

Wisconsin Identifies *E. coli* in Spinach during 2006 Nationwide Outbreak Laboratory and epidemiology capacity is critical for rapid response to national disease outbreaks.



In September 2006, Wisconsin public health officials reported a cluster of *E. coli* O157:H7 infections to CDC. Through the use of an

advanced “DNA fingerprinting” technique called pulsed-field gel electrophoresis (PFGE), staff at the Wisconsin State Laboratory of Hygiene (WSLH) were the first in the nation to identify the bacterial strain that sickened hundreds and caused three deaths in the spinach *E. coli* O157:H7 outbreak. By comparing PFGE patterns, or “DNA fingerprints,” in the PulseNet national database, CDC determined that within 1 month, 183 people across 26 states had been infected by the same strain. Joint epidemiology and laboratory investigations were critical in identifying the source of this outbreak.

The WSLH staff received the 2007 PulseNet PulseStar award from CDC and the Association of Public Health Laboratories for their efforts. Funding from the cooperative agreement was critical in providing WSLH with the laboratory capacity to successfully identify the bacterial strain that swept across the nation. Both the bacterial strain and outbreak source were identified

rapidly, and public health communications regarding food safety, *E. coli* infection, and product recall were quickly developed to protect people from further spread of infection. Individual states can have a significant role in stemming nationwide disease outbreaks through well-equipped and staffed laboratories and epidemiology divisions.

According to the Wisconsin Department of Health and Family Services, the cooperative agreement is valuable because it has led to a dramatic increase in Wisconsin’s capacity to conduct disease surveillance, epidemiological investigations, laboratory testing, and rapid/secure communications through the Health Alert Network. The state also has established and operated 12 local public health departments and tribal preparedness consortia to maximize funding, resources, personnel, and planning.

Snapshot of Public Health Preparedness

Below are activities conducted by Wisconsin in the area of public health preparedness. They support CDC preparedness goals in the areas of detection and reporting, control, and improvement; crosscutting activities help prepare for all stages of an event. These data are not comprehensive and do not cover all preparedness activities.

Disease Detection and Investigation

The sooner public health professionals can detect diseases or other health threats and investigate their causes and effects in the community, the more quickly they can minimize population exposure.

Detect & Report	Could receive and investigate urgent disease reports 24/7/365 ¹	Yes
	- Primary method for receiving urgent disease reports* ²	Telephone
	Linked state and local health personnel to share information about disease outbreaks across state lines (through the CDC <i>Epi-X</i> system) ³	Yes
	Conducted year-round surveillance for seasonal influenza ⁴	Yes

*Telephone, fax, and electronic reporting are all viable options for urgent disease reporting, as long as the public health department has someone assigned to receive the reports 24/7/365.

¹ CDC, DSLR; 2005; ² CDC, DSLR; 2006; ³ CDC, *Epi-X*; 2007; ⁴ HHS, OIG; 2007



Wisconsin



Public Health Laboratories

Public health laboratories test and confirm agents that can threaten health. For example, advanced DNA “fingerprinting” techniques and subsequent reporting to the CDC database (PulseNet) are critical to recognize nationwide outbreaks from bacteria that can cause severe illness, such as *E. coli* O157:H7 and *Listeria monocytogenes*.

Detect & Report	Number of Wisconsin laboratories in the Laboratory Response Network ¹	3
	Rapidly identified <i>E. coli</i> O157:H7 using advanced DNA “fingerprinting” techniques (PFGE): ²	
	- Number of samples received (partial year, 9/06 – 2/07)	117
	- Percentage of test results submitted to CDC database (PulseNet) within 4 days	89%
	Rapidly identified <i>Listeria monocytogenes</i> using advanced DNA “fingerprinting” techniques (PFGE): ²	
	- Number of samples received (partial year, 9/06 – 2/07)	8
	- Percentage of test results submitted to CDC database (PulseNet) within 4 days	88%
	Had a laboratory information management system that could create, send, and receive messages ³ (8/05 – 8/06)	Yes
	- System complied with CDC information technology standards (PHIN) ³ (8/05 – 8/06)	No
Crosscutting	Had a rapid method to send urgent messages to frontline laboratories that perform initial screening of clinical specimens ³ (8/05 – 8/06)	Yes
	Conducted bioterrorism exercise that met CDC criteria ⁴ (8/05 – 8/06)	Yes
	Conducted exercise to test chemical readiness that met CDC criteria ⁴ (8/05 – 8/06)	Yes

¹ CDC, DBPR; 2007; ² CDC, DSLR; 2007; ³ APHL, Public Health Laboratory Issues in Brief: Bioterrorism Capacity; May 2007; ⁴ CDC, DSLR; 2006

Response

Planning provides a framework for how a public health department will respond during an emergency. The plans can be tested through external reviews, exercises, and real events. After-action reports assess what worked well during an exercise or real event and how the department can improve.

Control	Developed a public health response plan, including pandemic influenza response, crisis and emergency risk communication, and Strategic National Stockpile (SNS) ^{1,2}	Yes
	Wisconsin SNS plan reviewed by CDC ²	Yes
	- Score on CDC technical assistance review (1-100)	86
	Number of Wisconsin cities in the Cities Readiness Initiative ³	1
Crosscutting	Developed roles and responsibilities for a multi-jurisdictional response (ICS) with: ¹ (8/05 – 8/06)	
	- Hospitals	Yes
	- Local/regional emergency management agencies	Yes
	- Federal emergency management agencies	Yes
	Public health department staff participated in training to support cooperative agreement activities ⁴	Yes
	Public health laboratories conducted training for first responders ⁵ (8/05 – 8/06)	Yes
	Activated public health emergency operations center as part of a drill, exercise, or real event ^{*16} (partial year, 9/06 – 2/07)	No
Conducted a drill or exercise for key response partners to test communications when power and land lines were unavailable ¹⁶ (partial year, 9/06 – 2/07)	No	
Improve	Finalized at least one after-action report with an improvement plan following an exercise or real event ¹⁶ (partial year, 9/06 – 2/07)	Yes

* Activation means rapidly staffing all eight core ICS functional roles in the public health emergency operations center with one person per position. This capability is critical to maintain in case of large-scale or complex incidents, even though not every incident requires full staffing of the ICS.

[†] States were expected to perform these activities from 9/1/2006 to 8/30/2007. These data represent results from the first half of this period only.

¹ CDC, DSLR; 2006; ² CDC, DSNS; 2007; ³ CDC, DSNS CRI; 2007; ⁴ CDC, DSLR; 1999-2005; ⁵ APHL, Chemical Terrorism Preparedness; May 2007; ⁶ CDC, DSLR; 2007