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Aminpour, Payam, Jennifer F. Helgeson, and Paul J. Ferraro. 2022. “The Choice of Message and Messenger to Drive Behavior Change That Averts the Health Impacts of Wildfires: An Online Randomized Controlled Experiment.” *BMC Public Health* 22 (December): 1–10. https://doi.org/10.1186/s12889-022-14801-6.

This study tested two different message framings about the health risk of wildfire smoke, from two different messengers (government vs academic), across 1.84M Facebook users in nine Western states. The results showed that the narrative story-focused framing increased click-through rates by 25.3% compared to fact-heavy informational ones. The difference of the messenger was small and not statistically significant. A relatable story that shows risk and action mattered more than who says it. Narrative framings help synthesize difficult information and can better affect people's willingness to seek out information, as well as move them toward action. This study is helpful as it suggests the focus on message framing should be short (both framings in the study were 89 words) local narratives, not just lists of facts. It also suggests it may not be critical whether it is PBEM or other partners who administer the messages.

Choy, Amelia, Erin M Shellington, Karen Rideout, Meghan Roushorne, Phalgun B Joshi, and Christopher Carlsten. 2023. “Engaging Interested Parties to Optimize Wildfire Smoke Communication in Canada: Challenges with Initiating Change.” *Frontiers in Public Health* 11 (November). https://doi.org/10.3389/fpubh.2023.1268249.

This study looks at whether participation in the Wildfire Smoke Communication Workshop series, held in Canada in February 2022, led to participants initiating changes to their communication strategies within their own organizations. The authors were seeking to evaluate whether these types of workshops, and the summary report developed from it, provided any lasting value to the actions governmental agencies take. In all three of the surveys (pre, during, and postfire season), respondents indicated that the information was useful and beneficial, helping them consider new actions or strategies. Intended actions were simplifying messages, using diverse communication channels, increasing frequency, and reaching out to vulnerable populations. But these *intended* actions differed from actions *taken*, namely due to limited human and financial resources, along with inadequate coordination. This study is important for our project because it looks at the problem of moving from intent to action within governmental agencies, highlighting the difficulties in making system-level changes when dealing with resource and capacity limitations.

Coker, Eric S, Susan Lyon Stone, Erin McTigue, Jiayun Angela Yao, Emily P Brigham, Michael Schwandt, and Sarah B Henderson. 2024. "Climate Change and Health: Rethinking Public Health Messaging for Wildfire Smoke and Extreme Heat Co-Exposures." *Frontiers in Public Health* 12 (March). https://doi.org/10.3389/fpubh.2024.1324662.

This study assesses messaging from public health agencies across the U.S. and Canada on wildfire smoke and extreme heat exposure. Only a small number of these resources were designed to address both of the co-exposures at the same time. Since the impact of both extreme heat and wildfire smoke are more likely to occur together, messaging should be tailored toward this. Key protective steps were also often missing, especially around indoor air cleaning and the use of DIY filters. The authors recommend standardizing simple, actionable, multi-hazard guidance that people can follow during overlapping events, and to align that with what local agencies can realistically provide. This study is important for this project as it suggests extending the messaging to include the risks and symptoms associated with both smoke and heat. It also highlights the need to provide concrete steps to take for both (DIY air cleaners, when to use clean air or cooling centers, how to protect indoors vs outdoors).

Coughlan, Michael , Heidi Huber-Stearns, Benjamin Clark, and Alison Deak. 2022. "Oregon Wildfire Smoke Communications and Impacts: An Evaluation of the 2020 Wildfire Season." State Library of Oregon. University of Oregon. 2022. https://digitalcollections.library.oregon.gov/nodes/view/163789.

This report is directly relevant to our project. It is a statewide survey of Oregonians after the 2020 smoke crisis, focusing on how people got information, what they needed, and what actions they took. Many people relied on self-observation or the internet for information, while non-White and Hispanic respondents leaned more on friends and family. Television and radio were also commonly used channels. People most wanted simple forecasts and step-by-step guidance for staying safe indoors/outdoors and using PPE. Lower-income respondents were less able to avoid going outside, but also less likely to wear masks, suggesting more education about and access to PPE is necessary. Most people limited outdoor exposure, but indoor protections were less clear. General preparedness was tied to prior smoke experience. Other guidance from this report for our project is to have clear forecasts and concise how-to steps of protecting yourself. Along with the channels noted, PBEM should focus on disseminating information through more informal networks, while pairing messages with material support, like PPE and access to clean-air spaces, for renters and lower-income residents.

Duan, Ran, and Christian Bombara. 2023. "Protective Behaviors against Wildfire Smoke in the Western United States: An Extended Protection Motivation Theory Perspective." *International Journal of Disaster Risk Reduction* 96 (August). https://doi.org/10.1016/j.ijdrr.2023.103956.

This study seeks to integrate perceived knowledge and prior experience into Protection Motivation Theory by understanding the social physiological factors that correlate to behavioral intentions (not actual behaviors) in regards to wildfire smoke. PMT was initially developed to explain what motivates people to take self-protective actions when they perceive a threat. According to PMT, both threat (severity and vulnerability) and coping (response efficacy, self-efficacy, and response costs) appraisals determine people's motivation, which in turn predicts intentions to adopt protective behaviors. This study then looks at how perceived knowledge and prior experience influence the appraisal process. Overall, both were connected to people's perceived vulnerability, not the severity of the risk, and people's likelihood of taking action was associated with how vulnerable they felt, but this also decreased when actions felt too costly. This study is important as it provides a *theoretical framework* for risk communication around wildfire smoke, which is often missing in other studies.

Hopfer, Suellen, Anqi Jiao, Mengyi Li, Anna Lisa Vargas, and Jun Wu. 2024. "Repeat Wildfire and Smoke Experiences Shared by Four Communities in Southern California: Local Impacts and Community Needs." *Environmental Research Health* 2 (3): 035013–13. https://doi.org/10.1088/2752-5309/ad6209.

This study focuses on four low-income, mostly Spanish speaking farmworker communities in the Eastern Coachella Valley. It focuses on the health threats (physical, mental, and psychological) of experiencing (both during and after) wildfire and smoke events. It also details communication preferences to ensure adequate preparation for future events. Key to this is disseminating information through multiple different channels (television, radio, social media, and word-of-mouth networks), as well as formats (print, video, phone/siren alerts, and maps). Targeting messages for specific subgroups, such as outdoor works, was another important finding. Participants wanted guidance on mitigation measures, as well as information on fire situations, severity, health effects/advice, and where to go for daily necessities. This study is helpful to our project as it centers low-income, vulnerable populations and offers ways that PBEM could focus their efforts for vulnerable groups. Some key aspects are the use of phone alerts with clear where to go and what to do details, tailoring messages for specific subgroups, utilizing trusted community groups, as well as NET volunteers to deliver updates, and postfire follow ups.

Sandoval, Sofia, Jessica Bui, and Suellen Hopfer. 2025. "Wildfire and Smoke Risk Communication: A Systematic Literature Review from a Health Equity Focus." *International Journal of Environmental Research and Public Health (IJERPH)* 22 (3): 368. https://doi.org/10.3390/ijerph22030368.

This review article looks at 23 studies from 2014 to 2024 and finds that people most at risk from smoke are also the least well served by current messaging. The authors sort the information by major themes: who delivers the message (using trusted local sources), timing of messages, using multiple channels, tailoring to subgroups, year-round messaging, clearly separating evacuation alerts from smoke guidance, and coordinating across agencies. There are gaps in explaining indoor versus outdoor actions, reaching older-adult and care facilities, and postfire messaging. This literature review helps with our project by pointing toward the necessity to build out a network of trusted neighborhood and community messengers, and to use consistent multilingual messages across different channels. It also suggests using pre-season message testing so we know which smoke messages move people to action.

Shellington, Erin M., Phuong D. M. Nguyen, Karen Rideout, Prabjit Barn, Anna Lewis, Margaret Baillie, Sue Lutz, et al. 2022. "Public Health Messaging for Wildfire Smoke: Cast a Wide Net." *Frontiers in Public Health* 10 (April). https://doi.org/10.3389/fpubh.2022.773428.

This study surveyed 757 residents from British Columbia to see how people receive, understand, and use smoke guidance. The results were broadly consistent with prior studies evaluating wildfire smoke communications. People relied on multiple channels (websites, social media, TV, and radio). A notable finding was that lower-income respondents were less likely to report that taking action reduced their wildfire smoke exposure. Suggestions included using diverse channels, tailored for specific groups, while simplifying messages, and using more frequent messages before and during events. These suggestions are consistent with other sources and reinforce actions PBEM can take, while also emphasizing the use of visual messages, as well as anticipating message fatigue and distributing information throughout the year and in different formats.

Slavik, Catherine E, Daniel A Chapman, Alex Segrè Cohen, Nahla Bendefaa, and Ellen Peters. 2024. "Clearing the Air: Evaluating Institutions' Social Media Health Messaging on Wildfire and Smoke Risks in the US Pacific Northwest." *BMC Public Health* 24 (February): 1–16. https://doi.org/10.1186/s12889-024-17907-1.

This study analyzes and compares 2022 Twitter/X communications from institutions across Oregon, Washington, and the broader U.S. It also provides insight into the literature around social media use, and how an active presence by governmental agencies is important in regards to communicating risks associated with smoke. Overall, the findings showed that institutions tended to tweet more as smoke levels rose, suggesting they adjusted messages as potential exposure increased. Most tweets were geared towards promoting action-taking, rather than sharing risk details or promoting community-building (though Oregon had more of the latter than Washington). The authors recommend using Protection Motivation Theory to encourage people toward action, and show how PMT has been effectively integrated into messaging at the local level. Findings from this study are critical for our project, as they explore how agencies throughout Oregon have already been communicating about smoke risks. There is much PBEM can likely learn by looking at what other agencies are already doing, county health agencies in particular.

Wood, Leah M, Savannah M Mack, Nicole A Errett, Ann Bostrom, Cody Desautel, Ernesto Alvarado, Kris Ray, and June T Spector. 2022. "'When People See Me, They Know Me; They Trust What I Say': Characterizing the Role of Trusted Sources for Smoke Risk Communication in the Okanogan River Airshed Emphasis Area." *BMC Public Health* 22 (1). https://doi.org/10.1186/s12889-022-14816-z.

This study focuses on who people trust for smoke-risk information and why. It centers mostly around rural and tribal groups, with participants generally trusting local and tribal sources, more than state/federal agencies. Informal networks and Facebook fire watch pages also play a big role. Trustworthiness depends on credibility, quality (accurate, timely, local), and relationships. The study also evaluates how politics and COVID-era polarization shape reception to information. It also highlights the Social Amplification of Risk Framework (SARF). Though this article looks at rural and tribal communities, I still think the insights can be useful for our project, particularly its emphasis on partnering with community-based organizations as a way to disseminate information. As well, it highlights the design of risk communication messaging, centering on local perspectives and the use of rebrandable templates so the same information can be utilized more broadly by different organizations..