



U.S. Department of Health and Human Services
Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy



ANALYSIS OF RISK COMMUNICATION STRATEGIES AND APPROACHES WITH AT-RISK POPULATIONS TO ENHANCE EMERGENCY PREPAREDNESS, RESPONSE, AND RECOVERY:

FINAL REPORT

December 2008

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This report was prepared under contract #HHS-100-03-0010 between HHS's ASPE/DALTCP and the RAND Corporation. For additional information about this subject, you can visit the DALTCP home page at http://aspe.hhs.gov/_office_specific/daltpc.cfm or contact the ASPE Project Officer, Emily Rosenoff, at HHS/ASPE/DALTCP, Room 424E, H.H. Humphrey Building, 200 Independence Avenue, S.W., Washington, D.C. 20201. Her e-mail address is: Emily.Rosenoff@hhs.gov.

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December 2008

Prepared for
Office of Disability, Aging and Long-Term Care Policy
Office of the Assistant Secretary for Planning and Evaluation
U.S. Department of Health and Human Services
Contract #HHS-100-03-0010

The opinions and views expressed in this report are those of the authors. They do not necessarily reflect the views of the Department of Health and Human Services, the contractor or any other funding organization.

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PREFACE

Communication is a critical component of helping individuals prepare for, respond to, and recover from emergencies. However, there is limited knowledge about how to best communicate with at-risk populations in emergencies. To inform this gap, RAND researchers, under contract by the U.S. Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation (Task Order 07EASPE000074), sought to understand the communication needs and to identify strategies with potential for improving risk communication with at-risk populations.

This one-year study presents the results of an assessment that involved review of the literature on emergency preparedness risk communication and public health messaging strategies; the compilation of educational and outreach materials for emergency preparedness communication with at-risk populations; and site visits in three states and the Washington, DC area to identify gaps in the practice of risk communication with at-risk populations.

The findings should be of interest to state and local emergency managers, community-based organizations, public health researchers, and policy makers.

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ACKNOWLEDGMENTS

We wish to thank those individuals whom we interviewed during our site visits for providing valuable information about their planning efforts and experiences working with at-risk populations around risk communication. We would also like to thank the individuals who helped connect us to our interview participants, making those interviews possible. In addition, we wish to thank Mary Vaiana, Nicole Lurie, and Sandra Quinn for their thoughtful reviews. Lastly, we would like to thank Roberta Shanman for her expertise in library science and Florence “Toni” Christopher for her help and organizational know-how in preparation of this report.

EXECUTIVE SUMMARY

A. Study Overview

Communication is a critical component of helping individuals prepare for, respond to, and recover from emergencies. The crisis and emergency risk communication (CERC) field is defined by the Centers for Disease Control and Prevention (CDC) as, “an effort by experts to provide information to allow an individual, stakeholder, or an entire community to make the best possible decisions about their well-being within nearly impossible time constraints and help people ultimately to accept the imperfect nature of choices during the crisis” (CDC, 2002). However, there is limited knowledge about how to best communicate with at-risk populations in emergencies, a group that is a particular focus of the Pandemic and All-Hazards Preparedness Act (PAHPA) of 2006 (P.L. 109-417). RAND researchers, under contract by the U.S. Department of Health and Human Services (HHS) Office of the Assistant Secretary for Planning and Evaluation (ASPE), sought to understand the communication needs of these populations. This one-year project provides the groundwork to inform the Secretary’s obligation under the PAHPA to plan for the needs of at-risk populations.

The PAHPA, signed by President George W. Bush in December 2006 created the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) and tasked it with new authorities for a number of efforts, including:

- Ensuring that the needs of at-risk individuals (sometimes referred to as “special populations,” “special needs populations,” or “vulnerable populations”) are integrated into all levels of emergency planning.
- Ensuring effective incorporation of at-risk populations into existing and future policy, planning, and programmatic documents at the federal and state levels.
- Establishing a Director of At-Risk Individuals within ASPR.

In this report, we use a broadened definition of at-risk populations that considers both the HHS working definition for at-risk individuals and that used by the CDC within the context of CERC (Reynolds, 2007). HHS defines the needs of at-risk individuals on the basis of five functional areas (shown below in italics).

Before, during, and after an incident, members of at-risk populations may have additional needs in one or more of the following functional areas:

- *Maintaining Independence--Individuals in need of support that enables them to be independent in daily activities.*

- *Communication--Individuals who have limitations that interfere with the receipt of and response to information.*
- *Transportation--Individuals who cannot drive due to the presence of a disability or who do not have a vehicle.*
- *Supervision--Individuals who require the support of caregivers, family, or friends or have limited ability to cope in a new environment.*
- *Medical Care--Individuals who are not self-sufficient or do not have or have lost adequate support from caregivers and need assistance with managing medical conditions.*

In addition to those individuals specifically recognized as at-risk in the PAHPA (i.e., children, senior citizens, and pregnant women) individuals who may need additional response assistance should include those who have disabilities; live in institutionalized settings; are from diverse cultures; have limited English proficiency or are non-English speaking; are transportation disadvantaged; have chronic medical disorders; and have pharmacological dependency.

Reynolds' defines at-risk populations as, "any group that cannot be reached effectively during the initial phases of a public safety emergency with general public health messages delivered through mass communication channels" (2007). Characteristics that might define such populations are cognitive impairment, language barriers, physical impairments, cultural beliefs relevant to the pandemic, lack of access to mass media, or pre-existing group psychological, social or political/legal contexts that would shape reaction to emergency communications.

For the purposes of this report, we endorse the HHS definition of at-risk populations which places emphasis on their medical needs but also highlight other types of needs regarding their ability to prepare, evacuate, and respond adequately to the risk communication messages. Thus we propose an expanded definition:

At-risk individuals are those who have, in addition to their event-related medical needs, social and structural needs that may interfere with their ability to access or receive medical care, prepare for an emergency, and take appropriate measures (e.g., evacuate, shelter-in-place, etc.) and respond adequately to risk communication messages during an emergency.

Communication about the risks associated with large-scale hazards and emergencies is a critical component of individual preparedness, response, and recovery. Although much is known about risk perception and communication, these topics have been less well addressed for at-risk populations, particularly as they relate to emergency preparedness. We define risk communication as "an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly

about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management" (Commission on Risk Perception and Communication, 1989). In addition, risk communication (National Center for Missing and Exploited Children, 2005; National Organization on Disability, 2006) specifically includes actionable information (Altman, Bostrom, Fischoff, and Morgan, 1994; Covello and Allen, 1988). That is, the information does not simply describe the nature or consequences of a risk, but rather provides information on how to prepare for, protect against, respond to, or recover from the risk.

In this report, we present an assessment of current risk communication practices focused on at-risk populations. This assessment is intended to inform planning for risk communication regarding public health emergency preparedness, response, and recovery for at-risk populations.

B. Policy Goals and Objectives

This study addressed three main policy questions:

- What public health preparedness outreach and risk communications strategies are used with senior citizens, persons with disabilities (PWD), and other at-risk populations, including their caregivers and providers of long-term care services? How have those strategies been translated into educational and outreach information?
- Which strategies, if any, demonstrate promising evidence of success (e.g., through increased public awareness and compliance) and thus might inform broader public health preparedness planning for at-risk populations, including PWD and/or senior citizens?
- What can we learn from existing emergency preparedness efforts that might specifically support ASPE's role in the implementation of the PAHPA and enhance emergency preparedness for at-risk populations?

The study had three components:

- *Literature review.* The team reviewed the literature on emergency preparedness risk communication and public health messaging strategies, particularly for at-risk populations, to describe promising risk communication strategies and identify gaps in the literature.
- *Compendium search.* The team assembled a compendium of current emergency preparedness communication, outreach, and education materials and practices directed at senior citizens, PWD, and other at-risk populations and their caregivers, including providers of long-term care services.

- *Site visits.* The team conducted interviews with representatives in four sites to identify promising or emerging efforts to educate and inform at-risk populations and their caregivers and providers.

C. Key Findings

In our assessment, we identified a number of advancements in the area of risk communication for at-risk populations. However, we also identified many remaining barriers to effective risk communication with this population. Below we describe both advancement and barriers.

Community-based participation strengthens emergency preparedness, response, and recovery for at-risk populations

Including representatives from at-risk populations in emergency planning can inform the types of risk communication strategies, as well as the approaches for message dissemination, that are needed. In addition, involving these representatives in the development and review of communication materials can ensure that messages are appropriately crafted. These community-based participatory approaches were emphasized by informants in our site visits, are encouraged by findings from the literature review, and are also in keeping with the goals outlined by the CDC (CDC and HHS, 2004, 2006).

Training through exercises and drills that include risk communication for at-risk populations may improve response to future disasters

Another potential way to address public concerns is to strengthen training activities among emergency responders through exercises and drills as well as through community engagement. Specifically, exercises and drills should include community-based organizations (CBOs), agencies, and other partners in the training itself as a way to aid mutual learning, increase cultural competence, and strengthen the capacity of health departments and other agencies/CBOs. Enhanced training for those delivering messages about the special needs of different at-risk populations may increase trust among members of these populations. Although, there is currently no evidence for assessing the impact of exercises (Dausey, Buehler, and Lurie, 2007), our compendium review echoes the idea that training activities should directly address at-risk populations including making messages clear and comprehensible, using concrete examples to make the messages more immediate, and tailoring to the specific audience and situation. Involving at-risk populations in preparedness activities (e.g., involving children with disabilities in school-based drills or senior citizens in influenza vaccination clinic exercises) can provide valuable lessons for future disasters.

Evaluating the implementation of risk communication programs and impact of risk communication efforts is critical but systematic efforts are lacking

Evaluating the impact of risk communication efforts and sharing lessons can inform future messaging. Coordinating risk communication activities *before* emergencies involves a variety of collaborative training activities (i.e., local businesses and other coalitions engaged in preparing at-risk populations). Coordinating communication to at-risk populations *after* an emergency emphasizes learning how to address gaps that were identified in previous events and how to minimize future problems. However, based on the literature review and site visits, we found that there is currently little formal evaluation of past efforts to inform communities about future risk. Building a capacity for systematic evaluations to track messages, monitor media coverage, and survey recipients about exposure and accompanying responses will be key to identifying what works to increase public awareness and compliance.

Our compendium review identified relatively few risk communication materials intended for longer-term recovery. Moreover, informants during our site visits told us that this continues to be a gap. At-risk populations are not only at increased risk of poor consequences during an event, but they often are more susceptible to challenges in re-establishing daily life after disasters. Risk communication efforts that include messages for these populations (e.g., how to access specialized resources, eligibility for specific social services) are critical. After-action reports and other evaluation activities that occur after the acute stage of a disaster provide opportunities for emergency managers to share experiences and lessons with other counties and states. To meet their full potential, these evaluation activities need to address successes and shortfalls relevant to at-risk populations.

Effective risk communicators must be trained to understand emergency risk communication, know their stakeholders, and be trusted in the community

Our literature review identified the importance of having those tasked with communicating to the public about risk (e.g., public health officials, public information officers [PIOs], and the media) engage the community, use trusted sources to deliver messages, and offer frequent messages in multiple modes that are locally and personally relevant. Site visit informants described efforts to address these communication needs. For example, one state is using weather reporters as trusted and preferred spokespersons to deliver emergency information. The literature review validates this approach. We also learned from site visits that states regularly engage their PIOs in continuing education.

Reaching at-risk populations requires the use of multiple channels, formats, and tools

Using multiple modes and languages, clear and actionable plans, and new technologies in a timely manner can all enhance the reach of emergency risk communication.

Messages should be readily understood by the intended audiences, in whichever medium or language they are presented. Pictures and images can effectively communicate across the majority of at-risk populations; those with visual impairments will obviously require other communication modes. Translation of materials into other languages by native or local experts can ensure that proper dialectical differences and colloquialisms are used to increase the likelihood that the intended audience will recognize and relate to the message. The literature review findings also underscore the importance of culturally competent risk communication materials for effective comprehension.

The most effective risk communication during an event delivers balanced facts and incorporates timely information. Facts about the risks should be accompanied by information on what individuals can do to protect themselves. Further, these actions need to be presented in terms that populations at-risk can relate to and that closely match the recipients' perspectives, technical abilities, and concerns.

New technologies, such as videophones, help lines, and mass phone alerts, can complement traditional print, Internet, radio, and television media, significantly broadening outreach. All of these new technologies are consistent with the principles identified in the compendium review.

Most states identified lack of resources as a major barrier to increasing capacity to develop and disseminate risk communication materials for diverse at-risk groups. Both our site visit informants and the literature review highlighted the need to tailor message content for some groups and to develop messages that can be disseminated in multiple modes; however, this kind of tailoring may not be financially feasible. Our informants cited inadequate resources as limiting the types of technologies that are available for enhancing risk communication. Thus, broadening capabilities through the addition of videophones and other novel technologies may not be possible without additional resources.

Finally, the use of interpersonal and social networks, often through community organizations such as faith communities, and other community groups are important channels for reaching at-risk populations.

D. Report Limitations

This report is limited in scope for two reasons. First, no evidence was available in some areas. For example, more evidence is needed for communicating risk as it relates to the post-event/recovery stage of emergencies for at-risk populations. Second, some important questions were beyond our study scope. For example, we could not survey at-risk populations to determine associations between disaster experiences, exposure to risk messages and their impact. Nor did we examine the effectiveness of new technology approaches for reaching at-risk populations.

E. Policy Considerations

Consistent with the HHS definition of at-risk populations, the function-based approach to implementing emergency planning under the PAHPA is ideal for emergency risk communication. A key theme in our discussions with informants across states was the importance of using “people first” language that does not inappropriately attribute a disability to the audience but rather, emphasizes the importance of understanding what the various at-risk populations are able to do to prepare and respond to emergencies. Thus, the function-based approach under PAHPA that focuses on individual capabilities rather than on labels or broad generalizations about populations was endorsed by study informants. This suggests that most risk communication messages and dissemination strategies should be designed to match the abilities and resources of individuals rather than their disabilities. For example, rather than focusing on a limitation such as being blind, risk communication should focus on communicating in forms that are interpretable for those with visual impairments (i.e., Braille, oral). Accordingly, communication for those needing supervision should also be directed to caregivers, family, or friends tasked with helping at-risk individuals.

Many aspects of communicating risks in the face of emergencies apply to all individuals, regardless of whether they are from an at-risk population. Further, most individuals at-risk are able to communicate in some common ways. For example, all groups except those with visual impairment have the ability to interpret pictorial material, particularly if it is simple and does not require translation to multiple languages. Supplementing imagery with audio messages is likely to address the needs of most at-risk populations.

However, we also learned that some content of emergency risk communication is specific to a particular at-risk group. Thus, consistent with a functional-capabilities approach, tailoring messages for particular groups should be based on functional areas, including independence, transportation, need for supervision, communication, and medical care needs. In such cases, the message may also need to target caregivers and providers instead of the individuals at-risk, who are unable to execute the information themselves. For example, individuals who need assistance with aspects of daily living may need information about how to involve their caregiver in preparing for and responding to disasters. Another example is that people who use wheelchairs need information on how to evacuate “on wheels.”

ACRONYMS

ADA	Americans with Disabilities Act
ASL	American Sign Language
ASPE	HHS Office of the Assistant Secretary for Planning and Evaluation
ASPR	Assistant Secretary for Preparedness and Response
ASTHO	Association of State and Territorial Health Officials
CARF	Commission on the Accreditation of Rehabilitation Facilities
CBO	community-based organization
CDC	HHS Centers for Disease Control and Prevention
CERC	crisis and emergency risk communication
DAF	data abstraction form
DC	District of Columbia
DHS	U.S. Department of Homeland Security
EAO	External Affairs Officer
FEMA	Federal Emergency Management Agency
GIS	geographic information system
HHS	U.S. Department of Health and Human Services
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
JFO	joint field office
NACCHO	National Association of City and County Health Officials
NECLC	National Emergency Child Locator Center
NRP	National Response Plan
OK-WARN	Oklahoma Weather Alert Remote Notification
PAHPA	Pandemic and All-Hazards Preparedness Act
PHEP	public health emergency preparedness
PIO	Public Information Officer

PTA	Parent-Teacher Association
PWD	people with disabilities
SAMHSA	HHS Substance Abuse and Mental Health Services Administration
SNAKE	special needs assessment for Katrina evacuees
TTY	telephone typewriter or teletypewriter

I. INTRODUCTION

A. Overview and Study Purpose

Communication about the risks associated with large-scale hazards and emergencies is a critical component of individual preparedness, response, and recovery. While much is known about risk perception and communication generally, these topics have been less well addressed for at-risk populations, particularly as they relate to emergency preparedness. In an effort to better understand what risk communication activities are currently used to reach at-risk populations, to learn from existing emergency preparedness efforts, and to identify which communication strategies, if any, have been successful, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) within the U.S. Department of Health and Human Services (HHS), contracted with the RAND Corporation to examine the state of risk communication efforts for at-risk populations. This one-year project provides the groundwork to inform the Secretary's obligation under the Pandemic and All-Hazard Preparedness Act (PAHPA) to plan for the needs of at-risk populations.

Results of this study, as summarized in this report, are intended to inform policy makers, federal/state/local public information officers (PIOs), others responsible for developing and disseminating risk communication messages, and other interested parties about the most promising activities focused on risk communication for at-risk populations. In our discussion, we also identify challenges to and gaps in the development of risk communication messages and methods of dissemination. This information will assist policy makers in building materials that focus on specific needs of at-risk populations that have not been previously addressed.

The PAHPA (P.L. 109-417), signed by President George W. Bush in December 2006 created the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) and tasked it with new authorities for a number of efforts, including:

- Ensuring the integration of the needs of at-risk individuals (sometimes referred to as "special populations," "special needs populations," or "vulnerable populations") on all levels of emergency planning.
- Ensuring the effective incorporation of at-risk populations into existing and future policy, planning, and programmatic documents at the federal and state levels.
- Establishing a Director of At-Risk Individuals within ASPR.

The full HHS working definition of "at-risk populations" (see box below) adopts a functional approach and establishes a flexible framework that encompasses a broad set of common needs irrespective of specific diagnoses, statuses, or labels (e.g., those with HIV, children, senior citizens). The approach is also designed to be congruent with the

definition of special needs as stated in the Department of Homeland Security (DHS) National Response Framework.

HHS Working Definition of At-risk Populations

Before, during, and after an incident, members of at-risk populations may have additional needs in one or more of the following functional areas:

- *Maintaining Independence*--Individuals in need of support that enables them to be independent in daily activities.
- *Communication*--Individuals who have limitations that interfere with the receipt of and response to information.
- *Transportation*--Individuals who cannot drive due to the presence of a disability or who do not have a vehicle.
- *Supervision*--Individuals who require the support of caregivers, family, or friends or have limited ability to cope in a new environment.
- *Medical Care*--Individuals who are not self-sufficient or do not have or have lost adequate support from caregivers and need assistance with managing medical conditions.

In addition to those individuals specifically recognized as at-risk in the Pandemic and All Hazards Preparedness Act, (i.e., children, senior citizens, and pregnant women) individuals who may need additional response assistance should include those who have disabilities; live in institutionalized settings; are from diverse cultures; have limited English proficiency or are non-English speaking; are transportation disadvantaged; have chronic medical disorders; and have pharmacological dependency.

Examples. We provide several examples of functional needs of at-risk individuals.

Example 1: An individual with HIV/AIDS who does not speak English and who contracts influenza could easily find herself in a precarious situation. In addition to treatment for influenza, her functional needs would be medical care (for the HIV/AIDS) and communication (her lack of English may keep her from hearing about where and how to access services). *Without addressing these functional needs, she cannot receive health care services.*

Example 2: The health status of an individual receiving home dialysis treatment and who relies on a local Para-transit system to attend medical appointments and shop for food could quickly become critical when drivers are scarce during a hurricane and transportation is suspended. His functional needs would be medical care (for dialysis) and transportation. *Without addressing these functional needs, he cannot receive health care services.*

Example 3: An individual with early stage Alzheimer's disease living on a limited income and supported by a part-time caregiver may become fearful and agitated during a bombing attack and unable to access additional care. (is not this a perfectly normal reaction under the circumstances?) Her functional needs would include maintaining independence; she might also need supervision if she decompensates. *Without addressing these functional needs, she cannot receive health care services.*

Example 4: A seven year old child with visual impairments contracts avian influenza and requires hospitalization. In addition to treatment for influenza, his functional needs include communication (due to visual impairment) and supervision (since he is seven). *Without addressing these functional needs, he cannot receive health care services.*

These kinds of at-risk individuals, along with their needs and concerns, must be addressed in all federal, state, Tribal, Territorial, and local emergency plans.

Importantly, the HHS definition focuses on the ability to access or receive medical care. However, it is also important to consider other types of needs as they affect the ability to prepare, evacuate, and respond adequately to the risk communication messages. Thus, we propose an expanded definition for the purposes of this report:

At-risk individuals are those who have, in addition to their event-related medical needs, social and structural needs that may interfere with their ability to access or receive medical care, prepare for an emergency, and take appropriate measures (e.g., evacuate, shelter-in-place, etc.) and respond adequately to risk communication messages during an emergency.

B. Risk Communication and Public Health Messaging Needs for At-Risk Populations

Many, at-risk populations are face specific communication challenges (Wingate, Perry, Campbell, David, and Weist, 2007). For example, those with low-literacy may not be able to interpret written messages. Thus, these groups may not be able to access and use the standard resources offered in emergency preparedness, planning, response, and recovery. In addition, the literature has shown that social, cultural, economic, and psychological factors, including age, class, race/ethnicity, and poverty, affect the ability of individuals to receive, process, and act upon messages (Tierney, 2000). For example, low-income populations cannot afford to buy and store extra food and other materials, such as extra medication to have in an emergency. Therefore, emergency messages should suggest alternative means of storing food and materials to help these populations overcome these economic barriers. For example, those with limited space could identify an alternative location for storing necessities and suggest purchasing materials in bulk with a group to save money. Cultural diversity and sensitivity are also important considerations, not only for various ethnic/racial groups but also for at-risk populations for which culture is a function of the type of disability or limitation they face in a disaster (e.g., the hearing-impaired, mobility restricted).

In a recent evaluation of the status of catastrophic and evacuation planning required by the 2006 DHS Appropriations Act (P.L. 109-90) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act (P.L. 109-59), DHS found clear deficiencies in communication and information-sharing strategies used by state and local emergency managers (DHS, 2006a, 2006b). The most pertinent finding from this evaluation was that emergency planning for at-risk populations is limited; for example, less than 25 percent of urban area plans were rated as having sufficient ability to provide expedited warning to custodial institutions or to provide pre-scripted, hazard-specific warnings.

To be effective in keeping the public safe, risk communication must allow for individuals to access, process, and act upon information provided about the risk (Mileti and Sorensen, 1990). At-risk populations may have unique needs related to each of these goals. Emergency preparedness plans as well as response and recovery

guidelines must include provisions for how to best inform and educate at-risk populations (Centers for Disease Control and Prevention [CDC] and HHS, 2006). As suggested by the PAHPA definition, many individuals will require messages specifically tailored to their functional needs. Messages should include information about the nature of the emergency as well as guidance about what to do given the particular circumstances.

Numerous federal statutes and plans call for including at-risk populations and each state is required to include those at-risk in their emergency preparedness plans. However, there is little evidence that the needs of these groups are being adequately addressed (Association of State and Territorial Health Officials [ASTHO], 2008; Ringel et al., 2007). In fact, we know from recent public health events and other emergencies that there are gaps in the ability of communities to respond to the special needs of at-risk populations. For example, Hurricane Katrina left 5,000 children without their families (National Center for Missing and Exploited Children, 2005). In New Orleans, 75 percent of all deaths were among senior citizens, yet only 15 percent of the city's total population is senior citizens (National Organization on Disability, 2006). In addition, less than 30 percent of sheltered populations had access to American Sign Language (ASL) interpreters, so individuals with hearing impairment had limited ability to receive information about risks and recovery (Wingate et al., 2007).

A recent study of gaps in the education and training to protect at-risk populations in public health emergencies found that most consumer-oriented aids and resources for at-risk populations, where they existed, were disseminated primarily through the Internet (Wingate et al., 2007). This medium of dissemination is likely to be inaccessible to many at-risk populations including the economically disadvantaged, the mentally ill, the visually impaired, low-literacy and non-English speaking individuals, young children, and older adults. Further, evidence suggests that some at-risk populations may prefer to rely on social networks or trusted community members to receive information and to guide decision making during a public health emergency (Eisenman, Cordasco, Asch, Golden, and Glik, 2007). This approach can strengthen trust in the community (Eisenman et al., 2007; Meredith, Eisenman, Rhodes, Ryan, and Long, 2007). These findings highlight the need for communicating about risk through appropriate channels and media before, during, and after emergencies and public health disasters (McGough, Frank, Tipton, Tinker, and Vaughan, 2005).

C. Policy and Organizing Framework for Risk Communication

Risk communication is typically defined as an interactive process that involves the exchange of information between parties about a sensitive issue (Commission on Risk Perception and Communication, Commission on Behavioral and Social Services and Education, Commission on Physical Sciences, and National Research Council, 1989). The two-way nature of this exchange is essential for giving people the information they need to make informed choices about potential risks they may encounter. Included in the risk communication process is some opportunity to elicit and respond to concerns,

opinions, reactions, and legal issues (e.g., mandated responsibilities and liability) related to the message. Even if the recipients of the information do not actively participate in the communication interaction, it is essential that they are comfortable with the quality of the information received (i.e., feel they have heard the truth and they received all of the information).

For this report, we present our findings within the context of guidance provided to the states by the CDC for renewing cooperative agreements, which provide funds to strengthen states' public health emergency preparedness (PHEP) capacity and build capability. As initially presented, the guidance was organized around Focus Areas, one of which specifically related to risk communication and health information dissemination (CDC & HHS, 2004). The guidance asked states to develop plans to meet the specific needs of at-risk populations, which included people with disabilities (PWD), people with serious mental illness, minority groups, non-English speakers, children, and senior citizens. In addition, the guidance identifies the general risk communication activities states were expected to perform under the funding they receive from the CDC. Specifically, the guidance encouraged states engage in five types of activities:

1. Develop response plans that include the media, public, partners, and community stakeholders.
2. Conduct trainings, drills, and exercises (including those that include risk communication for at-risk populations).
3. Coordinate risk communication planning with state/local agencies and non-government partners.
4. Train key state and local public health spokespersons in risk communication principles and standards.
5. Establish mechanisms to translate emergency messages into priority languages spoken.

More recent guidance has focused on a framework that makes the CDC's emergency response efforts more congruent with efforts of DHS. This guidance is organized around six CDC preparedness goals: Prevent, Detect and Report, Investigate, Control, Recover, and Improve (CDC and HHS, 2006). This guidance continues to emphasize the importance of including at-risk populations in emergency preparedness activities; documenting efforts to identify, quantify, and communicate with at-risk populations; and ensuring that these populations participate in all preparedness planning activities and exercises. It specifically asks states to coordinate activities within and across state and local jurisdictions, community organizations, health care providers and facilities, tribal organizations, etc. The guidance also continues to emphasize the support of preparedness education and training activities. A strong focus of this guidance is on being more efficient and reducing the time to respond/act by improving coordination among different entities.

We do not evaluate specific federal, state, or local risk communication activities in this report. However, the CDC guidance provides a useful framework for thinking about what might be considered expected or usual risk communication practice and to distinguish this from activities that may be considered more innovative (e.g., a practice that stands out from typical or core activities as determined by informants and the research team).

For this study, we framed our results in accordance with the five types of activities encouraged by the CDC guidance. Specifically, we explain risk communication activities as well as innovative practices identified in this research in terms of the development of response plans with the local community; trainings, drills and exercises; coordinated planning with government entities, training of risk communicators, and translation mechanisms. Our conclusions also consider how they map across phases of an emergency event in accordance with a Haddon Matrix (Haddon, 1972, 1980) which looks at factors and attributes before, during, and after an event. By utilizing this framework, one can then think about evaluating the relative importance of different factors and design interventions. This approach makes the risk communication practices more actionable.

D. Contribution of this Study

As we have learned from recent experiences, existing emergency plans are not often sufficient to meet the communication needs of the varied at-risk populations in the United States. Because little rigorous evidence is currently available in this area, we set out to identify what information does exist and to learn where more research is needed to fully inform policy makers about meeting the communication needs of at-risk populations. In this study, we use multiple strategies to identify existing practices, gaps that may still exist in developing and disseminating risk communication practices for at-risk populations, and promising approaches to reaching and preparing at-risk populations in the event of an emergency. This study focuses on the following policy questions:

- What public health preparedness outreach and risk communications strategies are used with senior citizens, PWD, and other at-risk populations, including their caregivers and providers of long-term care services? How have those strategies been translated into educational and outreach information?
- Which strategies, if any, demonstrate promising evidence of success--for example, through increased public awareness and compliance--and thus might inform broader public health preparedness planning for at-risk populations, including PWD and senior citizens?

- What can we learn from existing emergency preparedness efforts that might specifically support the Secretary's role in implementing the PAHPA and enhance emergency preparedness for at-risk populations?

To address these policy questions, the RAND team undertook three key activities: We: (1) reviewed the literature on emergency preparedness risk communication and public health messaging strategies, particularly for at-risk populations; (2) assembled a compendium of current emergency preparedness communication, outreach, and education materials/practices directed at at-risk individuals and their caregivers, including providers of long-term care services; and (3) conducted site visits in four states/regions regarding promising or emerging efforts to educate and inform at-risk populations and their providers. In this report, we present the results of our site visits, synthesize the findings from all of these efforts, and identify gaps in the practice of risk communication with at-risk populations. The interim reports from the literature review and compendium are included in Appendix A and Appendix B.¹

E. Report Organization

The remainder of this report includes the following sections:

- **Study methodology**, including a description of data sources, brief descriptions of the methods used to conduct each of the study components, and a discussion of study limitations.
- **Major findings**, synthesizing lessons learned from the literature review and compendium with that of the site visits, including discussions of existing evaluation efforts and the effectiveness of risk communication practices, risk communication challenges and barriers, and descriptions of innovative practices identified during our site visits.
- **Implications and conclusions**, including a discussion of future risk communication opportunities and key themes identified from the site visits, synthesized with lessons learned from the literature review and compendium.

¹ At the time that the interim reports were prepared, the process of establishing the HHS definition of “at-risk populations” was still in flux. The interim reports use the term *vulnerable populations* instead of *at-risk populations*.

II. STUDY METHODOLOGY

The study had three components:

1. **Literature review.** We reviewed the literature on emergency preparedness risk communication and public health messaging strategies, particularly for at-risk populations.
2. **Compendium search.** We assembled a compendium of current emergency preparedness communication, outreach, and education materials and practices directed at senior citizens, PWD, and other at-risk populations and their caregivers, including providers of long-term care services.
3. **Site visits.** We conducted interviews with representatives in four sites to reflect a wide variety of hazard and emergency situations regarding promising or emerging efforts to educate and inform at-risk populations and their caregivers and providers.

A. Literature Review

We reviewed the literature pertaining to the use of risk communication strategies for at-risk populations in any stages of emergency preparedness, response, or recovery (see Appendix A). Our review included peer-reviewed citations published in English since January 1, 2000. We reviewed the abstracts of 1,268 citations retrieved from four databases (PubMed, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, and the Social Science Citation Index) and deemed 40 citations relevant for inclusion in this review. Additionally, we searched all references dated 2000 or later in the National Cancer Institute's Risk Communication Bibliography² and we reviewed publications posted on the Center for Risk Communication website (<http://www.centerforriskcommunication.com/home.htm>). These websites, known to the authors through their previous work on the topic, were selected as supplemental search venues given their specific focus on risk communication to ensure no relevant content was missed and to validate the search strategy used in the larger databases. A citation was excluded from review if it addressed the consequences of a public health emergency without addressing risk communication; if it only addressed risk perception and not risk communication; if it only described a preparedness training program without describing the results of training; if it addressed interagency communication but not risk communication to the public; or if at-risk populations were not specifically and substantively referenced in the title and/or abstract of the citation.

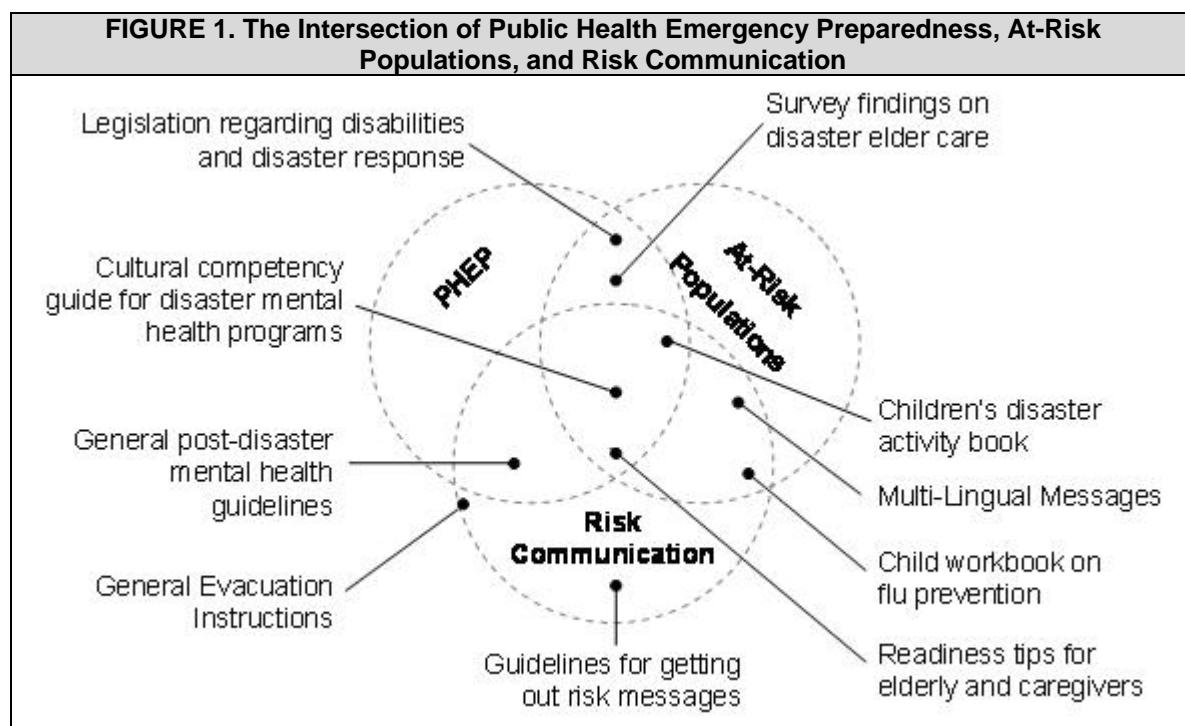
In addition to reviewing the peer-reviewed literature, we also reviewed selected statutes, regulations, and other related government and organizational reports. We

² See <http://cancercontrol.cancer.gov/RiskCommBib/>.

relied on direction from the ASPE Task Order Monitor and a targeted Web search to identify appropriate documents for review. More details about the literature review search methods are provided in Appendix A.

B. Compendium Search

We identified risk communication materials for at-risk populations by searching publicly available websites. We scanned and reviewed websites for communication materials that were at the intersection of three domains: PHEP, at-risk populations, and risk communication. Figure 1 depicts the intersection of these three domains and provides three examples of risk communication materials that fit in this intersection. Many of the materials we identified focused on some but not all of these domains. Figure 1 also provides examples of materials that do not fit in the intersection of the domains and hence are not included in the compendium.



The materials in our compendium largely focused on the needs or special circumstances of one or more at-risk populations (those with disabilities, children, and pregnant women, etc.), targeting members of those at-risk populations, their caregivers, and/or the provider communities that serve these populations. We included materials targeted at service providers only if the materials provided actionable recommendations for communicating with the at-risk populations, not merely general advice or considerations. We did not include materials that were simply translations of materials intended for the general population unless the materials devoted specific attention to the broader issues affecting limited English or non-English speakers. However, where materials that met inclusion criteria were translated, we noted these other languages.

Compendium search methods. We focused the compendium search on material that was both widely and readily available (from websites of major national organizations) through a snowball-sampling strategy that began with the identifying organizations whose focus was on public health and emergency preparedness, at-risk populations, or both. Specifically, team members and other RAND experts identified organizations targeting these areas. The project team searched the website of each organization, followed links from these to other websites one or two “clicks” deep, and cataloged eligible items. When links led to other rich sources of information, those sites were added to our existing list of organizations and returned to later for thorough searches.

Compendium sample. The compendium construction involved three progressive phases of review. Phase 1 focused on the identification of candidate materials to populate the compendium and catalogue key dimensions. We identified 309 different risk communication documents or other media from 73 different organizations. After removing 40 of these that we deemed outside the scope of the project and 27 that were unavailable for download and hence not immediately available to our audiences, 242 materials remained in the final compendium.

In Phase 2, each resource was reviewed by a randomly assigned team member, and catalogued data were double-checked. Reviewers were also instructed to identify exceptional materials (“all-stars”). Materials were identified as all-stars if they met two criteria: (1) if they conveyed actionable information; and (2) that the information is appropriate for the intended audience (i.e., were formatted and contained content matched to the target at-risk population). Of these, 41 (17 percent) were identified by Phase 2 reviewers as “all-stars.”

In Phase 3, four team members divided up materials flagged as “all-stars” and reviewed them in more depth to identify key messages and strategies. Each “all-star” resource was then rated on six dimensions, including the extent to which the resource clearly stated and addressed objectives, clearly stated and addressed risks associated with the public health emergency, reasonably covered issues salient to the specified vulnerable population(s), provided specific guidance on how to act on the advice given, was clear and easy to understand, and was engaging. More details about this task, including the compendium, are available in Appendix B.

C. Site Visits in Four Sites

The RAND team conducted interviews with 50 individuals via site visits in four states/regions across the country.

Criteria for choosing sites. We initially screened states using the criterion that they were exemplars with respect to PHEP planning. We based this criterion on other ongoing RAND work in emergency preparedness and prioritized exemplary sites based

on the size of the population and their distribution of at-risk populations, using statistics from the United States 2000 Census. We chose sites that represented disparate regions of the United States and had varied concentrations of urban or rural areas. We avoided sites that were over-studied (e.g., Louisiana) to reduce the research burden on potential informants and sites that would not be generalizable to the other sites (e.g., New York, given its extreme mix of urban and rural areas and its exposure to terrorism).

Although the initial site screening was based on exemplary work in PHEP, it was unclear if any state had yet emerged as exemplary in *risk communication* within emergency preparedness, especially as it related to risk communication with at-risk populations. We made many attempts to garner such information through informal conversations with emergency preparedness experts, emergency preparedness conference attendees, and Internet searches. We learned that although no state has yet been identified as exemplary in risk communication based on empirical evidence or consensus from public health informants, states that are leading innovative efforts in PHEP may have developed promising risk communication strategies for at-risk populations.

TABLE 1. Sites Selected, Disaster Types, and At-Risk Populations		
Site (Region)	Disaster Types	At-Risk Populations and Considerations
California (West)	Earthquakes, fires, floods, and landslides; terrorist threats to the Golden Gate Bridge and shipping ports	Diverse cultures (26% foreign-born) and non-English speakers (20% speak English "less than very well"); the vast majority (94%) of the 35 million residents live in urban areas in which commuting during disasters is a concern
Florida (South)	Hurricanes and flooding; receives evacuees from other states due to natural disasters	Senior citizens (17%); disabled (22%); and diverse cultures (17% foreign-born); and non-English speakers (10% speak English "less than very well")
Metropolitan Washington Area (Montgomery County, MD, and Washington, DC) (East)	Hurricanes, winter storms and flooding; domestic terrorism; as the nation's capital, this area remains a high-risk target for terrorism	Disabled (22%) and living below the federal poverty limit (>18%); relatively high percentage using the transportation system, which could make a large proportion of the population at-risk during a disaster, and a high proportion of African Americans (60%)
Oklahoma (Midwest)	Tornadoes, floods, and severe winter storms; domestic terrorism	Less populated state (3.5 million persons) with a relatively high number of rural persons living below the poverty limit (14%), disabled persons (22%), and diverse cultures (38 federally recognized Native American tribes)
SOURCES: Federal Emergency Management Agency Declared Disasters by Year or State, available at http://www.fema.gov/news/disaster_totals_annual.fema ; U.S. Census Bureau, 2000.		

Given this context, we chose sites for our study that: use innovative public health emergency practices or are considered "exemplars" in this field, have experienced a range of potential public health emergencies that other states would experience, represent the at-risk populations of interest, and are geographically diverse.

Sites selected for study. The sites selected for our study were California, Florida, the Metropolitan Washington Area, and Oklahoma (see Table 1). In the Metropolitan Washington Area, we focused on two jurisdictions: (1) Washington, DC; and (2) Montgomery County, Maryland. These sites are geographically diverse. Cumulatively, these areas experience a variety of natural disasters (i.e., earthquakes, fires, floods, landslides, ice storms, hurricanes, and tornadoes) as well as other emergencies and include areas at higher risk for terrorism. The sites are also areas with a greater than normal proportion of at-risk populations (e.g., senior citizens in Florida, non-English speaking populations in California).

Interview sample. We interviewed a total of 50 individuals working in emergency preparedness and risk communication with at-risk populations between May and July 2008. We used semi-structured interviews conducted in person or by phone, each lasting approximately 45 minutes to two hours long. Interviewees were a convenience sample based on referrals, cold calls, and contacts we made or had in the four sites.³ The distribution of interviewees by site was as follows: California (n=11), Metropolitan Washington Area (n=9), Florida (n=14), and Oklahoma (n=15). Interviews were conducted primarily with individuals from community-based organizations (CBOs), state and local departments of public health, and other state and local government agencies (e.g., Departments of Rehabilitation, Aging, or Social/Human Services) (see Table 2).

The CBOs that our informants belonged to overwhelmingly addressed issues of PWD (including older adults with disabilities) followed by organizations that served senior citizens. Two organizations addressed issues of pregnant women, children, non-English speaking populations, and those from diverse cultures.

TABLE 2. Interview Sample by Organizational Type (N = 50)		
Organizational Type	n	%
Community-based organizations	15	30
Departments of Public Health ^a	13	26
Government agency--other ^a	12	24
Miscellaneous experts ^b	4	8
Departments/Offices of Emergency Management ^a	4	8
Red Cross ^a	2	4
Total	50	100

a. Includes state and local offices.
b. People who consult on issues of at-risk populations.

Interview content. We developed an interview guide to elicit information about current risk communication practices (both that they were undertaking and other practices they are aware of in their area) with at-risk populations as they pertained to the broader study goals. Human subject protections and data safeguarding procedures

³ Initially, we identified and contacted 79 potential interview participants. However, some individuals did not respond to our request, others were unavailable, (e.g., deployed to the Iowa floods and other emergencies), yet others were not able to respond to the issues we wanted to address.

were approved by RAND's Human Subject Protection Committee. The protocol covered six domains:

- Emergency plans for risk communication (e.g., What plans are currently in place? Who is responsible for message formulation and delivery?).
- Risk communication for at-risk populations (e.g., Are at-risk populations specifically addressed in risk communication plans. Which at-risk populations are your focus? Are representatives from at-risk populations involved in the development and execution of plans/strategies?).
- Current risk communication practices for at-risk populations (e.g., How were strategies developed? What other organizations were involved? What modes of communication are you using?).
- Evaluation of risk communication strategies (e.g., Have you evaluated the impact of existing risk communication activities for at-risk populations? What have you learned?).
- Challenges/barriers to risk communication in at-risk populations.
- Innovative practices.

Data analysis. A team of five RAND staff took notes at each interview and compiled and analyzed the notes at the site. Site visit summaries were merged and compared across sites. We based our analyses on the six domains of the protocol and organized common themes across sites.

III. FINDINGS

Our discussion of study findings has five subsections. We first summarize some of the key risk communication planning and implementation activities planned and underway across the site visits (III A). We then highlight those innovative practices that are at the forefront of risk communication for at-risk populations (III B). We follow with a brief summary of evaluations undertaken to either assess needs of at-risk populations or to assess the impact of risk communication efforts (III C). We also describe the challenges and barriers to risk communication that sites face (III D), present future risk communication opportunities identified by informants (III E), and end this section by presenting some limitations (III F).

Within each of these subsections, we organize our findings in accordance with the CDC guidance framework introduced in the beginning of this report. Thus, we highlight the risk communication activities for at-risk populations in five areas: (1) developing emergency response plans that include the media, public, partners, and stakeholders; (2) conducting trainings, drills, and exercises that include risk communication for at-risk populations; (3) coordinating risk communication planning with state/local agencies and non-government partners; (4) training key state and local public health spokespersons in risk communication principles and standards; and (5) establishing mechanisms to translate emergency messages into priority languages spoken.

A. Risk Communication Activities for At-Risk Populations

General findings. Our interviews with state and local informants revealed common themes regarding how communities are currently developing and implementing their risk communication strategies for at-risk populations. Across states, planning is initiated at the state level, but most message adaptation and strategy development for reaching specific at-risk populations is conducted at the local level. As an example, in California, officials approach risk communication using a top-down guidance approach. Specifically, lead state agencies within the California Department of Public Health, such as the Public Health Emergency Preparedness Office and the Office of Emergency Services, provide broad guidance to the local agencies on how to deal with emergency situations, and they monitor how the agencies follow those guidelines. The California Department of Aging serves in an intermediary role between the Office of Emergency Services and CBOs. Specifically, the Department receives incident information, communicates it to their representatives “on the ground,” and then sends information from the ground it back up the pipeline. This minimizes the burden on the front lines.

Oklahoma also uses a top-down approach to risk communication practices. For example, state legislation guides how the state responds and communicates in the event of an emergency. The Oklahoma Department of Emergency Management generally takes the lead in developing and disseminating most messages before,

during, and after an emergency. The content of those messages may involve input from the Oklahoma Departments of Health and Rehabilitative Services or other state agencies, depending on the issues involved. In this state, the local/county governments adopt state messaging unchanged or adapt it/add to it as needed for their local communities.

At the state level, risk communication efforts are generally not specific with respect to different at-risk populations. Most state informants reported that the message content does not need to be tailored, but that there may be situations in which the method of message dissemination should be altered to meet the needs of at-risk populations (e.g., people with hearing impairments or those with limited English proficiency). This tailoring is generally performed at the CBO or agency level rather than by the state and is consistent with findings from the compendium, where we found that non-government organizations often specifically tailored message content to specific at-risk populations (e.g., transportation for those who are mobility impaired or sheltering for those with guide dogs).

Tailoring messages to each at-risk population is resource-intensive, and most state informants are not trained in messaging for each population. For example, in Florida and Oklahoma, the local/county governments use the state templates for messaging and then add messages that may be relevant to their local communities. Some county administrators manage multiple counties with limited staff (sometimes without a PIO) and may pass the messages on to their residents unchanged. Other counties have full or part-time PIOs and can tailor the messages more to the needs of the local community; however, this tailoring may be related to local emergency conditions and not the needs of specific local populations.

On the other hand, all states prioritized the translation of messages into multiple languages, depending on the need in the population. For example, the Oklahoma Department of Health regularly translates preparedness materials into Spanish but uses CDC-prepared materials translated into other languages spoken in the state. It is difficult to find the resources needed to translate into other languages that are spoken by smaller groups, especially when many of these groups are also proficient in English.

CBOs are important assets in serving as intermediaries in the process of communicating with different populations. Our literature review emphasized their importance in presenting messages from trusted members of the community. However, some states were more inclined to actively involve CBOs in the risk communication process than others. Nevertheless, these community partnership approaches are consistent with the priorities for risk communication in the CDC guidance.

States tend to develop some pre-planned, standardized messages around emergency events that are likely to occur every year in their state, such as heat waves, tornadoes, fires, or hurricanes. Many states have lists of sample key messages that are ready to disseminate. Informants also noted the importance of factors emphasized in the compendium report (Appendix B): Messages should be crisp and easily

understandable, and include actionable recommendations. Messages should be empathetic, describe the scope of the problem, list how the health department (or other agencies) are responding, explain the risk to residents, and tell the intended audience what actions can/should be taken (e.g., be alert, seek medical treatment, where to go for more information).

In the compendium of risk communications, we found that when risk communications specified the type of emergency, it was most often a natural disaster. In each of the sites visited, this same pattern was found, with sites targeting the natural disasters most common to their specific locations. For example, in California, the key events are earthquakes, heat, and fires, though guidance also covers terrorism and bioterrorism events. In Oklahoma, the emphasis is on tornados and ice storms, with some attention to wildfires and floods. Florida is concerned primarily with hurricanes and flooding, and the Metropolitan Washington Area is focused on bioterrorism, hurricanes, electrical storms, and flooding. The Washington, DC, metro area in particular is poised to respond to threats of terrorism given the events of 9/11 and the subsequent anthrax attacks. In addition, given CDC and other federal funding and the priorities they set, there is also a significant focus on developing preparedness plans and messaging for pandemic influenza.

- 1. Developing emergency response plans that include the media, public, partners, and stakeholders.** We learned about several activities across states that involve partnering with key stakeholders, including community members, agencies, and other organizations, to develop emergency response plans. The desirability of such strategies is supported by the results of our literature review, which identified community-based participatory approaches to message development as especially promising. We highlight some examples:

- *Plans for local community partners to address at-risk populations.* The California Department of Health Services developed a risk communication tool kit for use by local health departments in the state; the tool kit includes ideas about how to communicate with various populations but leaves the majority of content decisions to local planners. California is also working with community organizations, such as libraries, that can distribute guidebooks to their constituents. In addition, the state is partnering with Kaiser Permanente to develop three video public service announcements on seasonal and pandemic influenza. The state holds ethnic media roundtables where PIO staff meet with a wide variety of ethnic media organizations to discuss risk communication messages and to establish and maintain professional ties.

In Miami-Dade, Florida, there is a database containing information on 10 percent of the persons at-risk in the county. The county uses this information to work with CBOs to meet the needs of at-risk populations. The information can be organized by evacuation zone, level of care, primary language, whether the person is bed-bound, and a variety of other characteristics. CBOs often inform clients about an emergency and develop disaster guides with the

at-risk population they serve. This tool has high utility but because it is difficult to obtain such information for the majority of people at-risk, its reach is limited.

- *Plans for PWD.* Together, the Florida health and disability agencies have developed a 12-page preparedness guide for PWD. The Florida Statewide Disability Coordinator: (1) works with the health department and the Centers for Independent Living to learn how best to communicate with consumers of those agencies; (2) establishes procedures to provide effective communication within shelters; and (3) works with each county to establish contact with ASL interpreters who could be available in shelters during an emergency. In addition, the Developmental Disabilities Council is creating a manual to help PWD prepare for disasters, know what to include in emergency packets, and know what to do in the event of a disaster.
- *Outreach for senior citizens.* Oklahoma is in the process of developing the Push Partner Program. This is a plan for disseminating mass immunizations or prophylaxis in case of pandemic flu or other public health emergency. The state health department will partner with different organizations that have outreach to populations who might not otherwise be able to get to a central dispensing site. This includes older adults and people with disabilities. The state is developing a statewide memorandum of understanding with the Aging Services Division within the Oklahoma Department of Human Services be the conduit to the Area Agencies on Aging across the state to push information to older adults and others who are at-risk.

Specific messages have not yet been developed; however, the Push Partner Program offers a unique opportunity for getting messages out to at-risk populations through a community partnership approach. Indeed, these extra efforts to reach senior citizens are especially valuable: our review of the literature suggests that this population is less likely to access sources of information, such as the Internet, that are becoming increasingly popular media for disseminating emergency risk communication. (The literature review also identified the Internet as a successful delivery method for those who do have access.)

- *Communication channels for the hearing-impaired.* Oklahoma Weather Alert Remote Notification (OK-WARN) is a program developed in partnership with the Oklahoma Departments of Emergency Management and Rehabilitative Services, the National Weather Service, and other organizations to disseminate emergency messages via email and pagers to those who are deaf or hard-of-hearing. Interested individuals register themselves with this program and, in the event of a weather alert or an emergency, they are notified by the OK-WARN system. Message recipients must supply their own pager or other communication device, but the service is free. This strategy is consistent with findings from the literature review suggesting that risk

communication needs to be locally relevant in order to achieve effectiveness. States generally create broad messages for the population as a whole, which local staff tailor for their specific populations.

- *Core messaging tools.* Montgomery County in the Metropolitan Washington Area is using several strategies for developing plans and communicating with the major at-risk populations. The core approach relies on Plan 9 (Montgomery County, Maryland) or Be Ready DC (Washington, DC), a county-wide educational campaign and tool kit emphasizing preparing a disaster kit with nine essential items needed in the event of an emergency: water, food, clothes, medications, flashlight, can opener, radio, hygiene items, and first-aid. Plan 9 distills these nine essential tips to keep in mind during an emergency, which CBO leaders can use with their constituents to prepare them for an emergency. Another advantage of this approach is that the message is concrete and serves as a centralized messaging strategy that can be standardized on all preparedness plans and materials shared with the community. It also ensures that folks get the same types of information in an easy-to-use format. Community partners have enhanced this tool for use with specific at-risk populations, not by altering the content of Plan 9, but by adjusting the way this information is shared.

Both Department of Health interview informants in Montgomery County and Washington, DC, are partnering with a local CBO to craft and disseminate the messages. For example, in Washington, DC, city agencies have worked together to create Be Ready DC: easy-to-use materials for creating a personal or family emergency plan. Unlike in Montgomery County, where many efforts are housed in the Maryland Department of Health, the DC Departments of Homeland Security and Emergency Management coordinate Be Ready DC efforts. Be Ready DC is a centralized place to obtain emergency updates as well. These practices are particularly action oriented, a clear principle identified from the compendium.

2. Conducting trainings, drills, and exercises. We highlight two examples of training activities.

- *Communication exercises.* In collaboration with the Sheriffs Department, the California Department of Health and Human Services, through its PIO, conducts periodic exercises to ensure that responders are properly trained for helping at-risk populations during a disaster. For example, one exercise involved training responders to provide rapid outreach to non-English speaking people from different cultures in different languages. As emphasized in the literature review, it is important that risk communication efforts for at-risk populations go beyond straight translation to also teach cultural competence (e.g., address linguistic barriers and incorporate cultural beliefs) to ensure comprehension.

- *Risk communication training.* In Oklahoma, the PIO in the Oklahoma Department of Emergency Management provides regular training sessions and monthly opportunities for continuing education to PIOs across the state (including those who work for state and local government agencies as well as those who are responsible for messaging in private organizations). In addition to these efforts, the Oklahoma Department of Human Services provides risk communication training annually to PIOs, focusing on developing and disseminating emergency messages. A community disability organization is training advocates of PWD, and this training includes an emergency planning component. These approaches highlight the importance of cultural competency and participatory involvement of community members, as discussed in the results of the literature review.

3. Coordinating risk communication planning with state and local agencies and non-government partners. We identified a number of ongoing activities involving coordination of risk communication at our study sites.

- *Training the public to address the needs of at-risk populations.* The Red Cross Bay Area Chapter in California works with businesses and apartment managers to train residents on first-aid and cardiac pulmonary resuscitation, with a focus on the health aspects of disasters, including having extra medication available for people with chronic illness.
- *Training for PWD.* The Preparenow.org program is a coalition of local partners that includes risk communication to focus on PWD and non-English speakers, frail senior citizens, and recent immigrants to ensure that the needs and concerns of people at-risk are addressed in emergency preparedness and response. (“Secure your stuff” and “Have a disaster kit” are key messages.) Numerous materials on various types of disasters are available for download.
- *Contracting with disability organizations.* One mechanism that facilitates dissemination of risk communication messages in California includes contracting with disability organizations to leverage resources. For example, one state accessed a large volunteer base of trained instructors and presenters who were skilled in different languages and were from different cultures. Their materials were also available in Braille. They also conduct grassroots activities in the community and work in collaboration with other agencies. Key messages they promote are to (1) make a plan with family; (2) have a disaster kit with basic supplies; and (3) be informed--get appropriate and correct information during a disaster. Often these messages need tailoring to at-risk populations, for example, providing large print for senior citizens, identifying lower-cost strategies for low-income residents to assemble a disaster kit, and developing school-based programs to help parents prepare with their children.

- 4. Training key state and local public health spokespersons to communicate with at-risk populations.** Several training activities with a focus on emergency preparedness and response for at-risk populations were notable across the sites.

 - *Community health care and other providers as spokespersons.* In California, guidelines for message development include attention to cultural sensitivity, the needs of multiple community stakeholders, and mental health considerations. Populations that are identified as needing tailored messages include those with limited literacy, the homeless, immigrants, individuals with limited or no proficiency with English, those with visual or hearing impairments; individuals with disabilities, senior citizens, and children. Informants in this state have also developed an inventory of messages for “confirmed” and “unconfirmed” events. In addition to the general public, health care and other community providers are often the target audience for risk communication that occurs prior to an event. Messages tailored to these providers often include strategies for contacting clients and developing plans for their clients to obtain care in an emergency. The state disseminates best practices to local health departments through complementary resources--the Crisis and Emergency Risk Communication (CERC) Tool kit that is based on CDCynergy (Covello, 2008) and the CDC’s CERC course (<http://www.cdc.gov/communication/emergency/cerc.htm>). How local departments train spokespersons varies by community.
 - *Weather reporters as spokespersons.* Oklahoma relies heavily on the community and the “Oklahoma Standard” (a high standard of civic behavior and generosity in helping others), encouraging residents to check on their neighbors following an emergency to ensure that they are okay, to help them if evacuation is ordered, or to determine their needs. Weather reporters are also key assets in the state in communicating messages in preparation for, during, and in the immediate aftermath of a disaster. They help to reinforce messages for safety during a tornado (where you should be, what you should have with you, and how to keep yourself safe) and are important communications conduits--widely watched and respected. The results of the literature review suggested that weather reporters are a particularly trusted source of emergency information; they are seen as non-political, objective messengers who appear on the easily accessed communication medium of television.
- 5. Establishing mechanisms to translate emergency messages into priority languages.** Informants at all the sites we visited indicated that they translated risk communication materials into multiple languages. In California, in response to the fires and extreme heat of summer 2008, several key risk communication messages were translated into priority languages. For example, a one-pager in multiple languages explained the N95 respirator and how to use it appropriately, and another provided summer heat tips, with information on preventing and treating heat related illness (translated in 12 languages). Cultural and social

factors that may affect communication such as mistrust may also require different dissemination channels to increase the impact of messages. For example, we also learned about the importance of CBOs that are closely linked to non-English speaking populations in helping to ameliorate concerns of immigrants they will be reported to the immigration and naturalization service and mistrust of public health officials. As with training, messages and messengers must also be culturally competent in order for communication to be successful.

B. Innovative Practices

We now highlight risk communication activities that are particularly innovative strategies for reaching at-risk populations. We deemed a practice as innovative if it stood out from typical or core activities as determined by informants and the research team. These particular practices have strong promise for increasing public awareness of risks in advance of an emergency, and increasing compliance with public health recommendations during and following an emergency. We were not able to list all of the innovative practices but have attempted to emphasize those deemed innovative by informants and that, based on the literature review and compendium, appear to move the field beyond typical practice.

1. Developing emergency response plans that include the media, public, partners, and stakeholders.

Below we describe several promising practices pertaining to involving key groups in emergency planning.

- *Involving at-risk populations in the planning process.* Although other sites (Florida and DC) also involve at-risk populations in risk communication activities, the level of involvement in California was particularly noteworthy. California emergency response planners have 45 partners actively participating on committees to reach everyone in the state. These community participants not only guide disaster planning, policies, and approaches; they are trained members working on verifiable outcomes and goals to make risk communication plans usable across groups. The primary goal of the network is to get command center emergency information back to the partner organizations through real-time communication channels (email, wireless devices) and for community partners to return feedback about their local needs. All of the 110 individuals involved in this network are integrally linked into the warning center system around the clock. Individuals are selected from organizations because they have decision making capacities and other resources for at-risk populations (e.g., are sign language interpreters, have a wheelchair accessible vehicle). The committees strive to use “people first” language that attributes positive labels to people, such as “people with disabilities,” and avoids negative labels, such as “the handicapped” or “the disabled.” The committees also emphasize functional approaches to disaster planning and response. As noted previously, this community participation approach is well supported by the literature review. This is also one means of

enhancing the comprehensiveness of the risk communications--a theme identified from the compendium of risk communications--since local partners are more likely to be aware of needs of at-risk populations specific to their communities.

- *Establishing partnerships to prepare families.* April is Family Preparedness Month in Oklahoma. McReady is a private-public partnership designed to prepare families for emergencies, particularly weather-related emergencies. McDonald's restaurants across the state displayed a variety of brochures available to the public including a family preparedness guide, a coloring book for kids on weather safety, a brochure about the OK-WARN program (a program for communicating with the deaf and hard-of-hearing), and a preparedness guide for sheltering in place. The Oklahoma Department of Emergency Management also partners with two local television stations and their weather reporter to visit schools and give special presentations. They have developed a DVD that is distributed to all schools in the state and includes Oklahoma's First Lady, a popular weather reporter in the state, and the Oklahoma Gas and Electric's mascot talking about preparedness issues. Finally, the Oklahoma Department of Emergency Management and its McReady partners attend community safety fairs to present information about emergency preparedness. In 2009, the state plans to disseminate preparedness materials in Spanish through the McReady program. This substantial collaboration effort is consistent with the theme of community engagement identified in the compendium review.
- *Helping pregnant women prepare.* As part of home visits to pregnant women served by maternal and child health funding, the case workers in Montgomery County discuss Plan 9 in the context of pregnancy planning. During these visits, the workers check how women have progressed in their planning using the Plan 9 assessment (e.g., water, flashlight). The program has developed an additional assessment form based on case management forms for other populations, in which they adapted the Plan 9 list for the specific supply needs of pregnant or parenting women, such as formula, Tylenol, and diapers. This inclusion of pregnant women as a population in need of specific risk communication messages addressed a gap in current research: Both the literature review and compendium found limited attention to the preparedness needs of pregnant women.
- *Using technology to map the needs of at-risk populations.* Florida purchased and developed software to determine and map community resources, with attention to the needs of at-risk populations. Like the vulnerability mapping tool that RAND is developing, it would be useful to use such a tool to import local Census data for identifying and locating at-risk populations. The tool could provide information for planners on where to target resources before, during, and after an emergency. Our literature review highlighted the central role of vulnerability assessment in program development.

2. **Conducting trainings, drills, and exercises.** The sites also informed us about some innovative training activities being conducted.

 - *Including children with disabilities in exercises and drills.* This is particularly important for school-based exercises in which those at-risk are often excluded, despite the fact that they constitute the majority of individuals who will need help in that setting. Even simple knowledge about how to exit the classroom must be clearly communicated. This approach being used in California is consistent with the literature. Several of the citations we reviewed highlighted the special needs of children and pointed to school-based communication interventions as particularly effective in reaching this population. This approach also directly addresses two themes that arose from the compendium of risk communications: tailoring the format to the audience and using active approaches to engage that audience.
 - *Engaging the community.* Florida is working with high school youth as “mitigators” for disasters to raise awareness among youth in their schools and their families. Youth are also sent to senior centers and other senior housing facilities to conduct preparedness awareness sessions with senior citizens. Having youth interact with senior citizens makes emergency preparedness more collaborative and enjoyable for those involved. Some of the methods of interaction were to play “windy bingo” and “hurricane jeopardy,” activities that were well-received. The games were created by the youth (so they learned in the process) and enjoyed by the residents. The games also stimulated discussion about emergency preparedness. Senior citizens, in turn, shared their experiences in disasters over their lifetime so that some intergenerational learning took place. Bilingual youth are also involved as community educators with at-risk populations, including migrant camp areas and other neighborhoods whose residents may respond better to these interactive forms of communication than to typical didactic messaging.
3. **Coordinating risk communication planning with state and local agencies and non-government partners.** Our informants identified as innovative several coordination activities that involve planning with the community to better reach at-risk populations.

 - *Involving the faith community.* Two innovative strategies for reaching out to the faith community stood out in Montgomery County. The Gospel Program is an effort to partner with local churches to disseminate Plan 9 materials. During the 2007-2008 year, the program received money to provide survival kits for congregants. The initiative focuses primarily on work within congregations, but there are plans to use bus advertising to reach out to congregants in the community. In addition, Montgomery County has developed the Strengthening the Strengtheners program, which uses parish nurses to conduct outreach. The parish nurses and other community nurses

use a core set of materials to train others about emergency preparedness in their respective congregations. These strategies illustrate the power of community participation.

- *Regular meetings among PIOs across the state.* In Florida, PIOs use meetings to discuss important messaging issues and recent disasters. This serves two purposes: It provides continuing education, and it ensures that PIOs across the state know each other and are not just, in the words of one informant, “exchanging business cards on the day of the disaster.”
- *Employing Americans with Disabilities Act (ADA; P.L. 101-336) coordinators in all county departments.* Florida also works with a centralized ADA office and created a statewide disability position to help enforce ADA compliance. This strategy facilitates local tailoring of messages for PWD by providing a local opportunity for engaging these audiences more directly. Having a statewide disability position to help enforce ADA compliance better ensures that messages are made available in formats that are accessible to the relevant audiences (e.g., large print with sign language interpreter, appropriate color contrast, sound options, etc.).
- *Making emergency information readily available.* Oklahoma uses a 211 phone line to make information available statewide. It serves as a step-down version of 911 for non-emergency needs. Staff in the call centers are available to answer questions about a variety of issues and either already have or will be provided with all messages that come from the Oklahoma Department of Emergency Management and other agencies, including the Oklahoma Department of Health, in the event of an emergency. The 211 call center receives the same messages that are sent to the media in the event of an emergency. The call center will also feed back information to emergency management staff about the kinds of questions that callers are asking so that messages can be further tailored and refined. Various agencies are involved in advertising the availability of 211 through TV spots, ads on buses, website announcements, etc. These practices are consistent with an overarching conclusion of the literature review: To achieve effective emergency risk communication, offer frequent messages in multiple modes that are locally and personally relevant.

4. Training key state and local public health spokespersons in risk communication. We identified a number of innovative practices involving training in the sites we studied.

- *Building risk communication skills.* In terms of training, local public health officials in California receive a risk communication tool kit for use with all populations, including those at-risk. The tool kit earned California the Public Relations Society of America 2005 PRism award for excellence in public relations. The kit trains direct service providers to be better prepared and to

- *Providing materials to first responders.* In Oklahoma, a consortium of organizations representing PWD disseminates and provides training for a pocket-sized flip chart with guidelines for managing emergency response. The guidelines include a broad range of at-risk populations: senior citizens; those with service animals, those with mobility impairments; those with autism; individuals who are deaf, hard-of-hearing, blind, or visually impaired; those with cognitive disabilities; those with multiple chemical sensitivities; and individuals who are mentally ill. The demand for this information has been great, and the consortium is in the process of developing an on-line version for Fire and Rescue to use in their trucks. Exactly this sort of simple yet flexible tool was highlighted as an “all-star” from the compendium, since it addresses the needs of the audience and provides concrete motivations for recommended actions.
- *Conducting exercises and drills that include at-risk populations.* Including at-risk populations in drills can reveal risk communication problems: For example, one drill in Florida showed that police did not know how to communicate with deaf persons and, as a consequence, were perceived as threatening by deaf persons. Because their emergency management department implements the drills through a modular system, they can select different components that are relevant to emphasize communication with particular at-risk populations. This approach to risk communication is consistent with tailoring the format to the audience and using active approaches to engage that audience, key principles arising from the compendium.
- *Developing action plans for homebound populations.* Montgomery County, Maryland, developed a curriculum for case managers and home health aides. The curriculum trains aides and case managers to help clients prepare a “File for Life”—a list of medications and provider information that is placed on a refrigerator for family members and emergency medical technicians in the case of an emergency. Aides also work with clients to determine what needs to be replaced in their emergency kits (water, perishable items) and sometimes these aides shop for clients or ask family members to help shop.

5. Establishing mechanisms to translate emergency messages into priority languages. Below we highlight two strategies used to translate materials for the needs of at-risk populations. The first example addresses not only language translation but also strategies for making cultural competency an integral component of translation. The second example highlights the use of

interpersonal and social networks through community organizations which are important channels for reaching at-risk populations.

- *Tailoring messages for Latinos.* Montgomery County, Maryland, also started the development of a telenovela⁴ integrating emergency preparedness messages for Latinos. Although lack of funding has hampered continuation of the effort, the idea represents a creative strategy for reaching this community. The lack of translation to other languages was noted with regards to the risk communications in the compendium.
- *Networking with the faith community.* Montgomery County also readily involves the faith community to help with translation as with the Plan 9 materials (see section 3, “Coordinating”).

C. Evaluation of Risk Communication Strategies

Overview. The literature on evaluating emergency risk communications is “fraught with challenges” (Thomas, Vanderford, and Quinn, 2008) and our literature review and site visits revealed that evaluation studies of risk communication for at-risk populations were also limited. However, there were a few examples that stood out, including the Latino program in Montgomery County, Maryland, and other evaluations to map at-risk populations used in California and Oklahoma (described below). Given the dearth of effectiveness evaluations, we also asked site visit informants whether they conduct any kind of vulnerability assessments to guide their approach to risk communication with at-risk populations because these approaches can either facilitate evaluation or, in the case of exercising, can provide feedback for improving future activities. Specifically, we inquired about whether they collect information on the size and location of at-risk populations to gauge the communication needs of a specific population during an emergency. We also asked informants about whether they conduct any formal (or informal) evaluation of the impact of communication activities that have been conducted. For example, do they survey their at-risk constituents to assess whether communication efforts were successful at increasing preparedness behaviors and response following actual emergencies?

Vulnerability assessments. The literature points to vulnerability assessments as a key part of formative research in the pre-event phase. Vulnerability assessments can include geographic information systems (GIS) as a method to map the location of at-risk populations so that communication campaigns can be targeted accordingly. Use of GIS to plan communication strategies is already underway in one state. In addition to GIS mapping, many states are using community-based participatory approaches to foster preparation, response, and recovery. As described previously, most of the states we studied employed community partnerships and networks to build capacity by better understanding local concerns and identifying ways to best address them (Quinn, 2008).

⁴ A limited run television serial melodrama modeled after those made famous in Latin America.

Assets mapping can be used to elicit perspectives of at-risk populations through the process and can engage communities in identifying key strengths, assets, and partners that may be useful in risk communication activities. Moving beyond GIS, it would enable health departments to also have a comprehensive picture of at-risk communities including key natural leaders, important community locations that could serve as gathering places, critical partners such as specific churches or CBOs, and non-traditional communication channels. Other methods of assessment (e.g., telephone focus groups with professionals representing at-risk populations) are in use as well. Additionally, though more challenging, formative research is still possible at the time of an event. In fact, rapid assessment that can help to identify any hidden audiences, identify specific environmental factors that may increase risk, uncover critical audience questions and concerns, and identify any potential trusted spokespersons or partners is proposed by the literature (Quinn, Thomas, and McAllister, 2005).

Oklahoma's health department conducted a study in August 2004 to better identify their at-risk populations and determine their needs. They employed a consulting firm to run focus groups by telephone with professionals representing their key groups: Native Americans, immigrants and refugees, minorities, homeless and low-income populations, PWD, and senior citizens. That assessment concluded that lack of proficiency with English, cultural differences, and limited literacy were the greatest barriers faced by the state's at-risk populations. Consistent with the literature, these professionals highlighted the importance for at-risk populations to receive reliable information delivered by trusted spokespersons.

Effectiveness evaluation. As noted previously, evaluation studies to assess the impact of risk communication are limited. Nonetheless, we did learn about several notable evaluation activities from both a systemic and programmatic level (Thomas et al., 2008). For example, California's emergency services recently surveyed county and city emergency managers about the use of registries for tracking at-risk populations. The survey highlighted the need to increase manager awareness about the utility of registries for enhancing emergency preparedness, response, and recovery efforts. Survey findings also revealed concerns about privacy among constituents, which may explain the limited use of registries to track PWD in the community.

In addition, the California Department of Health uses a very rigorous message development methodology that incorporates evaluation. It begins with CDC risk communication messages, which are then adapted to the needs of particular at-risk populations and, subsequently, sent to CDC technical and medical personnel, who check the adapted versions for accuracy. When the risk communication product is both medically and technically correct and understandable for the relevant population and at the appropriate reading level, they translate the product into 12 languages. They then conduct focus groups to make sure that the translation actually conveys the intended message. However, this process takes about 6-12 months, so it cannot be used to develop messages about new events as they emerge (for example, as with the sudden wave of fires in 2008). Some chapters of the state Red Cross conduct periodic

telephone surveys with members of the community about preparation to inform future program design.

Oklahoma has exercised most aspects of its response plans, including risk communication. Combining exercises to test different aspects of response plans with after-action evaluation provide Oklahoma with insight into what works, what does not, and what needs to be modified for future response planning and response efforts. As an example of learning from an exercise, Oklahoma conducted an influenza clinic exercise during flu season and learned from the effort that they need to repeat messages many times and in many different formats to get the target populations to come to the clinics. To make risk communication most effective in the future, public health officials will put messages in the newspaper every day for a week up to the start of the flu clinic; they will also broadcast messages on the radio every day at different times to ensure that the messages reach the widest possible audience. They also learned that it helps to distribute flyers at the places where people frequent (e.g., Wal-Mart). These strategies are consistent with recommendations from the literature to offer frequent messages in multiple modes that are locally accessible and personally relevant. This example also demonstrates the value of a multi-modal risk communication strategy, which was identified in the compendium as potentially increasing attention and comprehension. This practice provides an example of how evaluation can be incorporated into regular activities to improve preparedness and response.

The Metropolitan Washington Area has evaluated several of its programs. For example, in Montgomery County, Maryland, the faith-based programs had several committee members perform outreach activities with their own organizations. One organization conducted a follow-up survey six months after the outreach, but the response was poor. Most of the participants had not yet started preparing a kit, although they reported knowing that they should do so. In addition, homebound care training was evaluated with a survey of aides at multiple assessments to determine whether clients had obtained the core items in the Plan 9 list, and case manager training is evaluated through required reporting every six months. Last year, Montgomery County informants evaluated a program for pregnant women by reviewing records to assess whether case managers were engaging pregnant women in preparedness planning. The reviewers saw increases in the number of women who included supplies (such as formula) for their child in their preparedness kits.

Another example of evaluation is for the Latino program in Montgomery County. There, informants conducted a small pilot evaluation focusing on health promotores and developed a curriculum to train health promoters based on their research. They have worked with six promotores who are active in a variety of venues (e.g., through parent-teacher associations and schools, churches, neighbors) in order to encourage their creativity.

The evaluation, which was performed at two sites, revealed that health promotores do affect recipients' actions with regard to emergency planning. Informants learned that "one-shot" interventions do not work well. Efforts must include repetition as well as

precise and simple messages. A structured training that includes follow-up is required to ensure that outreach workers are communicating the right message, and to provide incentives (such as food at trainings or gift certificates) for doing the work since they are volunteers.

Use of health promotores is consistent with recommendations from the literature to enlist community members as partners in message development and dissemination. This approach leverages existing community resources and capitalizes on the willingness (as suggested by the literature) of community members to be actively involved in emergency preparedness, response, and recovery efforts. It also augments the resources available to achieve a core recommendation from the literature review: communicate early, communicate often, and communicate in accessible and personally relevant ways.

D. Challenges and Barriers to Risk Communication in At-Risk Populations

We specifically asked site visit informants about challenges or barriers they experienced in conducting or planning risk communication activities targeting at-risk populations. Below we summarize some of the issues that were mentioned. We first address issues that were raised about specific at-risk populations and then address broader, more general challenges and barriers that were raised, such as politics, funding, and government structure.

Lack of resources for addressing diversity. Site visit informants reported that their constituents are very diverse ethnically, making it nearly impossible to translate risk communication materials into all the languages needed. Also, non-native English and non-English speakers often miss a lot of information contained in written materials, requiring direct one-on-one communication, which is not financially feasible. Translation is a necessary (and relatively low-resource) step to reaching non-English speakers. However, as noted above, emergency risk communication must also be culturally competent. Achieving cultural competency in the development and delivery of emergency risk communication is a more resource-intensive endeavor than translation. Cultural competence requires a significant investment of time and training. Partnering with CBOs that are competent to serve their own communities is one way to enhance the competence of the health department staff, build the capacity of the CBO staff, increase trust and credibility, and ultimately strengthen the relevance of the messages, channels and spokespersons.

Informants also mentioned several risk communication challenges or barriers that were not specific to any particular at-risk population, but instead applied to at-risk populations in general. One such challenge was how to prioritize among the many messages that needed communicating. Informants said that the range of messages that need to be communicated to at-risk populations is broad because different at-risk populations may face different issues during emergencies. Similarly, informants from all

four sites noted the difficulty of being able to reach at-risk populations both because they are dispersed geographically and because they are hard to find. A third, somewhat related challenge, is that funding to provide adequate risk communication to at-risk populations is limited. For example, many community-based providers serving at-risk populations cannot afford computers, which are necessary to receive emergency information electronically. Also, with cuts in state and county budgets, some government staff reported that it was becoming more difficult to justify conducting risk communication activities specifically for at-risk populations, as one informant put it, "when they are only 25 percent of the population." Although definitions vary between states, those with functional needs may constitute much more than 25 percent. Finally, many said it was difficult to access at-risk communities because they were difficult to reach or because they mistrusted the government or agencies. More focus on pre-event education is one means to address these barriers and to lay a stronger foundation for preparedness. By providing ongoing risk education and community engagement, communities are likely to be better able to respond during an emergency which in turn, increases community capacity and lessons can be incorporated into subsequent risk education (Quinn, 2008).

At-risk individuals have limited resources for emergency preparedness.

Informants reported that lower-income persons often believe that they do not have money to prepare for emergencies. Many lower-income persons reserve their resources for surviving now rather than spending them on preparing for the future. In fact, some persons living in small, crowded areas have no space to store preparedness provisions and, in some cases, low-income persons who receive pre-packaged meals to use in case of an emergency or shelter-in-place may eat those meals ahead of time because they lack food daily under ordinary circumstances. Due to limited resources, individuals at-risk may also be less likely to respond to emergency messages even if they receive them. For example, individuals may not evacuate because they lack transportation or a might need special attention that they feel they are unlikely to receive if they evacuate.

Special challenges for PWD. Sites also reported barriers to conducting or planning risk communication for PWD. One such challenge is finding them. Anyone receiving disability-related state or federal funding can be easily identified, but there are large numbers of people who do qualify but who will not pursue government funding and, as such, are more difficult to locate. Another challenge is the difficulty of getting TV stations to provide ASL interpreters for the deaf. Oftentimes, emergency message text runs across the picture of the interpreter or logos are placed over the ASL interpreters, making them impossible to see. Some informants reported that they have witnessed emergency response personnel not responding appropriately to the needs of PWD during an emergency, which heightens concerns about whether at-risk populations will be properly assisted. Community engagement in planning or the use of community-based participatory research and/or a community advisory board can sensitize first responders and strengthen communication planning (Quinn, 2008).

Poor trust and privacy concerns. At-risk populations may lack trust in the emergency response community. We learned from informants that PWD have

experienced challenges when trying to access shelters; not all shelters follow ADA guidelines regarding accessibility. A common concern across the sites was that the disabled community is not always involved in the planning process, which also can damage the community's trust in first responders and government agencies responsible for public health and emergency response. Informants from all sites also mentioned that undocumented persons have recently witnessed increased deportation activities. As a result, many undocumented individuals have become more reluctant to add their names to at-risk population registries, to seek preparedness information, to respond to evacuation requests, or to ask for emergency assistance. They also mistrust messages from the government or from service messages assuring them that they will not be deported if they do seek assistance. Community engagement would also be a significant step toward addressing the issues of mistrust. For example, in communities that have specific churches with established ministries for immigrants, CBOs, and even immigration lawyers, involving them as partners is essential for reaching immigrant communities.

Difficulty reaching the socially isolated. Few informants reported challenges or barriers to conducting risk communication that were specific to senior citizens. However, we learned that senior citizens may be difficult to reach if they have weak social networks or do not receive any social services. Others informants suggested that some senior citizens cannot easily remember information and may also become easily confused about how to prepare for and respond to emergencies. Their suggested solution was to repeat preparedness messages for senior citizens and also develop messages that target caregivers and providers so that they may be able to intervene on an elder's behalf.

Negative attitudes about preparedness and planning. Site visit informants mentioned that effectively communicating with at-risk populations was difficult because of the attitudes of their target audience. Not surprisingly, one prominent attitude was complacency. Informants were quick to report that most people, whether or not they belong to an at-risk population, think about emergency preparation after an emergency, not beforehand. Audiences also maintain a certain amount of disbelief about the potential for an emergency to arise. Other informants said it was difficult for people to understand that victims most likely would not receive prompt assistance during an emergency, making their personal preparation essential. A few informants also suggested that some people are suspicious when they receive preparedness information and demand, "Why are you asking us to do this? Is there something you know that we don't know?" Another challenge was trying to avoid "information overload;" people tend to feel overwhelmed when faced with too much information and disengage. The use of community-based participatory methods is one way to identify some of these obstacles as well as potential solutions from community partners' perspectives.

E. Future Risk Communication Opportunities

We asked all site visit informants to tell us, leaving aside any barriers, what would they like to see implemented to further improve risk communication content and strategies for disseminating information to at-risk populations in their state. In this section, we summarize what we learned from the sites as possible actions that could be taken to address the various types of barriers and what they see as opportunities for future risk communication. In some cases, what informants at one site identified as a gap in their current risk communication activities was actually being addressed in practice at another site; we highlight some of these cases in the discussion below. Informants across the sites we visited indicated that they would like more opportunities to learn about activities in other states that could be applied in their state or region. *This could be accomplished through the development of networks across states and localities to facilitate sharing of information. Use of existing networks coordinated by the CDC or through state and local government association annual meetings is a potential vehicle for such an effort. Specific partners for whom this report could be useful in developing further training activities are ASTHO and the National Association of City and County Health Officials (NACCHO).*

Targeting at-risk populations. A common concern raised by representatives of both Oklahoma and the Metropolitan Washington Area was how best to develop methods for identifying the types and locations of at-risk populations. In Oklahoma, there is no statewide understanding of where at-risk populations are located, making it difficult to target message delivery and develop plans for providing relevant populations with the appropriate response in the event of an emergency. Informants said they would like to see greater use of GIS technology to map, on a statewide basis, where different at-risk populations reside and to relay to appropriate agencies at the state or local level information about targeting response and allocating resources.

The literature review identified GIS as an innovative and promising tool in vulnerability assessments to effectively focus communication campaigns on areas in which at-risk populations are concentrated. Thus, across research and practice, use of *GIS may play an increasing role in emergency risk communication for at-risk populations. Informants also stated that they would like to develop a registry for at-risk populations that could be used in the event of an emergency to further target response and allocate resources. Both California and Florida have developed approaches for identifying the location of and developing registries for different at-risk populations. The lessons learned from their efforts may be useful to other states. RAND recently developed a tool that can import local Census data for identifying and locating at-risk populations; this may be useful in assisting states with resource planning.*

Informants in Oklahoma would like to see more messages disseminated appropriately for older adults and PWD. For example, it is useful to talk slowly and clearly (e.g., on the radio) for those with hearing impairments to and provide appropriate color contrast and big type for print and Internet messages for those with vision impairments. A California informant also called for developing new technology for the

hearing-impaired community to push out information to wireless devices, pagers, TTY (teletypewriter for communication with the deaf), and other social network service systems. *The OK-WARN program in Oklahoma may serve as a useful template for developing similar resources in other states.*

Oklahoma and Florida informants also thought that the relevant utilities companies (e.g., electricity and gas) may be important partners in identifying where at-risk populations live and in disseminating messages to them. In particular, developing a registry for those who are ventilator-dependent or are otherwise dependent on electrical devices can help identify where at-risk groups reside and help evacuate them to a safer environment if power is lost. In addition, a registry may also serve as a way to prioritize the utility company's response in the event that power is lost, as it would provide information about who needs power restored most urgently.

Partnering with at-risk populations. Informants from all of the states recognized the value of community partners in message dissemination and suggested that state and local officials recruit them to support risk communication activities. Community partners may be closest to the target at-risk populations and can be a valuable conduit for messaging. They can also help feed information back to state and local officials, who can help respond to the needs of local populations. Informants suggested identifying appropriately trained representatives from various at-risk populations as a way to facilitate access to these populations and to garner trust among the recipients of the message. Another recommendation from informants in Oklahoma was to capitalize on the trusting relationship citizens might have (a trust supported by the literature) in their weather reporters; they are regularly involved in communicating weather-related messages, and their prominence and authority make them well-suited for communicating messages about other types of emergencies.

Among the community partners identified as important collaborators for risk communication, faith communities were singled out as important assets in Oklahoma and DC. In many parts of the country, citizens are often well connected to their religious institutions, and the institutions stay in good communication with their members through the use of bulletins and volunteers. Bulletins can be used to disseminate important messages, and volunteers can also be important for checking in on individuals who may be at-risk in the event of an emergency. *Communities could enhance collaboration by training volunteers as a useful resource for helping at-risk groups prepare for an emergency. In addition, there are also opportunities for mutual learning that would allow for formative research, improve health departments' cultural competence, and enhance the capacity of organizations, including faith-based organizations, to serve their communities.*

Formatting messages. Informants from Oklahoma indicated they would like to develop more messages in a graphic form for those with limited ability to learn (e.g., those with intellectual disabilities, children). These could be most easily received by a wide range of at-risk populations, including those who do not speak English. This may also be an efficient use of resources if the same graphic message could be used for

multiple at-risk populations. Several of the themes drawn from the compendium echo these assertions, with multi-modal presentations increasing the usefulness to multiple audiences. We learned from informants in California and Florida that they are developing messages in pictorial format in order to reach the broadest audience. *Other states and localities could benefit from formatting their risk communication materials for use across multiple at-risk populations.*

Tailoring messages. In addition, many of the informants we spoke with would like to see more messages tailored to the needs of the population, recognizing that the same message may not apply to all at-risk groups. Even within the same at-risk population, messages may need to be tailored. For example, there are older adults or people with disabilities who may not speak English. In addition, messages that benefit an at-risk group may need to be targeted to multiple audiences (e.g., the individual, their caregivers, and their providers). In the compendium, 53 percent of the included resources targeted individuals at-risk, 53 percent targeted caregivers, and 38 percent targeted providers (i.e., there was often overlap). As another example, message tailoring for people with vision challenges would necessarily be provided in Braille and be segmented for both the individual and the caregiver. Informants from Oklahoma and Florida wished for greater financial resources to poll their residents to identify needs and learn where different at-risk populations reside. Thus, use of approaches that offer messages in multiple and graphic formats, tailor communication to the needs of specific groups, follow recommendations from the literature to offer frequent messages in multiple modes that are locally and personally relevant, enlist the participation of community members in message development and delivery, may boost communication for at-risk populations.

Training. Informants in Oklahoma and DC also wanted to train direct service providers (e.g., personal attendants, home health care providers, staff in doctor's offices) on emergency preparedness for at-risk populations, and to encourage them to have their own plans in place and to help prepare their clients (e.g., ensure they have an emergency kit). Informants recommended that direct service providers receive specific training on information management similar to what a PIO would learn so that they could better delegate authority and ensure a positive response. They also suggested empowering clients to make decisions about how they want to respond in the event of an emergency rather than having the provider make all decisions about evacuation, etc. California informants noted the importance of cross-training so that both emergency preparedness and response professionals as well as at-risk populations learn from each other's perspectives.

Another area of potential is to adapt Functional Assessment Services Teams, which deploy 8-10 people trained to help people with different disabilities during disasters, to focus on risk communication for those groups. Each representative would target an at-risk group and deliver messages to that group in the most appropriate manner. While California and Florida are doing this in some counties at shelters where PWD stay, we know of no adaptations focusing on risk communication.

F. Limitations

There are a few limitations worth noting; first, by only including peer-reviewed literature in our review, we may have eliminated books or other reports that include relevant information. However, by focusing on peer-reviewed literature, we are confident that the conclusions drawn from the literature review and the guidance of these conclusions for subsequent project tasks grounded our study in empirical evidence. The date boundaries of our review may have also affected our results; as the public health emergency risk communication literature published since 2000 focuses heavily on the events surrounding Hurricanes Katrina and Rita, our results may be biased towards risk communication regarding natural disasters and the at-risk populations represented in the Gulf States. Finally, though we reviewed a relatively small sample of statutes, regulations, and related reports deemed relevant for inclusion added a useful dimension of evidence to the review, because of the limited applicability of the data abstraction form in characterizing these references, our ability to synthesize these citations into the larger review of peer-reviewed literature was somewhat limited.

The compendium targeted materials that are widely available (e.g., through national organizations) and easily accessible on the Internet. Given the wide-ranging set of possible sources, we chose to use a snowball-sampling strategy. This strategy may have limited the search, unintentionally excluding some materials, such as those not available on the Internet. However, the compendium is not intended to be a census of risk communication: such a database would not be cost-effective to create and would be quickly outdated. Hence, caution should be used when making generalizations from the compendium. The identification of “all-star” materials was a subjective process, and one designed to identify exemplary materials rather than to provide a detailed evaluation of each resource (although inter-rater agreement was high). This part of the task was more qualitative, although structure was provided through the use of a standardized score sheet. Still, the subjective nature of these reviews should be acknowledged, and conclusions taken as suggestive.

Another limitation of our site visit approach is that we are not able to generalize the findings beyond the particular perspectives of the informants we interviewed. Although we strived to speak with informants in all of the organizations listed in Table 2, differences in state structures and access to individuals across the types did not allow for uniform coverage of informant type across states. In addition, our description of risk communication activities does not represent the totality of any state’s efforts in the area. Nevertheless, the site visits provide a snapshot of emergency preparedness activities at the state and local levels where we were able to collect information. As such, these findings provide a sense of how some local and state planners approach risk communication to address the needs of at-risk populations in emergencies.

IV. STUDY CONCLUSIONS AND POLICY CONSIDERATIONS

We draw a number of conclusions from our assessment of risk communication strategies and practices. First, the field, defined by the intersection of public health emergency risk communication and at-risk populations, is relatively new. Only a small proportion of the literature in this domain addresses at-risk populations within the context of public health risk communication (see Appendix A). Of the literature identified, most is descriptive in nature, suggesting a need for more rigorous evaluations of risk communication strategies that target at-risk populations. In her review of risk communication activities during public health emergencies, Glik (2007) also noted the need for systematic evaluations of the effectiveness of risk communication, particularly during actual events. We found that across states and risk communication activities, evaluation efforts range widely in terms of their methodology and rigor. More systematic evaluation to determine the impact of risk communication for at-risk populations would provide valuable information to guide the field in enhancing preparedness, response, and recovery.

A relatively wide range of risk communication resources was identified in the compendium search (see Appendix B). Among the subset of materials we judged to be “all-stars” and reviewed in greater depth, we confirmed many of the findings from the literature review.

For example, in the literature review, weather reporters were identified as a preferred risk communication messenger during emergencies. Accordingly, interviews in Oklahoma confirmed the importance of weather reporters as key communicators to the public because they are trusted community members and they provide essential weather-related information as well as reinforce messages about how viewers can protect themselves.

Our interviews also confirmed the literature review findings that children have special needs during disasters and therefore that school-based settings are an important venue for exercises and drills.

Finally, our literature review, compendium search, and interviews provided triangulating information about how risk communication for at-risk populations is used and highlighted those activities that are particularly innovative and that hold promise for broader use across states. As suggested by the results of the literature review, using community-based participatory approaches to designing and disseminating risk communication for at-risk populations, and offering messages in multiple modes that are locally and personally relevant, are promising practices that would have many benefits but are currently underutilized.

Table 3 summarizes the key factors of risk communication as they apply to at-risk populations organized within the five CDC guidance areas (rows) across each phase of an emergency event (columns). This table follows the form of a Haddon Matrix (Haddon, 1972, 1980). The matrix illustrates how particular features of effective risk communication map to the phase in terms of when certain activities should take place. Accordingly, our key conclusions and policy considerations are delineated by emergency phase (pre-event, event, and post-event), highlighting the risk communication strategies that are commonly used and suggesting which of these hold particular promise for future success. We also discuss implications for future PHEP.

TABLE 3. Matrix for Organizing Risk Communication Practices for At-Risk Populations by Phase of Emergency and Risk Communication Practice Area			
Risk Communication Practice Area	Event Phase		
	Pre-Event	During Event	Post-Event/Recovery
Plan Development	Establishing planning committees that include representatives of at-risk populations	N/A	N/A
Drills/Exercises	Strengthening training by directly addressing the needs of at-risk populations	N/A	Evaluate the impact of risk communication efforts
Coordination	Community involvement	Use new technology to enhance communication reach	Share lessons learned across organizations and geographic regions
Spokesperson Training	Present clear facts with actionable plans	Present clear facts with actionable plans	N/A
Translation Mechanisms	Tailor the risk communication to the unique needs of at-risk populations	Offer risk communication in multiple modes and multiple languages	Develop messaging for post-event risk communication

NOTE: N/A = not applicable for this phase.

1. Risk Communication Pre-Event

State officials in public health and other agencies have made a number of advancements in risk communication, such as developing tool kits to guide local agencies and developing core messages for use with common types of disasters, particularly for natural disasters, as described in Section III (e.g., involving at-risk populations in the planning process and tailoring messages for Latinos). There has also been promising growth in activities designed specifically for at-risk populations, including the availability of messages in different languages and formats for those who do not speak English or who have disabilities, respectively.

However, as evidenced by our evaluation (including the literature review, the compendium, and our site visits), many barriers to effective risk communication remain,

in part because of limited resources to enable specific tailoring to meet the needs of such a diversity of at-risk groups. Some possible solutions that may not be particularly resource-intensive may enhance public awareness and increase compliance with public health recommendations. These include the following activities *before* an event takes place:

- ***Establish planning committees that include representatives of at-risk populations.*** Including representatives who are themselves at-risk in planning committees can inform the types of risk communication strategies as well as approaches for message dissemination. Even if some groups are not represented on committees, involving them in other preparation activities (e.g., including children in school-based drills or senior citizens in influenza vaccination clinic exercises) will provide valuable lessons for future disasters. In addition, involving these representatives in the development and review of communication materials can ensure that messages are appropriately crafted.
- ***Strengthen training activities by directly addressing the needs of at-risk populations.*** One potential way to address public concerns is to strengthen educational activities by including CBOs, agencies, and other partners in the training itself. Enhanced training for those delivering messages regarding the special needs of at-risk populations may aid mutual learning, increase cultural competence, increase trust among members of the potentially at-risk population and strengthen health departments, agency, and CBO capacity. In addition, techniques such as message framing may be particularly useful. Specifically, framing messages to anticipate concerns expressed by at-risk populations (e.g., privacy and distrust) as well as by first responders (e.g., discomfort with PWD) that include points of resistance (Chapman and Lupton, 1994) may be particularly useful strategies for communicating risk to at-risk populations. Thus, trainings, drills, and exercises should incorporate the unique aspects of at-risk populations.
- ***Tailor risk communication to the functional needs of at-risk populations.*** Risk communication should closely match the perspectives, technical abilities, and concerns of the intended audience (National Research Council, 1989). Having at-risk population representatives involved in planning will facilitate message development to meet the specific needs of different groups. In particular, including checklists and self-assessments as part of risk communication development can help the recipient customize the material to their personal needs. Social marketing strategies, such as creating specific messages for audiences from diverse backgrounds and with diverse needs, are a useful approach to enhancing communication and associated compliance (Andreason, 1995; Kotler, 1989; Manoff, 1985). Identifying in advance who is most in need of help can more precisely direct preparation and response efforts (Kasperson, 1986), including communication channels. In particular, it is important to consider the likelihood that certain factors need to be addressed for successful emergency risk communication. As an example, it is highly likely that

PWD will be dependent on assistance from others given their limited independence and will also require different communication channels. Non-English speakers will require language translation and bilingual spokespersons with the appropriate social and cultural competencies and those from diverse cultures will also have a high likelihood of mistrusting authorities. Also, risk communication should be tailored to the developmental abilities of children and adapted for adults with intellectual disabilities. The use of data to identify characteristics of target audiences--such as through surveys, exploratory group sessions (focus groups), checklists, demographic profiles, and interviews--provides valuable information for guiding the design of risk communication messages and approaches to dissemination (Covello, McCallum, and Pavlova, 1989). In addition, embedding risk communication activities into other ongoing activities such as adding written materials to standard program or agency mailings using strategies that work in other community settings, may help engage individuals from at-risk populations to participate in preparedness.

2. Risk Communication During an Event

Dissemination of effective risk communication messages to at-risk populations during an emergency depends on the extent to which messages can be crafted so that they are “locally relevant and culturally competent” (Glik, 2007). Reynolds (2007) suggests considering three critical questions in determining how to communicate with at-risk populations during a crisis or emergency:

1. For which population during a crisis is a specialized message or communication product required, if any?
2. Are cultural differences among non-dominant group members of the United States significant when attempting to communicate health and safety information during a public health emergency?
3. Are communication messages from government authorities involved in the disaster response received differently by non-dominant groups?

Accordingly, local relevance and cultural competence can be more nuanced and therefore more challenging to address. Based on what we learned from this evaluation, the following strategies for use during an emergency hold the most promise and are supported by the literature:

- ***Offer risk communications in multiple modes and multiple languages.*** “A picture is worth a thousand words” and pictorial media can effectively communicate across the majority of at-risk populations, excepting those with visual impairments, for whom alternative modes of communication are necessary. Most information designed for informing at-risk populations about risk in emergencies is made available only on the Internet, yet this mode of communication may not be accessible to many at-risk populations (Wingate et

al., 2007). Other forms of communication, such as reliance on social networks in local communities, may be more effective for such groups (Eisenman et al., 2007). Further, translation of materials into other languages should ensure that proper dialectical differences and colloquialisms are used to increase reach and uptake by that population. In addition, crafting messages so that they can be most easily understood in whichever medium they are presented is critical. For example, speaking slowly and in an audible voice is necessary for television/radio messaging, presenting messages in large font and with appropriate color contrast is necessary for print messages, etc. Finally, the Internet was identified as a viable mode of risk communication but it is important to ensure that all individuals, including PWD, have access to that information on the websites. In fact, state and local government websites are legally obligated to provide equal access to information for PWD under the ADA (<http://www.ada.gov/websites2.htm>; <http://www.section508.gov>).

- **Present clear facts with actionable plans.** Consistent with the risk communication literature (Lundgren, 1994; Mileti, Fitzpatrick, and Farhar, 1992; Renn and Levine, 1991; Sandman, 2003), a strong theme from the site visits was the importance for messages to deliver balanced facts that incorporate the most timely and accurate information. The facts about the risks should be accompanied by information about what individuals can do to protect themselves. Specifically, risk messages should allow recipients to access, confirm, and take direct action (Mileti and Sorensen, 1990). Further, these actions need to be presented in terms that populations at-risk can embrace. As an example, it is insufficient to recommend evacuation without qualifying how someone in a wheelchair might comply; they might need to be advised to ask for help. Therefore, training for spokespersons delivering risk communication messages should emphasize these principles. However, to enhance reach to at-risk populations, it will be important to broaden the number and types of professionals available and trained in risk communication beyond the health department PIO. Additionally, use of message mapping (Covello, 2008) is a useful tool to help address mental noise and focus practitioners on creation of clear, jargon-free messages.
- **Employ new technology to enhance communication reach.** Recognizing that, for some states and localities, resources may limit the types of technologies that are available for enhancing risk communication, it is still important to use whatever methods are available. Thus, videophones, help lines, and mass phone alerts can significantly broaden the outreach of communications beyond what the print, Internet, radio, and television media can provide, particularly if some power sources are down. However, some older technologies such as phone trees, neighborhood watches, and bull horns may be the best option for reaching audiences that are unable to access the newer technologies.
- **Use strategies to identify and track at-risk populations.** Our site visits also suggested that registries are a promising planning tool for identifying and

communicating with at-risk populations and that the information in those registries can significantly improve the targeting of risk communication materials during an emergency. However, use of registries comes with a number of challenges. One concern is that such systems rely on PWD to register themselves, and the simple act of signing up for a registry may create a false sense of security; individuals will still need to be prepared, regardless of whether they are on a registry. Additionally, a registry is only as effective as the response capability. Thus, liability of emergency managers who maintain those registries is of concern. To address these barriers, site visit informants suggested that instead of implementing plans focused on knowing where to locate at-risk populations, emergency managers should integrate service providers from CBOs and local government agencies into a broader registry to address all phases of emergency management (planning, exercising, coordinating, training, and translation/cultural adaptation). In addition, a rapid assessment at the time of the event may uncover subtle cultural issues that need to be addressed either through changing the message, altering the channels, using a different spokesperson or engaging a community partner to help enhance credibility and trust (Quinn, 2008). Finally, as mentioned previously, GIS systems can be an effective tool for mapping the location of at-risk populations.

3. Risk Communication Post-Event

Following an emergency, the emphasis for communicating risk to at-risk populations is on learning how to address gaps that were identified in previous events and on how to minimize future problems. These are some of the themes revealed across our efforts pertaining to the *recovery* phase:

- ***Develop messaging for post-event risk communication.*** In our review of existing risk communication practices, we identified relatively few risk communication materials intended for the post-event response. However, informants shared that this continues to be a gap area, as the recovery from a major event may require a set of long-term strategies that must be shared clearly with community members. As we summarized earlier, at-risk populations are not only at increased risk of poor consequences during an event; they often are more susceptible to challenges in establishing daily life after disaster. Risk communication efforts that include messages for these populations (e.g., how to access specialized resources; eligibility for specific social services) are critical.
- ***Evaluate the impact of risk communication efforts.*** From our literature review and interviews, we learned that there is little formal evaluation of past efforts to inform communities about risk. Such evaluations, including after-action reports, may become more common as more experience is gained and as state governments face increasing disasters due to pandemic flu, bioterrorism, and other public health threats (Glik, 2007). Building a capacity for systematic evaluations to track messages, monitor media coverage, and survey recipients following emergencies accompanying responses will be key to identifying what

works and what does not work to increase public awareness and compliance. Of course, evaluation is also important before an event and we learned that few of the practices we identified through site visits and interviews are being evaluated to determine their reach and/or effectiveness.

- **Share lessons learned across organizations and geographic regions.** Once the acute stage of a disaster has subsided, communications can focus on after-action reports and other evaluation activities, including sharing experiences and lessons with other counties and states. Use of community forums and engagement of community partners in the evaluation will ultimately help to improve the capacity of agencies and their cultural competence with at-risk populations.

4. Implications for Future Public Health Emergency Activities

A key theme in our discussions with informants across sites was the importance of using “people first” language that does not inappropriately attribute a disability to those individuals. This feedback reaffirms a function-based approach, which focuses on individual capabilities rather than on labels or broad generalizations about populations, and is consistent with what we learned in the interviews. This suggests that most risk communication messages and dissemination strategies should be designed to match the abilities and resources of individuals, rather than their disabilities.

In addition, many aspects of communicating risks in the face of emergencies apply to all individuals, regardless of whether they are from an at-risk population. Further, most individuals at-risk are able to communicate in some common ways. For example, all groups except those with visual impairments have the ability to interpret pictorial material, particularly if it is simple and does not require translation to multiple languages. Supplementing imagery with audio messages is likely to address the needs of many at-risk populations.

However, we also learned that some content of emergency risk communication is specific to a particular at-risk group. Thus, consistent with implementing PAHPA with a functional-capabilities approach, message tailoring for particular groups should be based on functional areas, including independence, transportation, need for supervision, communication, and medical care needs. For example, individuals who need assistance with aspects of daily living may need information about how to involve their caregiver in preparing for and responding to disasters. Another example is that people who use wheelchairs need to know how to evacuate “on wheels.”

The results presented in this report could inform federal, state, tribal, territorial, and local emergency preparedness planning on how to address the unique needs of at-risk populations in existing emergency preparedness, response, and recovery plans. We have highlighted several risk communication practices that could be modified and adopted by others. We have also described some of challenges or barriers that others might encounter when attempting to plan and execute their own risk communication activities.

V. CONSIDERATIONS FOR ADDITIONAL RESEARCH

Through the course of this study, we identified a number of areas that warrant additional research. These considerations are organized in two groups: (1) questions that were within the scope of the project, but that we were not able to address given the lack of evidence; and (2) questions that were beyond the scope of the project.

Because states are not currently collecting this information, we were unable to gather and present data to:

- Evaluate the effectiveness of new technology for reaching at-risk populations.
- Study the impact of education and outreach campaigns on the awareness, attitudes, and preparedness of at-risk populations.
- Discover what methods of dissemination work best for each at-risk population.
- Identify risk communication activities for at-risk populations that were not covered in our literature review, compendium, or site visits (e.g., people without transportation, people with pharmacological dependence, mental illness).

Some questions were not addressable within the scope of this project. More evidence is needed to:

- Understand exposure following disasters and individual responses about message receipt, comprehension, and actions taken.
- Design, implement, and study the effect of a cross-state mechanism for sharing tools and lessons learned regarding disaster management for at-risk populations.
- Develop risk communication materials that address at-risk populations for the post-event/recovery stage of disasters.
- Identify additional ways to involve the community and at-risk populations themselves in communication for planning, response and recovery.
- Consider other aspects of being at-risk beyond function that may affect how messages are received--geographic isolation, socioeconomic issues such as affordability of emergency kits, etc.

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ANALYSIS OF RISK COMMUNICATION STRATEGIES AND APPROACHES WITH AT-RISK POPULATIONS TO ENHANCE EMERGENCY PREPAREDNESS, RESPONSE, AND RECOVERY: FINAL REPORT

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APPENDIX A: Literature Review

HTML: <http://aspe.hhs.gov/daltcp/reports/2008/emergfrA.htm>
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APPENDIX B: Compendium of Risk Communications

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