interviews with 58 randomly selected evacuees living in Houston's major evacuation centers from September 9 to 12, 2005. Transcripts were content analyzed using grounded theory methodology.

Results. Participants were mainly African American, had low incomes, and were from New Orleans. Participants' strong ties to extended family, friends, and community groups influenced other factors affecting evacuation, including transportation, access to shelter, and perception of

evacuation messages. These social connections cut both ways, which facilitated and hindered evacuation decisions.

Conclusions. Effective disaster plans must account for the specific obstacles encountered by vulnerable racial and ethnic minority communities. Removing the more apparent obstacles of shelter and transportation will likely be insufficient for improving disaster plans for impoverished, minority communities. The important influence of extended families and social networks demand better community-based communication and preparation strategies.

Galarce, Ezequiel M. and K. Viswanath. 2012. "Crisis Communication: An Inequalities Perspective on the 2010 Boston Water Crisis." *Disaster Medicine and Public Health Preparedness; Philadelphia* 6(4):349–56.

<u>Keywords</u>

Public Health, General Risk Communication, Risk Perception

Key Findings

 Studies conducted after a boil water advisory showed that many people continued to drink tap water despite the message (e.g., risk communication) directing them otherwise. This article examines five outcomes of crisis communication to explain these outcomes:

Take-Home Message

Risk communication messages may fail to be received and acted on if they are not timely, clear, or from a trusted and respected source.

- Behavioral compliance—it is essential that the messages sent are clear and actionable, to get through.
- Information sources—If recipients do not trust the source of these disaster messages, it is less likely that they will follow them.
- Information sources—Messages can get twisted or changed depending on the source.
 Tailoring messages in which the meaning is hard to convolute is one solution.
- Timeliness— how much time after receiving the message that individuals have to respond to the disaster.
- Information sharing behavior—how communities spread information, which is the hardest of the elements to control.

<u>Abstract</u>

Objective: Although the field of crisis risk communication has generated substantial research, the interaction between social determinants, communication processes, and behavioral compliance has been less well studied. With the goal of better understanding these interactions, this report examines how social determinants influenced communications and behavioral compliance during the 2010 Boston, Massachusetts, water crisis.

Methods: An online survey was conducted to assess Boston residents' knowledge, beliefs, attitudes, mass and interpersonal communication, and preventive behaviors on emergency preparedness topics dealing with the water crisis. Of a total sample of 726 respondents, approximately one-third (n = 267) reported having been affected by the water crisis. Only data from affected participants were analyzed.

Results: Following an order to boil water, 87.5% of respondents refrained from drinking unboiled tap water. These behaviors and other cognitive and attitudinal factors, however, were not uniform across population subgroups. All communication and behavioral compliance variables varied across sociodemographic factors.

Conclusions: Crisis communication, in conjunction with other public health preparedness fields, is central to reducing the negative impact of sudden hazards. Emergency scenarios such as the Boston water crisis serve as unique opportunities to understand how effectively crisis messages are conveyed to and received by different segments of the population.

Kiefer, John, Jay Mancini, Betty Morrow, Hugh Gladwin, and Terina Stewart. 2008. *Providing Access to Resilience-Enhancing Technologies for Disadvantaged Communities and Vulnerable Populations*. Institute for Advanced Biometircs and Social Systems Studies.

Keywords

Resilience, Technology, Social Vulnerability, General Risk Communication

Key Findings

 As community leaders, emergency managers, and government officials select appropriate technologies for communicating with vulnerable populations and increasing their disaster resiliency, a few broad principles can be used to enhance the overall effectiveness of technology as a means for building resilience:

Take-Home Message

Technology can play an important role in building resilience among vulnerable populations, but it must be deployed thoughtfully. Five principles can help in evaluating their potential.

- know your community's vulnerable populations;
- transmit clear and concise messages repeatedly;
- o deliver messages via multiple information channels and modes of communication;
- o project computer technology access into disadvantaged communities;
- mobilize community networks;
- o understand exploit, and use technology to enable the "power" of a community;
- tailor technology application to facilitate collaborations that are broad-based and targeted;

o develop ongoing and proactive sustainability mechanisms.

<u>Abstract</u>

A considerable amount of research has uncovered ways that make communities more resilient to a disaster's effects, including recent studies that focus on the ever-evolving world of technology as a means to enhance resilience. However, little research has specifically examined technology application within the more vulnerable elements of a community. In this regard, it is critical for communities to recognize the role that social networks play in developing community capacity, which in turn can reduce the vulnerability of those members of the population at greatest risk. Emergency managers, community planners and leaders, and others involved in a community's disaster mitigation, preparedness, response, and recovery efforts can significantly enhance community resilience through an understanding of the interplay among social networks, community capacity, and technology, including the roles they play in the framework of a community. This research effort provides a foundation for thought, discussion, and action relating to how emergency managers, community planners, and organizational leaders might enable technology as a vehicle to ensure that no segment of the community is left out as they prepare for, respond to, or recover from a natural or manmade catastrophe. It is critical to have positive emergency management policies and practices in place long before a disaster strikes. These broad recommendations can be considered by the leaders of any community.

Klaiman, Tamar, Deborah Knorr, Shannon Fitzgerald, Philip DeMara, Chad Thomas, George Heake, and Alice Hausman. 2010. "Locating and Communicating with At-Risk Populations About Emergency Preparedness: The Vulnerable Populations Outreach Model." *Disaster Medicine and Public Health Preparedness* 4(3):246–51.

<u>Keywords</u>

Social Vulnerability, General Risk Communication

Key Findings

- Emergency response systems often fail to reach persons who are homeless, disabled, or barred by language.
- The paper explores Philadelphia's plan for including vulnerable populations in disaster preparedness that links the government and vulnerable populations through partnerships

Take-Home Message

Using the vulnerable populations outreach model contained in this paper, risk practitioners can better address the needs and accommodations necessary for particularly vulnerable groups.

with community-based organizations that bridge the gap between the government and community.

• The vulnerable populations outreach model requires a circular process of developing sustainable partnerships; creating appropriate and tailored messages; disseminating messages; and evaluating the model and disseminating best practices.

<u>Abstract</u>

Vulnerable populations tend to have the worst health outcomes during and after disasters; however, these populations are rarely included in the emergency planning process. In Philadelphia, the Department of Public Health and the Office of Emergency Management have reached out to community-based organizations that serve vulnerable populations to include these key stakeholders in emergency planning. In this article, we outline strategies for locating, engaging, and communicating with vulnerable populations about both organizational and personal emergency preparedness. Such strategies include creating a method for bidirectional communication via a free quarterly health newsletter that is distributed to community-based organizations. We also note successes and next steps from engaging vulnerable populations in the planning process in Philadelphia.

Kwan, Crystal and Christine A. Walsh. 2017. "Seniors' Disaster Resilience: A Scoping Review of the Literature." *International Journal of Disaster Risk Reduction* 25:259–73.

<u>Keywords</u>

Older Adults, Resilience, Social Media

Key Findings

 Recent shifts toward more "efficient" communication methods such as social media and online engagement may lead to greater feelings of isolation. Take-Home Message

In order to ensure accessibility, it is necessary for risk communicators to consider age-appropriate outreach models and communication channels.

• There is a need for greater consideration of ageappropriate outreach methods and communication channels among risk communicators.

Abstract

In 2000, for the first time in human history, the global number of older adults surpassed the number of children. Globally, the older adult population will continue to grow at unprecedented rates. The number of older adults is projected to increase to 1.5 billion by 2050. These changes have significant social and economic implications, and for future disaster risk reduction practice and policy. The purpose of this paper is to use coping review methodology to identify the evidence-based knowledge on the main drivers of seniors' resilience throughout the disaster management cycle: i) mitigation, ii) preparedness, iii) response, and iv) recovery. The review highlights six points of discussion that may help to guide future disaster management research, policy, and practice. Overall a stronger research agenda on seniors' disaster resilience is necessary, without such evidence seniors may continue to experience disproportionate disaster outcomes.

Lee, Hsiang-Chieh and Hongey Chen. 2019. "Implementing the Sendai Framework for Disaster Risk Reduction 2015–2030: Disaster Governance Strategies for Persons with Disabilities in Taiwan." *International Journal of Disaster Risk Reduction* 41:101284.

<u>Keywords</u>

General Risk Communication, Access and Functional Needs, Emergency Management

Key Findings

 The Sendai Framework advises that vulnerable populations and the organizations that represent them are critical to the creation and implementation of plans that work for them.

Take-Home Message

The Sendai Framework articulates helpful guidance on the importance of engaging individuals with access and functional needs.

- Universal design helps to ensure that objects and spaces designed to be accessible to everyone by default.
- A permanent platform for risk communication that includes representatives with access and functional needs improves equity and accessibility.

<u>Abstract</u>

This study examined how to effectively implement the Sendai Framework for Disaster Risk Reduction 2015–2030 by inspecting disaster governance strategies for persons with disabilities in Taiwan. We identified priorities of the Sendai Framework that especially mention persons with disabilities or related stakeholders, including Priorities 24(a), 24(g), 24(h), 27(g), 27(h), 30(j), 30(k), 33(b), and 33(i). A set of questions was designed according to these priorities and distributed to all central ministries, agencies, and local governments related to disaster governance in Taiwan. The results showed that strategies currently cover the issues of evacuation, shelter operation, facility operation for persons with disabilities, electricity backup during emergency, strategies for schools, and disaster recovery and reconstruction. We found that the present disaster governance strategies for persons with disabilities in Taiwan are focused on the preparedness and emergency response phases, and most strategies utilize a top-down approach. Based on these findings, we suggest the development of more strategies for the recovery and reconstruction phases and the incorporation of bottom-up mechanisms such as stakeholder participation, dialogue and cooperation, coordination forums, empowerment, and consultation with stakeholders, as discussed in Priorities 24(h), 27(g), 30(j), and 33(i) of the Sendai Framework.

MacIntyre, Elaina, Sanjay Khanna, Anthea Darychuk, Ray Copes, and Brian Schwartz.

2019. "Evidence Synthesis Evaluating Risk Communication during Extreme Weather and Climate Change: A Scoping Review." *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* 39(4):142–56.

Keywords

Climate Change, Social Vulnerability, General Risk Communication

Key Findings

- There are three crucial themes to effective risk communication:
 - o Risk perception
 - Targeting vulnerable populations
 - Community engagement.

Take-Home Message

There are three crucial themes to effective risk communication: risk perception, targeting vulnerable populations, and community engagement.

- Effective communication is taking place through the use of apps, social media, and community-sourced-communication tools to reach a diverse group of stakeholders.
- Members and representatives of vulnerable populations need opportunities to provide input about their disaster assistance needs.
- Effective risk communication requires shaping the way that risks are perceived.

<u>Abstract</u>

Introduction: Communicating risk to the public continues to be a challenge for public health practitioners working in the area of climate change. We conducted a scoping literature review on the evaluation of risk communication for extreme weather and climate change to inform local public health messaging, consistent with requirements under the Ontario Public Health Standards (OPHS), which were updated in 2018 to include effective communication regarding climate change and extreme weather.

Methods: Search strategies were developed by library information specialists and used to retrieve peer-reviewed academic and grey literature from bibliographic databases (Medline, Embase, Scopus and CINAHL) and Google country specific searches, respectively. The search strategy was validated through a workshop with experts and community stakeholders, with expertise in environment, health, emergency management and risk communication.

Results: A total of 43 articles were included. These articles addressed issues such as: climate change (n = 22), flooding (n = 12), hurricane events (n = 5), extreme heat (n = 2), and wild fires (n = 2). Studies were predominantly from the US (n = 14), Europe (n = 6) and Canada (n = 5).

Conclusion: To meet the OPHS 2018, public health practitioners need to engage in effective risk communication to motivate local actions that mitigate the effects of extreme weather and climate change. Based on the scoping review, risk communication efforts during short-term extreme weather events appear to be more effective than efforts to communicate risk around

climate change. This distinction could highlight a unique opportunity for public health to adapt strategies commonly used for extreme weather to climate change.

Mando, Ahed M., Lori Peek, Lisa M. Brown, and Bellinda L. King-Kallimanis. 2011. "Hurricane Preparedness and Sheltering Preferences of Muslims Living in Florida." *Journal of Emergency Management* 9(1):51–64.

<u>Keywords</u>

Racial/Ethnic Minorities, Hurricane, Religious Minorities

Key Findings

- Muslim communities are often overlooked in disaster planning.
- Muslims may avoid evacuating to public shelters for fears of safety.
- It is crucial to understand religious needs in the context of shelters.

Take-Home Message

Disaster planners should be sensitive to religious obligations and tailor evacuation and shelter plans accordingly.

- A well-developed plan for the Muslim community is as important as a personal plan.
- Disaster response infrastructure needs to improve in the way of religious sensitivity and accommodation.

Abstract

Objectives: Given the increasing diversity of the US population and the continued threat of hurricane devastation along the heavily populated Gulf Coast region, the lack of research on preparedness and sheltering activities across religious or cultural groups represents a significant gap in the field of hazards and disaster research. To address this void, a questionnaire examining hurricane preparedness attitudes and sheltering preferences was administered to Muslims living in Tampa, Florida.

Design: An exploratory study using a cross-sectional survey of Muslim adults who were attending a religious or cultural event.

Setting: The Islamic Society of Tampa Bay Area and the Muslim American Society located in Tampa, Florida.

Participants: The final convenience sample of 139 adults had a mean age of 38.87 years (±11.8) with males and females equally represented.

Results: Significant differences were found in disaster planning activities and confidence in hurricane preparedness. Notably, 70.2 percent of the respondents were unsure about having a plan or were without a plan. Of the 29.7 percent who actually had a plan, 85.4 percent of those individuals were confident in their hurricane preparedness. This study also revealed that safety,

cleanliness, access to a prayer room, and privacy were concerns related to using a public shelter during hurricanes. Nearly half of the respondents (47.4 percent) noted that the events of 9/11 influenced their comfort level about staying in a public shelter during a hurricane disaster.

Conclusions: Disaster planners should be aware of the religious practices of the Islamic community, encourage disaster planning among diverse groups, and address safety and privacy concerns associated with using public shelters.

Matherly, Deborah and Jane Mobley. 2011. "Transportation and Emergency Management Tool Kit for Communications with Vulnerable Populations: Key Research Findings." *Transportation Research Record* 2234(1):62–70.

<u>Keywords</u>

Transportation, Social Vulnerability, Emergency Management

Key Findings

- Community-based organizations such as transit agencies and nonprofit organizations can provide valuable assistance to disaster response.
- Emergency response planning should begin at the local level and integrate the needs of vulnerable populations unique to the specific local region.
- Best practices for risk communication include:
 - Building necessary community relationships;
 - Securing and managing information from a transportation perspective;
 - Understanding requirements and desires of other agencies and community-based organizations.
- Relationships between transit agencies, emergency managers, and vulnerable populations are the foundation of effective interagency collaboration and communication.
- Descriptive examples are provided.

<u>Abstract</u>

Communication with vulnerable populations about transportation in emergency situations contains serious gaps. Earlier case studies notwithstanding, the lessons of Hurricane Katrina provided a major impetus to legislation, studies, and action. Much legislation advises that community-based organizations should be worked with to bridge the gaps, but little guidance is given. TCRP funded an effort to create such a tool kit for transportation and emergency

Take-Home Message

Best practices for risk communications involving vulnerable populations in the context of transportation include: building necessary community relationships; securing and managing information from a transportation perspective; and understanding requirements and desires of other agencies and community-based organizations. managers. The study culminates in spring 2011; this paper presents interim findings from a literature review and interviews. Transportation agencies are not in charge of communication with vulnerable populations during emergencies; emergency management agencies are in charge, but they may delegate such communication. However, transportation, public health, public information, and other agencies have significant community outreach capabilities inherent in their nonemergency roles. The most effective ways for transportation and emergency managers to communicate with vulnerable populations about their transportation options before, during, and after an emergency are learning how to identify and tap into existing resources and the networks of public, private, and nonprofit agencies that work with vulnerable populations and learn how to establish and maintain relationships with those entities. Inclusive planning helps everyone. Creation of accommodations for people who cannot hear or understand the primary language also helps tourists and residents who may lose their hearing aids, their hearing, or their composure in an emergency. Likewise, inclusively planning for people with personal mobility challenges helps accommodate people with temporary mobility problems, such as recent surgery or injury or loss of their vehicles during the event.

Meredith, Lisa S., Lisa R. Shugarman, Anita Chandra, Stephanie L. Taylor, Stefanie Howard, Ellen Burke Beckjord, Andrew M. Parker, and Terri Tanielian. 2008. *Analysis* of Risk Communication Strategies and Approaches with At-Risk Populations to Enhance Emergency Preparedness, Response, and Recovery. RAND Corporation. Retrieved November 20, 2019 (https://www.rand.org/pubs/working_papers/WR598.html).

<u>Keywords</u>

General Risk Communication, Social Vulnerability

Key Findings

- Community participation and involvement strengthens preparedness and response strategies for vulnerable populations.
- Responders should be trained for emergencies with exercises that include communicating to and responding with vulnerable populations to build trust and competency.

Take-Home Message

Community participation and involvement strengthens preparedness and response strategies for vulnerable populations, as individuals from those populations can make sure the messages are crafted and shared in a way that is effective for those populations.

- Evaluate and improve response strategies regularly to identify and improve on weaknesses.
- Utilize as many communication channels as possible in order to reach the diverse range of populations in any given community.

<u>Abstract</u>

Analyzes risk communication and public health messaging strategies and approaches with at-risk populations to enhance emergency preparedness, response, and recovery.

Millet, Barbara, Andrew Carter, Kenneth Broad, Alberto Cairo, Scotney Evans, and Sharanya J. Majumdar. 2019. "Hurricane Risk Communication: Visualization and Behavioral Science Concepts." *Weather, Climate, and Society*.

<u>Keywords</u>

Risk Perception, Hurricane, General Risk Communication, Social Vulnerability

Key Findings

- The most accurate risk communication information will not necessarily garner the most "rational" response,` especially with vulnerable populations.
- Visual communications for hurricanes are often ineffective for the general population.

Take-Home Message

Visual models that communicate relevant information tailored to a target audience may help to promote appropriate action in response to hurricane risks; however, communicators must also consider the capacities and constraints faced by message recipients.

- Instead of the "cone of uncertainty" use visual models that can communicate relevant information such as areas where flooding will take place or the extent to which the effects of the storm will spread.
- The Geospatial Research, Analysis, and Services Program (GRASP) uses census data to identify relative levels of social vulnerability within a specified geographical area.

<u>Abstract</u>

Increasingly, the risk assessment community has recognized the social and cultural aspects of vulnerability to hurricanes and other hazards that impact planning and public communication. How individuals and communities understand and react to natural hazard risk communications can be driven by a number of different cognitive, cultural, economic, and political factors. The social sciences have seen an increased focus over the last decade on studying hurricane understanding and responses from a social, cognitive, or decision science perspective, which broadly defined includes a number of disparate fields. This paper is a cross-disciplinary and critical review of those efforts as they are relevant to hurricane risk communication development. We focus on two areas that based on a comprehensive literature review and discussions with experts in the field have received comparatively little attention from the hazards community: (1) Research concerning visual communications and the way in which individuals process, understand, and make decisions regarding them, and (2) The way in which vulnerable communities understand and interact with hurricane warning communications. We go on to suggest areas that merit increased research and draw lessons or guidance from the broader hazards/social science research realm that implicate hurricane planning and risk communication, particularly the development and dissemination of hurricane forecast products.

Neuhauser, Linda, Susan L. Ivey, Debbie Huang, Alina Engelman, Winston Tseng, Donna Dahrouge, Sidhanta Gurung, and Melissa Kealey. 2013. "Availability and Readability of Emergency Preparedness Materials for Deaf and Hard-of-Hearing and Older Adult Populations: Issues and Assessments." *PLOS ONE* 8(2): e55614.

<u>Keywords</u>

Access and Functional Needs, General Risk Communication

Key Findings

- Two major problems with the emergency preparedness materials (EPM) for Deaf or Hard of Hearing (Deaf/HH) people are availability and accessibility include:
 - Limited availability of EPMs tailored to vulnerable populations, especially those who are Deaf/HH.

Take-Home Message

Emergency preparedness materials often fail to conform to recommended literacy levels, placing older adults and Deaf or Hard of Hearing (Deaf/HH) populations at a disadvantage.

- EPM that exist often fall above an understandable reading level for some vulnerable groups, limiting their usefulness.
- There is a need to improve the availability of EPM.
- Deaf/HH advocates in designing and disseminating EPM.

<u>Abstract</u>

A major public health challenge is to communicate effectively with vulnerable populations about preparing for disasters and other health emergencies. People who are Deaf/HH and older adults are particularly vulnerable during health emergencies and require communications that are accessible and understandable. Although health literacy studies indicate that the readability of health communication materials often exceeds people's literacy levels, we could find no research about the readability of EPM intended for Deaf/HH and older adult populations. The objective of this study was to explore issues related to EPM for Deaf/HH and older adult populations, to assess the availability and readability of materials for these populations, and to recommend improvements. In two California counties, we interviewed staff at 14 community-based organizations (CBOs) serving Deaf/HH clients and 20 CBOs serving older adults selected from a stratified, random sample of 227 CBOs. We collected 40 EPM from 10 CBOs and 2 public health departments and 40 EPM from 14 local and national websites with EPM for the public. We used computerized assessments to test the U.S. grade reading levels of the 16 eligible CBO and health department EPM, and the 18 eligible website materials. Results showed that less than half of CBOs had EPM for their clients. All EPM intended for clients of Deaf/HH-serving CBOs tested above the recommended 4th grade reading level, and 91% of the materials intended for clients of older adult-serving CBOs scored above the recommended 6th grade level. EPM for these populations should be widely available through CBOs and public health departments, adhere to health literacy principles, and be accessible in alternative formats including American Sign

Language. Developers should engage the intended users of EPM as co-designers and testers. This study adds to the limited literature about EPM for these populations.

Novak, Julie, Ashleigh Day, Pradeep Sopory, Lee Wilkins, Donyale Padgett, Stine Eckert, Jane Noyes, Tomas Allen, Nyka Alexander, Marsha Vanderford, and Gaya Gamhewage. 2019. "Engaging Communities in Emergency Risk and Crisis Communication: Mixed-Method Systematic Review and Evidence Synthesis." Journal of International Crisis and Risk Communication Research 2(1): 61-96.

<u>Keywords</u>

Emergency Management, General Risk Communication

Take-Home Message

Key Findings

 Community participation in risk communication planning during, before, and after disaster events is essential to effective risk communication strategies involving vulnerable groups. Community participation in risk communication planning during, before, and after disaster events is essential to effective risk communication strategies involving vulnerable groups.

• Pre-disaster community meetings that involve

community members as both planners and attendees improve the effectiveness of and cooperation with risk communication.

<u>Abstract</u>

The World Health Organization (WHO) commissioned systematic reviews to assist with the development of new emergency risk communication guidelines that will impact responses and distribution of resources at all levels. This mixed-method evidence synthesis, guided by Cochrane principles and methods, examined the extant research in countries throughout the world, published from 2003 to 2016, related to the best practices to engage communities in preparing for and responding to emergency events with public health implications. Although few studies directly examined which strategies or tactics effectively engage public participation, many studies reinforced the importance of community participation. The findings support the perspective that emergency risk communication before, during, and after such events, especially when grounded in local contexts. Although the importance of local context limits the generalizability of risk communication, it is important to continue studying strategies and tactics to cultivate participation among all stakeholders.

Ogie, Robert, Juan Castilla Rho, Rodney J. Clarke, and Alison Moore. 2018. "Disaster Risk Communication in Culturally and Linguistically Diverse Communities: The Role of Technology." *Multidisciplinary Digital Publishing Institute Proceedings* 2(19):1256-1263.

<u>Keywords</u>

Linguistic Minorities, Racial/Ethnic Minorities, General Risk Communication

Key Findings

- If applied correctly, technology can play a crucial role in supporting CALD communities in disaster response.
- Three pillars of effective risk communications for CALD communities include:
 - Culturally appropriate tailoring
 - o Effective translation of risk communication messages
 - o Trust and the use of trusted messengers
- Examples are provided to demonstrate how to act on these recommendations.

<u>Abstract</u>

Migrants, ethnic minorities and people from culturally and linguistically diverse (CALD) communities are often more vulnerable to natural disasters due to cultural barriers and limited proficiency in the dominant language, which sometimes undermine their ability to access, interpret and respond to warnings. Technology can assist in engendering culturally and linguistically appropriate communication with CALD communities if key challenges are identified. This study contributes by reviewing relevant literature with the aim of ascertaining the most pressing challenges requiring technological interventions. Three broad issues (i.e., trust, message tailoring, and message translation) are identified and discussed, and potential solutions for addressing these issues are recommended.

Pennington-Gray, Lori, Kiki Kaplanidou, and Ashley Schroeder. 2013. "Drivers of Social Media Use among African Americans in the Event of a Crisis." Natural Hazards 66(1):77–95.

<u>Keywords</u>

Racial/Ethnic Minorities, Social Media, General Risk Communication, Risk Perception

Key Findings

• Tourists often assume that nothing bad will happen to them on vacation, which heightens their vulnerability.

Take-Home Message

Technology can play a crucial role in supporting culturally and linguistically diverse (CALD) communities in disaster response if it is applied correctly.

Take-Home Message

Tourists and travelers are vulnerable populations in disaster circumstances because they have skewed risk perceptions and little access to information, especially in states with official languages different from their own.

- Social media is an important tool for reaching some tourists because it encourages peer-topeer risk communication and can efficiently relay information about disaster conditions.
- The unique vulnerability of tourists and the role of social media are important considerations for risk communicators.

<u>Abstract</u>

Research has examined the role of social media during the time of a crisis in various fields; however, there is a paucity of research in this area as it relates to tourism. Moreover, few studies have examined at-risk populations, such as tourists, in times of crisis. To assess the drivers of turning to social media during a crisis, a national survey of 1,018 African American travelers was conducted. Respondents were asked to indicate on a 5-point scale the likelihood of turning to social media for information "if they were currently in the middle of their trip and heard that a crisis has just occurred within the immediate vicinity of their current location." Hierarchical regression analysis was conducted to determine drivers on African American travelers' decisions to use social media during a crisis. These drivers were age, perceptions of risk during their trip, and frequency and type of social media use engaged in on a regular basis. Overall, findings suggested that when controlling for age only, crime, financial, and physical perceptions of risk drivers of social media use during a crisis, while controlling for age and perception of risk, use of social media in one's daily life showed no influence.

Siddiqui, Nadia J., Jonathan P. Purtle, and Dennis P. Andrulis. 2011. "Ethnicity and Minority Status Effects on Preparedness." Pp. 176–77 in *Encyclopedia of Disaster Relief*. Thousand Oaks: SAGE Publications, Inc.

<u>Keywords</u>

Racial/Ethnic Minorities, Low-Income Populations, Hurricane, Linguistic Minorities

Key Findings

- Responders must consider social disadvantages of certain racial and ethnic populations that elevate their disaster risk.
- This paper explores three factors that contribute to disproportionate risk:
 - socioeconomic conditions
 - o cultural/linguistic barriers
 - distrust of governing authority

Take-Home Message

In recognition of the unique challenges that racial and ethnic minorities face in the context of risk communication, emergency planners should actively engage these communities in planning, implementation, and evaluation.

- Poor translations may exacerbate vulnerability, as they may cause message recipients to miss out on important instructions or interpret information incorrectly.
 - This issue can be resolved by using pictogram warnings, employing bilingual community representatives, and diversifying the communication channels used.

Abstract

Participation of the entire populace in preparing for and responding to an event is imperative to minimizing harm and saving lives. Racial and ethnic minorities, defined as groups differing from the majority population by race, culture or language are often more vulnerable in times of disaster, yet are frequently not included in disaster plans and suffer disproportionately from adverse outcomes. This became especially evident in the United States in the aftermath of Hurricane Katrina, which ravaged the Gulf Coast region on 29 August 2005. The areas most affected by the hurricane were predominantly poor and African American.

A combination of factors associated with minority status contributes to the disaster vulnerability of racially/ethnically diverse populations. These include the social and economic conditions which often characterize minority communities, cultural and linguistic barriers, and distrust of government authorities. These dynamics largely hinder the ability of minorities to prevent, protect against, quickly respond to and recover from disasters.

Shiu-Thornton, Sharyne, Joseph Balabis, Kirsten Senturia, Aracely Tamayo, and Mark Oberle. 2007. "Disaster Preparedness for Limited English Proficient Communities: Medical Interpreters as Cultural Brokers and Gatekeepers." *Public Health Reports* 122(4):466–71.

Keywords

Linguistic Minorities, Emergency Management, Risk Perception

Key Findings

- Current disaster planning and emergency response procedures do not address the needs of communities with limited English proficiency (LEP).
- Medical Interpreters may provide a solution to the disaster response language barriers faced by LEP communities.

Take-Home Message

A range of community resources can be utilized to facilitate outreach and communication with Limited English Proficient communities, including medical interpreters, ethnic markets/shops, and community-based organizations.

- Small, ethnic, language-specific community businesses should be prioritized as an information pathway.
- Community planners and emergency managers need to coordinate with community organizations that are connected with language/culture communities to help disseminate information.
- Community organization leaders, including religious leaders, can be important collaborators and communicators.

Abstract

Current disaster and emergency response planning does not adequately address the needs of limited English proficient (LEP) communities. The complexities of language and cultural differences pose serious barriers to first responders and emergency providers in reaching LEP communities. Medical interpreters are potential key cultural and linguistic linkages to LEP communities. This project established a collaborative partnership with the Interpreter Services department of Harborview Medical Center in Seattle, Washington. In summer 2004, a pilot assessment of the training background and work experiences of medical interpreters was conducted that focused on training needs for disaster/emergency situations. Overall, medical interpreters identified a need for disaster preparedness training and education. Medical interpreters further reported that LEP communities are not prepared for disasters and that there is a need for culturally appropriate information and education.

Teo, Melissa, Ashantha Goonetilleke, Alireza Ahankoob, Kaveh Deilami, and Marion Lawie. 2018. "Disaster Awareness and Information Seeking Behaviour among Residents from Low Socio-Economic Backgrounds." *International Journal of Disaster Risk Reduction* 31:1121–31.

<u>Keywords</u>

Information Seeking Behavior, Low-Income Populations, Risk Perception, General Risk Communication

Key Findings

- Individuals from low socio-economic (LSE) backgrounds are less likely to respond effectively to a disaster due to other pressing struggles.
- Low literacy, low trust in authorities, financial limitations, and other challenges may increase disaster risk among LSE populations.

Take-Home Message

Low socioeconomic status can hinder receipt of warning messages and capacity to follow guidance in risk communication.

- LSE populations are often less aware of disaster risk and are at a disadvantage when it comes to information-seeking channels.
- Risk communicators must utilize diverse communication methods to reach the whole population.

Abstract

An individual's socio-economic status can increase their vulnerability to, and ability to prepare for and recover in the aftermath of a disaster. People from low socio-economic (LSE) backgrounds

often face greater disaster risks, but are least prepared for disaster events due to a number of factors including a lack of housing affordability, low income and literacy levels. While there is an established relationship between a person's socio-economic status and disaster vulnerability, very little is understood about the disaster information seeking needs and preferences of LSE population groups and how this affects their levels of disaster awareness. This paper addresses this gap through a comparative study of LSE and non-LSE population groups to identify key disaster information sources and how it shapes levels of disaster awareness. A survey of 224 residents was conducted, and multivariate regression analysis of both LSE and non-LSE respondents revealed a trend of disaster passivity in both population groups. English language proficiency, occupation, familiarity with the local environment are the most important factors influencing disaster awareness among the LSE population groups. For non-LSE population groups, disaster awareness is gender-dependent with females showing higher levels of awareness. Overall, television was the most trusted information source regardless of socio-economic status. The results provide a better understanding of the underlying impact of socio-economic status on disaster awareness and information seeking behavior, which can assist practitioners and policy makers in making informed decisions on disaster mitigation strategies to reduce the disaster risk vulnerability of targeted population groups.

Teo, Melissa, Ashantha Goonetilleke, Kaveh Deilami, Alireza Ahankoob, and Marion Lawie. 2019. "Engaging Residents from Different Ethnic and Language Backgrounds in Disaster Preparedness." *International Journal of Disaster Risk Reduction* 39:101245.

<u>Keywords</u>

Linguistic Minorities, Racial/Ethnic Minorities, Social Vulnerability

Key Findings

- Differences in culture can correspond to differences in how risk communication messages are interpreted, as well as differences in response.
- Generalized outreach to the majority community is often not enough, as migrant

Take-Home Message

Ethnic and language background influence levels of disaster awareness and preparedness, so inclusive risk communication requires consideration of the unique needs of these communities.

- populations may not yet be integrated with the community at large.
- It is important to consider language barriers when planning for disaster.
- Being observant of what communication channels are mainly used by these vulnerable groups can help us to more effectively transmit risk communication.

Abstract

Modern societies are increasingly a melting pot of people from different cultural and linguistic backgrounds which needs to be taken into consideration in disaster planning. People from different ethnic and language backgrounds are sometimes more vulnerable in a disaster due to a number of challenges including language barriers, cultural perceptions, social isolation, poor assimilation with the local community and distrust of authorities. The level of disaster preparedness differs significantly at a household level, yet there is little understanding of how an individual's attributes such as age, ethnicity, language skills and gender, influences and sustains the level of disaster preparedness. Past research has explored one or more of these attributes, but the relationship between 'ethnicity', 'language skills' and disaster preparedness is least understood. To address this gap, this paper investigates how an individual's ethnicity and language skills influence their levels of disaster preparedness. A questionnaire survey was conducted with 180 residents from a variety of ethnic and language backgrounds in Logan City, a local government area in Australia. The survey results were analyzed using hierarchical regression analysis, and suggest that 'ethnicity' and 'English Language skills', accounted for significant variations in levels of disaster preparedness in the case study location. The findings suggest that policy makers need to give due consideration to how different ethnic groups understand and prepare for disasters, and to design disaster management and communication plans that cater for different language ability.

Tyler, Jenna, Abdul-Akeem Sadiq, and Douglas S. Noonan. 2019. "A Review of the Community Flood Risk Management Literature in the USA: Lessons for Improving Community Resilience to Floods." *Natural Hazards* 96(3):1223–48.

<u>Keywords</u>

Social Vulnerability, Flood Risk, Decision Making

Key Findings

- Flood risk can be reduced through wetland conservation.
- The most effective flood risk response can vary from community to community.
- Engaging community members and stakeholders in disaster planning and response improves understanding of risk and builds trust with government officials.

Take-Home Message

Flood management decision-makers need to create plans that consider, build trust with, and are helpful to vulnerable populations across all stages of the disaster lifecycle.

- Consideration of vulnerable populations in flood risk situations is essential as they face unique challenges in the context of disaster.
- Use various resources to track and manage flooding, and continuously update with the newest best practices

Abstract

This study systematically reviews the diverse body of research on community flood risk management in the USA to identify knowledge gaps and develop innovative and practical lessons to aid flood management decision-makers in their efforts to reduce flood losses. The authors discovered and reviewed 60 studies that met the selection criteria (e.g., study is written in English, is empirical, focuses on flood risk management at the community level in the USA, etc.). Upon reviewing the major findings from each study, the authors identified seven practical lessons that, if implemented, could not only help flood management decision-makers better understand communities' flood risks, but could also reduce the impacts of flood disasters and improve communities' resilience to future flood disasters. These seven lessons include: (1) recognizing that acquiring open space and conserving wetlands are some of the most effective approaches to reducing flood losses; (2) recognizing that, depending on a community's flood risks, different development patterns are more effective at reducing flood losses; (3) considering the costs and benefits of participating in FEMA's Community Rating System program; (4) engaging community members in the flood planning and recovery processes; (5) considering socially vulnerable populations in flood risk management programs; (6) relying on a variety of floodplain management tools to delineate flood risk; and (7) ensuring that flood mitigation plans are fully implemented and continually revised.

Yeo, Jungwon, Claire Connolly Knox, and Kyujin Jung. 2018. "Unveiling Cultures in Emergency Response Communication Networks on Social Media: Following the 2016 Louisiana Floods." *Quality & Quantity* 52(2):519–35.

<u>Keywords</u>

Social Media, General Risk Communication

Key Findings

- Culture has a strong impact on disaster response; people are more likely to reach out to cultural peers in times of crisis.
- Culturally-sensitive disaster communication is more effective than standard practices that ignore culture.
- Social media should be incorporated into disaster risk communication and response.

Take-Home Message

Emergency responders should consider using real-time social media data to identify influential stakeholders and keywords that can help with understanding the needs of affected communities over time.

• Social media is a common vehicle for culturally-specific groups to discuss disaster risks.

Abstract

While culture in emergency management has gained attention from the field of risk communication, few have systemically dealt with the nuances of general culture involved in the formation and differentiation of risk communication. To fill this gap, this research aims to first

examine cultural nuances from the 2016 Louisiana flood response by primarily focusing on communications embedded in social media. The results from social network analysis and content analysis highlight that the flood response communication had strong cultural characteristics, highlighting the notion that of the cultures in Louisiana—faith-based, local authority, and nonprofits—were the prominent cultural responders in the flood response communication. In particular, cultural similarity in both intra/inter group response communication was observed, with each communication group comprising actors who shared a common cultural background and spoke similar keywords.

Risk Communication Across the Disaster Lifecycle

Bodoque, J. M., A. Díez-Herrero, M. Amerigo, J. A. García, and J. Olcina. 2019. "Enhancing Flash Flood Risk Perception and Awareness of Mitigation actions through Risk Communication: A Pre-Post Survey Design." *Journal of Hydrology* 568:769–79.

<u>Keywords</u>

Flood Risk, Hazard Mitigation, General Risk Communication

Key Findings

- Study examined risk communication techniques including:
 - handing out maps of flood zones
 - o informative talks
 - interactive "contests"
 - storytelling photography/video competitions
 - intergenerational workshops.

Take-Home Message

Interactive contests, maps, storytelling, and multimedia presentations may be particularly effective tools for appropriately adjusting flood risk awareness and mitigation measures.

• The interactive contests, maps, and storytelling were the most effective techniques in raising awareness of flood risks and how to reduce the impacts of flooding.

<u>Abstract</u>

Flood risk management is gradually shifting from a risk-based approach to an integrated one that, among other elements, considers risk communication (RC) as a means of boosting resilience. Regardless of the above, few scientists have tackled up to now the integration of RC into flood risk management. In this connection, this particular study seeks to check out the potential of a risk dialogue approach (based on an ad hoc RC strategy) to change attitudes and behaviours in relation to flash flood risk. Via a pre-post survey design, we evaluated risk perception and awareness regarding a Civil Protection Plan (CPP) implemented locally (i.e., in the municipality of Navaluenga, central Spain). For this particular objective, a questionnaire survey was created, and 201 adults (representing more than 10% of the population census) were interviewed twice in a one-year period. Before the second survey, an RC strategy was created. The RC strategy comprised briefings, quiz answers, storytelling, a contest of videos and photographs about past floods, and an intergenerational workshop. A t-test for paired sample analyses and a general linear model (GLM) repeated measures ANOVA were applied to identify changes in risk perception and awareness. Our results indicate that the RC strategy did increase flood risk perception in Navaluenga in the long term (lifetime). Also, it increased the level of awareness of the various features that comprise the CPP, enabling people to be more competent in facing a flash flood. Some cognitive biases detected in the perceptual process of human beings may shed some light on the results obtained. The implementation of well-thought-out RC strategies can

play a role in improving resilience, particularly in geographic areas such as the Iberian Peninsula, in which climate change scenarios indicate a likely increase in the severity and frequency of flooding.

Janoske, Melissa, Brooke Liu, and Ben Sheppard. 2012. Understanding Risk Communication Best Practices: A Guide for Emergency Managers and Communicators. Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate, U.S. Department of Homeland Security. College Park, MD: START.

<u>Keywords</u>

Disaster Lifecycle, General Risk Communication, Resilience

Key Findings

- This report aims to translate theoretical findings into practical guidance for risk communicators.
- Knowing how the public feels about a risk, how closely it is perceived to affect them, and the amount of trust the public has in risk

Take-Home Message

Risk communication theory informs risk communication best practices by emphasizing 1) the importance of the characteristics of the audience; 2) how, when, and by whom a message is delivered; and 3) the necessity of adaptation to changing situations.

communicators are important considerations when developing risk messaging.

- Some populations are difficult to reach through mass communication channels, including: children, the elderly and people with disabilities, those who struggle with mathematical literacy, racial and ethnic minorities, and persons with limited English proficiency or literacy. Additionally, activist groups and white males may have special risk communication needs.
- Best practices for risk communication differ at each stage of the disaster lifecycle:
 - Preparedness Phase: requires creating risk-specific effective messages, testing them, and distributing through appropriate channels.
 - Response Phase: Institutions, organizations, and public need to work together. Crisis management plans help prevent risks from escalating into crises.
 - Recovery Phase: Risk communicators should address failed elements of risk management and focus on the future for both community leaders and the publics they serve.

<u>Abstract</u>

Effective risk communication requires the alignment of complex factors including trust between the communicator and the audience(s), audience involvement, and emotional responses to risk. Risk communication is especially challenging now as new media changes the landscape for both

communicators and their audiences. Viewed as a discussion of the most important findings for risk communicators and managers, this report delves into research-driven recommendations for effective risk communication practices. Paired with Understanding Risk Communication Theory: A Guide for Emergency Managers and Communicators, this report reveals the complexity of developing and disseminating effective risk messages. Trust in institutions and organizations, risk-related emotions, public proximity to risk, the severity of risk faced, overall tolerance of risk, and public experience with past risks and threats all should be considered in developing risk communication messages and are explored here. The need to reach out effectively to special needs populations is discussed to provide insight on crafting messages for and understanding the behavior of children, the elderly and disabled, those with literacy difficulties, activists, and minority racial and ethnic groups. Other important populations discussed are activist groups and white males. The report also examines the direct and indirect roles of the media-both traditional and new media—on official communication efforts, and concludes with a discussion of communication considerations relevant to specific phases of a threat or risk. Throughout, the report offers explicit information on key implications of all these factors for effective risk communication. This report starts from the recognition that there is agreement on some specific principles related to effective risk communication: (1) that understanding characteristics of an audience is essential to developing effective risk communication efforts; (2) that how, when, and by whom a message is delivered impacts its effectiveness; and (3) that communicators must continually adapt to changing situations. The best practices presented here are rooted not only in experience but in well-developed theories and evidence from communication and other academic fields, as illustrated in Figure 1 and further discussed in the Understanding Risk Communication Theory report. The goal of this Best Practices report is to translate theoretical findings into practical guidance for those officials who have the daunting responsibility of communicating with relevant publics faced with a homeland security threat.

Sheppard, Ben, Melissa Janoske, and Brooke Liu. 2012. *Understanding Risk Theory: A for Emergency Managers and Communicators*. Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate, U.S. Department of Homeland Security. College Park, MD: START.

Keywords

Disaster Lifecycle, Emergency Management, General Risk Communication,

Key Findings

 By comparing and contrasting academic theory with what is currently in the "best practices" federal guidelines, the authors organize the theories based on how they would best supplement the best practices.

Take-Home Message

Inclusion of social risk theories in emergency management best practices may help to supplement the current standard for risk communication and public dissemination.

- Situational Crisis Communication Theory (SCCT) is best suited to crisis management plans, while the Situation Theory of Publics (STP) is applicable to all practices and every phase of disaster management.
- Emergency managers should use theories of social risk to help inform the current standard for risk communication and public dissemination.

Abstract

This document reflects the themes and concepts developed in the accompanying Understanding Risk Communication Best Practices: A Guide for Emergency Managers and Communicators. This report discusses and dissects theories and models relevant to federal, state, and local homeland security personnel and emergency managers faced with communicating risks within their communities. It first provides a detailed discussion on defining risk communication, followed by risk characteristics to summarize how perceived dread and familiarity can affect risk messaging. Next, relevant theories and models are discussed in two parts: cross-cutting theories and models applicable across the preparedness, response, and recovery phases, and then additional theories and models that are most relevant within a specific event phase. As with the Best Practices document, many of the communication approaches presented were not originally designed for a specific event phase, but nevertheless offer valuable insights that make them particularly suitable for a specific event phase.

Index

Α

Access and Functional Needs, iii, iv, 17, 19, 27, 33 Agriculture, v, 3

С

Climate Change, vii, 28

D

Decision Making, 6, 21, 40 Disability. *See* Access and Functional Needs Disaster Lifecycle, ii, 43, 44, 46 Disaster Planning, 19, 29, 30, 37, 40 Disaster Preparedness, iii, vi, viii, ix, x, xi, 18, 19, 20, 23, 24, 25, 26, 27, 29, 31, 33, 36, 37, 38, 39, 40, 44, 46 Disaster Recovery, 18, 25, 26, 27, 31, 41, 46

Ε

Earthquake, 8 Elderly. *See* Older Adults Emergency Management, v, viii, 4, 5, 7, 10, 12, 21, 26, 27, 29, 30, 34, 37, 46

F

Flood. *See* Flood Risk Flood Risk, iii, v, vi, vii, xii, 1, 5, 6, 7, 9, 10, 14, 15, 16, 40, 43

G

General Risk Communication, ii, 1, 2, 3, 4, 6, 7,
8, 9, 10, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22,
23, 24, 25, 27, 28, 31, 32, 33, 34, 35, 38, 41,
43, 44, 46

Η

Hurricane, v, ix, 2, 14, 18, 22, 29, 30, 32, 36, 37

I

Information Seeking Behavior, xi, 38

L

Linguistic Minorities, 18, 35, 36, 37, 39 Low-Income Populations, 18, 22, 36, 38

Μ

Mitigation, iii, 2, 15, 16, 25, 26, 39, 41, 43

Ν

Near Miss Experiences, 2

0

Older Adults, 26

Ρ

Public Health, v, vi, x, 1, 22, 23, 25, 26, 28, 37

R

Racial and Ethnic Minorities, 22, 29, 35, 36, 39 Religious Minorities, 29 Resilience, vi, vii, xii, 18, 24, 26, 40, 44 Response, viii, xii, 2, 31, 41, 44 Risk Perception, iii, 2, 8, 23, 32, 35, 37, 38, 43 Rural Populations, iv, 3, 10, 20, 21

S

Sendai Framework, vii, 21, 27 Social Media, v, x, xii, 5, 26, 35, 41 Stories. *See* Storytelling Storytelling, iii, 43

Т

Technology, vi, x, 4, 9, 10, 11, 12, 24, 35, 44, 46

Tornado, 2 Transportation, viii, xii, 16, 30, 31 Trust, xii, 15, 23, 31, 35, 38, 40, 44 Tsunami, 2

W

Wildfire, 2, 12, 13