Review

Effectiveness of public health messaging and communication channels during smoke events: A rapid systematic review

Jennifer A. Fish [a, *], Micah D.J. Peters [b], Imogen Ramsey [a], Greg Sharplin [c], Nadia Corsini [c], Marion Eckert [a]

[a] School of Nursing and Midwifery, The University of South Australia, GPO Box 2471, Adelaide, South Australia 5001, Australia
[b] The Joanna Briggs Institute, Faculty of Health Sciences, The University of Adelaide, Lvl 3, 55 King William Rd (Norwich House), North Adelaide, South Australia 5006, Australia
[c] Behavioural Research and Evaluation Unit, Cancer Council SA, 202 Greenhill Rd, Eastwood, South Australia 5063, Australia

ARTICLE INFO

ABSTRACT

Exposure to smoke emitted from wildfire and planned burns (i.e., smoke events) has been associated with numerous negative health outcomes, including respiratory symptoms and conditions. This rapid review investigates recent evidence (post-2009) regarding the effectiveness of public health messaging during smoke events. The objectives were to determine the effectiveness of various communication channels used and public health messages disseminated during smoke events, for general and at-risk populations. A search of 12 databases and grey literature yielded 1775 unique articles, of which 10 were included in this review. Principal results were: 1) Smoke-related public health messages are communicated via a variety of channels, but limited evidence is available regarding their effectiveness for the general public or at-risk groups. 2) Messages that use simple language are more commonly recalled, understood, and complied with. Compliance differs according to socio-demographic characteristics. 3) At-risk groups may be advised to stay indoors before the general population, in order to protect the most vulnerable people in a community. The research included in this review was observational and predominantly descriptive, and is therefore unable to sufficiently answer questions regarding effectiveness. Experimental research, as well as evaluations, are required to examine the effectiveness of modern communication channels, channels to reach at-risk groups, and the 'stay indoors' message.

© 2017 Elsevier Ltd. All rights reserved.

Contents

* Corresponding author.
  E-mail address: fish0133@flinders.edu.au (J.A. Fish).

1. Introduction

Wildfires, vegetative burns, and other type of fires (e.g., coal fires) are common internationally, and future wildland fire activity is predicted to increase (Flannigan et al., 2009; Stracher, 2007; Westerling et al., 2006). Wildland fire is important for creating and maintaining functional ecosystems, as well as fulfilling other public interest and land-use objectives (Hardy and Leenhouts, 2001). Despite ecological and land-management benefits, the air pollutants emitted from fires – termed 'smoke events' for the purposes of this review – pose a serious risk to public health. Smoke contains components potentially hazardous to human health and smoke events have been associated with a range of negative health outcomes, including respiratory symptoms and conditions, cardiovascular effects, chronic stress, and increased mortality (Adetona et al., 2016; Dennekamp et al., 2015; Johnston and Bowman, 2014; Clougherty and Kubzansky, 2009; Liu et al., 2015). It is yet to be established how best to manage and mitigate the effects of smoke events on the general public, as well as on people who are at greater risk of harm from smoke or less able to respond or receive warnings in the case of threats (e.g., elderly people, health compromised people). The prevailing view for public health protection in air pollution incidents is to shelter rather than evacuate the exposed population, and 'stay indoors' is therefore the most common recommendation provided to the public during smoke events.

Communicating with the public about health risks is an important part of risk management (Lundgren and McMakin, 2009). Lundgren and McMakin (2009, p. 12) define risk communication as a process, whereby "there is a source of communication that generates a message that goes through a channel to a receiver." Each part of the communication process requires careful consideration for successful risk reduction or communication problems may ensue (Bennett, 2010; Glik, 2007). For example, messages may be ambiguous and not easily understood by receivers (Glik, 2007), or at-risk populations may feel that a message does not address their specific situation or concerns (Bennett, 2010). It has also been proposed that effective risk communication is a bidirectional process that includes stakeholder engagement and consultation (Bennett, 2010; Lundgren and McMakin, 2009). Risk communication effectiveness can be measured in terms of behavioural compliance, although message awareness or recall, self-reported source preferences, and trust in communication channels may also be proxy indicators of message effectiveness.

An example of the importance of effective risk communication during a smoke event, is the 2014 Hazelwood coal mine fire in Australia. The Hazelwood coal mine fire burned for 45 days, with smoke and ash covering a neighbouring town (Macnamara, 2015). Residents of the town reported respiratory symptoms, illness, and damage to properties due to smoke and falling ash (Macnamara, 2015). An inquiry into the fire raised issues regarding public communication practices, timing of messages, effectiveness of the messages, as well as the effectiveness of the communication channels used (Macnamara, 2014). These issues were particularly pertinent for diverse communities, including elderly, low socio-economic status and Culturally and Linguistically Diverse (CALD) communities, as well as people living in rural areas with limited internet access (Macnamara, 2014). For instance, social media was heavily relied upon for public health messaging during the smoke event, which is arguably inappropriate for a small community with a high proportion of elderly residents and lower than average internet connectivity (Macnamara, 2015). Given the increasing evidence recognising the instrumental role of social media in emergency preparedness and response, the above example highlights the importance of communicating health risk information in a way that is context-specific, non-exclusive, and in accordance with the preferences and capabilities of the affected community (Merchant et al., 2011).

Evidence-based guidance is required for effective public health messaging during smoke events. A number of reviews of fire management and fire risk communication have recently been published, but each lacked an investigation of risk communication practices in a smoke event (Calkin et al., 2011; Kulemeka, 2015; McCaffrey, 2015; McCaffrey et al., 2013). McCaffrey et al. (2013) highlighted that more research is required to identify the best communication practices in smoke-events. One recent evidence check (a concise summary of evidence that answers specific policy questions) prepared for the British Columbia Centre for Disease Control assessed evidence regarding three public health interventions during smoke events, including advice to stay indoors, advice to reduce outdoor activity, and cancelling outdoor events during a smoke event (Dix-Cooper, 2014). While informative, the evidence check was limited in scope regarding the messages examined and did not address the effectiveness of communication channels.

Accordingly, this review broadly investigates the effectiveness of public health messaging during smoke events, the communication channels best used to reach at-risk communities, and the effectiveness of various communication channels during smoke events. Based on previous literature that has identified groups who are particularly vulnerable to adverse effects from smoke or less likely to benefit from public advisories (Macnamara, 2014), at-risk groups for this review included people aged over 65 years, children, people with cardiovascular and respiratory conditions, CALD communities, and Indigenous/Aboriginal and/or Torres Strait Islander people. For the purposes of this review, effectiveness was defined as compliance with advisories that aim to reduce smoke exposure. Due to the challenge of retrospectively investigating compliance, proxy indicators of effectiveness such as recall or awareness of advisories, trust in communication channels, and source preferences were also examined.

The aim of this rapid review was to investigate recent evidence (post-2009) regarding the effectiveness of public health messaging using various channels during smoke events. This review focussed on smoke-specific messages (to the exclusion of fire messages), and included international evidence. Hence, this review presents the