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Overcoming the Challenges of Protecting Vulnerable Populations During a Disaster

How software as a service can aid in the process of collecting, sharing and using data effectively.

BY NOAH REITER

To respond effectively during a disaster, it's first vital to understand the demographics of residents and visitors. Most offices of emergency management maintain detailed inventories of critical infrastructure, their vulnerabilities, states of repair and hotspots around their jurisdictions frequently impacted such as roads that consistently flood or ice over.

However, the same amount of critical information is rarely available about the community's most valuable asset — its people.

Just as other significant storms have in the past, Hurricane Sandy served as a strong reminder of the importance of having access to critical information about the individuals who reside in or commute to an area. Nearly half the victims of the storm were age 65 or older, similar to that of Hurricane Katrina where 71 percent of those who died were 60 or older. Recent lawsuits brought against the cities of New York and Los Angeles (as well as Los Angeles County) have reinforced the importance of anticipating and preparing for the needs of some of the population who might require additional or specialized assistance during a disaster. It's hard to say whether knowledge of the locations of older residents or those with other needs, particularly along coastal areas, would have reduced the death toll during Sandy, but having access to more information is always better when managing response to a disaster.

If collected, information about residents is typically maintained by numerous entities, stored in different systems and not rapidly accessible from either a central point (an EOC) or by agencies in multiple locations. This is unfortunate because when disaster strikes, emergency management can benefit greatly from knowing the needs of residents and commuters and where they are located. Worse, it's a scenario that can be avoided through new technology. individual based on their need or location.

There are a number of challenges associated with collecting actionable information to assist with whole community preparedness, particularly vulnerable populations that might require extra assistance during a major event such as a hurricane, blizzard or terrorist attack. Leading challenges include: scalability, interoperability, data privacy, public response and emergency notification.

THE CHALLENGES

Scalability limitations related to collecting, updating and maintaining data on a large number of participants necessitates an overly restrictive approach to only include those that self-select as being "vulnerable." Each additional participant in the system increases the burden on administrators who must verify the data, often re-enter it from paper forms, and somehow implement processes to keep the data current. While existing systems do not easily support large numbers of participants, the reality is that many groups that do not view themselves as vulnerable actually represent fairly complex challenges for emergency management officials during a disaster.

As an example, few pet or livestock owners view themselves as having additional needs. Yet, in every major natural disaster during the past 15 years, effective and rapid evacuation and sheltering of individuals with animals has become a huge issue. Other examples include those without access to transportation, with limited proficiency in English (spoken, written or read), with regular medical treatment requirements, as well as those in need of assistance with daily life functions. Nationwide, a more inclusive definition of individuals who have access or functional needs can encompass between 30 and 45 percent of the total population.

The complexities surrounding the makeup of our communities, as well as the shortcomings in recent disasters of responding to those with certain needs, have been large drivers behind FEMA's focus on the concept of whole-community preparedness. That is,

the effort to develop emergency operations plans around all the needs of the community, rather than the relatively small portion of the population that's viewed as self-sufficient.

The impacts of a major disaster are rarely confined to a single jurisdiction. Still, data collection typically occurs in a localized manner, existing in non-standardized formats in disparate systems. This makes data sharing and collaboration during an event extremely cumbersome and ineffective. In fact, it's not uncommon for different agencies within a single jurisdiction to maintain databases independent of one another. When it becomes necessary to estimate resource requirements in an effected region that spans multiple jurisdictions and agencies, it becomes impossible to collect, normalize definitions and de-duplicate data in order to get a usable estimate for action.

The reality is that most planning and response resource estimates are at best educated guesses and most likely, wildly inaccurate.

Privacy concerns exist for individuals considering sharing information about themselves, as well as public safety IT officials charged with securing and ensuring the privacy of collected data. Some information being provided to public safety and public health is sensitive, if not legally required through regulations like HIPAA. Even when registry participants sign some form of waiver, agencies still incur a burden of responsibility for properly maintaining and securing data provided to them. It's not an easy endeavor. Often, best practices are beyond the normal resources and/or expertise of the agency. For example, encrypting data, geo-redundant storage facilities with top-tier physical and virtual security, as well as regular purging processes are not normal capabilities of local or even state emergency management agencies.

Posing a further challenge is that public confidence and participation in a preparedness program — especially when perceived as singling out certain population groups — tends to be low. Concern about being labeled as different can discourage many individuals who have certain disabilities, such as a hearing impairment, from participating in a special needs registry.

While typical special needs registries focus on more traditional definitions, such as those with sensory or mobility limitations and developmental disabilities, there is a clear need to expand system capabilities to better include individuals who will require assistance during a disaster. This will enable emergency management officials to better provide for the needs of the whole community, and importantly, engage a much broader cross-section of individuals, agencies and advocacy groups in public preparedness outreach.

Beyond the pure technology that an emergency notification system is built on and how quickly it can deliver messages, a more difficult and sometimes overlooked goal to achieve is the comprehension of the message itself by the recipient.

Finally, in regard to challenges, a key element of the lawsuit brought against New York City was the inability to provide effective emergency communication to individuals with certain disabilities. The most obvious example of this is someone who is deaf and cannot hear a voice alert. Combine that with such factors that people who are born deaf use American Sign Language (ASL); significantly different from the English language. Without proper translation of emergency warnings and instructions into ASL, either in a text-based or video sign language format, the message may be misunderstood or not received. This population is just one of many that may be more difficult to communicate with effectively. For instance, individuals with limited proficiency in English or those with developmental delays, present serious

challenges that must also be considered by the emergency manager.

OVERCOMING THE CHALLENGES

To overcome the significant challenges mentioned above, many jurisdictions have chosen to use a cloud-based or software-as-a-service (SaaS) solution to maintain citizen-provided information. When evaluating systems to effectively collect and manage citizen-provided information, emergency management officials should consider how they address each of these common challenges.

Scalability: A best-of-breed solution for managing citizen-supplied information should leverage a Web-based platform, with geographically redundant facilities and infrastructure designed to handle peak loads of thousands or even millions of records and Web requests. A robust platform will allow for the collection of not only traditional vulnerable needs information, but also nontraditional information such as pet or livestock ownership that is extremely valuable during an incident. Some areas may also choose to collect information on residents or businesses that have access to, and are willing to volunteer, their heavy or other specialized equipment in the event of a major disaster. Ideally, the platform should be capable of keeping the information up-to-date and aging out information that hasn't been updated by the citizen after a specified period of time. In-house solutions can potentially meet these requirements, although it's becoming more common to obtain this type of architecture through a SaaS solution.

Interoperability: Data elements collected through a citizen-facing website should be formatted and structured to allow reporting across jurisdictions. Based on the credentials and permissions of a particular emergency management official, they should be able to perform queries around a combination of geography and citizen attributes. With certain levels of access, a user should be able

to query across jurisdictional boundaries. For example, a state-level official may be interested in critical electricity needs, spanning multiple cities and counties, in the aftermath of severe weather that caused what is expected to be extended power and transportation interruptions. Information returned through these queries should also be easily integrated with or exported for use by other systems, whether for emergency notifications or for tasks in collaboration tools like WebEOC.

Data Privacy: The security features of a SaaS or in-house solution should address the major concerns outlined earlier. These features should also provide liability protection for the jurisdiction collecting personal data. First, all data should be stored in top tier, geo-redundant hosting facilities, with data en-cryption technologies. Second, all users of the system should digitally accept terms and conditions covering liability for agencies utilizing the data. These terms can be updated and reaccepted during regularly scheduled data updates, if necessary. Third, all activities in the system and access to the data should be logged, providing a complete audit trail on data use and access by agency administrators. Automatic rules-based data purging in accordance with local data maintenance timelines and policies should be incorporated. Finally, jurisdictions should emphasize the importance of human factors impacting security, creating strong policies around password security, securing laptops and other devices containing sensitive information.

Public Confidence and Participation: The scalability afforded by a cloud-based solution allows the broader population to participate in the program. Members of a community feel more comfortable sharing their information and, ultimately, providing emergency managers with the vital data needed to enhance response when specific portions of the population aren't solely targeted for participation.

Mass communication channels, use of school systems, advocacy groups, faith-based organizations and emergency notification systems, are some examples of how jurisdictions have successfully promoted these systems. By encouraging the whole community to participate, emergency managers will have access to more complete information than through registries that are restricted to people with "special needs."

Emergency Notification: When coupled with a solution that collects information about disabilities, access and functional needs, the emergency manager is provided with the ability to better tailor messages to the recipient. First, emergency management should identify potential communications challenges, and then working with either translators or other subject-matter experts, craft messages that can be more easily understood. Furthermore, specific instructions that differ from those sent to the entire population can be sent to portions of the population with particular needs. Examples are shelter locations that can accommodate household pets or medical shelters that can provide the level of care required by an individual's needs.

An emergency manager's responsibilities are great and managing a large incident can easily become overwhelming. Although an emergency manager will never be able to achieve total situational awareness, and some decisions will always have to be made on incomplete information, having access to demographic information will greatly improve the response to any disaster.

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