

Innovation in Pandemic Planning and Response: The Case of Oakland County, Michigan

Responding in a Time of Need

It would begin with a slow trickle of the sick into emergency rooms. But within hours of word breaking that your region was hit with a pandemic flu, healthy and ill citizens alike would be clamoring for care at hospitals, at drugstores, at schools, even at local government offices.

More chaotic for you than the crowds, though, would be the confusion: principals asking if their schools should be on lockdown, quarantined. Thousands of citizens calling your office, asking you to find their loved ones, asking where to go, asking what to do next. Hospital administrators begging you to guarantee doctors, EMTs, and police access to antiviral drugs so they don't walk off the job.

Executive Summary

Oakland County, Michigan

- Local government
- 1.2 million residents

Situational Challenge

- Pandemic exercise
- Maximize citizen vaccination

Enabling Policy

- Cross-boundary planning and response
- Innovative vaccine-dispensing model

Enabling Technology

- Cisco Internet Protocol Interoperability and Collaboration System
- Cisco Video Surveillance System

Results

- Improved mobilization of vaccine-dispensing locations
- Vaccinated 12,000 residents in five hours

And as an elected official or senior executive of your city you know that within a matter of hours your region, known to have planned for a pandemic crisis, will be destination number one for anxious citizens from areas unprepared to deal with the outbreak. The situation could quickly escalate from a pandemic crisis into a law enforcement crisis as well.

You will be responsible for working with the first responders, community leaders, relevant agencies, and the media. You'll be coordinating the effort to react to the pandemic while simultaneously assuring the public of their safety. Critical to fulfilling all of these roles and responsibilities is the ability to quickly and accurately share real-time information across sectors and boundaries, and mobilize citizens, agencies and public health officials to work together to mitigate the crisis.

Are you prepared? How would your colleagues and staff respond to this scenario? Are your systems tested and capable of being mobilized? Are you ready to act in time?

The Oakland County, Michigan Challenge

These were the questions facing Oakland County, Michigan officials as they prepared for a large-scale pandemic exercise. Officials in Oakland County are proactive in their approach to preparing for a pandemic or other form of disaster, and regularly test their capacity for response. They know the stakes are high – the impact of an influenza pandemic on the 1.2 million residents of Oakland County could include 300,000 persons ill, 36,000 persons hospitalized and 840 deaths. Preventing this from happening was their charge as they prepared for their most innovative pandemic exercise to date.

Since 2005, the Oakland County Health Division (OCHD) has provided a mass-vaccination clinic once a year to test public health readiness plans. These exercises were designed to be cross-boundary (planning, processes, and procedures that cut across traditional jurisdictional, bureaucratic, or sector-based boundaries) in planning and execution. The Health Division takes the lead in a pandemic exercise and partners with key organizations including the local school district, hospitals, community groups, corporations, and police, fire and medical first responders.

A key component of the OCHD's plan is the deployment of vaccine-dispensing sites across the county. The sites are strategically situated in schools, hospitals and other public buildings. Officials understand that during the first hours and days of a pandemic or viral crisis, moving citizens through these dispensing locations smoothly would be critical to mitigating the spread of the virus.

Influenza is a highly contagious viral disease. Pandemics occur because of the ability of the influenza virus to change into new types or strains. People may be immune to some strains of the disease either because they have had that strain in the past or because they have recently received an influenza vaccine. However, depending on how much the virus has changed, people may have little or no immunity to the new strain. Small changes can result in localized epidemics. If a novel and highly contagious strain of the influenza virus emerges, an influenza pandemic can occur and affect populations worldwide.

Oakland County's annual flu clinic taught officials several lessons on the importance of cross-boundary communication, information sharing and situational awareness – requirements for mobilizing citizens and providers to get to the mass-vaccination clinics. One of these lessons was that their current plan for communication among the wide network of responders, volunteers and medical professionals hindered effective preparation and response. In a public health emergency in Oakland County up to 5,000 people might

need to be contacted and given direction regarding their roles and responsibilities. Under their current plan, select OCHD staff would contact other employees and volunteers via work phones, cell phones or email. Many departments would utilize call-down lists.

But in a pandemic situation, information would consistently change and could be misinterpreted in a telephone chain. Officials also discovered that calling staff and volunteers individually wasted precious time, and caused communication pathways to a central location such as the Emergency Operations Center (EOC) to become congested. During a pandemic, officials at various community locations would need to provide status updates and resource requests, as well as to report emergency situations.

Past exercises also showed that the level of OCHD integration and communication with other agencies, community groups and employers would be decisive factors in being able to respond effectively to a crisis. Community-based organizations could provide critical information on how many citizens are possibly infected

during a pandemic as well as information on the pace and progression of the influenza within the community. First responders with solid connections to the community also improved crowd control and the movement of people to vaccination centers during the exercises.

The "Midwest Blackout" of 2003, a power outage in several states including Michigan, also taught the OCHD valuable lessons. Without power, many basic methods of communication such as television, radio and the Internet were severely impacted. The event highlighted the need to develop alternative communication sources during an emergency. If cell phones are not functioning, there needs to be other forms of reliable and redundant communication available for first responders and public health officials. While 800-Megahertz systems are useful tools for police and fire responders, the systems can not be accessed by school,

About Oakland County, Michigan

Oakland County was officially organized on January 12, 1819 when Michigan Governor Lewis Cass issued a proclamation establishing the new county's boundaries. The Pontiac Company offered to contribute both property and money to the establishment of a county seat in Pontiac, a central location no more than a day's journey from any point in the County. With the County seat established in Pontiac, the County was divided into two townships. The northern section was Oakland Township and the southern section was Bloomfield Township. In 1827, Oakland County was further divided into five townships: Farmington, Bloomfield, Troy, Oakland and Pontiac. The first official census of the county was taken in 1820 and counted 330 persons. The 2000 U.S. Census reports 1,194,256 people reside in Oakland County, the second most populous county in Michigan, and the 26th most populous in the United States.

hospital and private industry response officials. Furthermore, traffic on radios could be congested during a large-scale event because public health issues may not be a priority for the communication towers. And while most have access to the Internet, the software packages that are used to communicate may not be compatible. Telephone lines may be disconnected or malfunction.

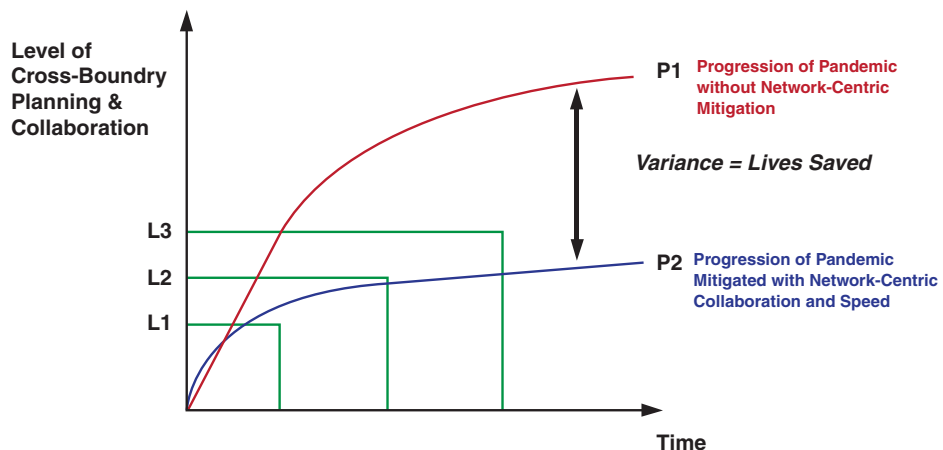
To meet these challenges, officials in Oakland County envisioned a system that would ensure interoperable and consistent communications across the staff and teams commissioned during an event. The system would have to have features such as interoperable communications independent of the 800-Megahertz system, a “mass alert network” to send messages to staff, a mechanism that can record and store key conversations and data, and the ability to collect, share and store situational-awareness data such as information from cameras and sensors.

Based on their findings and their vision for future capabilities, Oakland County officials knew they needed a more robust plan for cross-boundary communication and coordination. With a better system, they could mobilize dispensing locations and the incident-command structure faster, and optimize situational awareness. This would be the foundation for meeting their primary goal of maximizing the number of citizens vaccinated in the first hours and days of a pandemic crisis. What was needed was a “network-centric” approach to their planning and response, and they pondered how they would adopt one.

Innovation in Pandemic Planning: Network-Centric Models

In order to mitigate a pandemic crisis (or most other types of natural or human-made disasters) a community must act on two primary dimensions: comprehensiveness of planning and preparation and time of mobilization and response. The more advanced a

Innovative Network-Centric Preparation and Response Increases Speed of Mobilization and Mitigation



region is on these dimensions the greater its ability to curb the effects of a disaster. In action, this means a region must engage all of its resources – public, private, and community-based – and must be able to deploy them with speed and agility. This is ultimately what will save lives.

An emerging method for performing better along the two key dimensions is through “network-centric planning and response.” A network-centric approach can be defined as one in which leaders and managers utilize information and communication technologies as a hub to share information and content across boundaries, to realize situational awareness, and to plan for and respond to a crisis.

Network-centric business models play a critical role in enabling a region to act on the two dimensions. First, they help provide the tools for information sharing and align the cross-boundary roles, responsibilities and resources that can increase the comprehensiveness of planning and preparation. Second, they help increase the speed of mobilization and response to a crisis as key personnel know the location and level of resources, can communicate with enhanced interoperability, and can respond with greater situational awareness and clarity in purpose.

When a region uses a network-centric approach it can mobilize resources and people with greater speed than with older methods such as one-on-one contact and silo-based organizational communication. Thus, a region can exponentially increase its surge capacity and response ability – which is critical when attempting to mitigate a crisis that itself grows exponentially.

In a flu pandemic, for example, it is critical to know the pace, direction and intensity of infection in order to mitigate its spread. This type of situational awareness is only possible with advanced methods of information gathering, synthesis and sharing. In practice, the information gathering must come from public, private and community-based sources and all in real time. Then the information can be synthesized by experts within the health community and the Emergency Operations Center. Ultimately, the information can be shared with first responders in the field in order to make life-saving decisions.

“Old silo-based planning and response approaches to a major crisis just don’t work. The new and most effective way is through better partnerships across agencies and sectors – the cross-boundary collaboration that improves our surge capacity and our ability to save lives.”

**– George Miller, Oakland County
Health Division Manager**

Oakland County Pandemic Exercise and Results

To understand how to implement a network-centric business model for crisis preparation and response, Oakland County officials partnered with the Leadership for a Networked World Program at Harvard Kennedy School and with Cisco to test innovative preparation and response policy and technology ideas during their most recent simulated pandemic crisis.

In this exercise, the overarching strategic goal of Oakland County officials was to see how effective they could be against a fast-moving pandemic influenza or similar viral-based attack by maximizing the number of citizens vaccinated in a 5- hour period. The results would give the county insight into the maturity level of its ability to respond in the case of a real crisis, and key insights into areas for improvement.

The tactical goal of the exercise was to integrate communication, information sharing, and situational awareness systems across boundaries (jurisdictional, organizational and sector-based) to allow the Emergency Operations Center to mobilize dispensing locations and the incident command structure as quickly as possible in order to provide community members access to life-saving vaccinations.

Oakland County officials and Harvard researchers tested two primary methods for achieving these goals – a new command and control structure for dispensing vaccines, and emerging technologies for interoperable cross-boundary communication and situational awareness.

“Situational awareness, information sharing and communication is critical when responding to a crisis. IP-enabled platforms enable us to interoperate both horizontally and vertically – assuring us agility and speed on the front lines.”

– Phil Bertolini, Oakland County Chief Information Officer and Deputy County Executive

Command and Control of Vaccine Dispensing

The Oakland County Health Division (OCHD) took the lead role in the cross-boundary exercise, which included representatives from the county executive's office, the county department of IT, hospitals, police, fire and medical, and the broader community. As they would in a real pandemic crisis, the OCHD initiated the emergency response plan, setting in motion a number of activities including the activation of the Emergency Operations Center, the deployment of staff and responders, and the staging (setup and opening) of the vaccine-dispensing locations. A dispensing location is a facility at which trained personnel give the influenza vaccine by injection. Citizens were informed prior to the exercise that the county would be testing its ability to provide vaccinations in case of a pandemic influenza, and they were encouraged to participate in the exercise in return for an inexpensive flu vaccination. Citizens could either sign up for a dedicated time slot or simply show up during the exercise and get in line at one of seven dispensing locations in the county.

Communication and Situational Awareness Technology

To enable their policy goals and operations, Oakland County brought in Cisco to deploy a network-centric communication and situational-awareness platform. The exercise involved a broad array of organizations – from local and state agencies, to traditional first-response organizations (police, fire and emergency medical services), to allied agencies (such as power utilities or other enterprises), to other nongovernmental organizations such as local community shelters and the Red Cross – and all of them needed to communicate and work efficiently together.

Using the EOC as the system's hub, Cisco and Oakland County deployed the Cisco® Internet Protocol Interoperability and Collaboration System (IPICS), which enables interoperability between disparate radio networks and traditional communications networks. They also deployed the Cisco Video Surveillance System (VSS) which can use both analog cameras and IP cameras to stream visuals over the web directly to the EOC or to other devices. As IPICS and the VSS send data over an IP network they enable comprehensive communications interoperability between different networks and devices such as Land Mobile Radio (LMR) systems, push-to-talk (PTT) phones, IP phones, and PCs.

Exercise Results

After the exercise, the Oakland County and Harvard teams assessed the results and found that both the model of the response and the enabling technology worked synergistically, effectively enabling parties involved to communicate situational awareness, data, and ever-changing plans to team members across the county.

The command and control structure for the dispensing sites was highly successful. Upon entering the dispensing site, citizens were directed through a short process during which they filled out basic forms and received their vaccinations. At the dispensing locations a traffic system was put into place to manage the flow of citizens and the rate of vaccinations. Each location had a Site Incident Commander who oversaw the site operations along with staff who managed logistics, supplies, communication, information technology, traffic flow, vaccinations, public information, security, etc. Dispensing location staging plans were developed and a staff resembling a “tiger team” (a specialized group tasked with testing the effectiveness of an organization’s ability to accomplish an objective) assigned roles and responsibilities that helped make each location operable within hours.

Having an interoperable communication system dramatically increased the effectiveness of Oakland County officials and responders. The exercise demonstrated that in a real pandemic, the Emergency Operations Center representative could stand in front of the IPICS workstation and pull up information from the health division on what the symptoms of the outbreak look like. While looking at this content on the screen, the official could have a real-time conversation with an incident commander who could be on an 800-MHz radio, a dispensing site official on a mobile phone, an official from the health department on a networked desktop computer, and a hospital administrator on a traditional telephone. While they are in discussion, the EOC official could add other users to the system such as a first responder on a mobile phone. The EOC official could also view in real time the video feeds of the dispensing sites as captured from the Cisco Video Surveillance System and provide critical information as to what is happening in the field (such as too many citizens flowing into one particular dispensing location), which could help the others change their strategies and make decisions based on accurate and real-time information.

Combining these innovative technologies with comprehensive cross-boundary planning enabled Oakland County to improve its overall effectiveness and efficiency from previous exercises. Some of the results include:

- Faster deployment of dispensing sites
- Faster citizen flow through dispensing sites
- Situational awareness and reduced confusion for EOC and first responders
- Enhanced collaboration in EOC and at dispensing sites

Some of the metrics gathered from the exercise include:

- Total number of actual vaccinations = 12,096
- Total number of dispensing sites staged = 7
- Total hours of operation = 5
- Number of county employees involved = 369
- Time to mobilize seven dispensing sites = 4 hours
- Number of inoculations per hour = 345

Building Your Capacity for Preparation and Response

How should your region approach building a network-centric planning and response structure? The first step is reflecting on what happens when regions plan and respond with uncoordinated and silo-based methods – resources are lost, response is delayed and people are harmed. This is the way of the past and citizens will no longer accept governmental responses similar to the uncoordinated efforts in response to Hurricane Katrina. Modern, cross-boundary collaboration models and network-centric capabilities are ripe for adoption, and public leaders must now embrace these advances to protect and secure the public trust.

Proceeding with network-centric models takes political, strategic and tactical engagement across a range of organizations and sectors. At the political level, the governor, mayor or county administrator must be able to coordinate all organizations under their purview, as well as those in the community and private sectors with whom they have relationships. The political leader must then be able to communicate the status of action and results to the media and constituents. Deploying a robust IP-enabled communication and information sharing system is critical to these efforts because information needs to flow from organizations, communities and people in an integrated way and must be understandable and actionable for leadership.

On the managerial and tactical level, officials and first responders must be aware of where their critical assets and people are, and be able to track them in real time. Having IP-enabled communication and situational awareness tools ready for both pre-event planning and event response enables officials to execute effective operational plans. Investment in new management structures and IP-based open platforms is reasonable: IP-based systems are open (built upon standards that can easily synchronize with other technologies) and thus can scale economically while preserving existing investments in analog-based technology.

Summary

Responding to a pandemic crisis or most other types of natural or human-made disasters requires a community to act on two primary dimensions: comprehensiveness of planning and preparation and time of mobilization and response. The more advanced a region is in these dimensions, the higher its ability to respond effectively to a disaster. In action, this means a region must engage all of its resources – public, private, and community-based – and must be able to deploy those resources in a timely manner. Using a network-centric approach and solutions such as the Cisco Internet Protocol Interoperability and Collaboration System and Video Surveillance System can enable your region to share planning information and content across boundaries, to realize situational awareness and to respond to a crisis situation with increased speed and agility. This is ultimately what will save lives in your community.

For More Information

To find out more about Cisco solutions for preparation and response, please visit <http://www.cisco.com/go/physicalsecurity>.

To view video of the Oakland County exercise and learn about the County's innovations in policy and technology, please visit <http://www.lnwprogram.org/oaklandcounty>.