



Whole Community Assessment & Its Impact on Emergency Preparedness

A white paper by Rave Mobile Safety



Rave

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Executive Summary

The Federal Emergency Management Agency's strategy of whole community preparedness has been in the emergency management lexicon for a couple of years. Insufficient planning around community members with certain access and functional needs – medical dependencies, mobility limitations, age, lack of access to transportation, and owners of pets, as just a few examples – was clearly identified as a weakness in the response to Hurricane Katrina in 2005. Since then, incremental steps have been taken to better prepare for the large numbers of individuals who require additional assistance (as high as 45% or 50% in some communities). However, Hurricane Sandy in October 2012 demonstrated that significant gaps still exist in the ability to identify, prepare for, rapidly locate, and respond to those who require such assistance. Over half of Sandy's victims in the U.S. were age 65 or older, most of whom drowned in or near their residences.

This paper examines a novel approach to collecting and maintaining citizen-provided information, and the many ways in which that critical data can be leveraged to impact emergency preparedness and disaster response to improve outcomes.



Introduction

Most emergency managers maintain detailed inventories of critical infrastructure, their vulnerabilities, state of repair, and hotspots around town that are more easily impacted (e.g. the 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 residents.

As it approached and ultimately made landfall in the northeastern United States in late October, Hurricane Sandy demonstrated the importance of having access to critical information about not only the infrastructure in the community, but also the people who live and reside in the community. Some information about residents is available; however, it is typically collected by numerous entities, managed in different systems, and not rapidly accessible from either a central point (such as an emergency operations center / EOC) or by agencies in multiple locations.

When it matters most, emergency management officials need awareness of who resides and works in their communities, where they are located, and what kind of assistance they will require should a disaster strike.

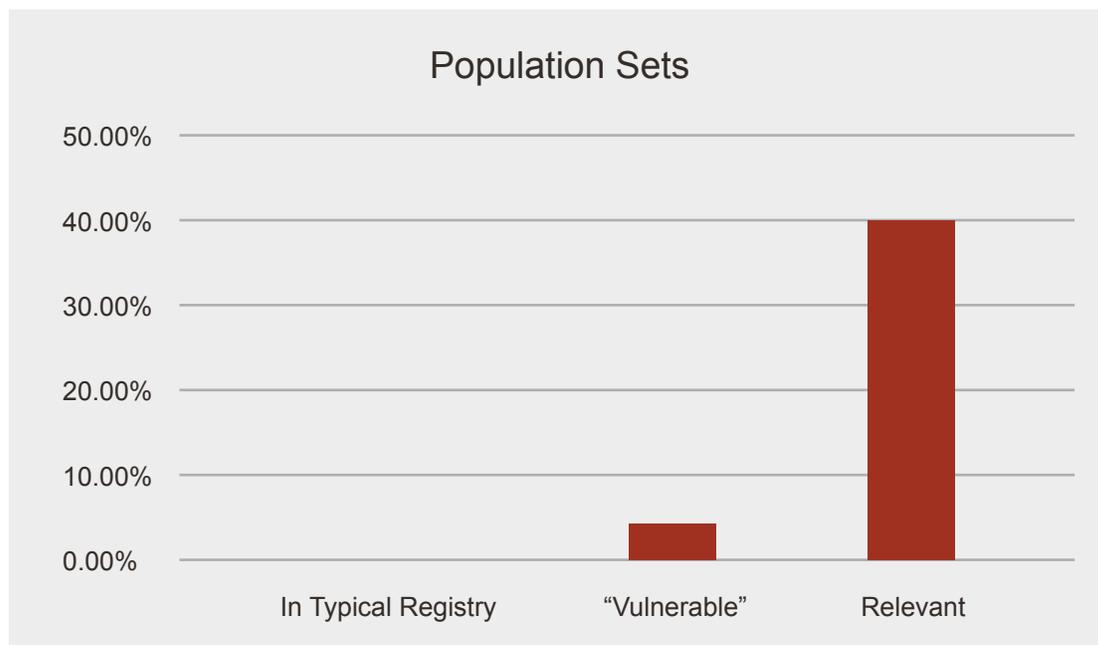
The Challenge: Substantial Vulnerable and At-Risk Communities

There are a number of challenges associated with typical registry solutions for maintaining critical information about those individuals requiring extra assistance during a major event such as a hurricane, blizzard, or terrorist attack. Leading challenges include: 1) Scalability, 2) Interoperability, 3) Data Privacy, and 4) Public Response.

Scalability

Scalability issues with collecting, updating and maintaining data on a large number of participants necessitates an overly restrictive approach to only address those that self-select as being "vulnerable". Each new participant in the system adds a burden on the administrators who must verify the data, often re-enter it from paper forms, and somehow implement a process to keep the data current. While existing systems do not easily support large numbers of participants, the reality is that many population groups that do not view themselves as vulnerable actually represent some of the most complex challenges for emergency management officials during a disaster. For example, few pet owners view themselves as having special needs, but during every major natural disaster in the past 15 years, effective and rapid evacuation and sheltering of individuals with pets has been a huge issue. Other examples include those without access to transportation, with limited English language proficiency, or with regular medical treatment or assistance needs.

In major cities across the nation, this more accurate definition of individuals who have access or functional needs can account for between 30% and 45% of the total population.



Interoperability

The impacts of a major disaster are rarely confined to a single jurisdiction, yet data collection occurs in a localized manner, existing in a non-normalized format in disparate systems, making data sharing and collaboration during an event extremely cumbersome and ineffective. Often there are even multiple databases maintained by different agencies within a single jurisdiction that somehow have to be manually combined. When it becomes necessary to estimate resource requirements (e.g. medical oxygen needs) in an affected region that spans multiple jurisdictions and agencies, it is impossible to collect and normalize definitions, and de-duplicate data, in order to get a usable estimate. The reality is that most planning and response resource estimates are at best educated guesses, and more likely wildly inaccurate. Interoperability issues also exist within a region for different uses of the same data.

Data Privacy

Privacy concerns exist for both the participants in the registry and those public safety information technology officials charged with securing and ensuring the privacy of data collected. Often the information being provided to public safety is sensitive, if not legally protected. Although most registry participants sign some form of waiver, agencies still incur a burden of responsibility for properly maintaining and securing data provided to them.

Often, best practices extend beyond the normal resources of an agency collecting the data. For example, encrypting data, geo-redundant storage facilities with top-tier physical and virtual security, and regular purging processes are not normal capabilities of a local or even state emergency management agency.

Public Confidence & Participation

Public confidence and participation in a preparedness program, particularly when perceived as singling out certain population groups, tends to be low. Concern about being labeled or singled out often prevents many individuals who are differently-abled, such as those who are deaf or hard of hearing, from participating in a special needs registry. While the typical special needs registries focus on more traditional definitions, individuals with mobility limitations and developmental disabilities, there is a clear need to expand the system's definitions to include the whole community to better protect everyone during emergencies, and importantly, engage a much broader cross-section of individuals, agencies, and advocacy groups in the public preparedness outreach. The complexities surrounding the makeup and needs 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 (www.fema.gov/whole-community). Specifically, Whole Community Preparedness is a comprehensive set of efforts to develop emergency operations plans around all of the needs of the community, rather than the relatively small portion of the population that is viewed as self-sufficient.

The Solution: SmartPrepare

SmartPrepare from Rave Mobile Safety allows agencies to quickly and easily collect and maintain up-to-date and detailed information about the residents and commuters within their jurisdiction who have access and functional needs, which can be as high as 50% in some jurisdictions. Each of the major challenges associated with effectively managing emergency preparedness information on a broad set of the population is addressed.

Scalability

SmartPrepare is a hosted Software as a Service (SaaS) solution providing a highly scalable, web-based platform for gathering and managing voluntary citizen information, with geographically redundant facilities and best-in-class infrastructure designed to handle hundreds of millions of users. The result is the ability to enable the ability to collect and manage data across the entire population of a given area, collecting traditional vulnerable needs information but also non-traditional information such as pet or livestock ownership that is extremely valuable during an incident. Emergency management officials can choose from a library of key data collection questions derived from best practices and thought leadership from EM professionals across the country, and they can add their own specific regional questions that are only presented to individuals in their jurisdiction.

For example, a rural area may choose to collect information on heavy equipment owners who may be able to volunteer their tractors or bulldozers in the event of a major disaster. SmartPrepare also automates the process of keeping the information up to date and facilitates far more effective data verification. Every six months, registered users of the system receive an escalating series of reminders to update the safety profile of information they have provided. The reminder steps culminate in automated voice calls, notifying the user that their profile will be suspended until reviewed and updated.

The screenshot displays the SmartPrepare web application interface. At the top, there are navigation links for 'Manage Questions', 'Reports', 'Account', 'Support', and 'Log out'. Below this, a report header indicates 'Report for Davidson County Aug 15, 2012 1:22:04 PM EST' and provides options to 'View KML', 'Alert', 'CSV', and 'Print'. The main query is defined as: 'Subscribers with Bed-confined OR Electric wheelchair or scooter OR Manual wheelchair OR Walker OR Weight > 350 lbs OR Other mobility impairment OR - Transportation'. On the left, a list of 'Matching Addresses: 10' is shown, including addresses like '2207 15TH AV N, Nashville TN 37208' and '1034 16TH AV N, Nashville TN 37208'. The central map shows a red shaded area around Nashville, TN, with a pop-up window for 'Kendra Lunderman' at '3931 BAXTER AV, Nashville TN 37216'. The pop-up also shows a phone number '919 000-0655 (L)' and a 'Bed-confined' status. The interface includes search, clear, draw, and radius controls, as well as map style options like 'Traffic', 'Bicycle Paths', and 'Hybrid'.

Interoperability

Data elements collected through the SmartPrepare citizen-facing website are formatted and structured to allow reporting across jurisdictions. Based on the permissions of the administrator they can easily utilize the geospatial reporting interface to query on specific parameters across jurisdictional boundaries. For example, a regional FEMA administrator may be interested in critical electricity needs across an area that spans multiple counties and states in the aftermath of a weather event causing and what is expected to be extended power and transportation interruptions. Information collected by SmartPrepare is also easily exported for use by other systems – whether for emergency notifications or for tasks in collaboration tools such as WebEOC.

Data Privacy

SmartPrepare provides a number of key features to ensure data privacy and liability protection for entities collecting personal data that are beyond the capabilities of most agencies. First, all data is stored in top tier, geo-redundant hosting facilities, with the same encryption and security utilized by leading financial institutions and federal agencies. Second, all registered users digitally accept terms and conditions covering liability for agencies utilizing the data. These terms can be updated and re-accepted during the mandatory 6-month data updates if necessary. Third, all access to the data is logged, providing a complete audit trail on data use and access by agency administrators. Finally, data is purged in accordance with local data maintenance timelines and policies.

Public Confidence & Participation

By empowering all community members to provide information about themselves, jurisdictions are no longer expending time and energy to target specific populations. With SmartPrepare, jurisdictions can target every segment of their population. This is the distinction that allows all members of the community to feel comfortable sharing their information and, ultimately, providing first responders and emergency managers with the vital information needed to enhance response.

The scalability afforded by SmartPrepare to manage a broader population set also allows a community to leverage outreach channels not available when targeting only the smaller, traditionally vulnerable population sets. Mass communication channels, use of school systems, and emergency notification systems are some examples of tools available to communities for broader communications. When upwards of 50% of some communities have access and functional needs, we are no longer talking about special needs. These are normal needs, not just outliers to be addressed in an annex to an emergency operations plan.

Due to SmartPrepare's broader approach to Whole Community Preparedness, it has garnered support from advocacy groups, Emergency Preparedness experts, and ADA coordinators across the country.

Prepare Your Family For A Winter Weather Emergency

**TOWN OF NEW CANAAN
CONNECTICUT 1897**

Create your free Preparedness Profile at SmartPrepare.com

Residents of New Canaan can now provide emergency management with vital information that may be used in the event of a natural disaster or emergency.

Information can include:

- People and pets living at home – names and photos
- Individual specific needs – medical and functional
- Utility connections – including gas, electric and water shut-off valves
- Emergency Contacts – in-state and out-of-state

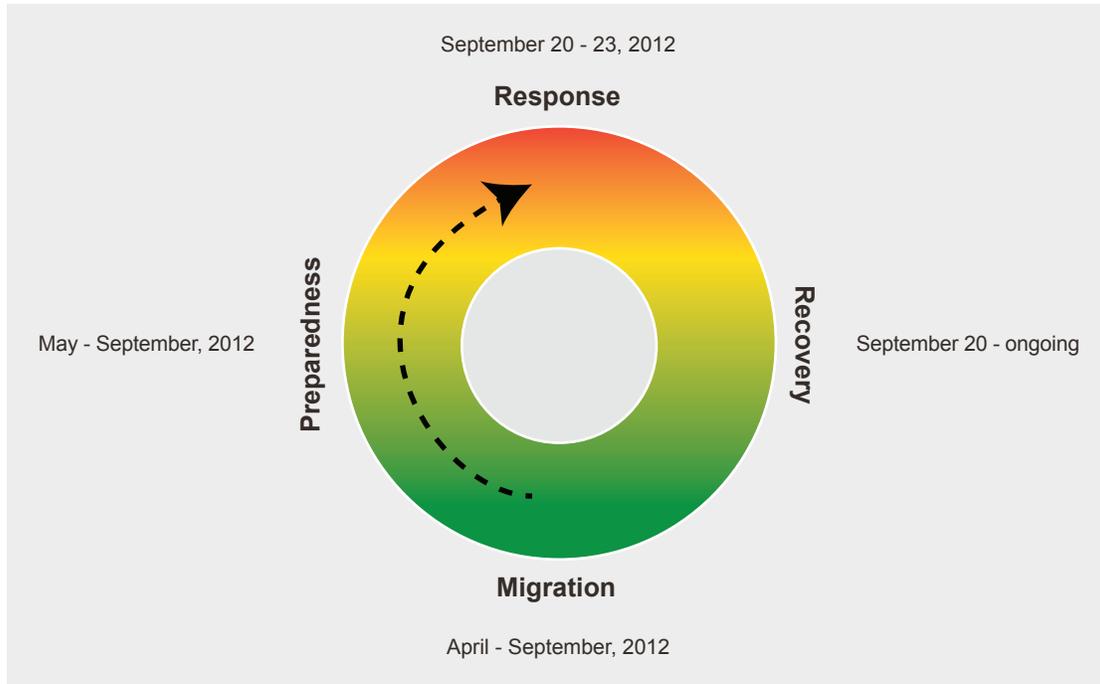
**Be Smart. Be Prepared.
100% Private and Secure**

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Case Study: Hurricane Preparedness & Response

The value of SmartPrepare's solution to Whole Community Preparedness can be easily demonstrated through the typical timeline of a hurricane.



February (4 months prior to hurricane season)

In preparation for what has been forecasted to be an active hurricane season, County emergency management officials review their plans around severe weather emergencies, evacuations, widespread flooding and power outages. After action reports (AARs) from recent responses are reviewed to ensure that any previously identified opportunities to improve their preparedness and response have not been overlooked.

One of the enhancements recently deployed by the County, SmartPrepare, provides members of the community with a free and easy way to assist Emergency Management by sharing critical information about themselves and members of their household. Information related to medical conditions, disabilities, their residence, and pets can be securely stored and made available for emergency preparedness activities.

Emergency Management brings in colleagues from Police, Fire, EMS and Public Works to discuss staffing recall and other contingency plans.

They consult with the health department and representatives from the local chapter of the American Red Cross to review their plans for mass care and emergency shelter operations. They review their agreements with debris removal firms and private transportation providers. Meetings are held with hospitals and long-term care facilities to assess their levels of readiness and to assist, where possible.

Representatives from the various County agencies agree to reconvene in April for a status update and to discuss public awareness campaigns around Hurricane Preparedness Week in May and National Preparedness Month in September.

April

Emergency management representatives from the various County agencies update their status as it relates to severe weather preparedness. County agencies also discuss a comprehensive plan for raising their community's awareness through messaging via the County website, social media outlets, local news media, emergency notification systems, dynamic message boards, and billboards. The messages will include information related to:

- ▶ The importance of personal preparedness and creating a free and secure Safety Profile in SmartPrepare to assist with emergency preparedness and response
- ▶ Developing a family emergency and communications plan
- ▶ Maintaining adequate water/food/medication supplies at home for all household members and pets

Finally, representatives from the Office of Emergency Management meet with emergency preparedness coordinators and business continuity managers from local businesses and healthcare organizations to brief them on the County's level of preparedness and to understand the private sector's progress. Several requests are made of County officials, as are offers of assistance from the private sector.

May

Using the data that members of the community entered into their Safety Profiles in SmartPrepare, County officials are able to collect the information and more accurately predict evacuation, transportation, and sheltering needs across their entire community. County officials meet with each emergency contractor – fuel providers, debris removal firms, specialty transportation providers – to review service level agreements and determine what, if any, gaps there are in their agreements or capabilities.



Officials from all public safety and support agencies, including the County Executive, use their various channels to share the preparedness messages crafted the previous month. They are also provided with considerable coverage through local news media outlets.

June

After a multifaceted public awareness campaign, the Emergency Management Planning Section and members of the Public Health Emergency Preparedness office leverage their work by running reports in SmartPrepare to determine the extent and location of certain vulnerable populations in the County. With the additional insight provided by SmartPrepare's reporting, officials are able to understand the needs of their population to a much greater extent than in previous hurricane seasons.



Now they are able to pull lists and create reports with information about residents who require either in-home care or electricity for medical conditions who might be impacted by a power outage or interruption in the transportation network, elderly residents living alone, individuals with mobility limitations or who have indicated that they don't have access to private transportation for evacuation, and those who have pets.



Armed with community data from SmartPrepare, Emergency Management officials begin to determine the resources required to address the needs of the community. These include: additional transportation resources – especially for wheelchair-bound and other non-ambulatory individuals; additional power generators at the designated shelter locations; plus, additional provisions such as kennels and staff for pets that might present to the shelters.

September Hurricane Threat (96 hours until landfall)

The National Hurricane Center & meteorologists are tracking a hurricane that just inflicted casualties and serious damage to property in the Caribbean. The storm is now in the Atlantic Ocean and early computer modeling places the probability of an eastern seaboard landfall at 35%.

Well aware that the hurricane's path is dynamic, local Emergency Management and Public Safety officials are:

- ▶ Monitoring storm updates through a variety of sources, including the National Hurricane Center / the National Oceanic and Atmospheric Administration (NOAA) and other media outlets
- ▶ Participating in twice daily National Hurricane Center & regional conference calls
- ▶ Developing hurricane scenarios internally and walking through the County's response and identifying any last-minute gaps in plans
- ▶ Developing unified messaging from the County, depending on the ultimate scenario that unfolds. This includes possible mandatory evacuations in some of the low-lying areas of the County
- ▶ Inventorying essential equipment, including, but not limited to emergency shelter supplies, road barricades, and dynamic message boards
- ▶ Topping off generator fuel tanks at the County administration complex, the police department, fire stations, 9-1-1 center, EOC, and emergency communications radio towers
- ▶ Ensuring that fuel vendors and service stations are properly prepared to keep the County's emergency fleet and facilities operational
- ▶ Contacting the utilities companies and other public works contractors to ensure that they have sufficient equipment and staffing plans to respond in a timely manner
- ▶ Reaching out to the American Red Cross and local hospitals to ensure readiness
- ▶ Contacting assisted living facilities to ensure they have adequate plans in place for evacuation, should it become necessary

Hurricane Threat *(72 hours until landfall)*

The National Hurricane Center's latest modeling has increased the likelihood of the storm's making landfall on the eastern seaboard to 70%. Armed with this information, the County partially activates its EOC to monitor the storm and begin coordination activities. All of the activities commenced the previous day continue, plus the following:

- ▶ Essential County employees are put on standby for recall to work. Employees are encouraged to ensure their family emergency plans are in place and that they have made any necessary arrangements for child, elder, and / or pet care. Employees who have no alternative for child care are given the option of utilizing the daycare center at one of the local hospitals, which has volunteered to accommodate the County. Similarly, employees lacking a pet care option are made aware of an arrangement at either the local pet daycare facility or an animal hospital.
- ▶ Non-essential County employees are advised that they may be recalled to assist in the emergency shelters



- ▶ The Medical Reserve Corps and American Red Cross are both asked to check their volunteers' availability for shelter operations and put them on standby
- ▶ The County Health Department is tasked with running reports in SmartPrepare to identify individuals with various vulnerabilities – mobility limitations, in-home electrically-powered medical devices, other medical needs, lack of access to private transportation, elderly residents living alone, non-English speakers, and pet owners.
- ▶ The County issues a press release outlining its current activities, state of readiness and official channels for the public to receive updated information – the County website, Twitter & Facebook accounts, the school district and public transportation sites, the County's non-emergency call center, and local media. The County further encourages its residents and commuters to enroll in or update their information in Smart911 / SmartPrepare and the County's emergency notification system. Residents are also reminded of simple steps they can take to prepare themselves and their families for a disaster: purchasing water and non-perishable food, refilling prescription medications, checking batteries in flashlights, obtaining a hand-crank radio, and securing any property that might be displaced by high winds.

Hurricane Threat (48 hours until landfall)

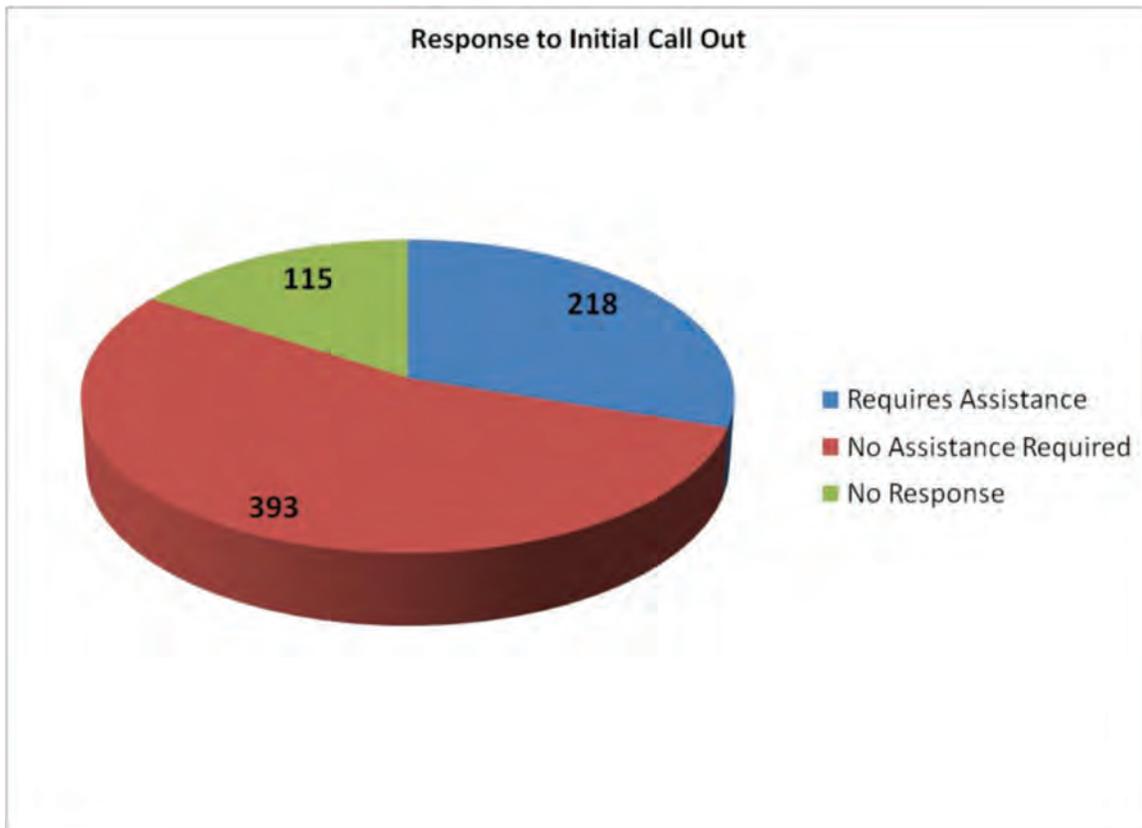
The National Hurricane Center's models are now suggesting an 85% likelihood that the storm will make landfall as a category 1 storm within 75 miles of the County. County officials convene and agree to fully activate its EOC and, that if the storm remains on this track by the next morning, to declare a state of emergency. This will trigger a series of activities, including staff recall, cancellation of classes in the public school system, securing of all vulnerable county equipment and assets, a planned failover of the County's IT systems to its redundant environment on the west coast, and the standing up of two emergency shelters. Additionally, a mandatory evacuation order will be issued for the lowest-lying portions of the County. This includes one senior assisted living community.

Hurricane Threat (24 hours until landfall)

With the forecast remaining the same as the previous day, the County Executive and other officials hold a press conference announcing the state of emergency. They outline all of the County's plans, including the mandatory evacuation, as well as the shutdown of the public school system and public transportation, at least until the storm passes. They encourage all residents, particularly those living in the mandatory evacuation zone, to take the warning seriously. The locations of the two emergency shelters are announced, as well as a hotline for residents to request transportation or other special assistance.

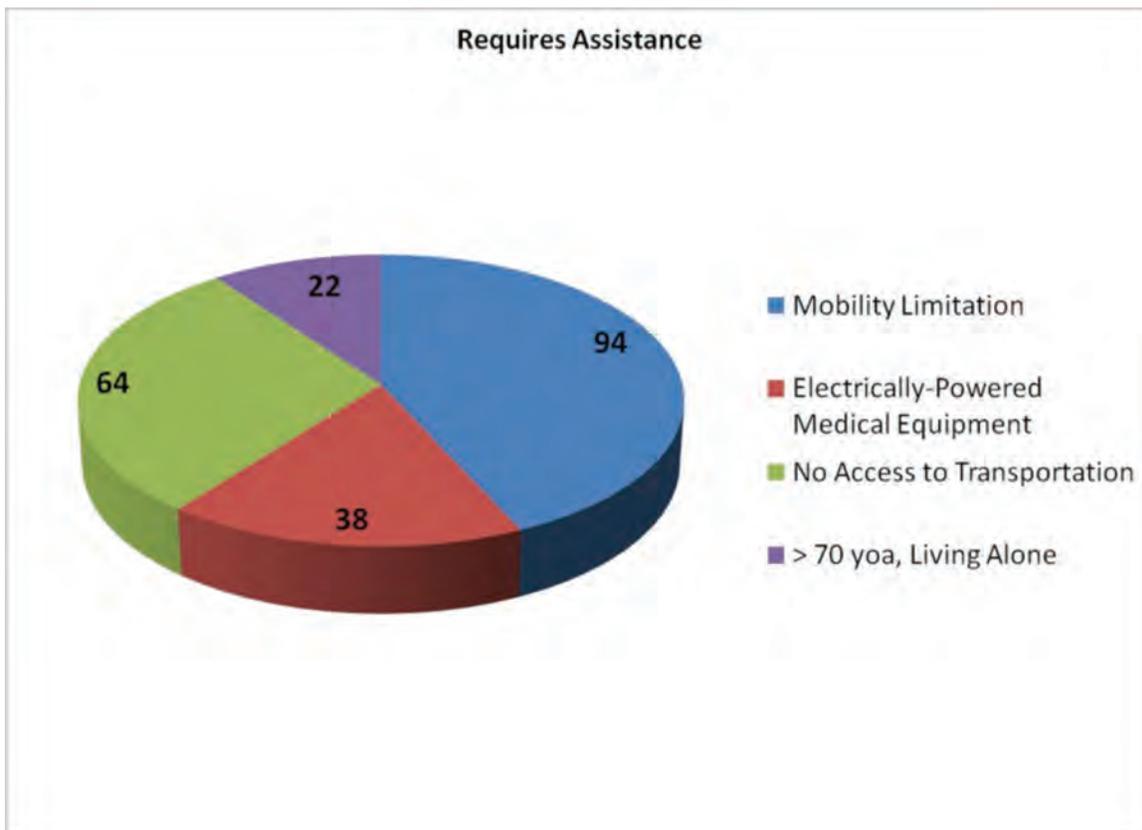


Simultaneously, with the EOC fully operational, members of the various emergency support functions (ESFs) are completing their job action sheets. ESF 6 / Mass Care, led by the County's Health Department is utilizing the emergency notification system to contact the 726 residents that indicated through SmartPrepare that they had a vulnerability that might impact them during an evacuation, power outage, or sustained outage of the road network. In response to the initial notification, 218 individuals indicated that they would require County assistance, 393 would not, and 115 residents did not respond to the message.



The Incident Commander (IC) is provided with the list of the 115 individuals who failed to respond to the emergency notification. The IC pulls together representatives from Police, Fire and Health and they collectively decide to divvy the list up between Community Emergency Response Team (CERT) members, Volunteers in Policing, and the Medical Reserve Corps. 25 volunteers across the three groups are identified to check on these residents and report back to the EOC within the next 8 hours.

Of the 218 individuals who indicated that they would require assistance of some sort from the County, the conditions those individuals reported were as follows:



The 64 individuals who indicated the need for transportation are referred to ESF 1 / Transportation, who ensures the individuals within this group who reside in the mandatory evacuation zone are evacuated to a safe alternate location or emergency shelter. Contact is made with those residents who live outside of the mandatory evacuation zone to understand the transportation need, should the situation evolve, and to provide further instructions. The individuals with electrically-powered medical devices are forwarded to ESF 8 / Public Health & Medical Services for follow-up and to determine the best course of action for each resident. The 94 residents with mobility limitations are either referred to ESF 1, or their needs are planned for in the shelters, depending upon their particular conditions. Finally, the elderly residents living alone are contacted by County non-emergency call center staff to determine their specific needs.

Additionally, there were 2,074 residents who indicated they had either a pet dog or cat. A separate notification is sent to these individuals to determine whether their evacuation plans include the use of a County shelter. The responses are forwarded to ESF 6, as well as their partners from the local animal rescue that assists with pet sheltering adjacent to the County's two emergency shelters.

Hurricane Threat (12 hours until landfall)

With the hurricane's landfall predicted for later that evening and within proximity of the County, all of the following is in place:

- ▶ The two emergency shelters are operational and have been publicized to the community through a mass emergency notification and various online and media outlets
- ▶ All of the vulnerable residents have been contacted, moved to the emergency shelters, or otherwise provided for
- ▶ Essential County employees have either reported to work or are on standby for the second operational period. Schedules have been modified to maximize the number of personnel available.
- ▶ Public transportation services have been suspended, as planned
- ▶ County employees are working to secure all remaining property to minimize damage and reduce service restoration times
- ▶ Utility service technicians are prepositioned in adjacent states to reduce response times should their services be needed, and the County EOC is in direct contact with their counterparts at the utility providers



Hurricane Landfall

The storm makes landfall approximately 90 miles north of the County as a category 1 hurricane. Damage is significant to the areas within the storm's direct path, particularly in low-lying and coastal areas. Sustained winds of 45mph and heavy rain are directly impacting the County. The EOC is busy fielding citizen requests via telephone and the County website, and cataloging all of the damage being reported from County first responders, as well as the public. The County public information officer is actively disseminating information to media outlets and through various social media channels, such as Twitter and Facebook. Additionally, staff is monitoring social media feeds and storm-generated hashtags for damage reports, possible requests for assistance, and to respond to any misinformation being spread through those channels.

Landfall + 30 minutes

Reports of the first major flooding and power outages come in. The areas impacted are located in the northeast portion of the County. Police and Public Works units are dispatched to evaluate the extent of the flooding, determine if additional evacuations or rescues are needed, and close the impacted roads. In the EOC, Public Health officials are querying data within SmartPrepare to determine whether there are vulnerable residents living in those areas. They identify an 86 year old, wheelchair bound female and a 53 year old male on an in-home ventilator. Units are immediately dispatched to these two individuals, and both are successfully evacuated – the female to a shelter and the male to a local hospital.

Landfall + 2 hours

The County has been busy responding to numerous reports of flooding, power outages, and trees and wires down. However, no major unforeseen issues have arisen. The current census in the two County shelters is 615, but they are well-staffed and have been properly provisioned. The County issues an updated media release and emergency notification system alert to provide a status report.

Landfall + 12 hours

With the weather beginning to taper and daylight approaching, the EOC leadership develops a plan to send staff and CERT members into neighborhoods to perform preliminary damage assessments. The public is also encouraged to report issues via the County's non-emergency hotline, website, and / or social media accounts. The EOC compiles all reports and works with both internal agencies and its external partners to prioritize restoration and recovery activities.

Landfall + 24 hours

With the storm having completely passed through the area, restoration and recovery activities are underway. Pockets of the County are still without electricity, several residences and businesses have experienced significant damage, and Public Works and its contractors are working to clear roadways of trees and other storm debris. Thus far, only a handful of minor injuries have been reported and, fortunately, no deaths. The preliminary damage assessment, focusing on the hardest-hit areas, is approximately 60% complete.

Census in the two County shelters is down to 275. The Red Cross and County officials are evaluating the ability for those remaining to either return home or stay with a friend or relative. There are only 24 individuals who will require longer-term support due either to damage to their homes or particular access or functional needs. They are being connected with various social service agencies to provide for alternate temporary housing arrangements, and all are expected to be placed within the next 72 hours.

Landfall + 72 hours

Only a few households remain without electricity and all primary and secondary roadways are passable. The remaining 10 individuals who require sheltering have been consolidated to a single location. The EOC has fully shifted its focus to recovery activities and the County Executive and Emergency Management leadership is working with the State to submit its preliminary estimates on storm damage so that a formal request for assistance can be made to FEMA.

Conclusion

The previous scenario illustrated how a jurisdiction can most effectively supplement its well-coordinated emergency preparedness and disaster response activities by leveraging emerging technology, in this case SmartPrepare. By providing its residents with a free, secure, and easy way to share information well in advance of the hurricane, this jurisdiction was able to better plan for and, ultimately, respond to those in the community with the greatest need for assistance. The SmartPrepare platform's security, scalability, automation in data collection and display, and ease of use all significantly streamlined the County's response and contributed to the effective response and outcome of this event.

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