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Psychological and Physical Impacts of Extreme Events on Older Adults: Implications for Communications

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Impacts of Extreme Events on Older Adults

Authors:

Erin McClelland, MA, King's College London, Department of War Studies

Richard Amlôt, PhD, Emergency Response Department, Health Protection Agency

M Brooke Rogers, PhD, King's College London, Department of War Studies

G James Rubin, PhD, King's College London, Department of Psychological Medicine

John Tesh, BA (Hons), King's College London, Department of War Studies

Julia M Pearce, PhD, King's College London, Department of War Studies

Address for correspondence and reprints:

Dr. Julia Pearce,

Room K7.05,

Department of War Studies,

Strand Campus,

London, WC2R 2LS

Tel: +44 (0)207 848 7282

Email: julia.pearce@kcl.ac.uk

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INTRODUCTION:

Disasters and public health events broadly affect communities and societies as a whole, but they also carry specific risks and outcomes for particular population groups. These high-risk groups have been categorized in a variety of ways including by geography¹, ethnicity², and age³. Older adults in particular are frequently highlighted as a sub-population requiring specific attention or care. The 2008 UK Cabinet Office report 'Identifying People who are vulnerable in a crisis' recognizes thirteen vulnerable groups including 'older people'⁴ and the UK's national adaptation plan for climate change has a particular focus on measures to mitigate the expected effects of changes in the climate on these groups, and in particular the elderly⁵. The United States Department of Health and Human Services lists older adults among the special populations for emergency preparedness and disaster⁶. In addition, the WHO recognises older individuals as a vulnerable group in emergencies⁷. Although various reports and agencies categorize older adults differently, definitions usually restrict it to a minimum age of between 60 and 65 years.

As witnessed during Hurricane Katrina and the 2011 earthquake in Japan, older adults suffer from increased morbidity and mortality rates. Prior to Hurricane Katrina, individuals over the age of 60 represented 15% of the population of New Orleans, however this group accounted for approximately 75% of the bodies found⁸. Following the Great East Japan earthquake in March 2011, an estimated 95% of those who perished were above age 60⁹. That older adults appear to be disproportionately affected by disasters not only represents an area of humanitarian concern, but also highlights the challenges that responding organisations face as they work to support affected populations.

It is possible that older adults also suffer disproportionately from the secondary effects of major disasters. These are defined, in UK law for example, as effects which result from the primary hazard and significantly impact on human welfare, including: homelessness (in the sense of a need for evacuation from an individual's customary place of residence) and damage to property; disruption of a supply of money, food, water, energy or fuel; and disruption of facilities for transport, or services relating to health¹⁰. The need to pay attention to these secondary impacts on essential services has been accentuated in recent years because they are increasingly interlinked so that disruptions in one tend to result in disruptions to others.

Aside from the moral implications of meeting the needs of the vulnerable in our societies, the proportion of older adults in society is growing. For example, in the UK the percentage of the population over the age of 65 is expected to increase from one-in-six to one-in-four by 2050¹¹. The 2001 United Nations 'World Population Ageing: 1950-2050' report noted that this move toward an aging population is a global development. In 1950 the proportion of older adults was 8%, increasing in 2000 to 10% and expected to rise as high as 21% by 2050¹². As the older population grows, so too does the need to ensure adequate, practical and appropriate measures are in place to offset the specific risks of extreme events within this sub-population. Increased vulnerability of older adults during extreme events is already recognized as a matter of policy in many areas. Seasonal vaccine priority lists include older adults as a target category¹³ and heat wave preparedness identifies older adults as an at-risk group¹⁴. However, this approach and its implementation needs to be reviewed for extreme events more broadly, particularly in the realm of crisis communication.

The importance of promoting a culture of resilience and supporting community disaster resilience – i.e. the ability of communities to withstand, respond to and recover from extreme events – is increasingly recognised^{15,16}. The promotion of resilience for older adults can be achieved by: : having clear and open responsibilities for risk-related decision-making; rehearsing adaptable crisis management arrangements, with good communication across boundaries; having a good understanding of the risks of emergencies and how they can impact different groups; and, potentially most importantly, by communicating a common understanding of risk in order to mobilise responsible individuals, and organisations to invest in preparedness¹⁵. Fostering resilience better prepares individuals, including vulnerable groups like older adults, to manage risks¹⁷.

This paper examines the impacts of extreme events on older adults, and focuses on how effective communication can improve health outcomes. It considers to what extent approaches to risk communication need to reflect the differences between this group and the rest of the population in terms of their abilities to cope with the psychological impacts (where older people may in fact be more robust than those younger than them) and the physiological impacts (where the opposite is more likely to be true). The usefulness of communication to offset extreme events is considered at a variety of stages including: pre-event (risk communication as education); the alerting stage (warning); post-onset (informing decisions during an ongoing crisis); and post-event (including recovery).

We identified primary sources for this review by searching electronic databases (Web of Science and Ovid) using combinations of search terms including ‘old*’, ‘senior’, ‘elder*’, ‘disaster’, ‘hurricane’, ‘earthquake’, ‘tsunami’, ‘terror*’, ‘behav*’, ‘evacuate’, ‘information-seeking’ and ‘shelter’. This search was limited to English language documents. This resulted in 1804 articles identified (excluding duplicates) of which 1563 were eliminated on the basis of relevance or access leaving 241 articles for full text review. A further search was conducted focused on communication using combinations of search terms including ‘old*’, ‘senior’, ‘elder’, ‘disaster’, ‘hurricane’, ‘earthquake’, ‘tsunami’, ‘terror*’ and ‘communicat*’. This resulted in 239 articles identified (excluding duplicates) of which 235 were eliminated on the basis of relevance, access or duplication with the initial search leaving an additional 4 articles for full text review. This formal review process was supplemented with articles and policy documents identified by subject matter experts, the reference lists of included papers and the websites of organizations such as Public Health England and the World Health Organization. This produced a total sample of 267 documents for full text review. These sources were coded thematically using NVivo to identify the physical and mental health impacts of extreme events on older adults and the role of communication in offsetting these outcomes.

OLDER ADULTS AND EXTREME EVENTS:

Age alone does not determine outcome

Although older adults represent a higher risk category in disaster outcomes, it is important to recognize that age, in and of itself, is not necessarily problematic but represents a state that tends to be paired with, and indeed often results in, other characteristics which render an older person more vulnerable. These include, “loss of skeletal muscle and strength, reduced bone mass, hearing loss and decreased visual acuity”¹⁸ as well as chronic health conditions¹⁹. These

health challenges, combined with the natural development of old age, can be problematic when preparing disaster mitigation strategies. For example, as a consequence of diminishing visual capacity an individual may lose the ability to drive and thus require higher levels of aid to evacuate or to receive necessary supplies such as medication²⁰.

Whereas these conditions may render an individual more vulnerable, in a day-to-day context many of the difficulties can be mitigated with support such as care workers or public transportation networks. In a disaster, these aids may not be available, resulting in a situation-specific increased rate of vulnerability. For example, in the 2006 war between Israel and Lebanon, many homecare workers stayed in their homes leaving individuals (primarily disabled adults) reliant on them without food, medicine, or care. Consequently, this subset of the older population was at greater risk of harm due to mobility issues and the often rapid need to take shelter²¹. This interdependent dynamic of emergency circumstances and vulnerable characteristics is highlighted in the literature, recognizing that, in addition to health challenges, older adults are more likely to have logistical and social difficulties such as mobility issues, lack of transportation and limited social networks²². Consequently, researchers have proposed the idea of cumulative risk as a stronger predictor of resilience. This suggests that a variety of risks (including age) combine to determine the level of resilience²³.

It is necessary to consider subpopulations, such as older adults, as a whole when trying to determine a baseline for average capabilities and requirements. It is, however, also important to note the valuable contribution that older adults can make, as well as the level of resilience many of them possess. Older adults do tend to be more vulnerable to disaster and are disproportionately represented in morbidity and mortality rates²⁴ but the very nature of their having reached advanced years demonstrates that they are also survivors. Although planning needs to take into account the needs of the more vulnerable among this population, many are as capable or more so than the average citizen and age should not be considered to equate to liability in this context. Older adults tend to be retirees and are often very active in their communities and families. They disproportionately include the volunteers who help mail letters, answer phones on political campaigns and watch the grand-children while parents are at work. Resilient older adults can also serve as resources to help younger populations understand how to cope with stressful situations²³. Recognising and valuing these resilience attributes alongside the potential for older adults to be more vulnerable to disasters will aid the development of adequate, practical and appropriate measures designed to harness capabilities and offset the specific risks of extreme events associated with this subpopulation.

Psychological Effects:

Despite a large body of research which has assessed the psychological vulnerability of older populations to extreme events there is little agreement regarding the proportional level of psychological effects, such as PTSD and depression, suffered by older adult disaster survivors. Some researchers have posited that older adults experience greater psychological distress²⁵, others that there is no marked difference between older adults and the general population²⁶ and still others maintain that the level of psychological stress experienced by older adults is, in fact, lower than average²⁷. This range of outcomes has been attributed to a number of factors such

as the socioeconomics of the countries affected²⁸, varied definitions of older adults²⁹, type of assessment, duration of time examined and intensity of the event³⁰.

Several theories have been used to interpret the various study outcomes and, as with the studies themselves, these theoretical approaches highlight differences in the characterisation of older adults' ability to cope with extreme events and disasters. For example, the 'inoculation hypothesis' posits that older adults are better able to respond to crisis as they have likely dealt with severe challenges in the past³¹ while the 'maturation hypothesis' proposes that successful aging brings with it a level of resilience due to more successful coping strategies³². A study testing the two theories in relation to older adults' responses to the 2001 World Trade Centre attacks and to Hurricane Sandy found support for the maturation hypothesis in the case of Hurricane Sandy and for the inoculation hypothesis when examining the 2001 attacks³³. On the other hand, the 'differential vulnerability hypothesis' suggests that the burden of coping with the challenges of aging (physical vulnerabilities, loss of loved ones, etc), the potential for financial difficulty and years of coping in response to challenges can limit the ability of older people to deal with an extreme event²⁸. This theory would help to explain the studies indicating increased negative psychological outcomes for older adults following an extreme event.

Although there is disagreement on the extent, it is clear that older populations do suffer from adverse psychological effects in the wake of a disaster. In addition, there is evidence to suggest that older people may be less likely to access post-disaster services, including but not limited to psychological assistance^{25,34}. This has implications for planning and in particular for communication, as it becomes necessary not only to attempt to identify and triage older patients in disaster shelters and other locations but to ensure that older adults are aware of the psychological services and benefits available to them. It is also important that these are presented in a manner that encourages uptake as older adults have been shown to be less likely than their younger counterparts to complain or to ask for support³⁵.

While exposure to past trauma may render older populations more impervious to the psychological effects of extreme events, there is also evidence to suggest this may make them less likely to accept warnings³⁴. Many older adults have chosen not to evacuate during hurricanes as they had survived previous incidents unscathed and/or evacuated unnecessarily in the past and so chose not to heed the present warnings³⁶. Furthermore, disasters requiring evacuation or relocation can cause additional stress and mental health issues with displaced older adults suffering greater psychological strain than those able to remain resident³⁷. A 2013 US study found that, despite being at greater risk due to disruptions in infrastructure and support, older populations were inclined to shelter in place rather than evacuate³⁸. There are several ways in which this issue could be addressed, for instance, encouraging greater personal preparedness and ensuring emergency preparedness plans (at all levels of government) take into account the needs of the older population. However, re-examining emergency communications-both messaging and medium- from a vulnerable populations perspective may help to provide suggestions for improving older adults' uptake of protective behaviours, such as evacuation, in the future.

Physiological Effects:

Unlike psychological impacts, there is clear evidence that older adults are disproportionately physiologically affected by disasters. While a small number of studies have demonstrated a reduced likelihood of adverse physiological effects these have been linked to very specific circumstances. For example, a number of studies on flooding have indicated the most vulnerable group are middle-aged men but this is attributed to risky behaviour such as attempting to swim across rivers in flood³⁹. The overwhelming majority of evidence indicates that, in a disaster, the mortality and morbidity rates among older populations are dramatically disproportionate to the general population. The high level of medical assistance needed by many vulnerable older persons and the already present physical challenges, increase the likelihood of disproportionate casualty rates for this particular sector of society⁴⁰. For example, despite representing 12-15% of the affected population, 75% of deaths associated with Hurricane Katrina were among older populations. The adverse effects were not limited to mortality. A study of New Orleans Medicare Advantage Plan enrollees conducted one year after the hurricane also demonstrated higher morbidity compared to national rates⁴¹.

Aging often results in general health complications and many older adults suffer from chronic medical conditions requiring treatments either at home or by local health services which may themselves be disrupted during emergencies. This characteristic increases the likelihood of adverse physiological outcomes during crisis. For example, a study on the 2011 earthquake in Japan highlighted that an inability to obtain medicine for chronic conditions resulted in worsening health for many older individuals⁴². Studies in developed countries indicate that up to 40% of individuals over 65 suffer from a chronic illness or disability, less than one third of adults over 75 are in good health and over one third of adults over 80 are unable to walk outside without assistance⁴³. This has serious implications for extreme events as mobility and health challenges may impede successful emergency management, in particular evacuation.

Nowhere has the specific adverse physiological effects of disasters on older adults been more clearly seen than in care homes, particularly in an evacuation setting. The decision to evacuate or shelter in place is driven by a number of factors, including the logistical challenge of transporting frail patients. Not only must transport be acquired but a safe destination that will meet the basic needs of the patients ideally confirmed⁴⁴. The 2011 post-earthquake Fukushima radiation incident resulted in a mandatory evacuation zone. Among the evacuees were 1,770 residents of care homes and hospitals. The need to evacuate quickly resulted in patients being moved without medical care, blankets or safety restraints. This resulted in adverse outcomes including traumatic injuries and death from dehydration and pneumonia⁴⁵. Furthermore, patients with dementia tend to be particularly badly affected by evacuation. A study of dementia patients evacuated for Hurricane Gustav indicated a 2.8% mortality increase at 30 days and a 3.9% increase at 90 days when compared to dementia patients who did not evacuate. This increase in mortality may be due to existing health conditions being aggravated by the disruption of regular daily living schedules and being in unfamiliar surroundings⁴⁶.

Greater morbidity and mortality among older populations is not restricted to natural disasters. Seasonal influenza targets the youngest (under two years of age) and oldest (over 65 years) of the population as well as those with specific medical conditions⁴⁷. These subpopulations not only account for the majority of influenza related-hospitalizations but older people alone account for over 90% of influenza-related deaths, often as a result of complications that develop, in particular, pneumonia⁴⁸. For those individuals over the age of 70, the risks of hospitalization and mortality increase⁴⁹. In addition, influenza infections in older individuals

have also been associated with decreased overall health such as functional decline⁵⁰. Protective measures such as handwashing and vaccination can help to reduce the risk of infection. Vaccination, in particular, can prevent seasonal influenza-associated fatalities in older populations by as much as 80%⁵⁰. Aging however, often results in a reduction in immunity. This not only increases an individual's vulnerability to influenza but also to other infectious diseases and may limit the body's ability to respond as effectively to preventive treatments such as vaccinations⁴⁸.

THE USE OF RISK AND CRISIS COMMUNICATION TO SUPPORT BETTER OUTCOMES FOR VULNERABLE OLDER ADULTS:

Effective communication plays a key role in preparing for, responding to and recovering from public health emergencies^{51, 52}. Communication can reduce uncertainty around an extreme event, providing reassurance and direction⁵³. Communication surrounding emergency events can be categorised as risk communication, crisis communication and Crisis and Emergency Risk communication (CERC). Risk communication is not limited to crises and can increase awareness in the population of risks including personal choices (such as diet)⁵⁴. Crisis communication is much more specific focusing on 'risks that are manifested'^{52,55,56}. CERC draws on the principles of both risk and crisis communication, as well as issues management in order to successfully communicate with the public during an emergency situation⁵⁵.

Pre-event Communication

Pre-event communication campaigns can be useful in preparing populations for extreme events as well as encouraging protective behaviour. Communication campaigns have been effectively designed for a number of different risks and threats. For example, communications focused on the needs of older adults, such as campaigns to promote vaccination^{57, 58} and heat-related communications campaigns⁵⁹, have been successful in encouraging positive health behaviours. However, a study on preparedness indicated that two thirds of older US adults did not have an emergency plan nor had they taken part in any disaster preparedness education⁶⁰. This lack of preparedness among older adults is not just an American phenomenon. A 2012 study of older adult preparedness in Hong Kong found that, "preparedness of elderly people in the present study is considered grossly inadequate"⁶¹. Individual emergency preparedness is important and pre-event communication can be used to highlight this and encourage personal planning. Emergency preparedness planning measures such as education booklets and lists specific to the general circumstances and needs of the older population can help to improve the disaster readiness of older individuals⁶¹.

Development of disaster management guidelines requires consideration of specific circumstances involving older populations. This includes aspects such as mobility, general health and cognitive challenges as well as emotional considerations. A CDC report on Disaster Planning for Older Adults highlighted that some older adults are reluctant to leave behind a lifetime of possessions in order to evacuate⁶². This advice is reinforced by a WHO report which identified that older adults may be reluctant to evacuate as it means leaving their 'lifetime homes'⁴³. Similarly, a study of older individuals in Georgia and North Carolina found that approximately 38% of pet-owning respondents would either not evacuate because of their pet or would only evacuate with their pet⁶³. It is important that communication is not

unidirectional. Including older adults in the planning phase can result in a better understanding of the needs of this group and lead to improved emergency preparedness planning⁴¹. For example, hearing first-hand about past experiences with disasters, what worked and what did not, can help identify the specific challenges for older adults.

Communication During an Event

Effective communication during an extreme event can be used to raise awareness, improve knowledge and reduce negative social, psychological and health impacts^{51, 52, 64}. Conversely, lack of communication may exacerbate negative impacts of disasters and emergencies. For example, insufficient information during the rapid evacuation of care homes in response to the 2011 earthquake in Christchurch, New Zealand resulted in confusion and anxiety amongst older adult residents⁶⁵. There are a number of well-established principles for effective communication during an emergency, namely the provision of accurate, timely, consistent, clear and simple to understand information^{56, 64, 66}. It is particularly important to avoid technical or complex language when communicating with older adults due to low levels of health literacy amongst this group and age-related cognitive decline⁶⁷. For example, in the Veterans Affairs nursing homes affected by Hurricanes Katrina and Rita, an estimated 50% of residents had some form of cognitive difficulty. As a result, staff in these homes took care to use easily understandable language to ensure that residents understood the situation¹⁸.

Crisis and emergency risk communication should also consider the mode of communication used to ensure that information reaches older adults. The move toward online information sources, while providing a rapid and cost-effective way to deliver messaging, disadvantages those individuals who are not active online, do not have access to computers and are not familiar with the internet. The 2015 UK Internet Users study indicated that, while internet use among older adults is increasing, 61% of adults over 75 years of age have never used the internet⁶⁸. As a result, any web-based advice and warnings would not have the same reach in these sub-populations as messaging delivered through another medium. A study on public perception of severe weather warnings in Nova Scotia reinforces this conclusion. Older adult participants in the study were far more likely to receive news from television, radio and non-media sources (ie: word of mouth) while younger participants favoured the internet⁶⁹. Research into responses to bioterrorism resulted in similar responses with older individuals expressing intent to receive information from healthcare providers and/or emergency departments⁷⁰.

Post-Event Communication

Clear and concise communication is not only necessary in pre-event planning and during an event, it is also required during the recovery period. For example, an assessment of older adults affected by flooding identified the need for 'ordinary' language rather than technical terminology or bureaucrat-ese to encourage repair and rehabilitation⁷¹. Post-event communication actions largely centre on communicating lessons learned⁷². There are, however, still avenues where event-related communication with the public is needed due to secondary stressors such as economic challenges, health problems, the loss of personal possessions, and disruption of daily activities⁷³. For example, in the wake of Hurricane Katrina, it was noted that many older adults, particularly those without family or the wherewithal to navigate the bureaucratic requirements to obtain money to rebuild, simply 'gave up'⁷⁸. While this highlights

the procedural challenges as much as the communication challenges, it does provide an opportunity to employ effective and targeted communication to advise individuals not only of the support available but to ensure the steps involved in accessing support are as clearly laid out as possible. Older adults should not be burdened with the task of negotiating needlessly complex and verbose bureaucratic hurdles when recovering from a disaster.

CONCLUSION:

Although some disagreement exists on the extent to which older adults are disproportionately affected by disasters, it is clear that this subpopulation is over-represented in overall mortality and morbidity rates. Including older individuals in the planning process, in particular, planning communications strategies, provides an opportunity to improve outcomes and better understand the needs of this community. The needs of this subgroup must be considered, integrated and accommodated for in disaster planning and policy. This does not necessarily mean separate plans are required but rather inclusive planning and preparedness, recognizing the distinct needs and challenges associated with this group. In particular, effective communication is essential and messaging must be provided in a manner and medium appropriate for older adults.

Effective communication is a vital component of emergency planning and response to encourage personal preparedness, reduce uncertainty and inform behavioural responses to extreme events. The requirement for clear and concise communication is not exclusive to older adults, however this vulnerable population group is likely to have specific needs that must be taken into account in emergency preparedness and response. This review was conducted in order to identify the impacts of extreme events on older adults to support the development of targeted crisis communication. This review suggests that while the impacts of extreme events on older adults have been well documented, the role of communication in mitigating these impacts has not received the same level of attention. In particular, there is a need for greater examination of specific communication guidance for older adults and empirically tested messaging.

Issues to consider for emergency planning

- The specific needs, challenges and requirements affecting older adults must be taken into account when developing emergency preparedness and communication plans in order to improve health outcomes for this vulnerable population.
- The communication requirements of older adults should be considered throughout all stages of risk or crisis communication development (pre-, during and post-event).
- Older adults and those responsible for their care should be included in the planning process in order to gain a better understanding of their particular needs and realities. Older adult advocacy groups have the potential to be useful partners in involving older adults in the emergency planning process.
- A common understanding of risk should be communicated and resilience among older adults built by mobilising individuals and organizations to invest in preparedness

- The use of clear, simple, easily understandable language in communicating is of particular importance when communicating with older adults.
- Personal preparedness should be encouraged and recommendations tailored to suit the needs and capabilities of older adults.
- Older adults may be less likely to use online sources of information. It is therefore important to continue using traditional modes of communication (e.g. print and broadcast media) to maximise coverage for older adults.
- Effective communication can encourage protective health behaviours and in so doing reduce the morbidity and mortality among vulnerable older adults. The need for organisations, such as care homes, to focus on communication during emergency events should therefore be reinforced.

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