CHAPTER 13 Community Risk Assessment

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Learning Objectives

After studying this chapter, you should be able to:

- Explain the reasons a community risk assessment is important to the process of establishing safety education priorities.
 NFPA 5.3.1 (pp. 244–245)
- Identify the types of risks that could face a community. (pp. 245–247)
- Collect community demographic data given sources of relevant information. NFPA 5.3.1 (pp. 248–249)
- Prioritize identified community risks. (p. 249)

Introduction

It is often tempting for fire and life safety educators to begin developing presentations, programs, and initiatives, or to request resources based on what they think the community needs or what they've seen other departments present. If this is the totality of the work that comes before developing programs, efforts may or may not hit the mark. As we venture into the importance of using a community risk reduction (CRR) model at the FLSE II level, we must acknowledge that the first step to any risk reduction model is to identify the risks specific to a community through a systematic process based on quantifiable and reliable sources. A **risk** can be defined as any factor, human or otherwise, that could lead to an emergency, negatively affecting the people, places, and resources of that community. Risk assessment is the identification of potential and likely risks within a particular community.¹ It includes the frequency, severity, and trends of the risks; who is contributing to the risks; and who is affected by the risks, along with an assessment of the community's preparedness and ability to resist the impact of risks. Most risks can be categorized as those created by humans and naturally occurring on a regular basis or those that are created by humans or occur naturally every 5-20 years, and have the potential for disastrous outcomes.

The resources available to each community will dictate the degree of sophistication of the analysis process. A comprehensive risk assessment requires data collection about many contributing factors of risk. This task may involve several people or a small team, including field experts. Regardless of the depth and breadth of collected information, the community's risk assessment is always the place to begin program development. Without this step as the foundation for a focused process, it can be difficult, if not impossible, to justify the need for requested budget items and other resources. Further, it will be challenging to measure long-term outcomes for prevention and intervention efforts. Even a well-presented, well-attended, and positively received program might not be that which is most needed by the community if it is not based on identified risks. This is not a wise use of resources, and tight budgets do not allow for indiscriminate, baseless programming.

Once the most important community risks, those most likely to occur, and those with the greatest potential for putting the community in harm's way are identified and prioritized, it is time to develop the strategies and tactics to mitigate the risks. As educators, it is almost instinctive that our thoughts turn to developing educational strategies that will change behaviors and increase awareness, thus creating a safer environment to combat these risks. But we are only one link in the chain of events that should follow a comprehensive risk assessment. In a department where all members embrace the concept of community risk reduction, divisions will share in the lessons learned from the initial assessment and will begin to recognize how their areas can positively contribute to remediation of the issues faced by the community. The same data collected during the risk identification process will be viewed through a different lens by each division, resulting in a richer, more comprehensive interpretation of the information. Data about the community might lead one division to see the importance of home visits to install working smoke alarms as imperative to the survival of occupants; another might see the need for more intensive training in-house to reduce response

time; and still another, the need to deploy additional equipment to respond to and mitigate a fire before it escalates. Most likely, it will be a combination of strategies that lead to the most effective resolution and desired outcome for the safety of the community. A department that considers the Five Es of fire prevention *education, engineering, enforcement, economic incentives,* and *emergency response*—when deciding what plans to implement will ultimately develop a well-rounded approach, achieving greater success for a sustainable plan. An integrative approach to data analysis leads to an organization primed for unified risk reduction.

Each community and each department is unique. The risks and the resources to mitigate them will vary. Working through a CRR model will assist in pinpointing exactly where efforts should be concentrated and the best approaches for mitigating the problems particular to a community. This chapter will specifically examine the process of risk assessment and prioritization of risks.

Identifying Community Risks

Department Data That Identifies Risks

A logical place to begin identifying community risks is to look at what the department experiences in terms of the types of incidents, call volume, location, and causes. Many departments today track incidents electronically and are required to submit this data to their state organizations. Most of the applications for the *records management systems* (*RMS*) are based on the **National Fire Incident Reporting System (NFIRS)**. If you are not able to access this information locally, you may be able to obtain the information from the state or by creating an account with the USFA to obtain specific reports. Talk to the person at your department responsible for NFIRS reporting about access to your account reports, or go to the FEMA website at www.nfirs.fema.gov for further assistance.

"Garbage in = garbage out." The quality and dependability of the information collected will only be as reliable as the information entered in the system. Local departments need to set protocols for incident data entry or there will be as many variations on entries as there are personnel entering data. Consistency for data entry will take training, quality assurance, and more training. An important and often overlooked point of the training is to discuss how the data is used on the output end of the reports. Once fire fighters understand the benefit to the department, how it will affect the community, call analysis, and possibly future equipment purchases, the greater chance they will invest in the data entry process for accuracy and compliance. Most software systems allow users to create additional fields for specific types of incident tracking. Another valuable resource for fire department data collection is the **public safety answering point (PSAP)** or local dispatch system. Again, the FLSE II may not be responsible for setting up or interfacing with these programs. Find out whom to speak with and discuss the possibilities of accessing data with the department administration to achieve the goals for risk assessment.

Common entry fields will provide the most important elements for data collection (date, time, location, and type). Use at least 3–5 years of data. This will allow you to review history and look for trends. This data should be reported along with graphic representations such as pie charts, bar graphs, and tables, making it easier to interpret the big picture. If possible, the following information should be collected to gain a better perspective about the incidents in your jurisdiction:

- Incident dates and times—frequency of occurrence, reported as a percentage of the total calls
- Incident types
- Incident locations and geographical distribution
- Causes of ignition of fires; heat sources; areas of origin
- Response times of all units
- Occupancy type
- Mortality and morbidity rates—fire and EMS related
- Financial impact/dollar loss to value
- Populations most experiencing specific types of incidents
- Incident trending

The FLSE II should investigate the availability of a **geographic information system (GIS)** and work with those familiar with its use before all data is collected. GIS is an information system that understands location, and is gaining popularity in the fire system as the value of pinpointing risks and preparedness capabilities continues to grow. Map projects are built with layers of data and generate custom maps. The geography integrates and organizes all kinds of data, building a visual relationship between the layers of data. Such a map may reveal that within one city, there are several different problems which can be defined by particular populations, races, age, housing, types of hazards, location of risks occurring, and many other attributes. **FIGURE 13-1** shows a GIS map highlighting locations of fires.



FIGURE 13-1 A GIS map highlighting fire locations.

Voice of Experience

In 2013, the Rancho Cucamonga Fire District was invited to compete for a spot in the pilot offering of a community risk reduction leadership program. The program was touted as an opportunity to participate in training that paired GIS technology with the integrated risk management plans that had been successfully used in the UK to significantly reduce fires and injuries. I knew that this would be a valuable opportunity for our organization as well as for me in my role as the fire marshal.

The host organization suggested a team of two management personnel and two GIS personnel, but we could select our own team. I knew that Solomon Nimako and Vincent Grant from the GIS Department had to be on the team. Rather than a chief officer or someone else from management, I chose Kelley Donaldson, the Fire District's Community Affairs Coordinator and Public Information Office, to fill out the team. This decision garnered significant interest since it did not exactly fit what was recommended. When asked why I chose Kelley, I explained that it was my belief that if we did not have a highly skilled person to craft and help to effectively deliver our messages that our efforts would come up short. So, the team was set.

As we worked through several projects, the value of good messaging became readily apparent. The combined skills of Solomon, Vince, and Kelley made for an exceptional team. At the conclusion of the first workshop, we were asked to implement a risk reduction project within the next six months before reconvening for the second workshop.

In talking through the challenges given our responsibilities with prevention, community outreach, community affairs, and making the best use of GIS technology, we arrived at the realization that what we really needed was a means of analyzing data to determine what risks and vulnerabilities we have in the community. That became our project—a comprehensive means of analyzing our own incident data to determine where our efforts were needed and what the message needed to be. We believed that there would be much more value in the ability to analyze our own incident data to guide risk reduction programs, efforts, and messages than relying on national statistics to determine our programs.

As our understanding of risk reduction increased, we struggled with identifying where the mission of risk reduction fit within the organization. Should we recommend a risk reduction division or specific risk reduction program? As we discussed these big topics with the UK chiefs, the answer became apparent: comprehensive, integrated risk reduction is, or needs to be, the *strategic objective* of the fire district. It needs to infuse the organization from the newest recruit to the Fire Chief, from the Prevention Bureau to Emergency Management, and from support staff to partner agencies. We didn't need to rename the Prevention Bureau or change job titles, we just needed to nudge our community-centered culture to be more proactive in preventing the incidents that hurt people and damage a community as well as its economy.

An important key to success is good data. We have emphasized the importance of data from our fire crews and what we are trying to accomplish. That has helped the firefighters realize their reports actually have value beyond completion as a mandated task. We have added special data collection fields to the standard reports and the crews are providing that extra data. Examples of these special fields include notifying the Prevention Bureau of hoarding conditions observed during an emergency response and youth and/or families at risk. Risk reduction is truly a team effort. We can now go to schools, neighborhoods, and senior care facilities and tell people what is happening right there as well as what can be done to prevent it.

> -Robert Ball, Fire Marshal and Kelley Donaldson, Community Affairs Coordinator and Public Information Officer, Rancho Cucamonga Fire District, CA

Educator's Tip

Data derived from department reporting systems is invaluable to the community educator. This information drives the objectives for future program planning. As an educator, you should have access to these records and check frequently for trends.

Human-Created Risks

Human-created risks are those resulting from unsafe or inappropriate human behaviors. Older adult falls, motor vehicle collisions, pedestrian and bicycle incidents, and many of the unintentional injuries discussed in the first chapter of this text are representative of these types of occurrences. Most of these risks are preventable. Educators designing programs for community risk reduction need to pay particular attention to these risks because educating the public in behavior change is one of the most important tools used to reduce the occurrence and severity of these risks.

Using the method of data collection as described for fire risks, review the same attributes of frequency of occurrence, populations affected by the risks, populations creating the risks, geographic locations, financial impact to individuals and community, and historical trends. This information will assist in defining methods to be employed for risk reduction.

Sources of data for some of these incidents will continue to be collected through fire department call data, but additional relevant information will come from other sources as well. Important data is accessible from emergency medical service (EMS) data, hospital data, the local health department, and the Centers for Disease Control (CDC) (WISQARS[™]) at www.cdc.gov/injury/wisqars. Information from the CDC and other national sources is well recognized and serves as a reliable resource; however, local data provides more meaningful impact for community stakeholders and decision makers. Use both sets of data to fully support a call to action.

Naturally Occurring Risks

Naturally occurring risks are not necessarily preventable, but they are fairly predictable. These incidents may not occur often, but must not be overlooked when assessing the risks to a community. Severe weather is an example of a naturally occurring risk. When naturally occurring events happen, they can arrive quickly, powerfully, and produce a heavy effect on an entire community with little warning. It will be important to look at the community's past history for selected risks to anticipate and preplan for future citizen preparedness, resource allocation, and community outreach. These risks will vary by geography, topography, and weather typical for particular regions of the country. Earthquakes, droughts, hurricanes, tornadoes, floods, blizzards, wildland fires, heat waves, cold snaps, or a combination of several of these naturally occurring events are devastating to a community. The likelihood of these weather patterns completely crippling a community is lessened when residents and businesses are prepared to resist the impact of the risks.

A review of past history, frequency and severity of occurrences, areas and populations of the community most vulnerable to the impact, potential future frequency and loss, and the level of current vulnerability or preparedness for such events will reveal where the community needs to invest its efforts.

The FLSE II will be wise to work with the local Emergency Management Agency before an emergency strikes. Collaborating to educate the public in preparedness will prevent a duplication of efforts and provide a more comprehensive approach. Further information for weather-related risks can be obtained from the National Weather Service at www.weather. gov, the National Oceanic and atmospheric Administration at www.noaa.gov, and the University of Colorado Natural Hazards Center at www.colorado.edu/hazards. **FIGURE 13-2** shows an example of a weather probabilities tracking map.



FIGURE 13-2 An example of a weather probabilities tracking map.

Contributing Factors and Populations at High Risk

By now, the FLSE II understands that there is a strong correlation between the characteristics of specific populations and their vulnerability for risk. Not only are they more likely to find themselves affected by risks, but may themselves be the cause of increased risks. One of the first steps in the community risk assessment process as outlined in this chapter is to identify the demographic composition of your community. It is time to align that information along with the identified risks to garner a real sense of who most needs assistance and where in the community prevention efforts should be allocated. Consider again each of the factors below as you sort through this information:

- Social factors. These include cultural influences, healthcare, affordable housing, levels of education, values, beliefs, traditions, customs, peer and family influences, childcare arrangements, and availability of government assisted programs.
- *Economic factors*. These include local economy, employment levels, income levels, single parent families, and transportation to employment.
- Environmental factors. These include housing conditions, substandard and older construction, multifamily housing conditions, hoarding, abandoned buildings, buildings in close proximity to one another, exposure to nearby fires, "grandfathered" structures, poor local code enforcement, buildings lacking fire protection systems, department response times, and difficult topography.
- Risk factors for specific populations. Revisit data about those at greatest risk for most hazards, remembering that a combination of any two or more attributes for risk put the individual at an even greater risk. Those most at risk are children 5 years old and younger; adults age 65 and older; people challenged by cognitive, physical, mental and emotional disabilities; those living in poverty; and non-English-speaking populations in some communities. Refer to the chapter *High-Risk Audiences and Behaviors* for a greater understanding of each of these populations when developing strategies and programs.
- *Growth trends.* Using information from local and national data systems, identify how the local populations have changed in the past 10–20 years. Project trends for the next 10 years. For example, are residents of an assisted living facility aging in place, thus creating a different, higher risk demographic within a few years if they do not move? What will this mean for the department and the community in terms of safety and risk reduction?

Educator's Tip

Educators not actively involved in the EMS system will benefit from riding with first responders to learn what actually occurs on calls. Statistics do not tell the entire story.

Identifying Target Hazards

All local target hazards should be identified and included as locations for consideration in a community risk assessment.

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Target hazards are defined by the Federal Emergency Management Agency (FEMA) as "facilities in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the community, or fulfill important public safety, emergency response, and/or disaster recovery functions."² The following facilities are target hazards: schools, hospitals, important government offices, emergency operations centers, community centers and shelters, nursing homes and assisted living centers, group homes for people with disabilities, roadways and railways, hazardous materials sites, communications systems, power plants, high-risk neighborhoods, airports, and water and sewage treatment facilities. This is not a complete list. Every community houses facilities important to their history, economy, and safety. These are target hazards specific to the community's risk assessment. Fire fighters are in a unique position to understand and identify the hazards within their response area, and may already have detailed information about target hazards in their preplan surveys. Include them in the risk identification process. FIGURE 13-3 depicts three known target hazards.

Educator's Tip

Life safety educators cannot operate in a "bubble," isolated from the concerns of other department divisions. Keep the lines of communication open, always learning what is trending in other areas of community response.

Building a Community Demographic Profile

The next step in assessing community risks is to get a handle on who lives and works in the community. What do you really know about the community and where can you obtain this information? Many students are surprised when they examine the make-up of their jurisdictions. The local community development and economic development departments of the municipality, and state and county governments will have statistics to draw from for data collection. You can also gather information from school districts, chamber of commerce, neighborhood associations, nonprofit organizations, realtor associations, and public health departments. Perhaps you can think of others in your jurisdiction that will have useful information to help paint a picture of the community. Experts in community risk reduction direct students to the American FactFinder website at the U.S. Census Bureau at factfinder2.census.gov/faces/nav /jsf/pages/index.xhtml. This valuable resource provides data on population, age distribution, employment, income, housing and more. Information can further be broken down by census tract. You will also find historical and projected population information. To gain the most useful and insightful data from this resource, it is important to take the time to drill down through several layers of available information. Another helpful resource for community data is the American Community Survey (ACS) at www.census.gov/acs. Information gathered from these resources should then be culled to build a community profile. No two profiles will be exactly the same, which is why no two risk reduction strategies will be exactly







FIGURE 13-3 Three examples of target hazards: Hospital under construction (A); nuclear power plant (B); large high school (C). Courtesy of Marsha Giesler.

the same. Include the following categories when creating a community profile:

Demographic. Information about the people, including total community population, census tract populations (especially for larger communities), age group breakdowns, gender, race and ethnicity, education levels, and social and cultural attributes (including single parent

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- Economic characteristics. Income levels and employment profiles. Included are types of jobs, income level ranges, local unemployment rates, stability of employment rates, strength of local economy, and major local employers. Remember that lower income levels are often associated with higher risk. People facing uncertain economic times will not be able to afford safety devices and systems. These purchases will not be a priority for a family struggling to put food on the table.
- Housing profile. The average age of the homes and occupants, new or older construction, types of construction and types of residential properties (single family, duplex, multi-family), percentage of renters vs. owners, and properties grandfathered and not meeting current safety codes. Do any homes have automatic detection and suppression equipment? These will all be considerations for both prevention and suppression companies and may vary by census tract.

Once this information is gathered, specific categories and populations should be studied as to *how* they are affected. Use local organizations, associations, professionals, volunteers and members of the identified populations who are familiar with the identified demographics to glean an even better understanding of the data.

Prioritizing Identified Risks

The amount of data compiled at this point can be overwhelming. In most cases it is not advisable or possible to tackle all of the risks facing a community at one time. Therefore, the next step is to prioritize the identified risks and work with the administration and community partners to begin plans for mitigating these risks. It may appear that all of the risks are important and all need your attention. How does one begin to make these decisions? When building a prioritized model for risk reduction plans, evaluate each of the identified risks based on scales of likelihood of occurrence (rare to almost certain), consequence and severity (level of impact to individuals or community ranging from minor impact to total devastation), frequency (how often the risk occurs), duration (incidents lasting from less than one hour up to a longer lasting impact of a year or more), and capacity (the level of the emergency response to accommodate the demand for services, including hospital and mutual aid departments. Does it overload the capabilities of the existing systems?). Political and economic influences may dictate the level of priority for particular risks; therefore, it is incumbent on all participants in the community risk assessment process to be as thorough, accurate, and succinct as possible in preparing and presenting the information.

Stakeholders and community partners will be invaluable in building the risk assessment profile and associated strategies. Include members of these organizations and other local agencies on your team to provide history, trends, and a street view of what is happening in the community with specific demographic groups. They must understand the correlation between the target populations and identified risks.

Applying the Assessment for Your Community

You have all of the necessary "ammunition" to clearly identify and prioritize the needs of your community. The next steps will be to use this information to plan meaningful and beneficial strategies to improve the safety of your community. Share the information gathered with your administration in a readable, understandable, and thought-provoking format. Although this may have been an endeavor from the onset, there are other department members or divisions that should have a vested interest and expertise in assisting with a multifaceted approach to reducing these risks. Everyone must understand the value of using a systematic approach to moving forward with strategies. Communication will be fundamental to a productive and professional final result.

Summary Points

- The FLSE II role involves developing programs and strategies aimed at improving the safety of the community through educational efforts.
- A logical place to begin identifying community risks is to look at what the department experiences in terms of the types of incidents, call volume, location, and causes.
- All local target hazards should be identified and included as locations for consideration in a community risk assessment.

Wrap-Up

- Fire fighters are in a unique position to understand and identify the hazards within their response area, and may already have detailed information about target hazards in their pre-plan surveys.
- It is imperative to take the time to work through a community risk analysis so all planning and resulting work is aimed correctly at the community's essential safety requirements. Though sometimes time consuming,

Smoke: © Greg Henry/ShutterStock, Inc

Wrap-Up, continued

this is a critical piece of the educator's job in evaluating community needs. Completing a risk analysis will help justify budget requests, partner and stakeholder buy-in, and long term program evaluation.

Key Terms

- **Geographic information system (GIS)** A computer-based tool that understands location, analyzing, storing, manipulating and visualizing geographic information on a map.
- **National Fire Incident Reporting System (NFIRS)** The standard national reporting system used by U. S. fire departments to report fires and other incidents to which they respond to maintain records of such incidents in a uniform manner.
- **Public safety answering point (PSAP)** A U.S. agency, typically county or city controlled, that is a physical location where emergency telephone calls are received and then routed to the proper emergency services.
- **Risk** Any factor, human or otherwise, that could lead to an emergency, negatively impacting the people, places, and resources of a community.
- **Risk assessment** Identification of potential and likely risks within a particular community records management system (RMS).
- **Target hazard** Facilities in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the community, or fulfill important public safety, emergency response, and/or disaster recovery functions.

Review Questions

- **1.** Why is it important to conduct a community risk analysis before developing programs?
- **2.** What types of community data should be collected for community profile?
- **3.** Name a reliable source for gathering community demographic data.
- **4.** Where will an educator look to compile data about department fire and EMS calls?
- **5.** What does GIS provide for educators building a community risk assessment?

Critical Thinking

- **1.** Available data for department calls is very basic and inconsistent. As the FLSE II, how might you make suggestions to improve this situation for the department?
- 2. What can you as the FLSE II do to help ensure that the priorities of risks identified by the department are recognized by decision makers who will allocate funding for programs?
- **3.** The fire chief has a project he would really like to provide for the community. You know from the risk analysis that this program does not address any of the prioritized risks. How do you address this situation?

Think About It and Make It Better

The local department's community education programs have been well-received for many years. Recent budget concerns have caused local village officials to scrutinize all current programs to validate their existence. Discuss the value of community risk reduction in justifying the usefulness and importance of community education programs.

References

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- 2. Stouffer, p. 12.

Additional Resources

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