

Building State and Local Public Health Capacity in Syndromic Surveillance Through an Online Community of Practice

Public Health Reports
2019, Vol. 134(3) 223-227
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DOI: 10.1177/0033354919828713
journals.sagepub.com/home/phr



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Keywords

syndromic surveillance, public health surveillance, capacity building, community of practice, public health practice

A community of practice is a group of persons who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise by interacting regularly, either in person or virtually.^{1,2} Communities of practice have been used for many years in the private sector¹⁻⁵ and to a lesser degree in public health.⁶⁻¹¹ To our knowledge, however, a community of practice has never been used to build public health capacity for a Centers for Disease Control and Prevention (CDC) public health surveillance program. In this *Executive Perspective*, we discuss how CDC's National Syndromic Surveillance Program Community of Practice (NSSP CoP)¹² is proving to be a promising approach for building state and local public health capacity in syndromic surveillance.

Syndromic surveillance is public health surveillance that emphasizes the use of near-real-time prediagnostic data, primarily from emergency departments and urgent care centers, and statistical tools to detect and characterize unusual activity for public health investigation or response.¹³ The capacity to conduct syndromic surveillance is key to public health officials' ability to detect, monitor, and characterize unusual illnesses in the general population or to identify and respond to potential events of public health concern.¹⁴ CDC's NSSP provides funds and support to local and state public health authorities to implement syndromic surveillance in their jurisdictions. NSSP operates and maintains the BioSense Platform,^{15,16} a cloud-based platform that provides participating public health jurisdictions with tools and resources for data collection, storage, analysis, and exchange of syndromic surveillance data. These tools enable users to rapidly collect, evaluate, share, and store syndromic surveillance data. Health officials can use the BioSense Platform to analyze and exchange syndromic surveillance data across city, county, or state jurisdictions—improving their common awareness of health threats over time and across regional boundaries.

In June 2016, CDC awarded a 3-year cooperative agreement to the International Society for Disease Surveillance (ISDS) to collaborate with NSSP to formalize, manage, and facilitate an online community of practice for syndromic surveillance. This collaboration was an effort to engage more effectively with syndromic surveillance practitioners at state and local levels. Communities of practice have been shown to be beneficial in breaking down professional, geographic, and organizational boundaries; in facilitating knowledge sharing and management; in aiding peer-to-peer problem solving; and in fostering new ideas and innovations.² Whereas the BioSense Platform provides the technical infrastructure for NSSP, the primary goal of the NSSP CoP is to build syndromic surveillance capacity and capabilities by fostering learning and knowledge sharing for and by its members.

CDC and ISDS designed the NSSP CoP on the basis of best practices as described in the community of practice literature.^{2-4,17-19} Membership in the NSSP CoP is open to any person or organization interested in advancing syndromic surveillance. As of November 2018, the NSSP CoP had 541 members, of whom 183 (34%) were state, 100 (18%) were local, and 82 (15%) were federal public health practitioners with responsibilities for syndromic surveillance in their organizations. Other members were from nonprofit and

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for-profit organizations, international organizations, health care, and academia. Members access the NSSP CoP through the ISDS website (healthsurveillance.org), which provides access to forums for problem solving, subject-matter experts for technical assistance, a surveillance knowledge repository, online webinars and trainings, and the opportunity to join workgroups and committees to use their collective knowledge to build the practice of syndromic surveillance.

NSSP CoP's Capacity-Building Approach

Capacity building is defined as “activities that strengthen and maintain the infrastructure and resources necessary to sustain or improve system, organizational, community, or individual processes and competencies.”²⁰ It includes strategies that increase the knowledge and skills of public health practitioners, expand and support organizational infrastructure, and develop new alliances and partnerships. The NSSP CoP's approach to building syndromic surveillance capacity includes various activities that were developed on the basis of an analysis of issues and learning needs identified through needs assessments, surveys, and conversations with syndromic surveillance practitioners and stakeholders.²¹⁻²⁴ Capacity-building activities of the NSSP CoP are grouped into 5 domains: (1) community-driven leadership, (2) member participation and engagement, (3) collaboration and networking, (4) knowledge sharing and training, and (5) problem solving. ISDS uses a combination of quantitative (website usage metrics, member surveys) and qualitative (success stories) data to monitor the community's capacity-building efforts and successes.

Community-Driven Leadership

Successful capacity-building efforts require trusted community leaders who can promote a culture of sharing and collaboration. Along with the technical and administrative support and facilitation provided by CDC and ISDS, a member-appointed NSSP CoP Steering Committee²⁵ was established by ISDS in 2016 to champion causes that are important to and representative of the broader syndromic surveillance community. Members of the Steering Committee include surveillance experts from state, local, and federal public health agencies who provide direction and recommendations for projects that benefit members' engagement and collaboration in the syndromic surveillance community. The Steering Committee works closely with syndromic surveillance community members to identify gaps in knowledge or practice and serves as a conduit between the syndromic surveillance community and CDC, ISDS, and other stakeholders. Members of the Steering Committee commit to spending 1 or 2 hours per week on committee business, including a monthly 90-minute conference call. An NSSP CoP Charter,²⁶ developed by the Steering Committee, articulates the mission, vision, and goals of the community and how these goals align with the broader mission of NSSP.

Additional leadership roles are available to syndromic surveillance community members who wish to chair or co-chair subcommittees or workgroups that are structured around a functional area (eg, data quality, BioSense Platform, preparedness and response, syndrome definitions).

Member Participation and Engagement

Capacity building within the NSSP CoP could not happen without the active engagement of its members. As members learn from each other and develop new skills and knowledge, they share these skills and knowledge with others in their networks and organizations. Similarly, members tap the expertise of their networks and bring that expertise back to the NSSP CoP. ISDS tracks membership registration and engagement data for the NSSP CoP monthly, and these numbers have grown steadily. The NSSP CoP membership increased from 188 members in August 2016 to 541 members in November 2018. From January 2018 to November 2018, member participation in monthly NSSP CoP conference calls averaged 54 attendees per month.

Monthly NSSP CoP conference calls are member-driven and bring together various stakeholders to spark collaborative efforts and to share guidance, resources, and technical assistance. Results from the 2018 NSSP CoP member satisfaction assessment,²³ which was conducted with state, local, and federal members, found that 42 of 52 (81%) respondents regularly attended (at least once every quarter) the monthly conference call and 32 of 42 (76%) respondents stated that the call generates new ideas for syndromic surveillance practice. Twenty-eight of 44 (64%) respondents reported that the healthsurveillance.org website was their primary source for information about syndromic surveillance and that they accessed the website to learn about upcoming activities and calls offered through the NSSP CoP.²³

Collaboration and Networking

Collaboration and networking between organizations or groups of people who might otherwise have little or no working relationship are essential for building public health capacity.²⁷ State and local syndromic surveillance practitioners often have similar technical problems; however, many are geographically and professionally isolated and have limited opportunities for face-to-face interaction. As a way to facilitate collaboration and networking, the NSSP CoP membership directory allows members to identify their areas of expertise. This feature makes it possible for members to locate and contact other members who may have expertise in a certain area, thus facilitating discussions on syndromic surveillance practice among geographically dispersed members who may otherwise never have met or worked together. This informal sharing among members of tacit knowledge or know-how—some of which cannot be found in a training manual or classroom—is important for building syndromic surveillance capacity.

More structured collaborations occur within the NSSP CoP workgroups and committees, where members share resources and use their combined talents to improve syndromic surveillance practice. For example, the Syndromic Surveillance Public Health Preparedness Response and Recovery Committee is collaborating with public health preparedness and emergency response officials to develop a syndromic surveillance–focused exercise for emergency management specialists that can be adapted to local health department priorities and interests. The Message Guide Workgroup is a collaborative effort among state and local public health agencies and federal health information technology agencies to revise the *Implementation Guide for Syndromic Surveillance*.²⁸ The guide provides technical specifications for sending and receiving data on clinical patient encounters from emergency departments, urgent care facilities, and inpatient and outpatient health care facilities. The Data Quality Committee is working on ways to strengthen relationships and communications between electronic health record (EHR) vendors and state syndromic surveillance programs.²⁹ An NSSP CoP Technical Committee was formed in October 2018 to focus on the functionality and user experience of the BioSense Platform and provide members the opportunity to engage with CDC on decisions that affect the BioSense Platform’s functions and enhancements.

Knowledge Sharing and Training

NSSP CoP members have access to numerous knowledge-sharing tools and resources aimed at improving syndromic surveillance capacity. The surveillance knowledge repository³⁰ contains more than 2000 surveillance resources and provides members with quick, streamlined access to a syndromic surveillance knowledge base, such as trainings, webinars, ISDS conference abstracts and presentations, use cases, syndromes, and technical guidance documents. Approximately 170 webinars, with topics ranging from data analytics, data sharing, and RStudio to mass-gathering surveillance and syndromic surveillance 101, are available in the knowledge repository. The Electronic Surveillance System for the Early Notification of Community-Based Epidemics online training module, developed by CDC and the Johns Hopkins University Applied Physics Laboratory, is the most visited resource in the knowledge repository. The knowledge repository’s Stories of Surveillance in Action library contains success stories of how jurisdictions are using syndromic surveillance data to address various public health problems.³¹ For example, in August 2017, the Tarrant County Public Health Department in Tarrant County, Texas, used syndromic surveillance during Hurricane Harvey to determine how many evacuees from affected areas were seeking emergency medical care in Dallas-Fort Worth, Texas, metroplex emergency departments.³² Analysis of the data found expansive use of health care services extending outside the areas most affected by this natural disaster. These

data can be used to predict the health needs of emergency evacuees in future events.

The Idaho Oral Health Program has anecdotal evidence that some Idahoans are compensating for shortages in dental health professionals by seeking dental care in emergency departments. In 2017, epidemiologists from the Idaho Division of Public Health began using syndromic surveillance to better understand the scope of the problem and the demographic characteristics of persons who make these visits.³³ Syndromic surveillance provided a quantifiable understanding of the scope of the problem so that the Idaho Oral Health Program can explore ways to reduce these visits.

In July 2017, the Kansas Department of Health and Environment used syndromic surveillance data to determine whether rabies post-exposure prophylaxis was being administered.³⁴ These data can help to detect increases in the number of persons seeking care for potential rabies exposure, which can serve as an indicator of more human or animal (including wildlife) interactions. These examples highlight best practices and lessons learned so that members of the syndromic surveillance community can learn from the experiences of others.

Problem Solving

Capacity building presumes that the identification of problems, solutions to problems, and actions to resolve problems are carried out by the community.²⁷ Problem solving is primarily conducted through workgroup and committee member interactions. These interactions provide insights and perspectives that have helped with trouble-shooting and problem solving, especially for technical issues associated with the BioSense Platform. For example, syndromic surveillance practitioners from the Arizona Department of Health Services observed a problem with their state’s data in the BioSense Platform, where the chief complaint field was being truncated at 200 characters. Through problem-solving efforts with others in the NSSP CoP Data Quality Committee, the Arizona Department of Health Services discovered the root causes of the problem, assessed its effect on other jurisdictions, and worked with CDC and others to resolve the issue. Maintaining data quality for the chief complaint field is a priority because it can affect the creation, refinement, and successful application of a syndrome definition for fundamental data elements.³⁵

In another example, the BioSense Platform’s Master Facility Table gathers data on EHR vendors, EHR vendor software, aggregate data quality metrics (timeliness, validity completeness), and facility types participating in syndromic surveillance. However, until 2018, these data fields were not standardized, which made it difficult to use the data for data quality purposes. To address this problem, the NSSP CoP Metadata Visualization Application Workgroup created a standardized list of the top 20 EHR vendors and software names and added these to the drop-down menu used in the BioSense Platform’s Master Facility Table, making the tool

more user-friendly and allowing users to examine data quality metrics by vendor name and product. In addition to problem solving through committees and workgroups, NSSP CoP members can also post requests for help on the community forums or search the directory by area of expertise to find members who may have the needed expertise.

Conclusion

The NSSP CoP demonstrates the value of using a community of practice approach to build syndromic surveillance capacity. The NSSP CoP's capacity-building activities to date indicate that the community of practice concept is a positive strategy to encourage community members to work together collegially, to share and learn from each other's expertise, and to use their collective knowledge to build the practice of syndromic surveillance. The NSSP CoP provides its members with a group of trusted peers who can be contacted quickly and easily to provide help. Because public health resources are scarce, creative strategies and solutions are needed to support the public health workforce and ensure effective public health practice. Working together, sharing resources, and combining talents through a community of practice enhance the opportunities and likelihood for achieving positive health outcomes. Public health program managers should consider adding communities of practice to their capacity-building toolkit because they offer unique opportunities to build partnerships, foster collaborations, and exchange skills, knowledge, and resources.

Acknowledgments

The views contained in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The International Society for Disease Surveillance is supported in part by cooperative agreement #1 NU50OE000098-01 from the Centers for Disease Control and Prevention.

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