Infectious Disease Infrastructure: Impact and Continued Improvements Due to H1N1 Investments


Infectious Disease Infrastructure

State health agencies’ ability to quickly detect and respond to infectious diseases depends on having a strong infrastructure in place. Infrastructure is the foundation for planning, delivering, and evaluating public health. State health agencies require effective and efficient systems for preventing infectious disease morbidity and mortality, ensuring control of outbreaks and vigilance against diminishing diseases, and preventing and responding to reemerging and emerging infectious disease threats.

Impact and Continued Improvements Due to H1N1 Investments

During the public health response to the H1N1 influenza pandemic from 2009-2010, state health agencies maximized existing resources and received additional federal resources. Emergency supplemental funding that Congress provided allowed state health departments to examine and improve their infrastructure to respond to this significant infectious disease threat. This report describes some infrastructure gains in state program capacity, partnerships, and communications that resulted from increased engagement during H1N1, including those that are sustainable and replicable post-pandemic. The lessons learned from states’ experiences, as well as their responses to identified gaps, can inform further improvements of infectious disease infrastructure nationwide.

ASTHO held conversations with representatives from 14 states to elicit stories and specific examples of infrastructure benefits. Four of these states (Arizona, Florida, Minnesota, and Oregon) were selected based on their participation in conversations about key H1N1 response activities for at-risk populations as part of a previous ASTHO project, Meeting the Needs of At-Risk Populations During the 2009 H1N1 Pandemic Response. Representatives from five states (Alaska, Arkansas, Idaho, Indiana, and Minnesota) had engaged in conversations with ASTHO regarding infectious disease infrastructure in general. Representatives from additional states (Maine, Maryland, Nebraska, New Mexico, Oregon, Pennsylvania, and Virginia) provided input at a roundtable session, “Ongoing Contributions of H1N1 Investments to Public Health Infrastructure,” at the 2012 Council of State and Territorial Epidemiologists (CSTE) Annual Conference.

This report summarizes the states’ input highlighting improvements that were made as a result of increased resources provided on a one-time basis, how some improvements were able to be sustained, and where gaps still exist that make the nation vulnerable for the next response. The Appendix beginning on p. 11 provides detailed examples of states’ experiences and activities.
State Program Capacity

WORKFORCE CAPACITY
Adequate workforce capacity in health departments is needed to analyze infectious disease surveillance data, develop response activities, and communicate with other health agencies and the public. During the pandemic, staff funded by one program were sometimes moved to another to support the response (more details in the “Partnerships” section, beginning on p. 5).

H1N1 Experience
• H1N1 taxed staff capacity, forcing departments to hire temporary staff—such as recent MPH graduates—or cross-train existing staff for use in incident command systems (ICS). Incident command allows staff to respond in a coordinated manner, but it is important for all staff members to understand the response process and to have adequate staffing capacity for all roles.

Improved Systems Going Forward
• After the pandemic, states recognized the need to hold exercises so staff could become comfortable with ICS and to train multiple people to assume the same incident command positions so staff could work in shifts and avoid exhaustion during long-term responses. Communication was key in assigning staff responsibilities.

Current Challenges
• While cross-training allowed some states to develop appropriate coverage for all roles, hiring freezes and inadequate funding in other states mean there are still shortages in workforce capacity. For example, in one state there is not enough lab staff capacity to support increased testing for influenza. Another state with inadequate capacity for pandemic activities tried to increase its workforce through authorizing overtime and hiring contract staff but found that it was difficult to find skilled applicants for the temporary positions. The constrictions on funding for adequate workforce capacity make it more difficult to respond to public health emergencies. Although states learned key lessons about cross-training staff during the H1N1 pandemic, some states still need support to reach full response capacity. According to the ASTHO Budget Cuts Survey (Update December 2012), 91 percent of all state health agencies have experienced job losses through a combination of layoffs and attrition since July 2008. Approximately 9,800 state jobs have been lost in central, local, and regional offices.

SYSTEMS CAPACITY
State and territorial health agencies require effective and efficient systems to prevent and control infectious disease. Updating technology and automating systems saved time and allowed staff to focus on response.

H1N1 Experience
• Throughout the pandemic, states recognized gaps in their ability to respond quickly. Some issues were small and easily addressed. For example, one state needed to develop a system to ensure that situational reports were updated, and another needed to develop explicit guidelines to demobilize the emergency operations center. Others needed larger systems changes, such as automating vaccine ordering systems or making changes to the immunization registry.
Improved Systems Going Forward

- When the pandemic strained systems and exposed weak areas, states were able to use emergency funding to make improvements. Some states made long-overdue updates to their technology systems. These improvements allowed states to better track and manage supplies, reducing staff time needed to address these issues so they could prioritize efforts elsewhere. One state was using paper records and moved to automating vaccine supply ordering, which means orders can be updated on a daily basis. Another took advantage of the increased interest during H1N1 to improve how private providers recorded immunization doses in the immunization registry. Since the pandemic, the thousands of private providers who started submitting vaccination records during H1N1 continue to submit to the registry. These improved systems enabled health departments to improve response times during the pandemic. Maintaining these enhancements will better position states for future responses.

Current Challenges

- Systems for sharing data between state health agencies and providers are in flux due to significant developments in electronic health records (EHR). State and local health departments are trying to facilitate the Health Information Technology for Economic and Clinical Health Act’s Meaningful Use requirements (under which CMS will provide incentive payments for meeting certain EHR objectives), but efforts to move forward are impeded by a strained workforce both in terms of numbers and skill set. It is also a challenge to share immunization information system data across state lines. Working toward interstate data sharing can be a lengthy process. While there are few technology barriers prohibiting data sharing, there are many other difficulties to overcome, such as allocating staff time to establish and implement data sharing agreements, legal differences between states on the type of information that can be shared, competing priorities, and funding reductions.

SURVEILLANCE

The need for a robust surveillance system was evident during the H1N1 pandemic. Health agencies needed to track where disease was occurring and what populations were affected. Collecting and analyzing surveillance data was critical to making targeted recommendations to address the pandemic.

H1N1 Experience

- Using H1N1 funding, states enhanced their syndromic surveillance activities by adding providers or updating systems. Some programs used Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE), a web-based system from the U.S. Department of Defense that tracks early indicators and detects changes in influenza activity. Others started using commercial systems to collect syndromic surveillance data or made changes to their systems to more quickly deliver lab results to epidemiologists. At least one state brought in ancillary staff to support syndromic surveillance. These changes allowed states to collect and analyze information faster, better characterizing the disease and affected populations.
**Improved Systems Going Forward**

- Going forward, the new activities described above will allow states to monitor seasonal influenza and other infectious disease outbreaks and provide data for implementing prevention measures. In one state, temporary funding was used to hire a specialized team to conduct hospital surveillance. Maintaining those positions and others would allow for continued data collection, which could be used to create specific and targeted public education on flu topics.

**Current Challenges**

- Although some improvements were made during H1N1, many surveillance systems are still in need of improvement. According to a CSTE survey,¹

> “The most mentioned issue was the need to address gaps in public health informatics capabilities, especially involving the urgent need for message mapping guides for all notifiable conditions, the technical challenges surrounding the implementation of Health Level 7 (HL7), electronic laboratory reporting (ELR), and electronic health record (EHR) reporting. The second and third most mentioned issues were insufficient resources for surveillance and the need for increased coordination among CDC programs including their use of common standards for surveillance. Implementing Health Level 7 format and electronic laboratory and health record reporting is technically challenging and requires considerable resources and expertise. Surveillance staff needs more informatics training.”

**VACCINATION CLINICS**

School-located vaccination (SLV) clinics have the potential to reach a large number of people at once, including those who might not be vaccinated otherwise. Besides improving vaccination rates, studies have shown that SLVs can be successful at decreasing absenteeism.

**H1N1 Experience**

- H1N1 allowed states to test and refine their procedures for vaccination clinics. Additional funding was used to develop and update tools needed to successfully manage the clinics. A study of four Maine counties found that higher SLV rates were associated with decreased absenteeism and missed work days for teachers.² Another study found that among New York City children vaccinated at elementary schools during H1N1, only 65 percent had been vaccinated in previous seasons (in comparison, 90% of children vaccinated at healthcare provider offices had been vaccinated in previous seasons).³ These findings show that SLV clinics are a way to reach new populations.
**Improved Systems Going Forward**

- Some states continue to use the infrastructure developed with H1N1 funds to hold SLV clinics, and results continue to show SLV clinics are effective at decreasing absenteeism and increasing vaccination rates. A study of seasonal flu clinics in Maryland over three years found decreased absenteeism associated with SLVs, including among the elementary school children where clinics were held and among older children not offered SLV (indirect effects of SLV). A study in Monroe County, New York, found higher vaccination coverage rates among SLV elementary schools than among control schools (43% vs. 30%).

**Current Challenges**

- Sustainable funding remains an issue, both for maintaining the clinic infrastructure and vaccine purchase.

**Partnerships**

Partnerships are critical to expanding public health’s reach and breadth. Key partners include: inter- and intra-health agency partners at local and state levels, departments of education, schools and school systems, healthcare providers, dentists, pharmacy chains, faith- and community-based organizations, tribal nations, private businesses, and other partners, such as WIC and Meals on Wheels.

**INTER-AND INTRA-AGENCY COLLABORATION**

Staff from throughout the health departments, and often from other agencies, needed to take on new responsibilities to address the multifaceted response needs during the H1N1 pandemic.

**H1N1 Experience**

- In many states, staff from the preparedness, epidemiology, and immunization programs worked together and integrated content experts in the response structure. This was especially important when using ICS and managing an emergency operations center to ensure all critical roles were covered. In addition to formal structure, staff needed to form informal relationships to establish trust, know where to go for information and assistance, and ensure critical messages were conveyed. Staff met frequently, sometimes on a daily basis. Staff persons who had not previously interacted began working together to share knowledge, and previously existing relationships were strengthened between epidemiology, preparedness, environmental health, emergency response, public health laboratories, and communications/media relations programs.

**Current Situation**

- In many cases, these relationships have continued, improving day-to-day communications and collaborations. The challenge for states is that siloed funding often creates challenges for cross-training or joint efforts if staff are paid out of different funding pools. The Pandemic and All-Hazards Preparedness Reauthorization Act (PAHPRA), passed by Congress in March 2013, enhances state and local preparedness and response flexibility with respect to public health personnel. PAHPRA allows state governors or tribal organizations to request authority to temporarily reassign federally-funded state and local public health personnel (voluntarily) to assist during an HHS-declared public health emergency, including public health personnel whose general duties are not related to emergency preparedness or response. CDC and ASPR are working to develop guidance as to how this reassignment will take place.
EXTERNAL PARTNERS

One of the lessons learned from the H1N1 public health response was the importance of communicating closely with and integrating activities between public health agencies and external partners.

H1N1 Experience

- The H1N1 response demonstrated that it is important to develop strong relationships with partners before a major public health event. During the response, health agencies worked with community-based organizations, tribes, pharmacies, poison control centers, and other partners. Although agencies had worked with partners before the pandemic, collaborating during the event led to better aligned efforts and defined roles even after the pandemic had ended. The pandemic showed that public health agencies need to engage partners and bring them in early and often, which requires a dedicated champion in the health agency to coordinate efforts among partners.

Current Situation

- In many cases, these relationships were maintained after the pandemic, which provides an opportunity to collaborate to address seasonal flu or other infectious disease threats. One state has used a task force developed during H1N1 to disseminate information to the community on other infectious disease outbreaks. Another has continued to work with partners to sustain a surveillance reporting network. States also continue to explore relationships with pharmacies to distribute vaccines or antivirals. Health agencies and partners recognize the increased return on investment from aligning efforts.

Community-Based Organizations

One of the lessons learned from H1N1 was the importance of communicating closely with and integrating activities between public health and community- and faith-based organizations (CBOs and FBOs, respectively), which may have similar goals and may be performing similar activities. Partnerships with CBOs can multiply the impact of health department efforts through coordinated activities aimed at at-risk populations. Although there may have been a lack of aligned effort pre-H1N1 in some states, the pandemic demonstrated the need for public health agencies to engage CBOs and FBOs. Doing so required a coordinated effort and dedicated leadership. One state has staff dedicated to coordinating related activities among groups, which allows it to maximize efforts and impact. The health department is developing a toolkit to aid in this work. Another developed a task force of stakeholders that works with at-risk groups, allowing for a new communications network to more effectively disseminate information to target populations and involve partners in sharing knowledge. For example, the task force has been used to communicate with daycare centers about infectious disease outbreaks. In some jurisdictions, the health departments have worked with FBOs and faith-based health systems to ensure availability of vaccine and prevention messages to communities.
Tribes

Tribes are a special partner in many ways because sovereignty presents a unique dynamic to relationship building. There also may be language and cultural barriers among tribes, which could necessitate different approaches for different tribes within the same jurisdiction. Regardless, the key to successful collaboration is to begin working with tribes early and often. The states interviewed reported that they had been working with tribes before the pandemic, so they had a solid foundation to address unique issues around tribes as they arose. In one state, the immunization program in the health department had a relationship with tribes, so other programs leveraged that relationship to make new connections. Another state has dedicated tribal liaisons to ensure communications pathways are open and tribal needs are addressed in planning. Working with tribal media can help ensure that information is shared in culturally appropriate ways.

During the H1N1 pandemic, health departments worked with tribes to ensure their populations received vaccines. For example, one state allocated 10 percent of their vaccine to tribes and worked with Indian Health Services (IHS) to identify high-population clinics to which the state sent supplies. In another state, the health department helped identify strategies for tribes that did not have a medical officer or clinic. Health departments also coordinated with IHS to collect surveillance information or distribute vaccines or antiviral medications.

Pharmacies

Partnerships with pharmacies were beneficial during the H1N1 pandemic to expand the reach of vaccine and antiviral distribution because 95 percent of the U.S. population lives within five miles of a pharmacy. Once the H1N1 vaccine became available, the relative proximity of pharmacies to at-risk and prioritized populations became an asset for those jurisdictions that had cultivated relationships with pharmacies before the pandemic. States also formed new relationships with pharmacies, including immunization activities, as well as antiviral distribution and compounding medication ingredients. Relationships worked well when pharmacies were involved early in the planning and systems were set up to coordinate activities. Several states established formal relationships through memoranda of understanding (MOU).

In some ways, these relationships were maintained after the pandemic and influenced the role of pharmacies in public health, such as vaccine administration or antiviral distribution. For example, in at least one of the states interviewed, legislation was passed post-H1N1 to expand pharmacists’ role in vaccination.

Other Partners

As with internal collaboration, the pandemic prompted the states to collaborate with partners outside the health agencies, with novel methods of outreach to ensure a streamlined flow of information. One state started communicating with private providers via their medical boards; another added providers to a surveillance network to monitor influenza-like illness. In many cases, these partnerships have been sustained, improving communication about seasonal influenza, vaccination efforts, and other infectious diseases.

Given these partnerships’ value and ability to improve outcomes, there are ongoing efforts at both the state and national level looking at building on these relationships moving forward. For example, states continue to explore the expanded use of pharmacies during a pandemic response, enhancing faith-based networks to reach diverse populations, reaching out to adult providers, and using workplaces and schools to reach high volumes of people in a response.
ASTHO Resources

ASTHO has developed a number of tools on the importance of working with external partners:

- **Knowing Tribal Health.**
- **At-Risk Populations Project Tribal Engagement Meetings: Final Report.**
- **Evaluation of Pharmacy Participation in the H1N1 Vaccination Campaign: Pharmacies and Public Health Summaries.**
- **Operational Framework for Partnering with Pharmacies for Administration of 2009 H1N1 Vaccine.**
- **Findings from an Evaluation of Public Health and Workplace Collaborations During the 2009-10 H1N1 Influenza Pandemic.**
- **Influenza Immunization During Pregnancy (toolkit for obstetric providers).**

ASTHO continues to develop materials and resources related to both seasonal and pandemic influenza preparedness. These resources can always be found on the ASTHO website at www.astho.org/Programs/Infectious-Disease/Pandemic-Influenza/.

Communications

During H1N1, state health agencies worked to communicate with a variety of stakeholders. States tried to execute three components of effective communications with at-risk populations: audience-appropriate messages, trusted messengers, and effective methods. This included reaching out to relevant stakeholders for feedback and developing communications networks.

It is essential to create a robust communications infrastructure before an emergency situation strains the system. The H1N1 pandemic revealed some gaps in communications activities, which states addressed by forming partnerships or developing materials.

**AUDIENCE-APPROPRIATE MESSAGES**

H1N1 called for a variety of outreach materials to communicate effectively with different audiences. Some states developed or improved web pages on influenza, which can be used annually for seasonal flu and modified to report on the current season. In addition, state web pages can link to other sources, such as CDC, for general information on flu while supplementing with state-specific statistics, vaccination clinic locations, and other information. One state held a flu summit to share information with the community. Another state developed a library of disease-specific fact sheets. A third created templates for sharing information that are currently being used for other disease responses, making for timelier messaging and reducing staff time needed for developing new materials.

When communicating with diverse audiences, coordination is important to ensure that all audiences are getting the same message. One state created a new message coordinator role to monitor messages for consistency. It is also important to ensure that the messages are in languages that are appropriate to the target population.
TRUSTED MESSengers

Because a message’s perceived credibility often depends on who delivers it, trusted messengers are valuable partners. Health departments can work to translate messages and deliver them through trusted media outlets, including ethnic media. One state put together a workgroup for addressing limited-English populations and developed a communications toolkit to reach its audiences.

Again, when disseminating information in a community, it is important to coordinate activities to ensure that messengers are delivering the same message. One state addressed this by developing simple, key messages and materials to be translated into several languages.

Effective Methods

Effective communications methods are needed, which can entail using existing infrastructure and utilizing new methods and technologies to further reach diverse populations. One state utilized the well-developed local public health infrastructure to target communications during the pandemic, which also provided the opportunity to refine and improve message targeting. Another state gathered information from focus groups and a survey to develop more effective communication methods, both for day-to-day situations and emergencies.

Defined systems and protocols can be developed and tested during normal operations to expose and correct any challenges before use in an emergency situation. In one state, the Health Alert Network was used widely and consistently during the pandemic. Continued feedback and improvements can ensure the network will be successful during the next public health emergency. In addition, some states have found that new systems initiated during the pandemic have remained useful for communicating health information. In one state, teleconferences begun during H1N1 have continued to involve stakeholders in planning, messaging, and relationship building.

ASTHO Resources

ASTHO has developed the following tools to help state health agencies with communications around infectious disease issues:

- [Making the Case for Infectious Disease Infrastructure: Communications Toolkit](#)
- [Addressing Communication Challenges During an Infectious Disease Emergency Response: State Experiences from the H1N1 Pandemic](#)
Conclusion

This report describes some infrastructure improvements and lessons learned during H1N1 in the areas of state program capacity, partnerships, and communications. It also highlights examples of activities that have been maintained and incorporated into ongoing work, while others have been discontinued due to inadequate resources. Public health has a unique opportunity to bring together various agencies and partners and reach all population segments. However, state health agencies’ ability to quickly detect and respond to infectious diseases depends on having a strong infrastructure in place. The H1N1 pandemic and response spurred public health agencies to improve capacity, partnerships, and communications, but also revealed gaps in these areas that will require additional support to address. Sustained attention to and investment in infectious disease infrastructure is needed to ensure success in preventing and controlling infectious diseases on an everyday basis and being adequately prepared to respond quickly to the next large-scale outbreak.

References

APPENDIX: EXAMPLES OF ACTIVITIES

State Program Capacity

WORKFORCE CAPACITY

• During the pandemic response, the Florida public health laboratory realized that it had insufficient staff capacity and needed licensed staff and specific training to perform PCR testing for influenza. To address those challenges, laboratory operations were expanded to handle the higher volume of testing for H1N1 influenza, but just-in-time training was difficult due to the skill levels needed to perform the testing. The lab worked to cross-train staff to have surge capacity. H1N1 funding helped, but because that funding ran out, insufficient staff capacity is still an issue in Florida.

• The Minnesota Department of Health (MDH) observed a large improvement in the response to the second wave of H1N1, partially due to having an incident command structure in place. The assignment of responsibilities and overall response during the first wave often had an ad hoc quality because staff had to respond to a highly fluid and rapidly evolving situation. During the second wave, using an incident command structure provided a clearer definition of roles and lines of authority and a clearer process for rapid decisionmaking. This was especially evident in areas like public communication, which benefited from a faster and better defined message approval process, clearer identification of content experts for the message development process, and better defined procedures for sharing information with the media and the public (e.g., the routine posting of updated case statistics and other information to the MDH website).

• The Pennsylvania Department of Health transferred some roles across staff to ensure all had the appropriate depth of coverage. For example, within the state Division of Infectious Disease Epidemiology, staff that might have been engaged on other outbreak response and surveillance activities were reassigned to respond to pandemic influenza. Measures were taken to temporarily increase staff capacity in areas such as preparedness, community health, EMS, epidemiology, and laboratories, including hiring contract staff and authorizing overtime. However, at times it was difficult to find applicants for positions that were only offered for the short term.

• During the H1N1 response, Oregon experienced hiring freezes, which were a barrier to strengthening the workforce quickly.

SYSTEMS CAPACITY

• Florida was initially hampered by a lack of uniform methods for reporting to the state immunization registry. The state made a system change to record doses given by private providers, which allowed thousands of new private providers to submit to the registry. A long-term effect of this change is that providers continue to submit to the registry post-pandemic.

Florida also needed to offer training on how to provide mass prophylaxis. Going forward, the state health agency ensured that staff participated in exercises and trained epidemiologists to be able to respond in the case of a pandemic.
APPENDIX: EXAMPLES OF ACTIVITIES

- After previously using a time-consuming paper file method to order vaccine supplies, Arizona used H1N1 funding to purchase modules to automate ordering, which allowed orders to be updated daily. The automated vaccine supplies ordering system is now used statewide. The Arizona Department of Health Services (AZDHS) is also reaching across the agency to update and manage IT systems to maximize its IT resources.

Arizona also identified the need to develop an explicit exit strategy and guidelines to shut down the emergency operations center, which it has since developed.

During H1N1, hospitals in Florida looked to the health department for guidance and were eager to join surveillance efforts, which allowed the department to add additional facilities to ESSENCE.

SURVEILLANCE

- The Florida Department of Health increased the number of hospitals that report to ESSENCE. During H1N1, hospitals looked to the health department for guidance and were eager to join surveillance efforts, which allowed the department to add additional facilities to ESSENCE. Early data during the pandemic showed that H1N1 did not have a large impact on the elderly population and most cases were seen in children, adolescents, and pregnant women. The health department used emergency department data captured in ESSENCE early in the pandemic to determine that this was, in fact, the case in Florida. Due to the additional hospitals added to ESSENCE during H1N1, Florida had 156 hospitals report to the system in 2012, and the department hopes that number grows to more than 200. The increase in ESSENCE participants allows the health department to monitor influenza and other infectious disease outbreaks in real time and allows hospitals to meet Stage 1 Meaningful Use standards.

- The Florida Department of Health changed its web-based notifiable disease system related to influenza. As soon as lab results became available, they were sent from the state public health lab to county health departments to quickly provide epidemiologists with the data they need to start investigations and implement prevention measures.

- A team at the New Mexico Department of Health (NMDOH) that included epidemiologists and administrative staff designed, implemented, and managed hospital surveillance during the pandemic. Some of the above-mentioned staff were also available to the state flu surveillance coordinator for outpatient surveillance purposes. This ensured that NMDOH had adequate staff to collect, clean, and enter the data received from its network of about 54 statewide hospitals. NMDOH was able to collect, analyze, and disseminate information on the burden of the H1N1 pandemic in terms of hospitalizations, as well as the epidemiology of the pandemic strain circulating among the New Mexican population. With this increased capacity, NMDOH was able to identify early what appeared to be a significantly higher hospitalization and mortality rate among its American Indian population, which contributed to subsequent research and national policy changes. If NMDOH were able to maintain such an increased infrastructure/capacity permanently, more complete outpatient and inpatient surveillance could be conducted. This would allow for more specific and targeted public education on the risks and complications of influenza and the need for vaccination and other prevention strategies within New Mexico.
APPENDIX: EXAMPLES OF ACTIVITIES

• NMDOH conducted a standardized survey of state and local employees after the pandemic, which measured respondents’ experiences regarding H1N1’s impact on the quality and quantity of other work. In general, other core infectious disease surveillance activities were maintained, though timelines for steps in data collection, data entry, and investigation referral were slower.

• In Alaska, there was no mechanism to electronically collect influenza data because influenza was not a reportable condition. The Alaska Section of Epidemiology utilized a commercial off-the-shelf system to collect surveillance information from hospitals and state lab specimen data to monitor the spread of H1N1. The epidemiology section requested that healthcare providers submit numerous specimens early in the pandemic and then refined the submission criteria as specimen submission revealed the spread of H1N1 throughout each region of the state.

• In Oregon, syndromic surveillance was not available during the H1N1 pandemic. The potential value of automated emergency department surveillance to track the health impact of events such as the pandemic was evident and was a strong incentive to develop this capacity. Consequently, Oregon began implementing the ESSENCE syndromic surveillance system.

VACCINATION CLINICS

• Before H1N1, the Oregon Public Health Division (OPHD) conducted an evaluation of SLV clinics. When H1N1 hit, OPHD gave the vaccine (purchased with Section 317 funds) to the counties, which provided the structure, staff, location, and time for SLV clinics. The clinics provided insight into overcoming challenges for SLV, such as moving paperwork through a process compliant with the Family Educational Rights and Privacy Act while still allowing data to be captured in immunization information systems. However, the cost of counties supporting school clinics is high and cost benefits are tough to weigh, especially if vaccine is not provided for free. In addition, private providers are sometimes hesitant to support SLV in non-emergency situations. An analysis of Oregon physician attitudes regarding SLV clinics was published in the *Journal of School Health* in May 2013.

• During the pandemic, Arkansas focused on vaccinating in schools, and it has continued SLV clinics on an annual basis. The state Department of Health has been refining the clinics each year with funding available, including from American Recovery and Reinvestment Act and H1N1 supplemental funding. These funds pay for clinic infrastructure, including an electronic system used to record doses given in the state registry and bill insurance when possible. State funds are used to purchase vaccine, but cannot cover all aspects of running the clinics. However, the health department is able to reach more than a third of the children in public schools with these clinics and almost every public school in the state.

During the pandemic, Arkansas focused on vaccinating in schools, and it has continued SLV clinics on an annual basis, refining the clinics each year with funding available.

• In New Mexico, schools and school systems have maintained the use of mass vaccination clinics for influenza prevention purposes since the pandemic. New Mexico has a statewide, multidisciplinary immunization coalition that addresses vaccination education and accessibility issues. The coalition was instrumental during the pandemic and has continued to keep influenza prevention as a high priority.
Partnerships

INTER- OR INTRA-AGENCY COLLABORATION

- AZDHS worked with the state Department of Education. AZDHS opted for the most part not to close schools and so needed to determine a way for students to do school work when they were out of class, and still needed to provide reduced and free lunch. The Department of Education is now brought to the table in any planning meetings.

- OPHD consulted with local health departments and school district administrators about possible school closures. This collaborative model for decisionmaking ensured mutual understanding and helped arrive at decisions that were appropriate to the specific circumstances of the school and community. During H1N1, OPHD also strengthened relationships with the medical directors of the state’s Department of Corrections, Division for Seniors and People with Disabilities, and administrators from the Oregon Occupational Safety and Health Administration. These relationships helped the agencies develop consistent, effective guidance regarding infection control and management of clients with influenza-like illness. The working relationships established between these agencies during the H1N1 pandemic have continued to provide benefits when other disease outbreaks or situations requiring collaboration present themselves.

External Partners

Community-Based Organizations

- AZDHS was having difficulty reaching certain populations, such as refugees, the developmentally disabled, and the elderly. To solve this problem, it developed a “hard-to-reach populations” task force with representatives from community groups serving those populations. This task force brings together people and parts of the agency that weren’t used to collaborating to share knowledge and communication channels to ensure messaging reaches the intended audiences. By providing a communications network, the task force allows for more integration and less duplication of effort. Since H1N1, the task force has been used to disseminate information about the shingles vaccine and reach daycare centers with information about infectious disease outbreaks.

- Many community groups in Minnesota were working toward similar goals but had differing levels of interaction with state and local emergency systems, particularly government agencies such as MDH. To increase collaboration, prior to H1N1, Minnesota state emergency management hired a functional needs planner who coordinates activities focused primarily on those who are deaf, blind, or hard of hearing and persons with other disabilities. There was also a staff member based in the state Refugee Health Program whose role focused on building relationships with refugee and immigrant communities, many of whom are limited English proficient (LEP), through ongoing health education and promotion activities that are culturally and linguistically appropriate. Having committed staff dedicated to focusing on reaching at-risk populations allowed the department to work more efficiently to ensure their efforts had maximum impact during H1N1. Since then, the functional needs planner has developed a functional needs toolkit.

Having committed staff dedicated to focusing on reaching at-risk populations (including persons with disabilities and the refugee and immigrant communities) allowed the Minnesota Department of Health to work more efficiently to ensure its efforts had maximum impact during H1N1.
APPENDIX: EXAMPLES OF ACTIVITIES

• OPHD worked with several community-based organizations and media outlets in the Vietnamese, Korean, Latino, and Native American communities to disseminate information about influenza prevention, as well as the safety and availability of vaccines. OPHD also collaborated with a nonprofit organization working with immigrants and refugees of many cultures to disseminate written information on influenza symptoms, management, and prevention in multiple languages and provide training for case workers who could then share information verbally with their clients.

During the pandemic, Indian Health Services sites in New Mexico developed a program that was applied to their electronic medical record system to identify patients with influenza-like illness.

Tribes

• OPHD has good relationships with tribal health clinics through Vaccines for Children, including a project through which immunization liaisons meet with tribal leaders. Also, the state preparedness program and Acute and Communicable Disease Prevention Section have tribal liaisons. OPHD was engaged in bridge building and increased engagement with tribes around vaccines—especially adult vaccines—right before the pandemic began. This opened the door for collaboration when funding came, and there was clear discussion to ensure that some funding went to tribal partners. Because of this mutual engagement, OPHD and the tribes worked together effectively in response to H1N1, particularly in the area of vaccination. For example, OPHD distributed allocations of H1N1 vaccine directly to the tribes, as well as to local health departments. Further, OPHD assisted the tribes in working with the 100 dose limit for vaccine and helped identify strategies to ensure vaccine availability for tribes that do not have a medical officer or clinic. OPHD continues to have a tribal liaison funded by preparedness funds who works on emergency plans, SOPs, and funding opportunities, and the chief medical officer for the preparedness program serves as the tribal epidemiology liaison for the Acute and Communicable Disease Prevention Section. Both the tribal preparedness and tribal epidemiology liaisons regularly attend quarterly meetings, where they work with tribal health directors.

• In Arizona, because the epidemiology showed early that Native Americans had higher rates of disease, Native Americans were prioritized at the outset of vaccine distribution. AZDHS carved out 10 percent of its vaccine to distribute to tribes and worked to identify high-population IHS clinics to which they could quickly distribute vaccine. AZDHS shipped some vaccine directly to these sites and the local health departments nearby. AZDHS continues to work with tribal leaders on other issues.

• During the pandemic, IHS sites in New Mexico developed a program that was applied to their electronic medical record system to identify patients with influenza-like illness. This development was very useful during the pandemic for reporting to the NMDOH for sentinel influenza surveillance. The IHS outpatient influenza-like illness surveillance reporting network in New Mexico was sustained post-pandemic, fulfilling a CDC goal of transitioning influenza outpatient surveillance to electronic detection and reporting. IHS also successfully worked on improving mass vaccination efforts, resulting in better coverage with influenza vaccine.

• OPHD staff took part in interviews with tribal media to share influenza prevention and management information in a culturally responsive way. The connections with tribal media have opened a door to sharing key public health information more efficiently with tribal communities. Additionally, through work with the tribes and the Northwest Portland Area Indian Health Board, OPHD recruited three tribal and IHS facilities as participants in the state’s sentinel network for surveillance of influenza-like illness.
APPENDIX: EXAMPLES OF ACTIVITIES

Pharmacies

- In Oregon during H1N1, OPHD worked with pharmacies on new activities, including contracts to compound pediatric suspensions of antiviral medication during a shortage. The improved relationship and engagement with pharmacies facilitated the passage of a state bill to allow pharmacists to vaccinate children as young as 11 years old, which opened the door for pharmacists to become Vaccines for Children providers.

  Post-H1N1, ADPH is maintaining the pharmacy MOUs set up for antiviral distribution because the pharmacies are an important part of the state’s SNS and receiving, staging, and storage antiviral distribution network.

- During H1N1, the Florida Department of Health established relationships with private pharmacies, including MOUs with pharmacies for providing antiviral medications. The department provided guidance documents to retail pharmacies on the proper storage, utilization, and recovery of antivirals. Protocols included sending unused or expired antivirals back to the state central pharmacy. They also worked together on issues related to vaccine distribution.

- AZDHS had been working with the Arizona State Board of Pharmacy as part of pandemic planning, and utilized pharmacies to provide flu vaccine to those that needed it. In addition, pharmacies were able to order vaccine and distribute it to smaller doctor’s offices that might not have normally offered vaccine, so they could vaccinate their office employees. AZDHS is also investigating if pharmacies could be utilized for Strategic National Stockpile (SNS) dispensing.

- During H1N1, the Alaska Division of Public Health (ADPH) developed relationships with several hospital and retail pharmacies throughout the state. Post-H1N1, ADPH is maintaining the pharmacy MOUs set up for antiviral distribution because the pharmacies are an important part of the state’s SNS and receiving, staging, and storage antiviral distribution network. Areas for improvement identified during the pandemic were inadequate distribution documentation and challenges with inventory tracking. These issues have been resolved by implementing an inventory tracking software system that can track and provide decision makers with real-time detailed reports on all antiviral stocks within the state. The state health department continues to establish tangible agreements with pharmacies through policies, procedures, and MOUs. Any retail pharmacy may request participation in the state’s antiviral stockpile program by contacting the ADPH pharmacist and requesting participation in the program. The pharmacy must then sign an MOU agreement with ADPH that specifies distribution details and storage conditions.

Other Partners

- To reach private providers, AZDHS worked closely with medical boards and professional medical organizations to form a “hub and spoke mechanism” of communication. They found that most doctors preferred not to receive frequent email updates from AZDHS, but preferred emails from their associated medical boards and nonprofits, such as the American Academy of Pediatrics. This made it easier for AZDHS to disseminate information because it did not need to maintain large lists of providers, but instead kept a list of associations, which then passed the information along to their members. In addition, AZDHS was able to reach obstetric providers, which had been a difficult, but important, population to reach during the pandemic. Since H1N1, AZDHS has maintained this method of communication with medical boards.
APPENDIX: EXAMPLES OF ACTIVITIES

• In Alaska, ADPH performed outreach, registration, and training for healthcare providers who vaccinate, including facilitating registration into the statewide immunization registry. These activities are ongoing.

• Idaho strengthened partnerships with hospitals through voluntary enhanced surveillance and allocation of federal vaccine for their employees and patients during the outbreak. The state also made novel influenza reportable for the first time, which will serve it well in the future should other novel influenza strains be identified. As a result of the enhanced surveillance during the H1N1 outbreak, communication with hospitals has improved and several hospitals continue to voluntarily report influenza cases and deaths from their facilities.

• In Oregon, hospital representatives and other state and local clinical partners participated in a pandemic influenza coordinating committee and a technical advisory workgroup, refining infection control, personal protective equipment guidance, and treatment guidance. Additionally, OPHD has a network of about 30 healthcare providers throughout the state who track and report the percentage of all patients they see who present with influenza-like illness. During the H1N1 response, OPHD added three providers from tribal or IHS clinics to this network and they continue to be part of the surveillance system. Also during H1N1, these providers submitted specimens for PCR testing from a subset of their patients, providing a better understanding of the incidence of H1N1 and influenza in general.

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Communications

AUDIENCE-APPROPRIATE MESSAGES

• OPHD worked to improve its flu web page to better serve the public. The page was used to point people to vaccination clinics and share guidance for local health departments, clinicians, and the general public on topics such as what to do about flu, antivirals, mitigation, and contacts, as well as general context on the flu. OPHD also worked with the state 2-1-1 information system to have up-to-date information on vaccination clinics. This was helpful because vaccine was scarce, and the OPHD website provided information on who could receive the vaccine (i.e., priority groups) and where vaccine was. Using the website and the 2-1-1 system was a way to relay that information between the counties and state. Moreover, a governor’s flu summit was held in Oregon to share information about pandemic influenza, prevention, and mitigation strategies and engage private and public sector partners.

• Florida’s communication outreach included fact sheets, guidance materials, websites, and a call center geared toward the general public. Post-H1N1, the department built a library of fact sheets of different diseases to reference the next time there is an outbreak.

• MDH had a week-long continuous improvement event in January 2011 to review communications activities undertaken in connection with the pandemic response and explore possible strategies for coordinating and improving the consistency of messages provided to the media, the public, and response partners. At this meeting, a new role, message coordinator, was defined within the MDH incident command structure and a job action sheet created. The message coordination function will be responsible for monitoring messaging from various sources within MDH (that may be
directed to internal or external response partners, stakeholders, or the general public; identifying possible discrepancies, inconsistencies, or gaps in messaging; and, if any were found, notifying the parties responsible for the messaging. The event also produced protocols for creating and obtaining approval of both internal/partner messaging and public messaging and a new message coordination unit annex to the MDH All-Hazards Emergency Response and Recovery Plan.

- The Idaho Department of Health and Welfare created a new web page devoted to the H1N1 outbreak that linked to CDC information and provided state-specific prevention messages. This web page continues to be maintained with historical information and will be utilized for future outbreaks of novel influenza.

In Alaska, templates for communications created during H1N1 response are currently being utilized for other disease responses. This cuts staff time for creating messages by at least 50 percent. Additionally, the communications now go out through a GovDelivery system. Finally, a readily available list of translation sources was established so more populations could receive the information. Due to these changes, public health messages are going out in a timelier manner.

**OPHD partnered with the state Department of Human Services’ Office of Equity and Inclusion to form an interagency taskforce to work with community-based organizations to make information available in appropriate languages, at an appropriate health literacy level, and in a culturally responsive format.**

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**TRUSTED MESSENGERS**

- During the pandemic, MDH identified concerns regarding coordination of its communication with LEP populations. Responsibility for LEP communication was divided among three program areas within the agency, and some communication tasks were also outsourced to Emergency, Community, and Health Outreach (ECHO), a private sector nonprofit that MDH and local public health agencies created. ECHO activities relating to H1N1 were supported by Public Health Emergency Response (PHER) Grant funds and were conducted under contract with MDH. An internal workgroup has been established at MDH to monitor and coordinate LEP communication activities of the three affected agency program areas and ECHO. In addition, an external group focusing on communication issues was created as a subcommittee of the Public Health Emergency Coordinators (PHEC) group for the Twin Cities metro area. The PHEC subcommittee, which is made up of public information officers from local public health agencies in the metro region and staff from ECHO, created an LEP communication toolkit for use by local health agencies. MDH subsequently committed PHER funds to reproduce the toolkit materials and distribute them to local health agencies, create a template and guidance document for incorporating potential use of ECHO into local emergency plans, and roll out the toolkit, template, and guidance document.

- During H1N1, MDH was able to successfully develop simple, key flu-specific messages and materials very quickly via ECHO, including a DVD and public service announcement (PSA). The materials were translated into 18 languages through state-contracted vendors. The internal workgroup also assembled a language prioritization grid using census data and other criteria (i.e., time elapsed since coming to the United States, literacy in native language, literacy in English, etc.). Subsequently, the ongoing LEP internal workgroup and a newly formed subcommittee of health communicators interested in LEP issues are creating an intranet page that will serve as a resource to all MDH programs and staff interested in communicating effectively with LEP and low-literacy populations.
APPENDIX: EXAMPLES OF ACTIVITIES

- Oregon is predominantly an English-speaking state, but there are a number of smaller populations and first-generation immigrants. Additionally, there are many languages spoken in Portland, so getting through language barriers there is a challenge. To better assess the language, information, and other service needs of different linguistic and cultural communities, OPHD conducted a number of focus groups and a survey to learn how to communicate more effectively with vulnerable populations, both day-to-day and during emergencies. To address the issues identified, OPHD partnered with the state Department of Human Services’ Office of Equity and Inclusion to form an interagency taskforce to streamline translation services and work with community-based organizations to make information available in appropriate languages, at an appropriate health-literacy level, and in a culturally responsive format. OPHD also worked with media, including television and radio stations serving the Vietnamese, Korean, and Latino communities, to reach non-English speaking populations.

- Minnesota has a large population of refugees from Burma and Somalia. CDC conducted two educational sessions with representatives from these communities and found that some people had misinformation or little information regarding the pandemic. MDH took this feedback and worked on sending out specific information to decrease information overload. The department also worked with diverse community media (such as Somali TV) and leveraged existing relationships to reach target populations.

EFFECTIVE METHODS

- There was a significant focus in Minnesota on coordinating communication between state and local public health departments, especially in the Twin Cities metro area. Minnesota has a strong, well-developed local public health infrastructure with significant responsibility for communication with targeted groups within the communities they serve, as well as community-based response partners. During the pandemic, local agencies received negative feedback about the large volume of information they were providing and the impression that created that “everything seemed like an emergency.” Local agencies responded by working to improve the targeting of information and messages for specific target audiences.

- In Oregon, H1N1 funding was used to flesh out what the relevant communication issues were and what was needed. For example, one activity was improving communications with those who run long-term-care facilities. To improve risk communication at public information events, OPHD hired a risk communications officer who has had a large impact in a short period of time, with activities such as coordinating communications and engaging in social media.

- In Florida, a joint information system protocol was completed and incorporated into an incident command system, pulling in public information from both the private and public sectors, including different state agencies and emergency response. The system protocol and partnerships developed can be used for future emergencies.

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The Pennsylvania Department of Health developed a new website to provide information on the pandemic, including prevention messages developed by the acting bureau director and a PSA. The communication office received an award for the innovative messaging.
In Arizona, the joint information system, which is usually housed at the state Department of Emergency Management, was housed at AZDHS during H1N1. During the first wave of the pandemic, there was a perception that the messaging coming out of the various state agencies was not consistent, so during the second wave, a protocol was put in place that the AZDHS operations chief had to approve all health messages, which led to the chief reviewing all messages. This caused confusion and consternation because the operations chief did not need to review messages from different agencies. To resolve this issue, the joint information system now operates out of the state Department of Emergency Management during all emergencies.

In Alaska, set up a telephone bridge line during H1N1 to communicate with outlying villages and towns. The state continues to use teleconferences to gather experts and local decisionmakers together for response planning, public messaging, and building relationships and trust.

The Pennsylvania Department of Health developed a new website to provide information on the pandemic, including prevention messages developed by the acting bureau director and a PSA. The communication office received an award for the innovative messaging. The website was disbanded after the pandemic, but a website dedicated to seasonal influenza that existed before the 2009 pandemic, “Focus on Flu: Get the Latest on Influenza” at www.flufreepa.com, continues to be maintained and developed.

In New Mexico, the Health Alert Network (HAN) was used widely and consistently. At the time of the pandemic, NMDOH was using HAN to disseminate rapidly changing information regarding detection, testing, and treatment of suspected 2009 H1N1 cases. Anecdotal feedback from New Mexico providers was positive about the usefulness of HAN in this context, though this has not been formally evaluated. In New Mexico, there is currently no easy and effective way to assess the ability for all potential users to gain and maintain access to this password-protected communication system. NMDOH has recognized the need for continuous improvement of its HAN system in general and its utility during seasonal, novel, or pandemic influenza occurrences.

ASTHO collects and disseminates stories that highlight promising and useful practices and implementation strategies developed by state and territorial health agencies. ASTHO staff are actively seeking new stories about infrastructure gains made since the H1N1 pandemic to broaden our understanding of how states can adjust and improve their ability to respond to pandemic situations or other infectious disease threats. If you have information to share about how your state’s infectious disease infrastructure has changed as a result of H1N1, please contact infectiousdisease@astho.org. For a complete archive of ASTHO’s state stories, visit www.astho.org/stories.