Building Risk Communication Infrastructure by Bolstering Emergency Managers' Formal and Informal Communication Networks

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Abstract

Emergency managers and community partners must communicate complex information to public audiences likely to have low knowledge and high anxiety during hazardous materials incidents. Emergency officials convey information through press briefings, news releases, and social media. Changes in media systems such as loss of local outlets, increasing social media reliance, media fragmentation, and disinformation challenge traditional approaches to risk communication. Formal and informal communication networks can play an integral role in helping prepare for and respond to technological incidents. Organizations like Local Emergency Planning Committees (LEPCs) coordinate, connect, and build network communication infrastructures, supporting risk communication in catastrophe. Although LEPCs do not respond to emergencies and disasters, the networks that LEPCs cultivate can assist emergency officials and community partners in sharing coordinated messages about technical risks that are more likely to encourage trust among an anxious public.

Keywords: networks, resilience, risk communication infrastructure, emergency management, emergency officials, message coordination, media fragmentation, Local Emergency Planning Committees

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Communicating in response to catastrophic events increasingly involves conveying complex emergency and technical information to divided publics who may lack scientific literacy, who may be doubtful of experts, and who may be less likely to take official announcements at face value (Gauchat, 2012; D. J. Houston & Harding, 2013; Samet & Burke, 2020). Hazardous materials (HazMat) incidents demonstrate these challenges. Responding to HazMat incidents requires specific technical and scientific knowledge. The safe handling of HazMat often requires very different response and mitigation approaches from other hazards. A strategy used with one hazardous material may backfire if applied to another. This chapter argues that the strategies used to prepare for HazMat incidents via Local Emergency Planning Committees (LEPCs) offer lessons that apply to the difficulties of science communication exacerbated by catastrophe. Empowering science communication during a crisis requires formal and informal networks, and these networks are important risk communication infrastructures that LEPCs can help to build.

Communicating complex scientific information in an emergency is difficult for many reasons. For example, analyses of communication during the 2001 anthrax attacks make clear the multiple, compounding difficulties that responders must manage. An examination of the Centers for Disease Control and Prevention's communication identified five primary challenges for communicating complex risk information (Freimuth, 2006): uncertainty, credibility, collaboration, intensive media coverage, and speed. Such incidents involve uncertainty and urgency (Robinson & Newstetter, 2003), particularly about uncertain and emerging science that is difficult to communicate and difficult to cover (Han et al., 2021; Jensen, 2008). During a

widespread emergency, it can be challenging for the public to identify a single, credible spokesperson (Clarke & Chess, 2008), which is complicated by the diversity of responding organizations and their coordination, or lack thereof (Clarke et al., 2006; Doerfel, 2016; Rubin et al., 2012). Although structures exist to support message coordination, like the use of joint information centers, their usefulness depends on the goodwill and participation of multiple organizations and levels of government, each with different priorities and agendas.

Media coverage can focus intense attention on incidents. Communities that do not have full-time dedicated communications staff may struggle to attend to public information functions while also supporting the response to an incident. The time-sensitive nature of hazardous materials incidents require quick responses—a priority that can make message coordination difficult. Research on media coverage of the anthrax attacks found that variations in the political context in media coverage rested in part on the unwillingness of critical public health sources to articulate certainty in the heat of the crisis, which was evident during the COVID-19 response (Lambrecht, 2021; Winett & Lawrence, 2005). Uncertainty, or an unwillingness or inability to communicate with certainty, may encourage negative media coverage, heighten the political stakes, and add concerns about blame during the aftermath—all of which make communicating the science harder. During incidents, the need to tailor messages to particular audiences conflicts with the fact that most messaging is available to all, exacerbating feelings of uncertainty and chaos (Clarke et al., 2006). These problems are particularly acute for marginalized groups with access to fewer resources, well-founded doubts about the credibility of responding organizations, and more significant safety concerns (Steelfisher et al., 2012). Again, the COVID-19 pandemic provided ample examples of these same issues and often for the same organizations examined in previous research (Cherry et al., 2021).

Cultivating communication networks ahead of incidents can help address the difficulties of communicating emergent, scientific information during emergencies and disasters. Theories of resilience stress the importance of building risk communication infrastructures before crisis events. For example, Buzzanell's (2010) communication theory of resilience suggests that communities reintegrate and rebuild after disruptions by "(a) crafting normalcy, (b) affirming identity anchors, (c) maintaining and using communication networks, (d) putting alternative logics to work, and (e) downplaying negative feelings while foregrounding positive emotions" (p. 1). Maintaining and using communication can foster relationships that allow information sharing during incidents, more effective collaboration, and uncertainty management (Doerfel, 2016). During responses to incidents involving HazMat, LEPCs may bolster those networks (Barbour et al., 2020). Illustrating the utility of the LEPC as a model for science communication in catastrophe, this chapter first unpacks the present-day communication difficulties associated with emergency communication. Next, we draw on theories of networked community resilience to make a case for the networking role of LEPCs. We then review the history and the current state of LEPCs and conclude with recommendations for research focused on the LEPC as a mechanism for bolstering resilience that supports communication about hazards with insight into the broader challenges of risk communication.

Challenges for Public Communication During Emergencies

Traditionally, emergency management and first responders communicated emergency information about evacuation or shelter-in-place orders for hazardous incidents via radio, television, and the Emergency Broadcast System. That traditional approach persists, but changes in the news industry and how the public consumes media undermine its effectiveness and reach. In many parts of the U.S., fewer media outlets offer local news, from fewer local reporters to

fewer local news consumers (Ardia et al., 2020; Pew Research Center, 2021). Political identity and interest can drive news consumption and the selection of sources for that news (Hardy & Tallapragada, 2021; Strömbäck et al., 2013). Further, social media platforms themselves may hasten changes in news-seeking behavior among users (Kitchens et al., 2020). Many local media outlets now operate as part of national conglomerates with slimmed-down news operations that increasingly depend on user clicks on social media or websites for revenue over traditional advertising. This trend encourages publishers to use emotive appeals to engage with potential readers, a tactic also used by disinformation operators to increase reach (Cheung-Blunden et al., 2021).

The decline in local news is varied and complex (Pew Research Center, 2021). The most significant decline is in newspaper circulation, from over 62 million in 1990 to just over 24 million today. Corporate consolidation and reductions in newsrooms of all types are well documented (Ardia et al., 2020; Miller, 2018). Although, anecdotal indications of growth in digital newspaper circulation exist, not all papers release subscriber digital subscription data in a form that allows easy comparisons to past surveys. Local television media viewership is more consistent but cyclical, with interest tending to peak around elections and then wane. However, the numbers reached by local television are small and declining overall. Each night only about 3.5 million U.S. televisions tune to a local evening news broadcast on one of the four major network affiliates. Terrestrial radio listenership remained consistent over the last decade, with about 50% of U.S. adults reporting getting news on the radio often (Pew Research Center, 2021). However, radio listenership declined in 2020, likely related to reduced commuting from the COVID-19 pandemic. Podcast listenership saw significant increases over the last decade, and they may further the spread of misinformation/disinformation.

The growth of streaming media, podcasts, and decline in live T.V. viewership also decreases exposure to local news via television or radio (Raine, 2021). Traditional means of communicating during HazMat incidents reach diminishing numbers of households, with clear generational divides. The effect is particularly acute in younger audiences. Sixty-one percent of respondents 18-29 in a recent Pew Research Center study had never subscribed to a pay television service (cable or satellite) (Raine, 2021). Moreover, the public increasingly accesses news outlets through the circulation of news stories on social media. Another Pew Research Center study conducted in 2020 found that 36 percent of Americans reported getting news from Facebook regularly, followed by YouTube (23 percent) and Twitter (15 percent) (Shearer & Mitchell, 2021). During crises, the circulation of information via social media includes conflicting messaging from different levels of government (local, state, and federal), traditional media reports, and information from disreputable sources or nefarious actors. Source fragmentation engenders distrust and confusion. Social media also has a "timeline problem," meaning that social media users see and respond to old posts without realizing they are no longer valid.

Further, human-made and human-exacerbated natural disasters may limit the reach of messaging by emergency officials by damaging the infrastructure that officials use to communicate with the public. For example, the 2001 World Trade Center (WTC) attacks severely affected communication in New York City (EL Khaled & Mcheick, 2019). The WTC housed essential parts of the city's physical communication infrastructure and emergency management facilities, most destroyed or damaged in the attacks. Hurricane Katrina in 2005 caused more widespread communication outages, creating obstacles for first responders attempting to locate victims and correspond with the overwhelmed public (Doerfel et al., 2010,

2013). Likewise, Superstorm Sandy in 2015 obstructed or damaged communication networks while extended power outages exacerbated service restoration (Manandhar & Siebeneck, 2018). As a result, some authorities posted handwritten community messages on make-shift town boards in strategic locations. Without power, cell phone batteries went dead. Police and fire radios were rendered inoperable due to failed repeaters and collapsed cell phone towers.

Social media presence and reach also play a role in modern risk communication. During Superstorm Sandy, many jurisdictions lacked established Twitter or Facebook pages or social media accounts. Misinformation became a significant issue as rumors began to spread online. Citizens seeking to escape the cold extremes created congested traffic on already dangerous roadways, forcing the closure of roads and altercations with local authorities unable to warn motorists of the dangers.

Local emergency management responded to the changing media landscape and previous disasters by developing reverse 911 systems, cellphone and text-based notifications, redundant communication systems, and increased social media posting and monitoring. However, emergency response organizations rarely have the resources to monitor and engage via social media in real-time, making voluntary contributions more critical (Li et al., 2019; Smith et al., 2021). The COVID-19 pandemic provides further examples of these risk communication problems. This changing media landscape and associated fragmentation exacerbate the difficulties of emergency management risk communication.

Audience Changes

Traditionally, emergency response communication focused on one-way delivery (Seeger, 2006; Sellnow et al., 2017): Public officials communicated instructions to the public via mass media expecting a high degree of compliance. The rise of social media has shifted the focus to

audience engagement and exchange. Conveying scientific information is increasingly complex because audiences have access to more and more information, not all of it reputable. However, receptivity to messages from official emergency channels is also changing. Audiences increasingly have different expectations and may be less trusting than before (Svedin, 2012). Members of the public may openly oppose official guidance (Gauchat, 2012; Gupta et al., 2020; D. J. Houston & Harding, 2013). Politics and polarization can define how members of the public receive communication about risks and how they act on that information. The perception of control over a decision to act, or the ability to choose between options, can increase public compliance with disaster instructions though such an approach runs counter to the command-driven, traditional model (Atalay & Meloy, 2020).

The COVID-19 pandemic has demonstrated that political perspectives can drive differences in receptivity, from mask mandate compliance or vaccination hesitancy (Cherry et al., 2021; Hornsey et al., 2020). The isolation of like-minded individuals into specific media ecosystems can foster what Meyer and Kunreuther (2017) described as herding bias in disaster response. Even if overall media literacy remains unchanged, the number of individuals consuming non-traditional media sources via the internet and social media is increasing. Thus, audiences that lack of media literacy may have greater exposure to disinformation and misinformation than they might have had in previous decades. Disinformation peddlers, political operators, and foreign influence operations can target low-media literacy demographics.

Likewise, disinformation operations target social media influencers with broad reach, attempting to share content more widely by developing online relationships with key individuals who may remain unwitting of the source of the material they pass on. This “seed-corn” of influencer and low-media literacy users can combine for an outsized effect as they share

misinformation on social media, allowing disinformation to achieve durability as groups and predisposed individuals spread it further, adding to and creating new, organically produced content that builds on or supports the initial disinformation (DiResta et al., 2019).

Politics plays another critical role in emergency risk communication. In the United States, the primary risk communicator is often an elected official. As seen during the response to the COVID-19 pandemic, multiple elected officials, advisors, and response organizations at different levels of government may offer competing visions of the response and provide conflicting instructions to a worried public. When disconnects and disagreements about risk become political, compliance with emergency instructions can diminish in groups depending on which official delivers the message, based solely on their party affiliation.

Disconnects and Silos

Previous research supports the idea that risk communication by public officials is most effective in achieving compliance when everyone speaks with one voice and delivers the same messages (Clarke et al., 2006; Seeger, 2006). Due to political considerations or legitimate disagreements over policy, disconnects between elected officials, their non-political advisors, and levels of government can foster mixed messaging and sow confusion among audiences. Disinformation operations also target and seek to exacerbate such divisions and confusion (Arif et al., 2018). Mixed messages reduce overall compliance and create demographic and geographic pockets of non-compliance that can complicate responses. Further, in high fear, low information environments, members of the public, when faced with confusion from official or traditionally trusted resources, may seek information from social media, friends, or family, where they are more likely to encounter rumors, misinformation, or disinformation.

Similarly, risk communications to economically and socially disadvantaged groups have long faced similar problems due to disconnects about language and culture, deep mistrust of officials due to racism or immigration status, and even open hostility due to past abuses or perceptions of abuse (Steelfisher et al., 2012). Further, such problems can cross ideological spectrums. A police reform-oriented group may disregard risk communication from law enforcement officials due to mistrust about motives and past discrimination or conspiracy theories. An anti-government group may similarly discount such communication as part of their general anti-government viewpoint or belief in conspiracy theories. You "should not tell me what to do" and "you cannot tell me what to do" are reactions to official messaging that limit risk communication effectiveness.

In addition to official messaging to the public, levels of government and different agencies must also share such information and attempt to coordinate their messages to the degree possible. In the United States, the "whole community" can include the public, different response agencies (police, fire, EMS), jurisdictions (city, county, local), and government (local, state, and federal), non-governmental organizations, and community partners including businesses and interest groups (U. S. Federal Emergency Management Agency, 2022). Responders and those who support them at the local, state, and federal levels attempt to work within common operating frameworks. However, their cooperation is not always seamless (Barbour & Manly, 2016; Chen et al., 2008). Turf battles, bureaucratic politics, personal and organizational agendas, interpersonal conflict and relations, overlapping or competing institutional goals or authorities, and differing organizational norms and practices can interfere with or stifle information sharing and cooperation (Boin & 't Hart, 2003; Carlson et al., 2017; McConnell & Drennan, 2006).

Despite their varied cultures, norms, methods, and communication patterns, these disparate groups must work toward common goals for effective emergency and disaster response.

Formal inter-agency and inter-government communication

Several approaches built into emergency management exist to address message coordination and risk communication. The most basic framework through which this occurs is the Incident Command System (ICS), part of the National Incident Management System (NIMS) that guides interagency and intergovernmental (local, state, federal, cross-jurisdictional) cooperation in an emergency or disaster. Both ICS and NIMS address communication and public information. These systems include common operating structures and identify organizational positions to perform communications functions using the Joint Information System (JIS) and Joint Information Centers (JICs) (U.S. Department of Homeland Security, 2020). JIS and JICs are part of the National Incident Management System (NIMS) (Bigley & Roberts, 2001; Moynihan, 2008; U. S. Federal Emergency Management Agency, 2020b). For many communities, public information officer (PIO) duties fall to a member of a responding organization. However, as noted above, the "face" of the response is often a political leader. In both cases, these spokespeople may lack an understanding of technical risks, especially those associated with significant hazmat incidents, which means leaning on experts. ICS and NIMS can provide structures for that expertise. Leaders and executives may also leverage informal networks for insight and guidance.

Informal inter-agency and inter-governmental communication

During disasters and emergency responses, informal networks and groups form among agencies and governments. These groupings share information outside of formal channels within their organizations and between organizations functioning within ICS/NIMS. Emergency

management professionals often recommend that the first time they work together should not be during a response. Informal networks in disaster may be ad hoc or task/project-oriented, while others informal networks form out of established, pre-existing relationships in a crisis. These informal networks are the ones formal and informal leaders turn to for advice in an emergency or when planning for one (Barbour et al., 2020; Doerfel, 2016).

Networked Resiliency

Theory and research related to networked community resilience suggest that bridging the disconnects and silos among organizations can help them coordinate their communication and navigate changing media systems and emergency communication audiences. The importance of communication networks in resilience is evident in Doerfel and colleagues' work that documented the central role of organizational leaders' networks in recovery from Hurricane Katrina (Doerfel et al., 2010, 2013). Summarizing insights from this and related scholarship, Doerfel (2016) argued that "resilience involves organizations communicating through networks to gain and share information and resources" (p. 367). Those networks can provide organizational and community systems sufficient capacity for responding to and mitigating crisis events (robustness), substituting system elements should part of a network or community be unable to act (redundancy), and the "capacity to identify problems, establish priorities, and mobilize resources when disruption occurs" (resourcefulness) (p. 366).

Working along a similar trajectory, Houston and colleagues (2018; 2015) have developed a theory of community resilience that also emphasized the importance of networks. In their framework, community resilience relies on relationships among individuals, households, and organizations. Houston (2018) argued for a multilevel, interconnected approach to resilience, highlighting examples of the differing information difficulties of key stakeholders during crisis

response. Governmental officials emphasize the difficulties of top-down communication efforts highlighted above, an information distribution problem. Community stakeholders' difficulties may center on being disconnected from each other and responding agencies, an alienation problem. These twin difficulties of distribution and alienation reflect differing experiences with the same issues. Communities with insufficiently robust networks lack the connections needed to access and distribute efficiently and effectively information in a crisis.

The failure to develop robust crisis response networks despite their theoretical and practical importance stems from the paradoxical nature of disaster preparation efforts (Barbour & Manly, 2016; McConnell & Drennan, 2006). Major crises are thankfully rare but preparing for them requires significant resources and effort. Policymakers assigning those resources must weigh preparation against other priorities. Preparation involves order and coherence, but crisis can be chaotic. Indeed, a key indicator of resilient response networks is their ability to maintain a high degree of functioning despite the chaos involved (Doerfel, 2016; Kirschenbaum & Rapaport, 2018). Stability and certainty favor the standardization, efficiencies, and clarity of hierarchical forms. Instability and uncertainty encourage organizational and network forms with sufficient communication capacity to change their operations, reconfigure, and respond quickly (Ford et al., 2016; Kim et al., 2017). Disasters and catastrophic events are especially difficult for organizations because, most of the time, emergency preparedness organizations operate in predictable and stable environments; they respond to emergencies that they have trained to manage (Boin & 't Hart, 2003).

We contend that local emergency planning committees (LEPC) as risk communication infrastructures offer strategies for bolstering networks of resilience that support emergency professionals' efforts. In sum, LEPCs are distinctive in that they are formal organizations that

engender the creation of informal networks by their nature. Before an emergency, they bring together responders, officials, the public, non-governmental organizations, the media, and other organizations that may not work together typically. Thus, an LEPC creates conditions from which critical informal networks form – pre-disaster, increasing the likelihood that those networks will coalesce early in a crisis as formal and informal leaders seek information on hazardous materials from experts they know and trust. Illustrating LEPCs as a model for preparing for communication during a catastrophe, the following section describes LEPCs—their history, diverse functioning across communities, and current state.

Local Emergency Planning Committees

Created in 1986 by the Emergency Planning and Community Right to Know Act (EPCRA), policymakers envisioned LEPCs as planning entities that could connect industry with elected officials, government professionals, the media, and community representatives to enhance emergency planning for and enable the public's right-to-know about chemical hazards in their communities (see Figure 1). (EPCRA was Title III of the Superfund Amendments and Reauthorization Act (SARA). SARA Title III is an alternate way of saying EPCRA. Both refer to the same section of law and regulation.) These committees meet regularly in various jurisdictions across the United States to perform a variety of functions. Although structures, meeting frequency, and purposes can vary from jurisdiction to jurisdiction, generally speaking, LEPCs perform a coordinating and advisory role in emergency management.

For some jurisdictions, meetings might include a review of HazMat incidents within the jurisdiction since the last meeting or an informational briefing from a member or outside expert. These briefings can be domain or function-specific (planning, response, outreach, mass casualty, or other topics) or ad-hoc depending on the LEPC. LEPCs might organize emergency plan

reviews and coordinate training activities, schedules, and exercises between chemical facilities, transportation companies, and local response organizations. LEPCs can also support emergency plan reviews and training through grant funding available from state organizations, industry, the federal Pipeline and Hazardous Materials Safety Administration (PHMSA), the Environmental Protection Agency (EPA), and the Federal Emergency Management Agency (FEMA). LEPCs also provide an essential risk communication infrastructure, responding to and providing information about HazMat risks within their communities to the public via Right to Know legislation and conducting community emergency planning for those hazards.

Active LEPCs still fulfill these planning functions in some jurisdictions. However, subsequent legislation to EPCRA, the Stafford Act passed in 1988, formalized much of emergency management at a federal level, subsequently adopted in various forms at the state and local levels. Stafford Act structures took over many of the planning roles originally envisioned for LEPCs, especially as community emergency management planners adopted all-hazards approaches that incorporated the community planning functions EPCRA envisioned for an LEPC related to chemical hazards. After 9-11, the system of emergency management in the U.S. underwent numerous changes at federal, state, and local levels. These systems changed again following a devastating ammonium nitrate explosion at the West Fertilizer Company in West, Texas, in 2013, with several changes directly impacting LEPCs. Some active LEPCs adopted an all-hazards approach after 9-11, urged by the Environmental Protection Agency, the federal regulatory authority under EPCRA (U. S. Environmental Protection Agency, 2008).

Although no recent data are available, anecdotal accounts suggest that many LEPCs are no longer active (Dempsey & Collette, 2016). The Emergency Planning Districts in which LEPCs organize are defined differently in each state but generally conform to incorporated

municipalities and counties in most states. There are over 3,000 such districts in the United States. The EPA's 2008 nationwide survey did not measure activity focusing on active LEPCs, but a survey published in 2000 found that approximately 60% of LEPCs active out of approximately 3,000 potential jurisdictions nationwide (Starik et al., 2000). In some jurisdictions, LEPCs exist in name only, having no active meetings or members, with a local emergency management official (potentially the lead local elected official as the jurisdiction's emergency director) and local fire department receiving and reporting Tier II information as required under the Right-to-Know portions of EPCRA. Tier II information refers to the required reporting by industry of regulated, hazardous materials stored above specific threshold quantities.

Funding also remains limited for LEPCs in most jurisdictions. The 2008 LEPC survey found that 59.3% of responding LEPCs had no operating budget and 64.1% received no direct funding; 56.3% reported receiving indirect funding, primarily meeting space, office supplies, and the use of computers and equipment. In some jurisdictions, LEPCs receive funds through fees directly as part of Tier II reporting or grants or dues paid by industry members or associations. In some states, a state agency collects fees from Tier II reporters on behalf of the State Emergency Response Committee (SERC). The state then uses the revenue from these fees to fund state EPCRA requirements or apportions a part of the fees to local LEPCs, either as grants or via direct funding. However, the structures vary widely. The involvement of any LEPC in Tier II reporting involves decisions made by LEPCs and state and national government with variability from locale to locale and state to state, but most LEPCs have limited or no direct funding.

The number of Right-to-Know requests by citizens for information about chemical hazards in communities as afforded by EPCRA has proved significantly less than anticipated.

Both the 2000 and 2008 LEPCs surveys conducted by the EPA showed that many responding LEPCs had no requests for Tier II information (U. S. Environmental Protection Agency, 2008). Likewise, given that LEPCs often exist outside current local and state emergency management structures, where LEPCs continue to meet, they facilitate planning coordination and advise community emergency managers rather than lead the jurisdiction's emergency planning effort (e.g., Trefz et al., 2019).

Public recognition of LEPCs is low, even in emergency planning districts where they are regularly active. Few community members typically claim to know about LEPCs. Even among those familiar with LEPCs, few can describe what they do (Heath et al., 2002, 2018; Heath & Lee, 2016; Heath & Palenchar, 2000). That said, LEPCs did receive attention and support as a result of Executive Order 13650, issued following the West, Texas disaster (Exec. Order No. 13650, 2013). Although changes proposed as a result of the West, Texas disaster were subject to ongoing political wrangling between recent Presidential administrations, changes to the Risk Management Program (RMP), and other regulations that increased the role of LEPCs in local emergency planning for chemical risks were generally preserved despite considerable debate between industry, executive branch, and other stakeholders and subsequent court and administrative decisions. The final provisions requiring increased coordination and exercises with local responders and LEPCs survived much of the political wrangling. They proved uncontroversial (U. S. Environmental Protection Agency, 2018, 2021a, 2021c, 2021b). Additionally, the West, Texas disaster led to changes in states such as Texas regarding regulatory authority related to EPRCRA and non-EPCRA regulated chemicals like Ammonium Nitrates (see, for example, changes to the Texas Health and Safety Code, Section 505.0061, Reporting for Facilities Storing Ammonium Nitrate Used in Fertilizer, 2015). So, in a broad sense, LEPCs

struggle with name recognition among the public, even in areas where they are active, but they are loci for coordination between responders, community leaders, and other groups where they are active.

In places where LEPCs remain active, the organizations vary widely as well. LEPCs can be relatively small and meet infrequently. Other LEPCs in industrial areas are large, active, and meet regularly. Some LEPCs carry out a relatively narrow range of activities, for example, dealing exclusively with Tier II-related inventory reporting. A few engage in a broad range of activities more in line with their original mandates, conducting public education and safety programs, supporting emergency management through Emergency Operations Plan (EOP) reviews, and serving as an information exchange and coordination point for the public, first responders, industry, and other organizations.

Many LEPCs focus exclusively on chemical hazards, consistent with the EPCRA regulation, while others adopt a recommended all-hazards perspective (Bierling et al., 2018; Trefz et al., 2019; U. S. Environmental Protection Agency, 2022). As LEPC activity and roles may vary from place to place, active LEPCs provide a valuable model for collaborative activity. LEPCs foster the development of communications networks that can benefit the emergency management community (Barbour et al., 2020). Further, the trend in emergency management, especially since the West, Texas disaster, is toward a whole community model. The National Preparedness System focuses on a whole community effort from the individual citizen to the President, operating within a common framework (NIMS and the National Planning Frameworks), across five mission areas, Prevention, Protection, Mitigation, Response, and Recovery, toward a common goal – the National Preparedness Goal (U. S. Federal Emergency Management Agency, 2020c, 2020e, 2020a, 2020d). LEPCs existed before the formulation of the

National Preparedness System, NIMS, and National Planning Frameworks. Nevertheless, LEPCs encompass the spirit of the National Preparedness System. As envisioned, LEPCs are a whole community network focused on emergency preparedness, albeit for a narrower range of emergencies.

Communication Strategies for Catastrophe

The inactivity of LEPCs in some communities notwithstanding, LEPCs as a model for risk communication infrastructure (see Figure 2, Bierling, 2012) highlights the importance of network building, messaging coordination, and trust-building for collaboration as underpinning efforts to respond to catastrophes involving complex scientific information. Networks are essential for responding to crisis events because they can quickly focus available resources on the most pressing problems. Networks are also more flexible, which allows them to reconfigure as the nature of the crisis changes. LEPCs bridge hierarchies and networks. Future research should focus on the capacity of LEPCs to do so by comparing the hazardous materials planning and response networks in communities with and without active LEPCs. This research will require investments in conceptualizing and measuring what it means for an LEPC to be active (cf. Shumate et al., 2017). It should focus on encompassing the diverse range of LEPC activities with value.

Coordination and Trust Building

Effective, functioning LEPCs can bolster organizational and community networks toward coordinated information sharing and messaging. LEPCs make these systems more robust by identifying useful information, resources, and capacities in response organizations and the industries that store, create, use, and transport hazardous materials, including those not directly involved in emergency response. LEPCs create redundancy and resiliency by facilitating

information exchange about hazards to multiple, non-responding stakeholder groups (Lindell & Meier, 1994; Lindell & Whitney, 1995). Future research comparing more and less active LEPCs should build on previous research by Lindell and colleagues on factors that contribute to LEPC effectiveness (e.g., Lindell & Perry, 2001; Lindell & Whitney, 1995) to consider the organization and institutional factors contributing to LEPC activity and engagement. Many LEPCs are active despite the lack of funding, changing emergency preparedness missions and frameworks, and shifting regulations, making them worthy of study.

Coordination of Messaging

Coordinated messaging is essential in a crisis, but as argued above, changing media systems and audiences makes unified messaging more difficult, especially when it involves complex scientific information. The COVID-19 pandemic showed again that disconnects in messaging occur between government levels and between local, state, and federal agencies with overlapping or conflicting responsibilities (Cherry et al., 2021; Lambrecht, 2021). Coordinated messaging may be easier to achieve locally due to the familiarity among the responding agencies' personnel. Local responders from multiple departments or jurisdictions generally function within a unified command structure at the incident command level and work together at a political level within emergency operation centers. Their more frequent interaction with the emergency system at a local level builds trust and supports unified messaging.

Disconnects can occur where officials and elected leaders are less likely to regularly experience emergencies or work together, where bureaucratic politics between and within agencies can play a more significant role, both between elected or appointed political officials and between politicians and the bureaucracies they oversee. Bureaucratic politics in emergency management, national security, and foreign policy tend to be more pronounced due to

overlapping authorities between levels of government (local, state, and federal) and within the federal government (Carpenter & Krause, 2015; Kapucu, 2014; Sylves, 2019; Zegart, 2000).

Future research should seek to link robust collaboration networks and the coherence (or lack thereof) of messaging. Research offers evidence about the efficacy of crisis communication strategies and crisis response organizing but too little insight into the connections between the two. LEPCs offer a context for that area of research.

Conclusion

The catastrophes of tomorrow will no doubt require the communication of complex scientific information. Examples such as the anthrax attacks and the COVID-19 pandemic suggest that emergency response organizations must grapple with uncertainty, credibility, collaboration, intensive media coverage, and speed exacerbated by changing media systems and audiences. Informal and formal networks formed within the whole community, like those created by LEPCs, assist risk communicators in crises and create the necessary frameworks they can utilize to coordinate risk communication strategies.

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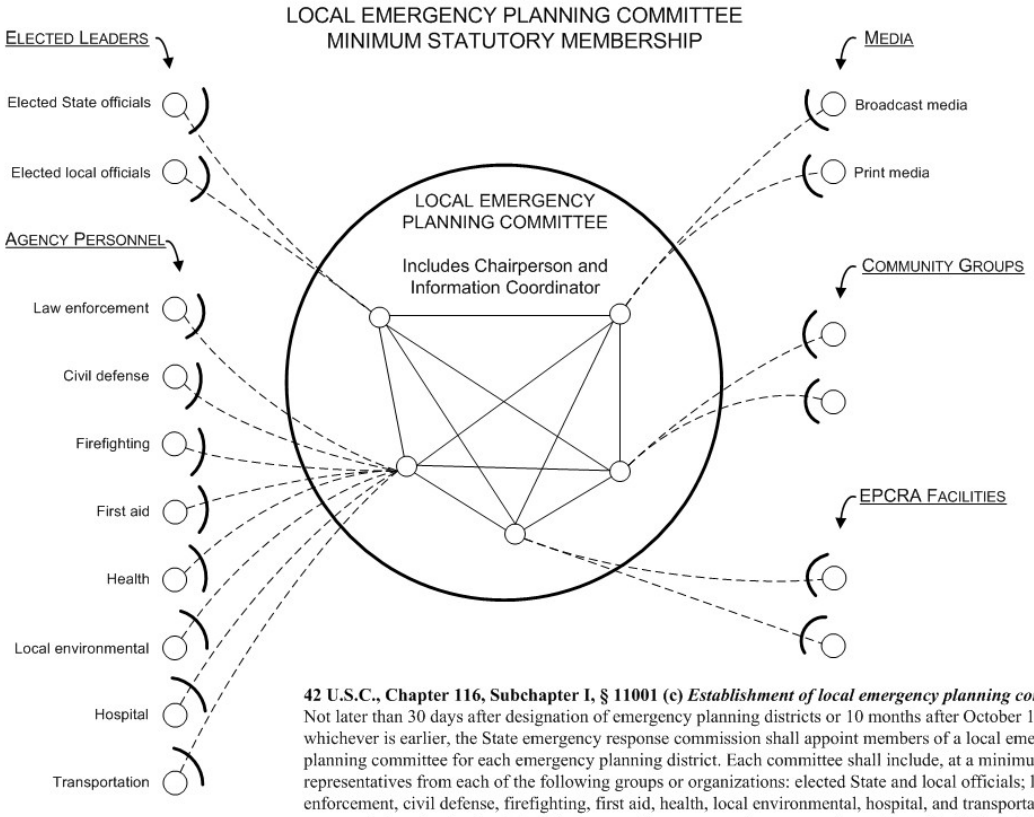
Figure 1

Statutory Requirements for LEPC Membership



42 U.S.C., Chapter 116, Subchapter I, § 11001 (c) ***Establishment of local emergency planning committees***
Not later than 30 days after designation of emergency planning districts or 10 months after October 17, 1986, whichever is earlier, the State emergency response commission shall appoint members of a local emergency planning committee for each emergency planning district. Each committee shall include, at a minimum, representatives from each of the following groups or organizations: elected State and local officials; law enforcement, civil defense, firefighting, first aid, health, local environmental, hospital, and transportation personnel; broadcast and print media; community groups; and owners and operators of facilities subject to the requirements of this subchapter. Such committee shall appoint a chairperson and ... include the designation of an official to serve as coordinator for information.

Figure 2

Hypothetical LEPC Organizational Structure