STRATEGIES FOR EFFECTIVE RISK COMMUNICATION UNDER SARA TITLE III: PERSPECTIVES FROM RESEARCH AND PRACTICE

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Abstract. Title III of the Superfund Amendments and Reauthorization Act of 1986 requires that planning and emergency response agencies be able to communicate with the public in nonemergency situations in order to help citizens understand the risks they face from hazardous materials and to secure citizen participation in designing responses to chemical emergencies. Both research and reports from the field indicate that, with notable exceptions, most Local Emergency Planning Committees created for this purpose are making little or no effort at proactive communication. As a result, citizens are not being educated effectively about the hazards they face and are not acting as full partners in emergency response and risk management planning. This paper draws on research and field observations, identifies ten major barriers to sound risk communication, and offers organizational and tactical suggestions for overcoming each barrier.

INTRODUCTION

The planning process mandated by Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) requires that local planning and emergency response agencies be able to communicate with the public in nonemergency situations, in order to help citizens understand the risks they face from hazardous materials and to secure citizen participation in designing responses to chemical emergencies. This responsibility is vested most directly in SARA-mandated Local Emergency Planning Committees (LEPCs) that have been formed throughout the nation (see Musselman, 1989, for an overview of Title III). Advocates of the legislation saw this process as a potential catalyst for community debate about environmental issues (Florio, 1987).

Unfortunately, both research and reports from the field indicate that, with notable exceptions, most LEPCs are having little or no effort at communicating proactively with the public. Even if they wish to increase their levels of communication, many lack the skills necessary to do so successfully. As a result, citizens are not being educated effectively about the hazards they face and are not acting as full partners in the emergency response and risk management planning process (Conn et al., 1990).

This paper identifies some major barriers to effective nonemergency risk communication and offers suggestions about what can be done by LEPCs to overcome each barrier. Our analysis is based on a combination of our own and others' research findings and on our less formal observations of response and planning organizations.

Our research has involved four main components: (1)a mail survey of the chairs and members of all LEPCs in Virginia prior to Title III's October 1988 deadline for completing local emergency response plans, as well as case studies examining the activities of selected LEPCs (Conn et al., 1988); (2)a mail survey of the chairs and members of a national sample of LEPCs conducted well after the 1988 deadline, together with case studies of especially aggressive risk communication efforts by LEPCs and other organizations (Conn et al., 1990; Rich et al., 1990a); (3)case studies of the emergency and post-emergency risk communication that accompanied actual chemical accidents (Rich et al., 1990b); and (4)a field test of a technique for communicating fairly complicated emergency preparedness information in the absence of an emergency (conducted in cooperation with the National Institute for Chemical Studies, and still in progress). We also have had the opportunity to learn about the operation and practices of many organizations with risk communication responsibilities through our role as editors of a quarterly publication entitled *Hazardous Materials Dialogue*, which is distributed to LEPCs, the State Emergency Response Commissions that oversee them, government officials, citizens' organizations, and researchers across the nation.

Although we have confidence in the validity of the underlying research, we must recognize that our recommendations for action have not been evaluated systematically in practice. As a result, we suggest that, for the time being, they be judged on highly pragmatic grounds—by asking if they make sense in light of experience and if they work when tried. Certainly, each recommendation will be more appropriate to some LEPCs than to others.

BARRIERS TO EFFECTIVE RISK COMMUNICATION

Our observations suggest ten broad problems that make it difficult for LEPCs to mount risk communication programs. Conceptually, these can be divided into problems that are institutional (having to do with the design of the LEPCs) and problems that are more situational (stemming from the nature of chemical hazards and risk communication). In practice, the two types of problems interact. In our opinion, many of the difficulties LEPCs face in risk communication stem from the fact that Title III's institutional arrangements were developed essentially without reference to the demands of the task of risk communication. Our discussion will move from the more institutional to the more situational problems, since it is the former that set the context for addressing those problems that are more practice-oriented.

1. Unclear Mandate: Perhaps the most basic barrier to effective risk communication is a lack of consensus among LEPCs about what kind of risk communication efforts are required of them under the Emergency Planning and Community Right-to-Know Act (as SARA's Title III also is called). The basic question is whether they have to do anything more than (a)include members from the SARA-mandated categories on their committees, (b)passively make information on chemical hazards available to the public, and (c)hold open planning meetings. While the legislative history of Title III can support an argument that the spirit of the law requires a proactive stance, the letter of the law requires very little from LEPCs (Hadden, 1989; Musselman, 1989). Our contention is that, regardless of Title III's provisions, a sound case can be made for aggressive risk communication efforts, on the grounds of their value to the emergency planning mission. The following considerations are pertinent:

   - Only if the public is made aware of risks is political pressure for risk reduction likely to be generated. Most responders and citizens would agree that it is far better to avoid accidents than to attempt to cope with their consequences.
   - Although existing empirical evidence on the impact of pre-emergency communication generally is inconclusive (Sorensen and Mileti, 1990), it is reasonable to suppose that citizens who have been given information in advance are more likely to know how to cooperate with responders in emergency situations and how to take protective action, where possible. If so, communication would make the responders' job easier and response plans more effective.
   - Similarly, where full communication precedes an emergency, citizens may be more willing to accept officials' instructions and cooperate with response efforts. If a threat comes as a complete surprise, citizens may be skeptical of authorities' interpretation of the danger and judgement about how to respond to it. This could cause delays that cost lives.
   - In the longer term, if citizens have a full understanding of the dangers they face, they may become the political allies of local responders, working to secure adequate equipment, funding, and administrative support for response organizations.

2. "Decide-and-Announce" Approach: Most LEPCs are led by emergency responders and administrators who are accustomed to evaluating the available information, deciding on the best course of action to protect the public, announcing what will be done, and having their decision accepted. While this may be essential in an emergency situation, the approach does not build the trust necessary for citizens to accept official judgments about acceptable risks or appropriate emergency precautions, and it can contribute to public "outrage" if things go wrong (Sandman, 1989). More important, this approach will not overcome public resistance to risk messages and will fail to get public attention in advance, so that citizens know what to do in an emergency or can act as informed participants in the planning process (Scanlon, 1990). Since responders cannot protect everyone in an emergency, it is vital that citizens do what they can to protect themselves. It also makes more sense for the community to debate chemical hazards openly and reach agreement

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on a policy to reduce the risk of accidents than to count on being able to deal successfully with them when they happen. As a result, LEPCs and other responsible parties should adopt a new approach to dealing with the public.

A two-pronged attack is needed. First, there should be a concerted effort to introduce LEPC members to new ways of looking at their communication tasks. This effort should focus especially on LEPC chairs, since these individuals tend to set the agenda for most local committees. The central idea to convey here is that citizens' acceptance of a risk message depends on their acceptance of the process by which the content of a message was determined, just as much as it depends on the perceived accuracy of the message (NRC, 1989). Citizens are far more likely to accept a process as legitimate if it was open to public scrutiny, input, and questions. This means that success in getting a message across (and in designing an effective response to hazards) can depend on providing for two-way communication with the public.

Second, LEPCs should work to diversify their membership to bring in new perspectives. Most local committees would benefit from having more members from civic and community organizations, the medical profession (especially public health), businesses other than the chemical industry, and the media. These people can bring a layman's perspective to discussions of what citizens need to know to understand chemical hazards and to become involved meaningfully in the planning process. They also can help discover what approach to risk communication might be most effective in reaching the public in given locales. Having members from different backgrounds also will help in solving some of the other problems we address below.

3. Lack of Resources: Most LEPCs have neither the budget nor the staff to undertake expensive and time-consuming risk communication campaigns successfully. Part of the solution to this problem (and a big step toward resolving others) is to define a proper role for the LEPC in risk communication. Just as LEPCs are expected to plan emergency responses but are not expected actually to respond to emergencies, so they should plan a proactive risk communication campaign without being expected to actually carry out major risk communication tasks. Their most productive roles are to design effective risk communication systems, to act as advocates for aggressive risk communication efforts by other agencies, and to coordinate the communication efforts of other organizations (Conn et al., 1990; Rich et al., 1990a).

   Their success in adopting these roles will depend on their ability to persuade other public agencies and private organizations to take responsibility for major risk communication tasks. Clear directions from the Environmental Protection Agency about the proper scope of LEPC responsibility in this area could help them persuade other organizations to take operational roles in risk communication.

   Until they succeed in establishing this planning/advocating/coordinating role, LEPCs that accept responsibility for proactive risk communication can stretch their resources through the following strategies. First, they should recognize that risk communication often is most effective when approached as a two-step process, in which the LEPC does not try to reach citizens directly but communicates with them through respected community organizations. By having community groups host presentations prepared by the LEPC, distribute written materials to their members, or sponsor discussions of hazardous materials issues, LEPCs can reach a large number of citizens far more cheaply than by doing these things directly. Moreover, this two-step approach allows LEPCs to enhance their credibility by "borrowing" the trust members have for their own organizations. When people hear a message from a trusted source in a familiar setting, they are far more likely to take it seriously than if it comes from an impersonal authority through an anonymous channel (Krimsky and Plough, 1988). Moreover, LEPCs can magnify their resources by tapping into the volunteers, money, etc., that community organizations can put into public education efforts. One tactic for working through established groups is to create a "speakers' bureau" of LEPC members and others who can make presentations on emergency preparedness at meetings of local organizations.

   A second approach to overcoming resource limitations is for the LEPC to seek funding and technical support for risk communication efforts from the local chemical industry, while maintaining control over what is communicated. Although individual plants may be reluctant to make information on hazards public, many facilities will see working with the LEPC as a way of gaining public trust (Covello et al., 1988; Baram et al., 1992) and will be willing to support the production and distribution of pamphlets, videos, and other materials. Care must be taken, however, to avoid the reality, or even the perception, of industry cooption of the LEPC's message.

4. Lack of Expertise in Risk Communication: Risk communication is a complex business in which well-intentioned efforts can turn into a waste of resources, or even a public relations disaster. Successfully formulating and delivering risk messages requires knowledge and skills that most LEPC members simply don't have. Similarly, actively involving citizens in the planning process requires public relations skills and knowledge of citizen participation techniques that are possessed by few LEPC members (Conn et al., 1990). Under these conditions, it is natural that local committees would give little attention to such unfamiliar tasks.

   Several strategies can be employed to secure the skills necessary for sound risk communication. It may be possible to rely on the media representatives that SARA mandates for each LEPC. In practice, however, these individuals often are from the management side of the media and can provide little help in solving practical communication problems. In this situation, local committees would be well-advised to expand the number of media members and, specifically, to recruit people who can offer advice on how to design media campaigns. In addition, they can tap into other pools of communication skills, such as local advertising or public relations firms who may be willing to provide expertise as a community service.

   Since the tasks of risk communication go beyond fielding well-worded, eye-catching messages, LEPCs also may need to call on persons with experience in citizen participation techniques who can help design and manage outreach efforts that involve two-way communication. Such people usually can be found in city or county planning departments. In addition, the local League of Women Voters often will have experience in encouraging citizen participation, and generally is regarded by citizens as an objective, trustworthy sponsor of outreach efforts.

   Colleges and universities also can be valuable sources of free or inexpensive advice about communication methods. Local Emergency Planning Committees should seek faculty members in departments such as communication, planning, political science, sociology, and urban affairs, who may be willing to perform community service by acting as consultants or by evaluating the impact of outreach efforts. Often, graduate students can make valuable contributions by working as interns on LEPC projects or by taking on some aspect of the LEPC's work as part of their research for advanced degrees.

5. Lack of Procedures: The vast majority of LEPCs have not developed procedures for communicating routinely with the public about chemical hazards (Conn et al., 1990; Lindell and Meier, 1991). They talk with industry and government agencies, but any efforts to reach the public usually are *ad hoc* responses to specific problems. While emergency communication responsibilities generally are well-established, responsibility for nonemergency communication seldom is delegated specifically, with the result that it usually is given a low priority.

   To be successful, risk communication must be integrated into overall response planning and risk management efforts, and it must be systematic. For this reason, we argue that risk communication efforts should be guided by a plan, just as emergency preparedness is, and that the plan for risk communication should be a formal part of the overall emergency response plan developed by the LEPC. The risk communication plan should assign authority for different aspects of nonemergency communication and should describe procedures to be followed in efforts to reach the public. At a minimum, it should specify in detail how chemical hazard information will be made available to the public (as required by Title III) and how the public will be assisted in making effective use of this information. It also should provide for the establishment of an advisory committee to assist in formulating and disseminating messages, and for the development of working relationships between response planners and the local media.

6. Political Fears: Public officials and business leaders often are reluctant to have chemical hazards discussed openly, for fear that public debate will result in demands for government action to reduce the hazards, will bring pressure on local firms, or will lead the public to blame incumbents for adverse situations. We refer to these possible outcomes as "the risks of risk communication." If LEPCs and others are to get the political support they need to engage in effective risk communication, they must recognize these fears (whether justified or not) and find ways to overcome them.

   Local Emergency Planning Committees should approach officials with proposals for proactive risk communication efforts only after the committee members themselves have a firm understanding of the importance of such efforts to effective emergency response and risk management. They should be prepared to argue that the risks of not communicating are far greater than the risks of informing the public. While revealing the existence of a hazard may bring government and business some adverse publicity at first, this will be minor compared to the outrage that would follow an accident in which lives were lost or people were injured, because citizens had not been informed of a danger known to public or private officials. Most officials should be able to see advance communication as being in their enlightened self-interest. In addition, LEPCs can suggest that educational efforts are likely to make emergency response more effective, thereby enhancing officials' standing with the public.

   Since many of local officials' fears about proactive risk communication revolve around concerns about its potentially negative impact on the business community, a good strategy is to enlist the aid of local industry representatives when trying to sell risk communication programs to local government. Similarly, some officials fear overreaction by local environmental or neighbor-

hood groups. Since showing that these groups approve of the planned activities and will act responsibly may reassure public officials, LEPCs should include such groups in the design of risk communication programs and, if possible, get their endorsement before going to office holders for support.

Arguably, LEPCs should not undertake any major risk communication effort without being sure that public officials are aware of its purpose and methods in advance. If the activity sparks controversy and officials have not been informed about it, they may feel betrayed and withdraw support for LEPC efforts.

7. Public Resistance: There is a widespread perception among LEPC members that most citizens just don't pay attention to environmental hazards. Psychology and communications studies provide plenty of reasons for this behavior (see, for example, Douglas, 1985; Marks, 1990; Perrow, 1984). Among the more prominent explanations are the following:

- Most environmental hazards pose a threat only in the future, while people have their hands full dealing with immediate problems;
- People have to be prepared to receive complex messages, and most citizens do not have the knowledge or backround to understand risk information, and as a result, ignore it;
- Modern communications techniques flood people with messages that claim to be important, so that it is very difficult for any one message to get through.

Together, these and other factors produce what appears as public apathy toward hazardous materials issues. But a variety of psychological processes also work to create actual resistance to risk messages. For example, the risks of a chemical accident often are beyond the control of the average individual, but have the potential of being overwhelming. Accepting this reality means accepting one's own vulnerability and can create fears that are emotionally painful. To avoid this discomfort, people may engage in denial, ignoring the danger and refusing to take steps to prepare for an emergency.

Suggestions for ways to overcome this resistance are both procedural and substantive. Procedurally, it is vital that authorities be able to point to an open, balanced process by which hazards were analyzed and selected for attention, the content of messages was developed, and risk management plans were laid. Only then are skeptical citizens more likely to accept information and instructions as legitimate (Fessenden-Raden et al., 1987). For a process to be "open and balanced," citizens from a variety of backgrounds should be selected to participate by a disinterested party, and the citizen members of the group must have more than advisory authority in determination of the final outcomes.

Substantively, there are a variety of measures that can help overcome public resistance to risk messages (see, for example, NRC, 1989). First, LEPCs must study their intended audience and design messages specifically for it. The goal is to discover relevant facts about the audience (e.g., where they work, shop, and play; how mobile they are) and to understand their concerns and values (e.g., what health fears they have; what hazards they worry about).

Second, LEPCs should not assume that one message will reach all groups. It is vital to segment the audience and design appeals tailored to the concerns and interests of each segment. This will mean using not only different "appeals," but also different methods of delivery—talks to civic groups, videos, direct mailings, TV spots, etc.

Third, it is essential to pretest messages. The fact that a message is technically accurate does not mean that it will communicate the desired content or have the desired emotional impact (Slovic, 1987). Before finalizing the message, it is essential to present draft versions to small samples of the intended audience in controlled environments and to discuss what they learned and how they were made to feel. This will reduce the chances of unintended consequences.

Fourth, messages should be tied to immediate concerns and behaviors. People are more likely to be motivated by immediate problems than by distant ones and are more likely to hear and respond to a message if there is something they can do with the information. It also helps, where possible, to provide citizens with a concrete reminder of the message, like a phone plate, bumper sticker, key chain, or fact card.

Fifth, suggestions for concrete defensive measures that citizens can take always should accompany risk messages. Alerting people to a danger without offering them a way to protect themselves only creates fear and can encourage them to "tune out" the warning.

Sixth, risks should be explained using layman's terms and familiar comparisons, when possible. Most people are intimidated by chemical names and statistics and often will ignore messages that are ladened heavily with them.

Seventh, risk communication should be viewed as an ongoing process. It will be necessary to repeat information campaigns on a regular basis, due to population turnover, fading memories, and changes in individual circumstances.

Eighth, where possible, hazardous materials risk communication efforts should be integrated with natural hazards education efforts to maximize impact and reduce duplication.

8. Popular Misperceptions of Risks: Those responsible for communicating about chemical hazards often express frustration over what they perceive as the public's tendency to misunderstand risks. On the one hand (as discussed above), people sometimes disregard risks when experts feel that they should be far more concerned and should take precautionary actions. On the other hand, officials often fear that citizens will become excessively concerned about relatively minor risks if "agitated" by public discussion of the risks—as when they oppose construction of a hazardous waste treatment facility that experts think will pose little danger (Bord et al., 1991).

The public does not always see risks in the same context as public officials or scientific experts (Krimsky and Plough, 1988). However, problems develop when officials are too cautious about giving citizens the information they may need to protect themselves or to participate effectively in public policy debate. When this happens, responders and planners often make their own tasks more difficult by leaving the public in the dark (Johnson et al., 1988). Uninformed citizens may not take the right steps in an emergency and can not be counted on to pressure government to support emergency preparedness fully. Moreover, poorly informed citizens will be less able to contribute insights and suggestions to the planning process. The challenge, then, is to inform citizens of hazards in ways that provide adequate motivation for them to take necessary defensive measures and become involved in the debate over risk reduction and emergency preparedness, but that do not create an overreaction.

First, it is important to recognize that there is no way to guarantee that citizens will reach the conclusions that officials want them to draw from risk information; therefore, it is a mistake to consider risk communication efforts successful only if citizens accept the official view as a result. In a democratic society, citizens are given information so that they can reach their own conclusions about what is an acceptable risk or an appropriate risk management measure.

There are, however, ways to increase the chances that risk information will be taken seriously and an overreaction will be avoided. First, it is important to rely on trusted sources to convey the message. Since research suggests that citizens view medical professionals as highly credible (McCallum et al., 1990), LEPCs are well advised to establish contacts with the local medical communities and to enlist their aid in reaching the public with information. Similarly, environmental groups and academics generally are regarded by the public as trustworthy (Bord et al., 1991) and should be utilized in risk communication. Second, attentive citizens are more likely to trust information if they have a chance to question the source and explore assumptions behind conclusions (Slovic, 1987). For that reason, whenever possible, it is wise to present especially important or sensitive information in public forums where there can be two-way communication between citizens and officials. Such forums should be a regular part of risk communication efforts and should be designed to encourage questions and expressions of opinions from citizens. Third, it generally will help to diversify the range of persons involved in response planning so that likely critics (environmental groups, for example) are well-informed and do not promote misperceptions by challenging the validity of official statements exclusively as a result of having incomplete information. Formally including such groups in the presentations at public forums can help persuade citizens that the process is open.

When accidents do occur, it is important to monitor the risk content of emergency messages and follow up to correct any misperceptions that may have been created. Citizens may overestimate or underestimate lingering health risks after an incident and may, therefore, either worry unnecessarily or fail to take needed precautions to avoid adverse health effects. If there is reason to think misperceptions are common, officials should attempt to correct them with direct mailing or phone calls, if possible.

9. Media Indifference to Issues: There is a widespread perception among LEPC members that, in the absence of a dramatic event such as an accident or reports of safety violations, the media are not sufficiently concerned with chemical risks. Whether this disinterest stems from the media's lack of understanding of what is at stake in situations involving hazardous materials or from differences in what the media and public officials consider to be "a story," the effect is that there seldom is a strong alliance between risk communicators and the local media.

While some progress can be made by appealing to the civic responsibility of the media to promote public safety, in most cases LEPCs must attempt to meet the needs of the media if they are to get adequate coverage of hazardous materials issues (see National Safety Council, no date.). It is important to recognize that the media are businesses, as well as public servants, which means that securing an audience may be as important to them as telling the "truth." They may not even seek to uncover a single truth; rather, as Sandman (1986) has suggested,

they may set out to present competing claims as fairly as possible, leaving the task of determining truth to the readers.

Two strategies are among those that can help to improve media coverage of hazardous materials issues. The first involves the development of better working relationships between the media and LEPCs. A highly recommended approach is for LEPCs to hold annual "media-responder workshops," in which key members of the local media are brought together with emergency planners and responders so that each can learn about the issues and job demands of the other. Media people can be educated about the facts of chemical risks and response techniques so they can be better informed, motivated reporters of hazardous materials stories. Responders can learn how to make a story attractive to the media. It also can help for each LEPC to develop a "press kit," which provides reporters with background information that will enhance their ability to cover stories involving hazardous materials under both emergency and nonemergency conditions. The press kit should include information on the Title III planning process and any local efforts to inform the public about chemical hazards or emergency response procedures.

In order to further improve interaction with the media, LEPCs should seek to develop ongoing working relationships with specific reporters who are assigned to cover environmental issues or local government in their area. These people should be kept well-informed of LEPC activities and given material for stories, whenever possible. Local committees also should see their media representative members as resources and learn all they can from them about the operation of the media.

Our observations suggest that media representatives seldom are active members of the LEPC and may feel a certain conflict of interest in being in the position of both contributing to the making of news (as a Committee member) and reporting it. For that reason, it usually is unwise to recruit as members of the LEPC those reporters who are most likely to cover hazardous materials issues. At a minimum, their membership may reduce their credibility with the public.

The second strategy for increasing media attention involves the linking of chemical safety news to other community issues, such as education, economic development, or transportation. This can be done through such tactics as getting community organizations to sponsor hazardous materials education efforts and involving the public in the planning process through public forums that warrant news coverage. In addition, LEPCs should not shy away from controversy, as this is both a good way to bring out useful new information and perspectives and a way to ensure media attention.

10. Insufficient Channels for Reaching the Public: Even if LEPCs are clear about their risk communication objectives and know how to frame their messages, they still may be stymied by their inability to deliver information to the public. In part, this is simply a question of how to cut through the torrent of information and images to which Americans are exposed, in order to capture citizens' attention. In addition, however, the question of channels is an issue of credibility. Having the public hear your message is only effective if the public also regards the message as trustworthy. Citizens often distrust information about chemical hazards and do not regard all sources as equally knowledgeable or believable (Krimsky and Plough, 1988). The task here is to find methods of getting messages to people in ways that will maximize the chances that they actually will listen to them and accept them as true.

Rather than trying to carve new channels, LEPCs can make use of existing lines of communication about health and matters of community welfare more efficiently. One strategy is to undertake a study of the sources that people already rely on for information on health and community welfare issues in a given community. Once these channels are identified, the LEPC can use them to attempt to get its messages out. In addition, it usually will be helpful to enlist the aid of the local medical community. Not only should medical personnel be used as spokespersons, but also they should be educated about chemical hazards and encouraged to discuss the issue with patients, whenever relevant.

CONCLUSION

Local Emergency Planning Committees have a unique opportunity to focus public attention on local environmental issues and promote long-range thinking about these issues. To take advantage of this opportunity, the local committees will have to become far more proactive in their risk communication efforts. We believe that there are many possible grounds on which to make the case for LEPCs to pay greater attention to nonemergency risk communication; however, as indicated in this paper, its potential contribution to fulfilling the LEPCs' emergency planning mission may be sufficient. Thus, the present ambiguity of Congressional expectations with regard to the LEPCs' role in risk communication need not be an issue. The most important task, we believe, is to mount a major educational and administrative support effort, first to persuade the LEPCs of the importance of nonemergency risk communication, and then to assist them in doing it successfully.

Critical to this effort is the definition of a proper role for LEPCs—one that has them planning for proactive risk communication without being expected to undertake the communication by themselves. Given the LEPCs' current lack of resources in most places, it would be unrealistic to expect more of them. The LEPCs do need to know what efforts are

required, and they need to persuade other public and private organizations to undertake these efforts. It is evident that they face many problems in doing so, but this paper has indicated that knowledge and strategies are available to help them overcome the barriers.

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