

Laboratory System Improvement Plan



Assessment

City of Milwaukee Public Health Laboratory



Steve Gradus, Ph.D., D(ABMM)
Laboratory Director

November 18, 2010

Intended Results

- Conduct an assessment of the local public health laboratory system which:
 - Brings together key partners to determine system performance
 - Measures capacity and performance of the local system in addressing national standards
 - Provides results for system improvement (a starting point)

Concepts

- Local & State Public Health Laboratory System
- Laboratory Systems Improvement Plan (LSIP)
- 10 Essential Public Health Services
- 11 Core Public Health Lab Functions

What is the Laboratory System?

- The Local Public Health Laboratory System (LPHL System) consists of all the organizations that participate in or otherwise support public health laboratory testing and includes those who initiate testing and those who ultimately use the test results.

Mission and Vision of L-SIP

- **Mission:** To establish a system that measures the performance of state and local public health laboratory systems and supports their continuous improvement.
- **Vision:** A healthy world through improved public health practice and highly functioning and effective laboratory systems.

Ten Essential Public Health Services

Laboratory performance measurements were designed around the ten Essential Public Health Services developed nationally in 1996. They represent the capacities that must be present in a public health system, whether at the local, state or national level, to assure a fully functioning system. They include:

1. Monitor health status to identify community health problems
2. Diagnose and investigate health problems and health hazards in the community
3. Inform, educate, and empower people about health issues
4. Mobilize community partnerships to identify and solve health problems
5. Develop policies and plans that support individual and community health efforts
6. Enforce laws and regulations that protect health and ensure safety
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable
8. Assure a competent public health and personal health care workforce
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services
10. Research for new insights and innovative solutions to health problems

Eleven Core Functions and Capabilities of Public Health Laboratories:

define the role of public health laboratories in service delivery intended to serve as the basis for assessing and improving laboratory quality.

- 1. Disease Prevention, Control and Surveillance
- 2. Integrated Data Management
- 3. Reference and Specialized Testing
- 4. Environmental Health and Protection
- 5. Food Safety
- 6. Laboratory Improvement and Regulation
- 7. Policy Development
- 8. Emergency Response
- 9. Public Health Related Research
- 10. Training and Education
- 11. Partnerships and Communication

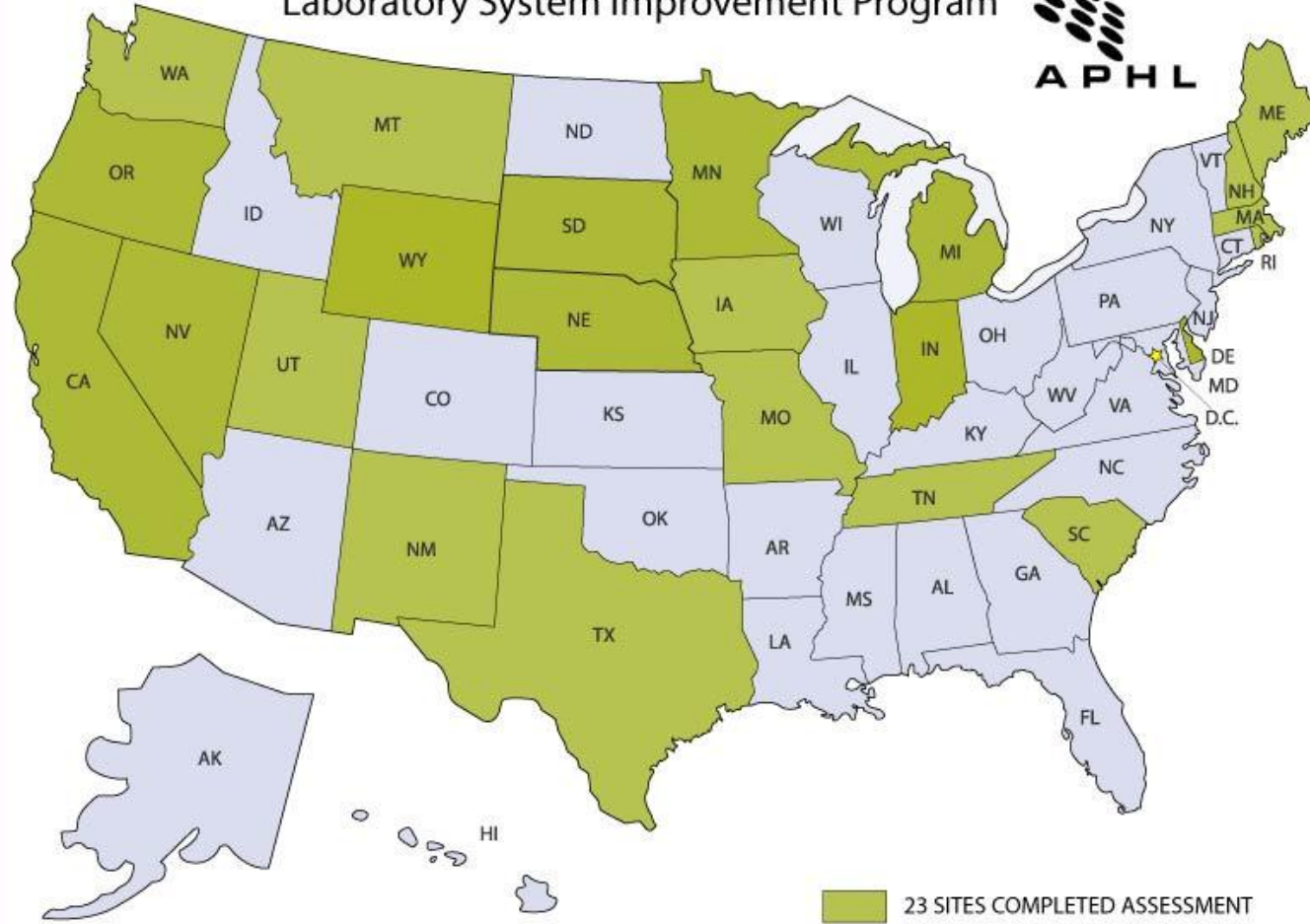
Today's Agenda

- Welcome & Introductions
- Orientation
- Large group: ES 7
- Small group breakout (ES 4, 6, 8)
- Lunch
- Small groups (ES 9, 5, 1)
- Break
- Small groups (ES 3, 2, 10)
- Summary, Discussion & Next Steps

Developing the Program

- Feasibility Study 2004
- Development Phase 10/05 – 6/06
- Pilot Phase April/May 2006
- Field Test Phase 10/06 – 5/07
- Final Draft Product 2007 APHL Annual Meeting
- Implementation & Improvement –
Ongoing: 100% state participation by

Laboratory System Improvement Program



**As of June 2010

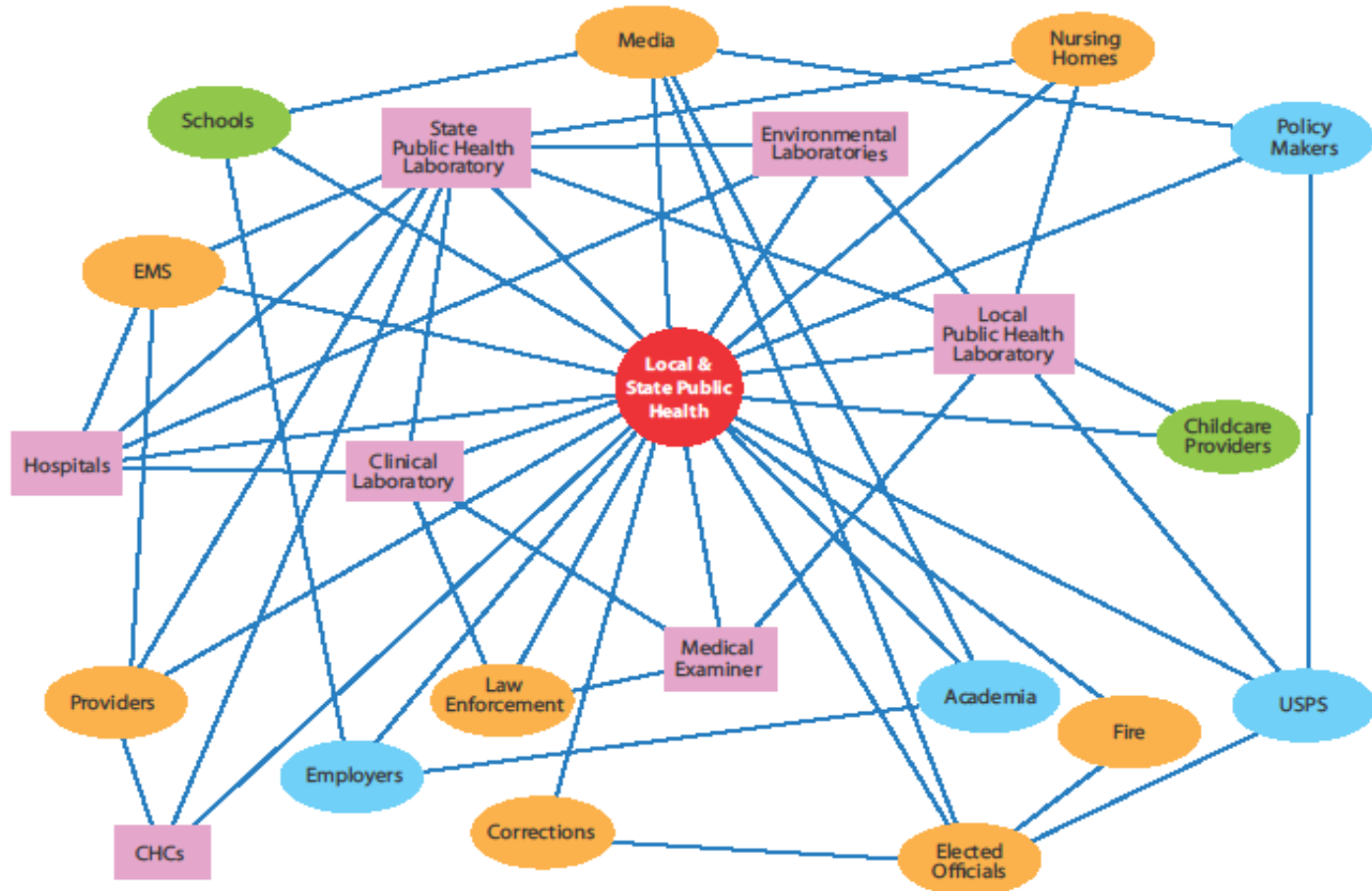
Four Concepts Applied in Local Public Health Laboratory System Assessment

1. Based on the ten Essential Public Health Services & the 11 PHL Core Functions
2. Focus on the overall local public health laboratory system
3. Describes an optimal level of performance
4. Supports a process of improvement

What is the “Local-Level Public Health Laboratory System?”

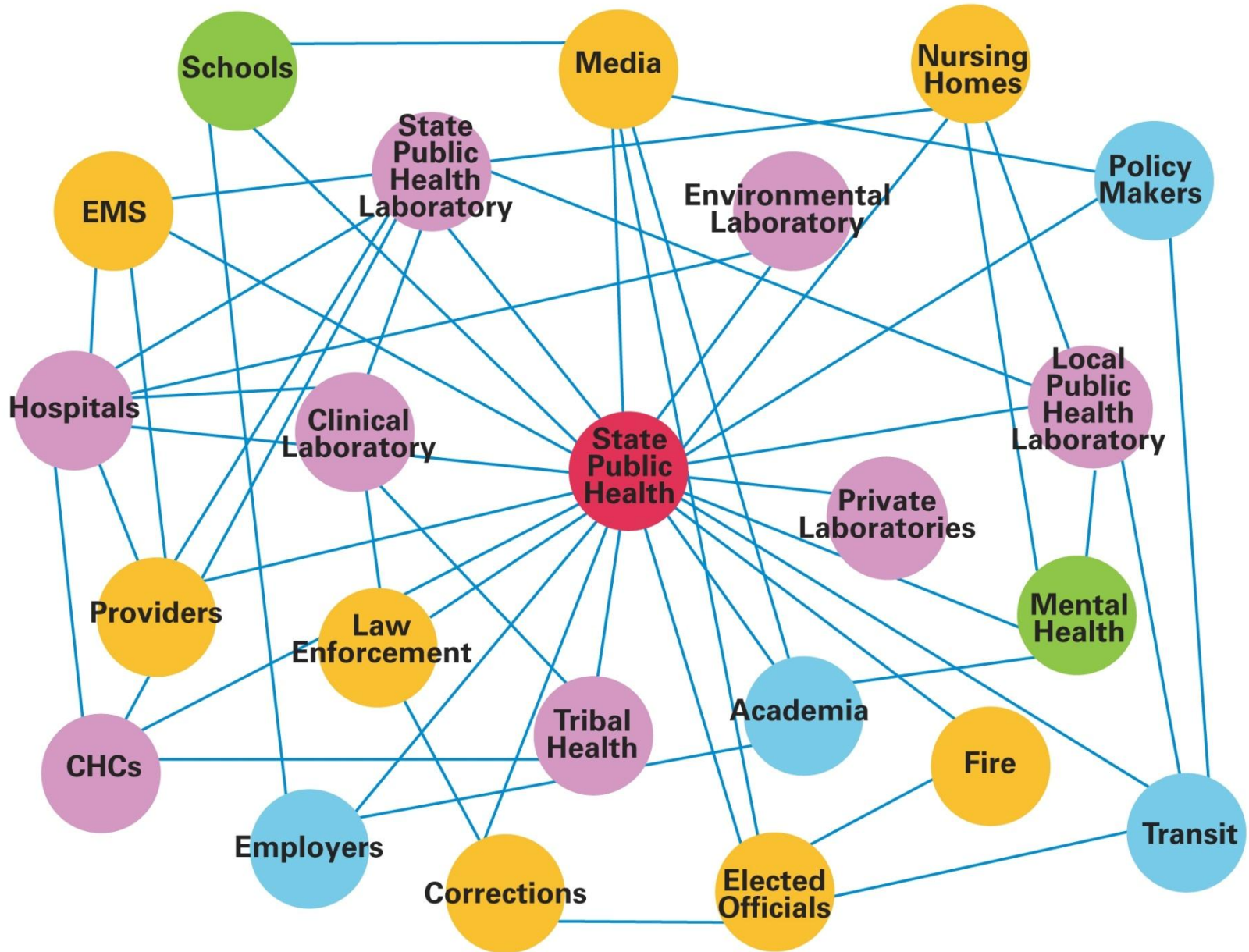
- ...More than the local public health laboratory
 - All public, private, and voluntary entities that contribute to public health laboratory practice in the community
 - A network of entities with differing roles, missions, relationships, and interactions

Local Public Health Laboratory System



2010 City of Milwaukee Health Department

State Public Health Laboratory System



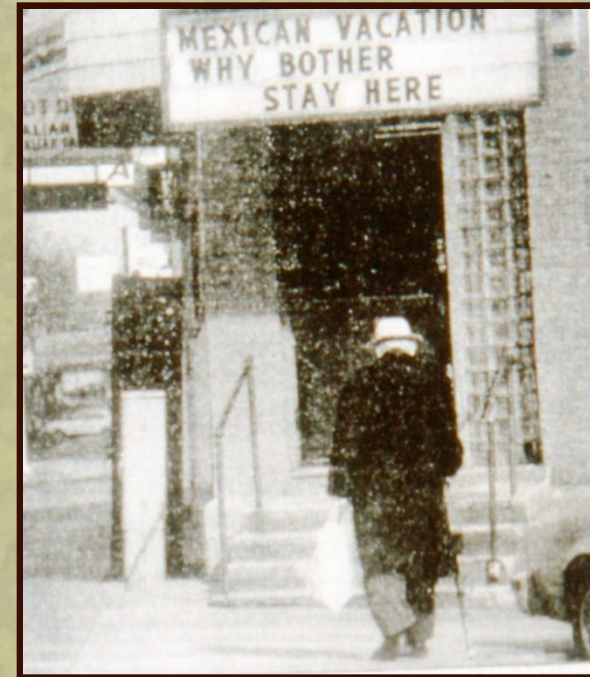
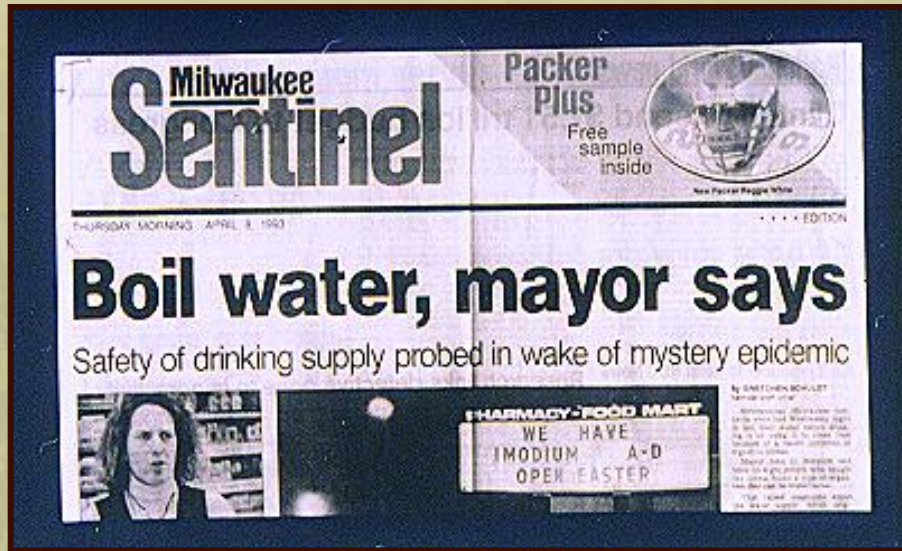
The Unique Nature of Local vs. State PHL Systems

- Support & serve as surge capacity for State PHLS.
- Address testing at the site of patient care or local environmental issue.
- Support the mission of local public health departments.
- Typically co-located in an agency with other public health professionals
- Provide rapid responses to community needs.
- Maintain strong ties & proximity to the community it serves

Examples of the Local Public Health Laboratory System in Action

your roles as stakeholder

>400,000 in Milwaukee Infected with Cryptosporidium

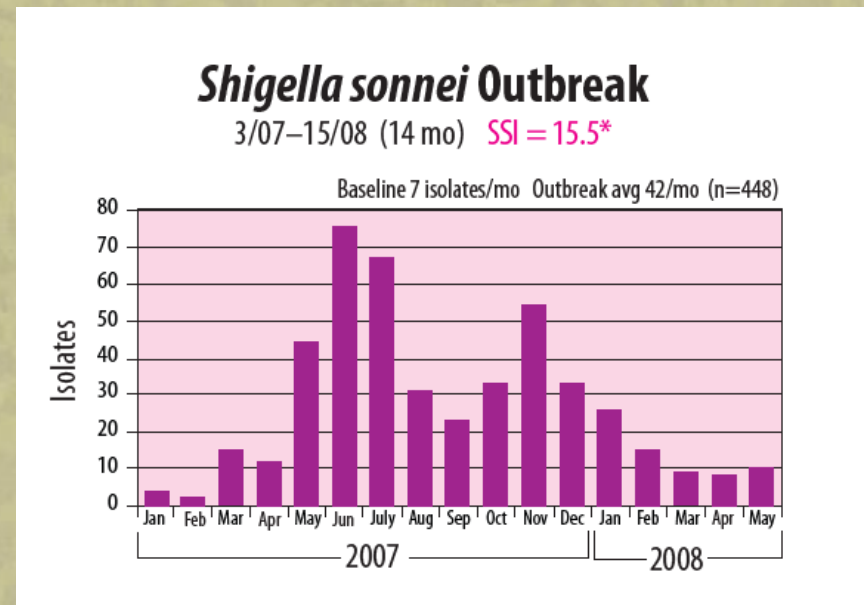


Cryptosporidium Outbreak

- **Scope**
 - 400,000 ill, 4,400 hospitalized, 100 deaths
 - Hospitals, ERs, Labs, commerce, industry affected
 - \$96,000,000 medical costs & productivity loss
 - **14 Clinical Microbiology Laboratories Assisted**
- **Description**
 - City water supply contaminated
 - Boil water order
 - Results: Improved national water quality standards

Milwaukee Shigella 2007 Outbreak

- **Scope** – March 2007 – May 2008
 - **local-only** epidemic: 540 confirmed cases
- **Description** –
 - >250 child care facilities
 - >100 family clusters
 - Child care facilities
 - Schools
 - Health care facilities
 - Food handlers

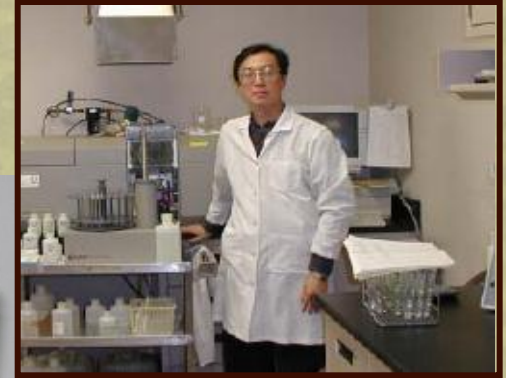


Recreational Water Quality Hazards

Notification of swimming pool operators: Shigellosis



Children's Candy Recalled Contaminated with Lead



Milwaukee 2004

- MHDL Test Development
- Multiple Lab Collaboration
 - Wisc. Ag Lab; USDA Lab; FDA lab
- Food & Lead inspectors

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Mumps '06 & Pertussis '04 Outbreaks

“A Wakeup Call”

Local & State



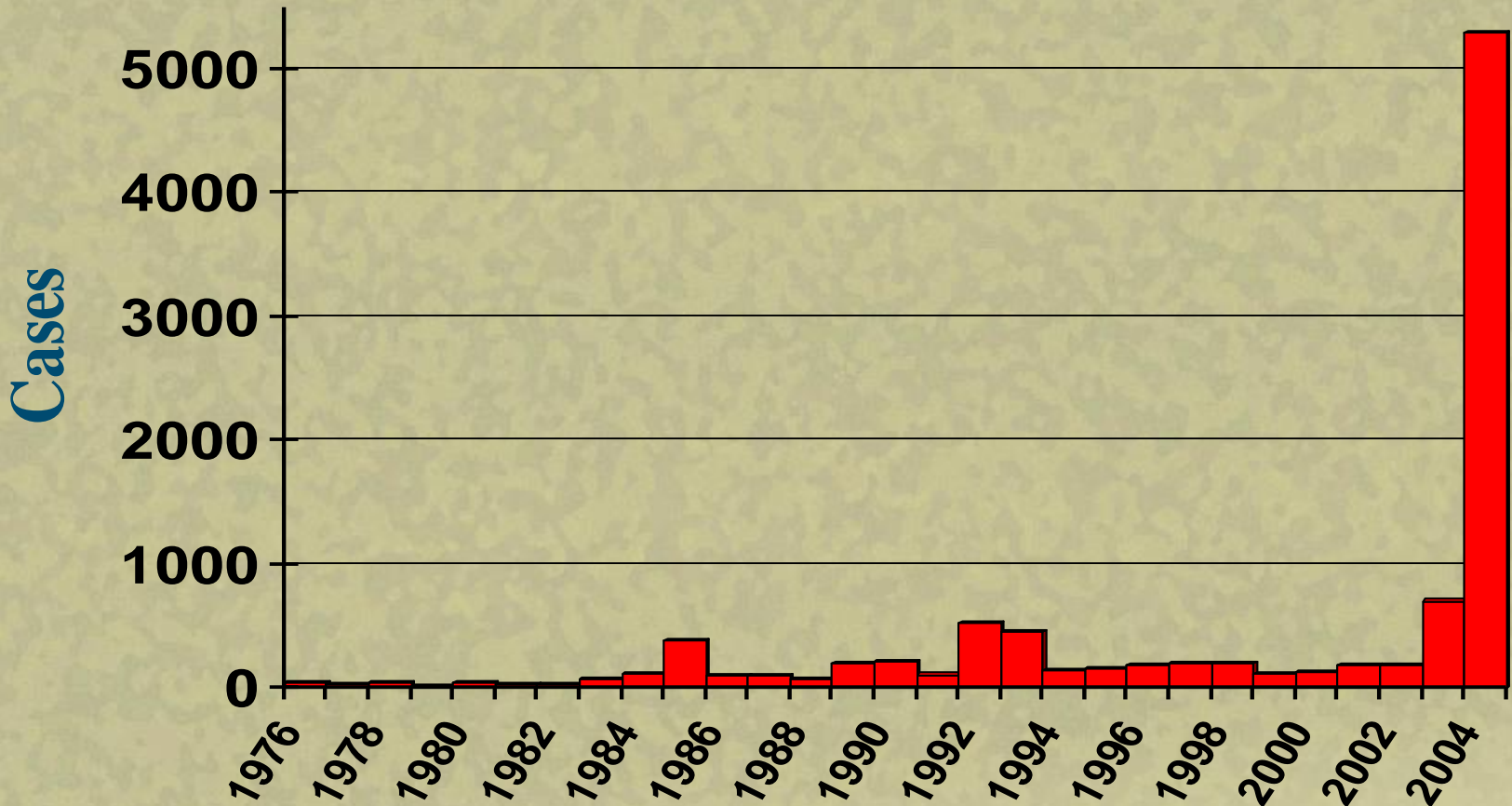
- Immune response and reporting in highly tested and vaccinated populations
- Changing clinical picture & diagnostic tools

MHDL – WSLH: State-Local PHL Agreements

1) MOU - describing mutual roles

2) Collaborative Action Plan –
event specific logistics

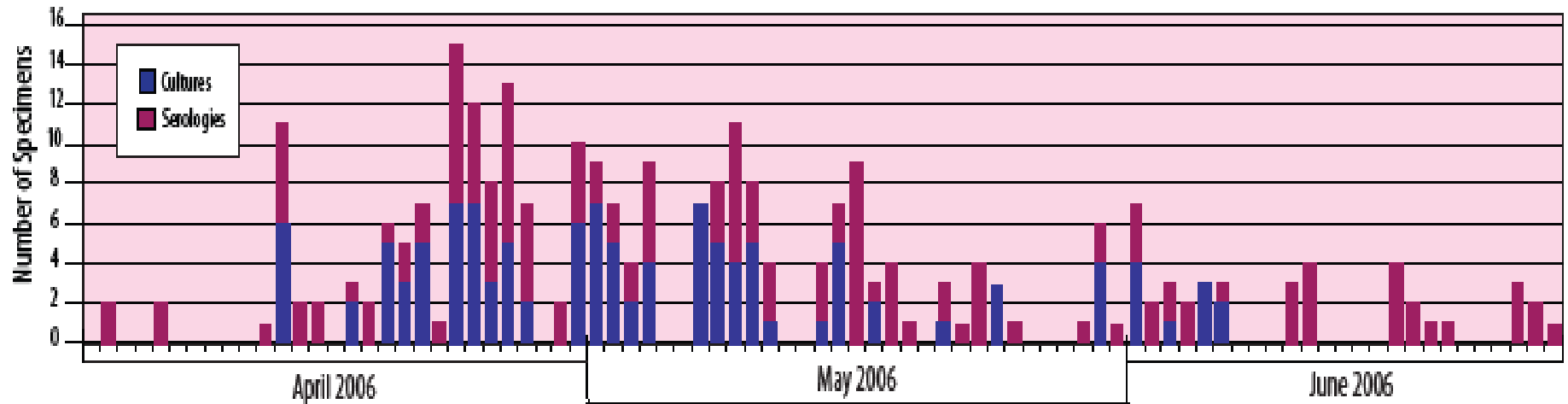
Pertussis Case Reports – WI



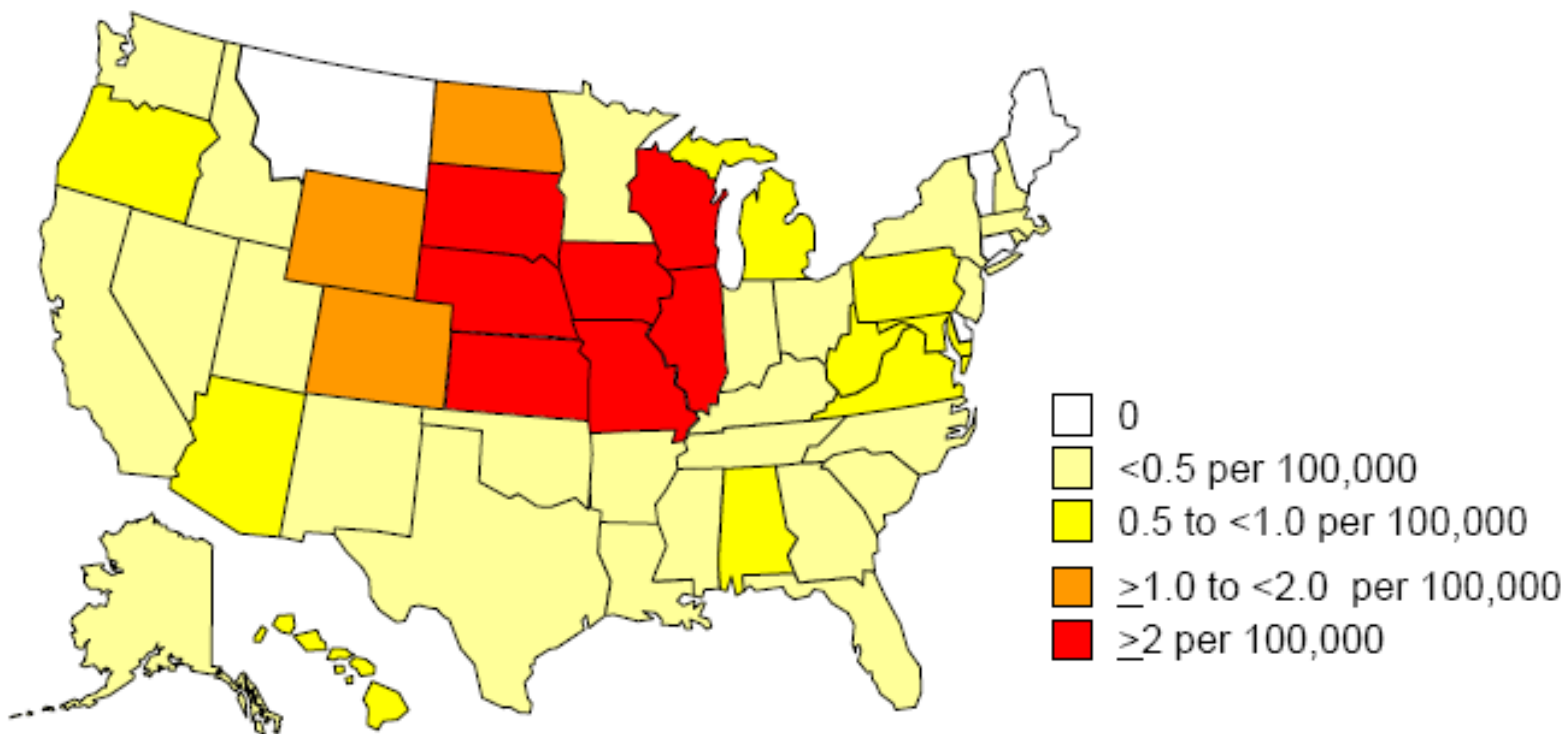
Mumps Outbreak: Local & State

Baseline <1/wk
 Outbreak 33/wk
 n=266

Mumps Outbreak
 4/2/06–6/28/06 (8 wks) SSI = 11.5*

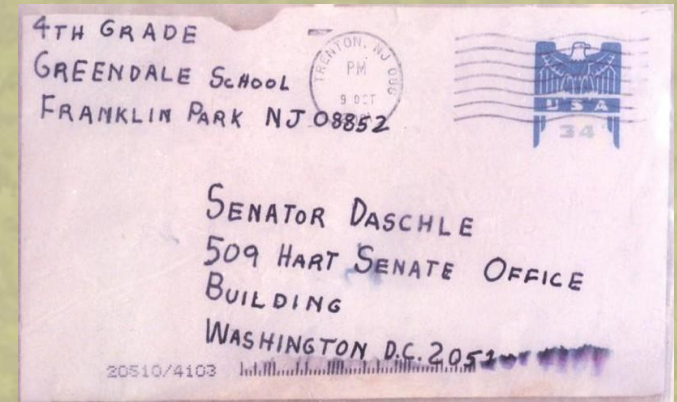
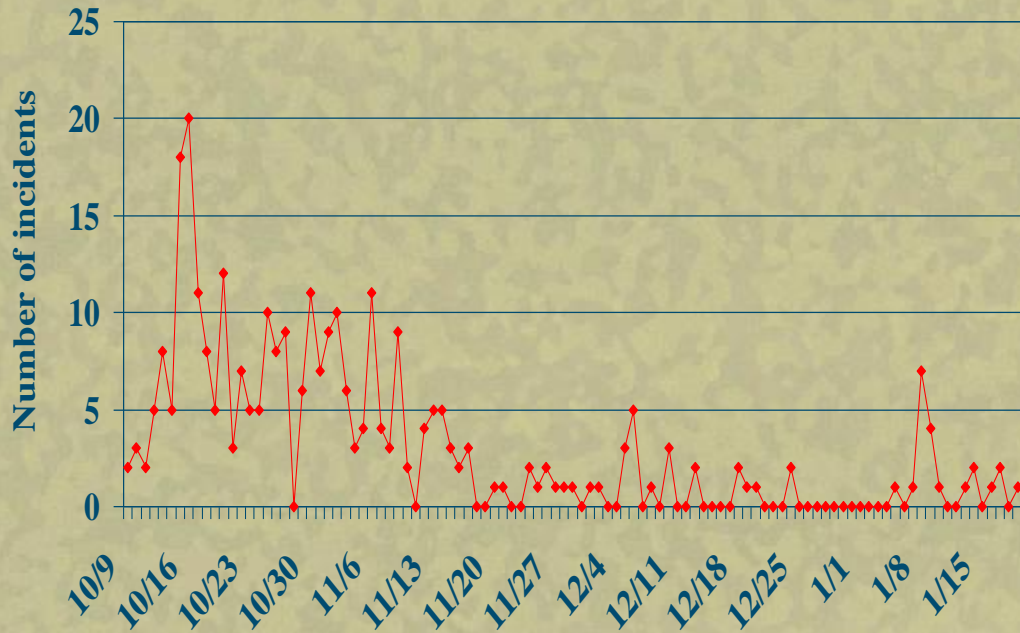


Incidence of Mumps by State, United States, January 1 – October 14, 2006 (n=5824)

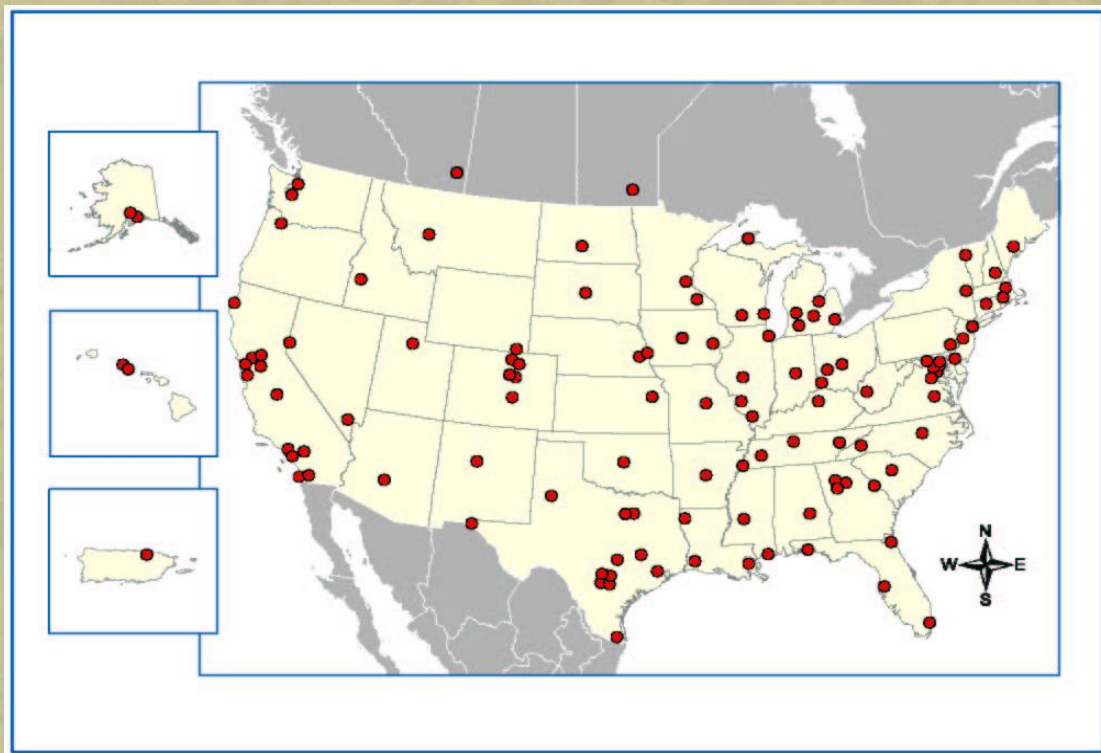


Suspicious Powders

Incidents involving perceived anthrax exposure from MHD Emergency Response Log, Milwaukee, 2001-2002. (n=306)



The Laboratory Response Network



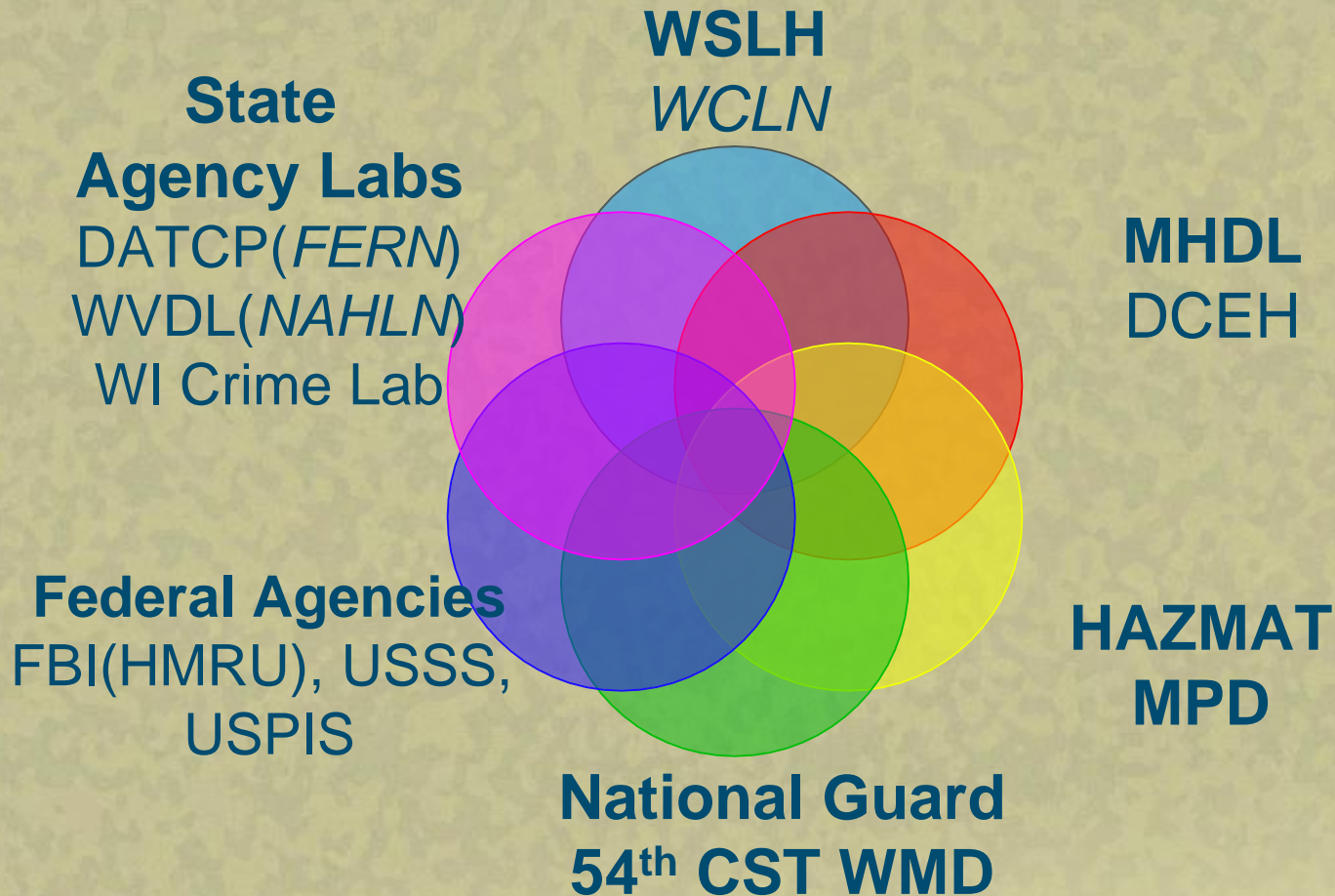
- 140 federal, state and local labs in 50 states and abroad
- National labs – CDC, military – perform definitive testing.
- Reference labs – BSL-3 labs capable of confirmatory testing for agents such as *B. anthracis*, and *C. botulinum* toxin.

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Emergency Laboratory Response Capabilities in Wisconsin

- *An expanding list of partners*



Milwaukee Urban Area Security Initiative (UASI) Grant

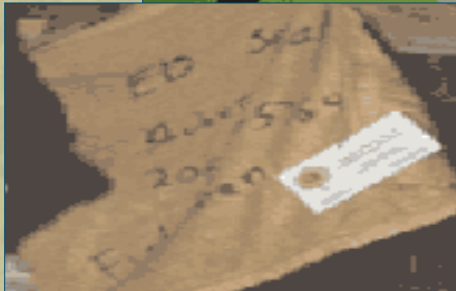
The federal government has defined the Milwaukee Urban Area as Milwaukee, Ozaukee, Racine, Washington and Waukesha Counties



Regional Asset for
PH Emergency
Response

Potential Biological Threats

Anthrax

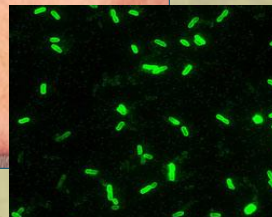


Lab response for suspicious items



Anthrax Spores

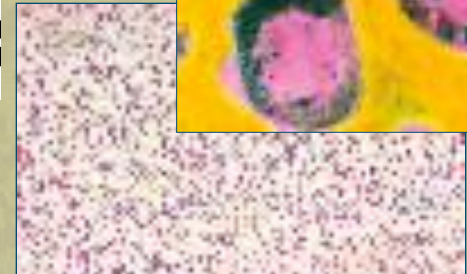
Plague



Tularemia

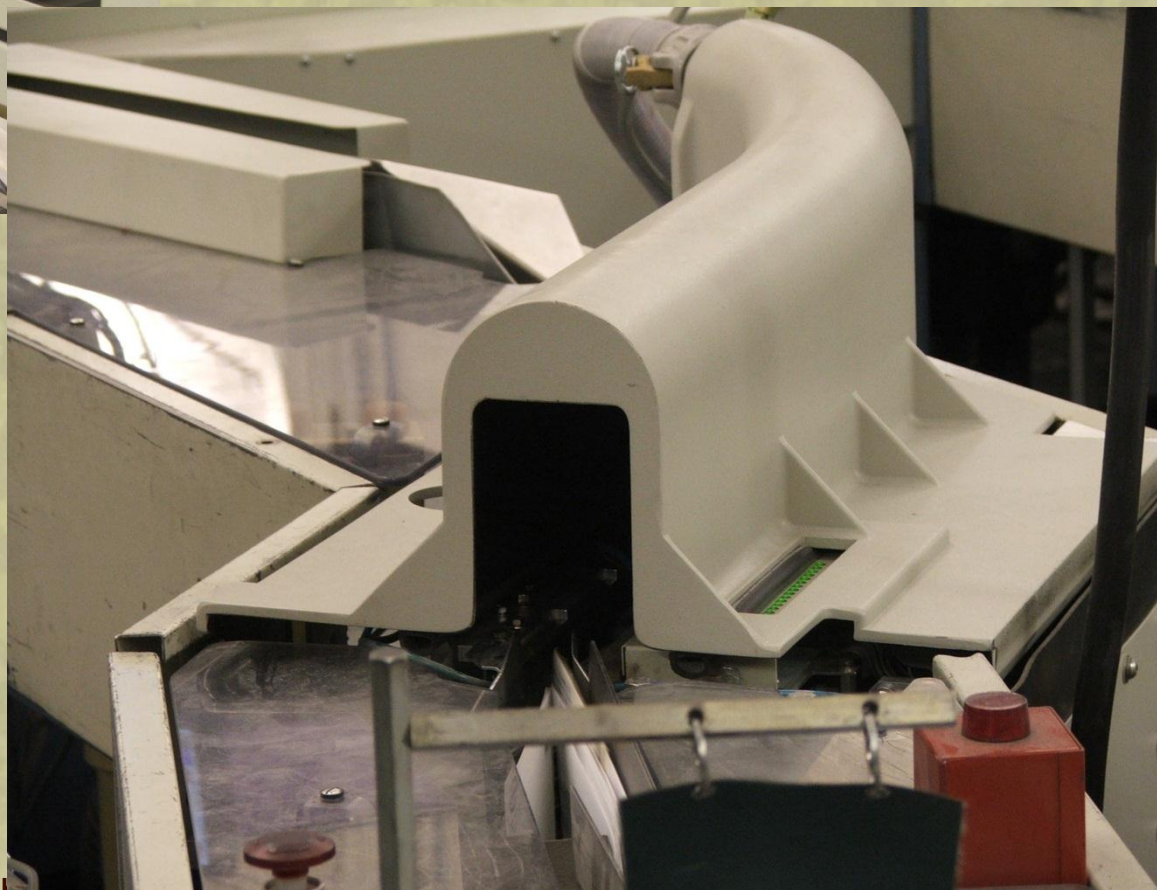


Use appropriate insect repellents



Francisella tularensis Gram Stain

Automated Sorting of Letters at Milwaukee Post-office



Air-sample Collection Site for BDS Analysis

Chlamydia & Gonorrhea Statistics

2005 Rates Ranked by City

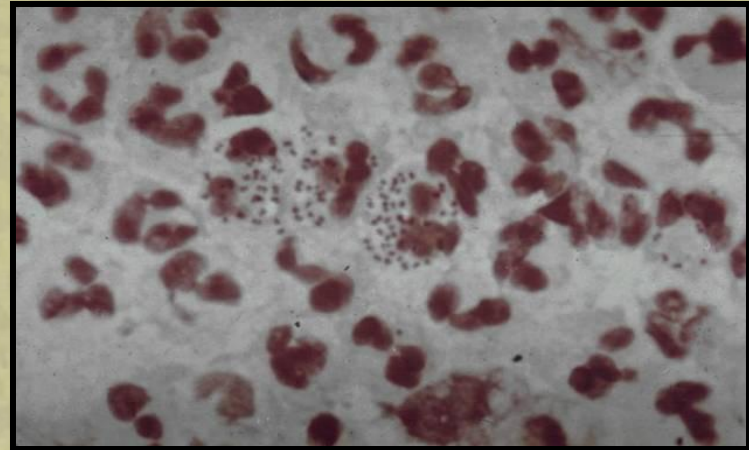
- **Chlamydia**

- #1 Milwaukee
- #11 Chicago
- #28 New York City

- **Gonorrhea**

- #3 Milwaukee
- #12 Chicago
- #34 New York City

Gonorrhea



Source: CDC PHIL Plate #4085

Source: National Association of County & City Health Officials, Big Cities Health Inventory 2007

MHDL: CDC Gonococcal Isolate Surveillance Project

- Bacterial isolates received **from local hospitals & MHDL STD Clinic**
- Monthly reports of antimicrobial resistance in gonorrhea to:
 - the local medical community
 - State STD Program
 - Centers for Disease Control & Prevention

Multi-State Outbreak of *E. coli* O157:H7 Infections From Spinach September–October 2006

CNN.com.



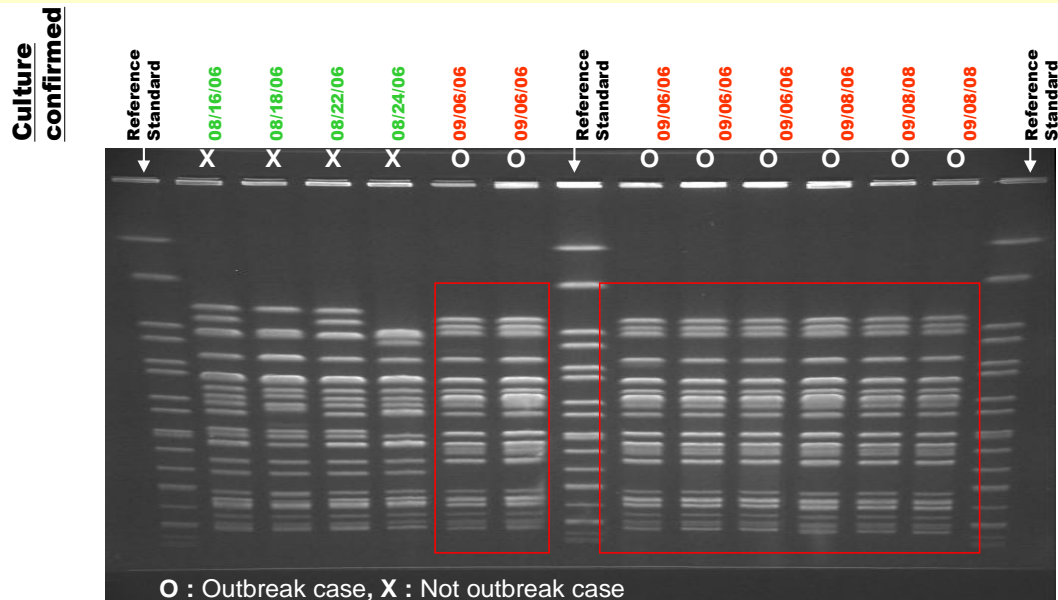
Nationwide

Final Outcome

- 205 Ill
- 103 Hospitalized
- 3 Deaths
- 49 Wisconsin Cases
- 12 Milwaukee Cases

9 cases of spinach-acquired E. coli O157:H7 confirmed by MHD Lab

2006 nationwide outbreak



Timeline of events:

- September 5: Lab received 4 E. coli O157:H7 isolates for confirmation.
- September 6: Lab received 3 more E. coli O157:H7 isolates for confirmation.
- September 7: Culture confirmed E. coli O157:H7 isolates received on 8/31, 9/1, 9/5, 9/6 were subjected to PFGE (fingerprinting) analysis.
- September 8: PFGE results confirmed the presence of same strain of E. coli O157:H7 in all patients (Shown above)
- September 15: Two more isolates received confirmed to same outbreak by PFGE
- September 21: Two more isolates (culture confirmed on 9/19) confirmed to same outbreak by PFGE

PFGE Fingerprinting

The National Molecular Subtyping Network for Foodborne Disease Surveillance



January 2003

Falk Explosion - Milwaukee

December 2006

3-killed; 46 injured

Propane Explosion Levels Building at Milwaukee's Falk Corporation

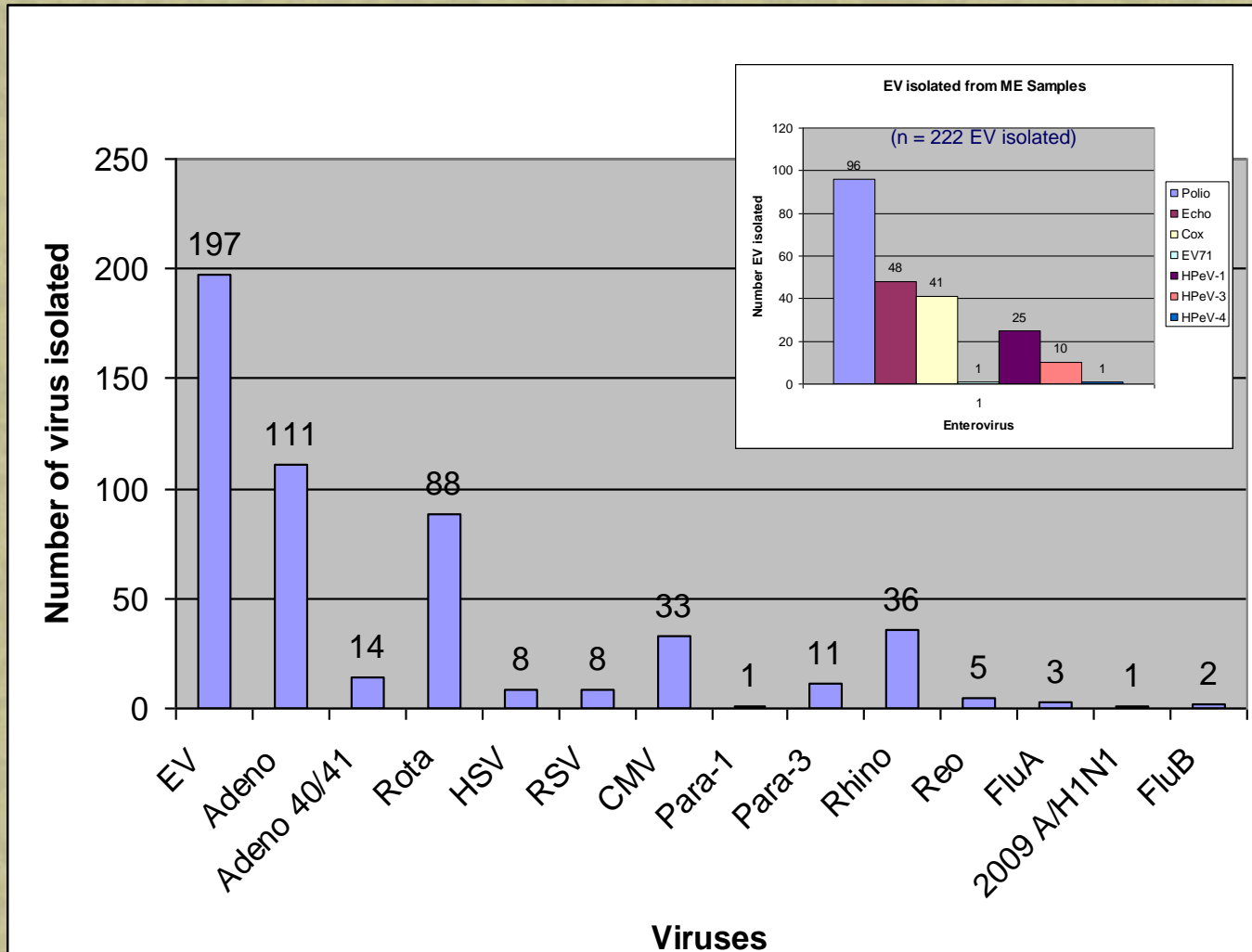
Propane testing: State Lab
Asbestos testing: City of Milwaukee Lab



Medical Examiner - Specimens for Viruses

MHDL1987 - 2010

(n = 518 virus isolated: 2279 samples)



Infant deaths associated with human parechovirus infection in Wisconsin.

- **Clin Infect Dis. 2010 Feb 1;50(3):357-61.**
- **Infant deaths associated with human parechovirus infection in Wisconsin.**
- Sedmak G, Nix WA, Jentzen J, Haupt TE, Davis JP, Bhattacharyya S, Pallansch MA, Oberste MS.
- Virology and Molecular Science Laboratory, City of Milwaukee Health Department, Madison, Wisconsin, USA.
- Comment in:
- **Abstract**
- **BACKGROUND: From December 1987 through August 2004, lung tissue, nasopharyngeal swabs, and colon swab specimens obtained during 1263 autopsies of infants and young children were examined to assess the role of viruses in deaths of children aged <2 years.**

Relative contributions to recreational water pollution ?

Research Collaborations: UWM – Racine Health Department – MMSD - MHDL



Gulls



Canadian Geese



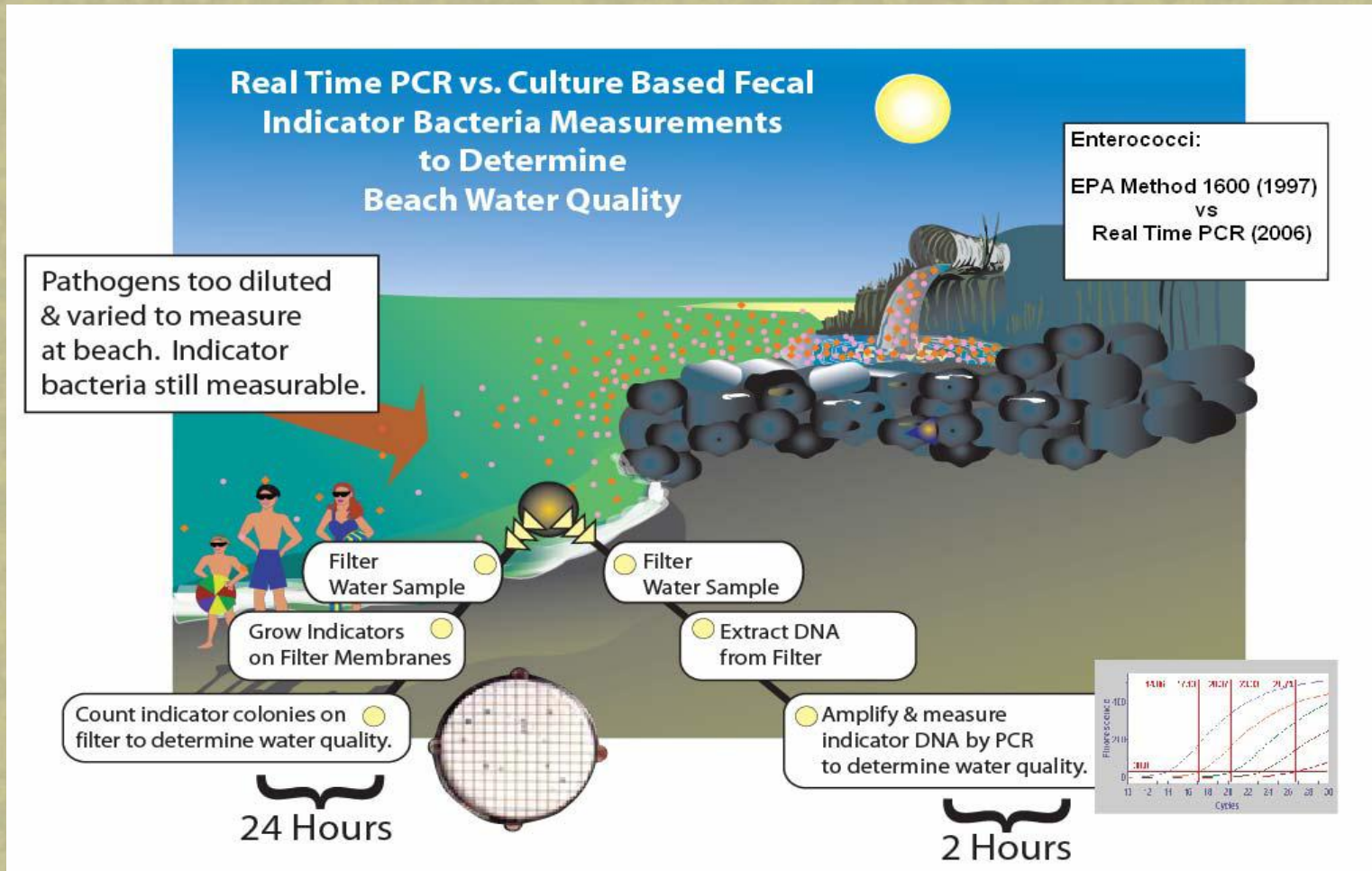
Algae



Outfalls

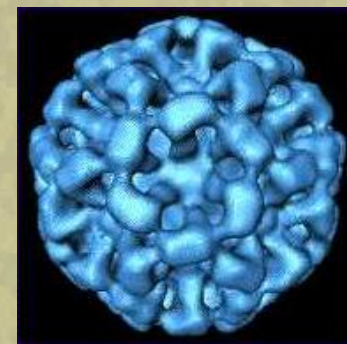
WSLH-MHDL-UWM-RHD

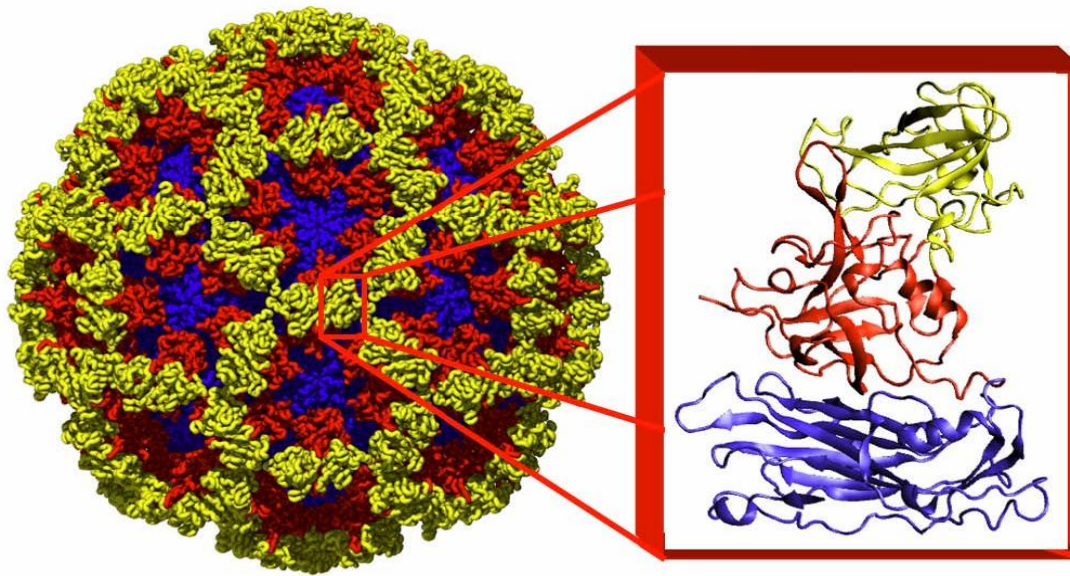
EPA Validation Study of Rapid Method – "qPCR" Water Quality – Milwaukee Beaches



Milwaukee Norovirus: Local Outbreaks

- **Wedding dinner 206 attended**
- **>20 ill following day**
- **Outbreak investigations (ave.5-8/yr)**
 - **Long term care facilities**
 - **Hospital clusters**





National Norovirus Outbreak Network

CaliciNet

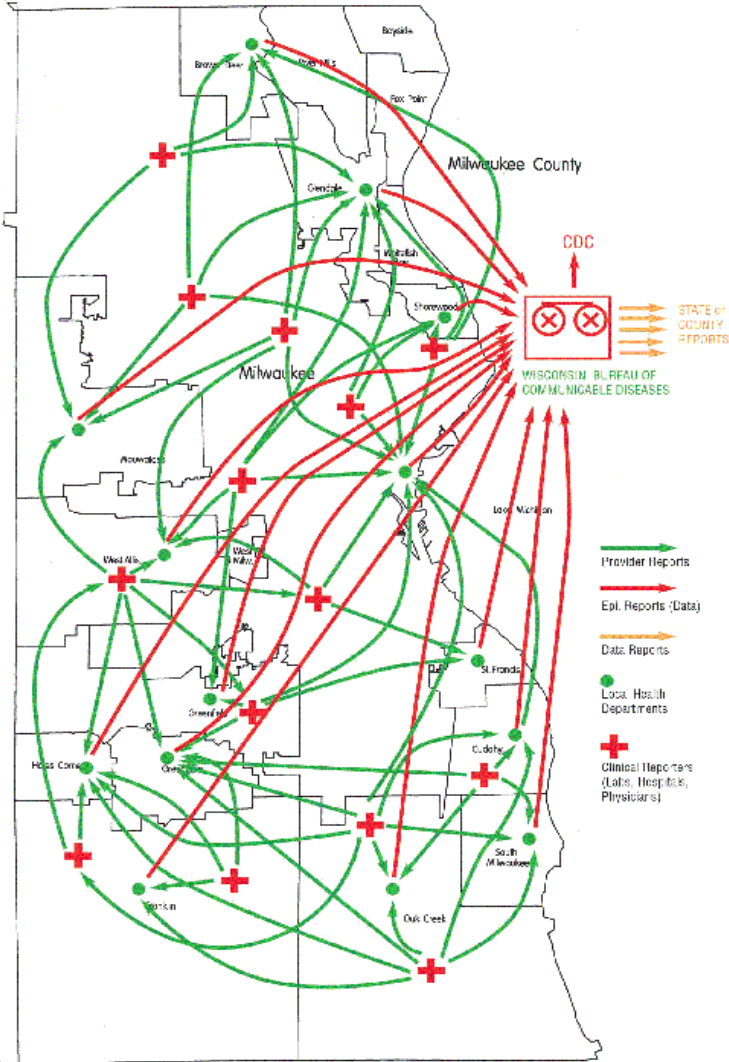


- Improve surveillance of Norovirus (Sapovirus, other GI viruses)
- Allow for real-time data exchange at the state and national level
- Rapid genotyping and compare Norovirus sequences
- Link geographically different clusters of illness to a common (food) source
- Facilitate the identification of new emerging Norovirus strains

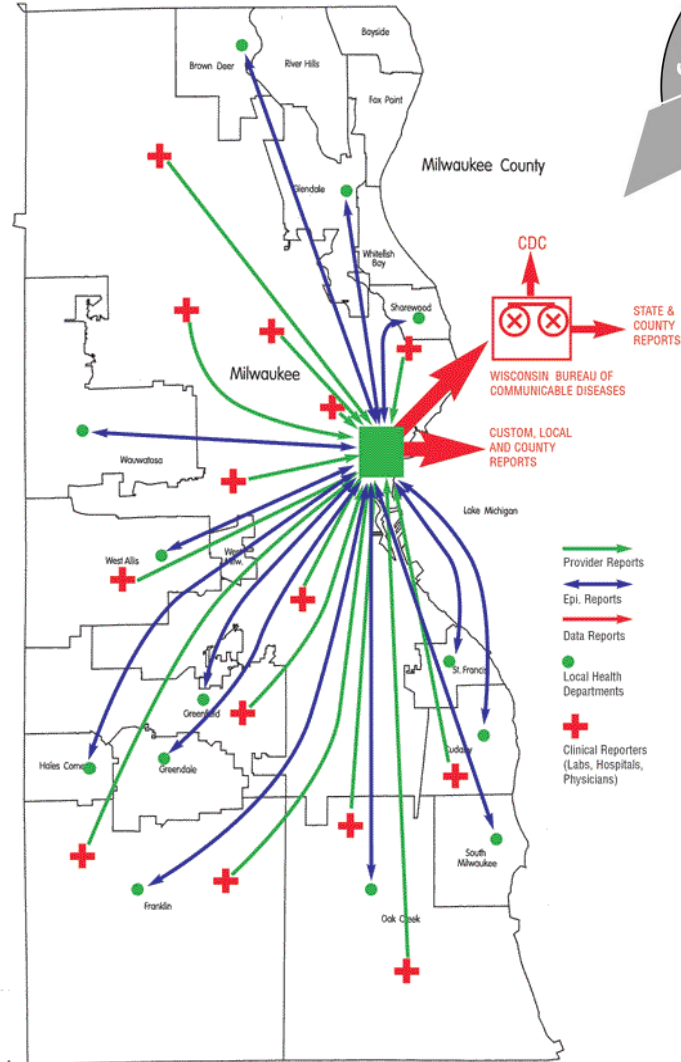
19 Agencies: Reportable Diseases through MHD

The Wisconsin Electronic Disease Surveillance System (WEDSS)

BEFORE SURVNET



AFTER SURVNET



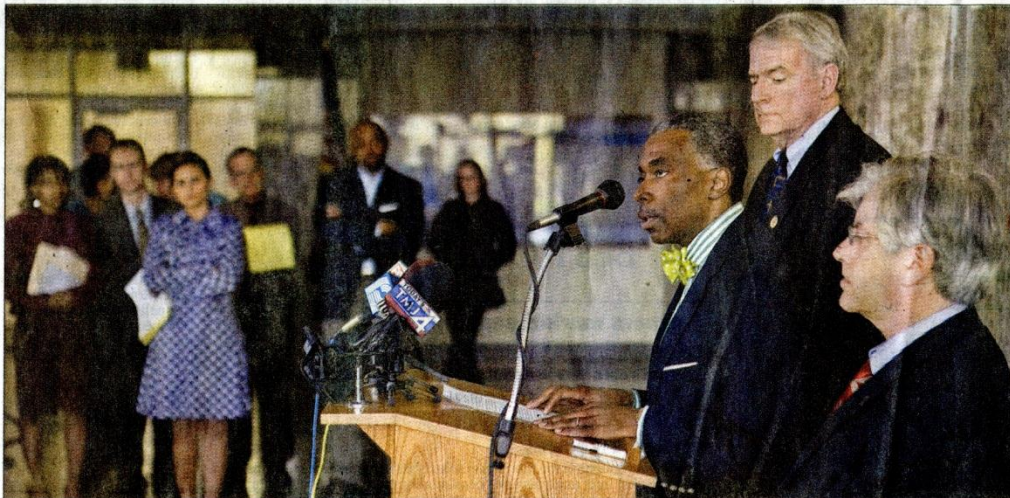
The MHDL Public Health *e* Lab Network of metro-Milwaukee *since 1998*

- Messaging tool to stakeholders
- Monthly report of confirmed infections
- Laboratory surveillance tool
 - Respiratory, enteric, foodborne
- Emergency preparedness information
- Continuing education

Electronic Lab Reporting to 25 Sites

- 5 – MHD in-house sites with auto-printed reports: Lead, CD, DNS
- 3 – MHD off-site locations receiving auto-printed reports: 2-STD, TB
- 8 – area clinical labs receiving electronic reports.
- 1- Milw. Co. Med. Examiner
- 1- Commercial Lab
- 5 - Surveillance sites: Marquette, UW-Milwaukee, local STD clinics
- 2 - State agencies receiving reports: STDs to WSLH for Region 5 Infertility & ELR to WSLH-WEDSS (twice /day)

Global flu pandemic imminent; first likely cases found in state



TOM LYNN / JOURNALSENTINEL.COM

"Our goal is to minimize the spread of disease in this community," said Milwaukee Health Commissioner Bevan K. Baker (speaking) Wednesday at the Zeidler Municipal Building in downtown Milwaukee. Seth Foldy (right), state Public Health Administrator, and Mayor Tom Barrett announced the closing of four Milwaukee schools.

City closes four schools; caution urged

By RYAN HAGGERTY, SUSANNE RUST and GEORGIA PABST
rhaggerty@journalsentinel.com

Three probable cases of swine flu were identified in Wisconsin on Wednesday, including two in Milwaukee, prompting officials to close four city schools indefinitely as global health authorities warned that the virus could soon become a pandemic.

One adult and one child in Milwaukee are believed to have swine flu, Bevan K. Baker, the city's health commissioner, said during a news confer-

ence Wednesday.

The adult and child are not related, Mayor Tom Barrett said.

A third probable case was identified in Adams County, according to state health officials.

As of Wednesday, the state reported it has submitted 144 suspected cases for testing, 41 came out negative, 100 were pending and the three were listed as probable.

A number of children with connections to the two Milwaukee cases are exhibiting symptoms of swine flu,

Baker said. Those children attend various Milwaukee Public Schools and are being monitored by health professionals, Baker said.

"Our goal is to minimize the spread of disease in this community," Baker said.

Officials did not identify any of the people who may have swine flu, provide information on their conditions, or say whether they had been hospitalized or quarantined.

Please see **FLU, 6A**

Four schools close

Staff and nearly 3,400 students attending four Milwaukee schools were told to stay home following the news that two probable cases of swine flu were detected in Milwaukee.



Journal Sentinel

Swine flu extras

Go to jsonline.com for:

- Video of Wednesday's news conference.
- An interactive map and timeline showing the flu's spread and worldwide response.
- Local flu updates in NewsWatch.
- Worldwide updates from the wires.
- Advice for employers.

► **Mexico:** Some must travel. **7A**

► **H1N1:** Strain shows signs of being less deadly than others. **7A**

► **No sports:** Texas, Mexico postpone events. **7C**

KEY DEVELOPMENTS

Deaths: 168 in Mexico, eight confirmed and the rest suspected. One confirmed in U.S., a nearly 2-year-old boy from Mexico who died in Texas.

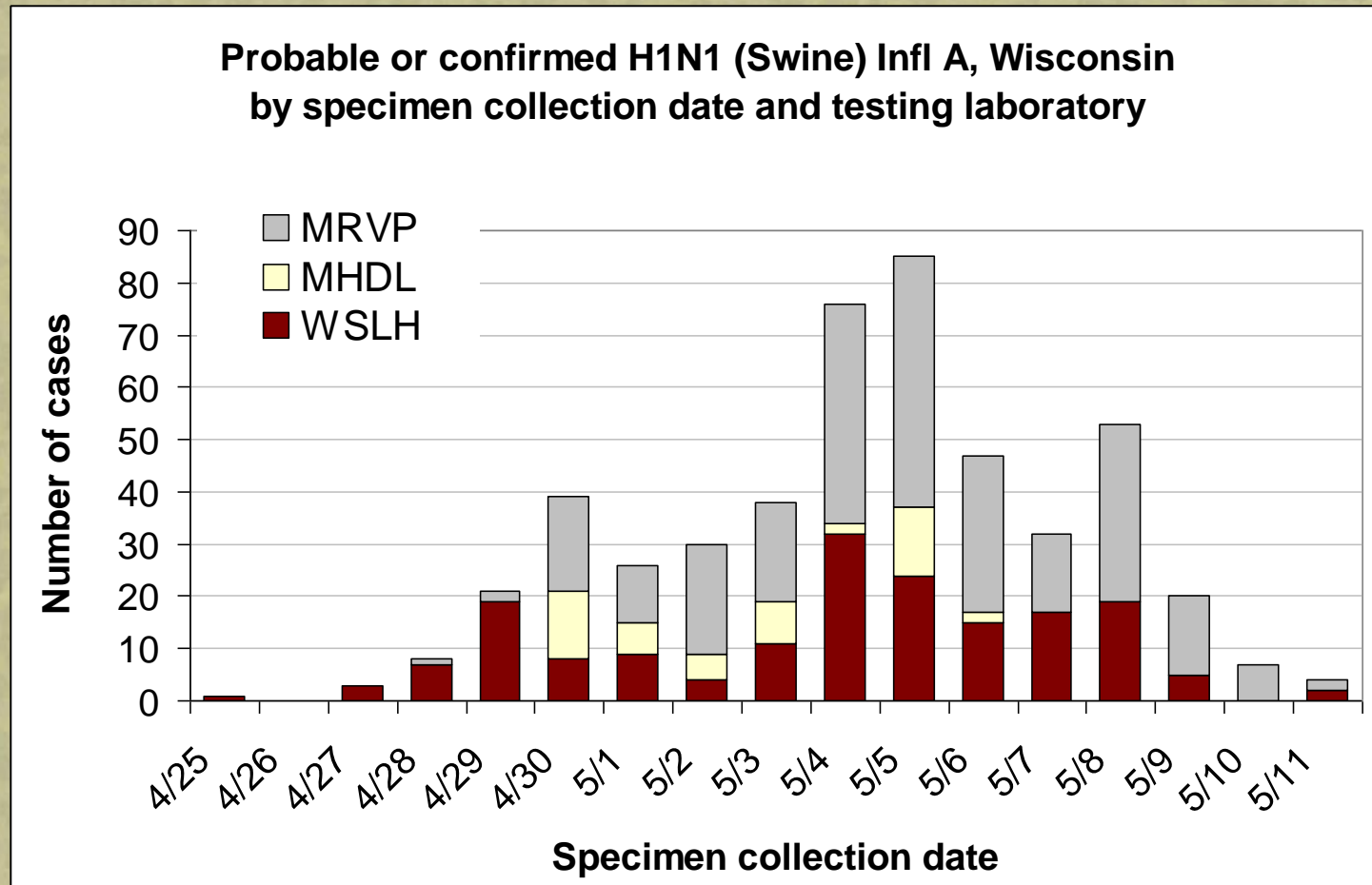
Sickened: 2,498 suspected and 91 confirmed in Mexico; at least 93 confirmed in U.S., 19 in Canada, 13 in New Zealand, five in Britain, four in Germany, 10 in Spain, two in Israel, one in Austria.

Global alert: World Health Organization raises pandemic alert to second highest level.

Story on 6A

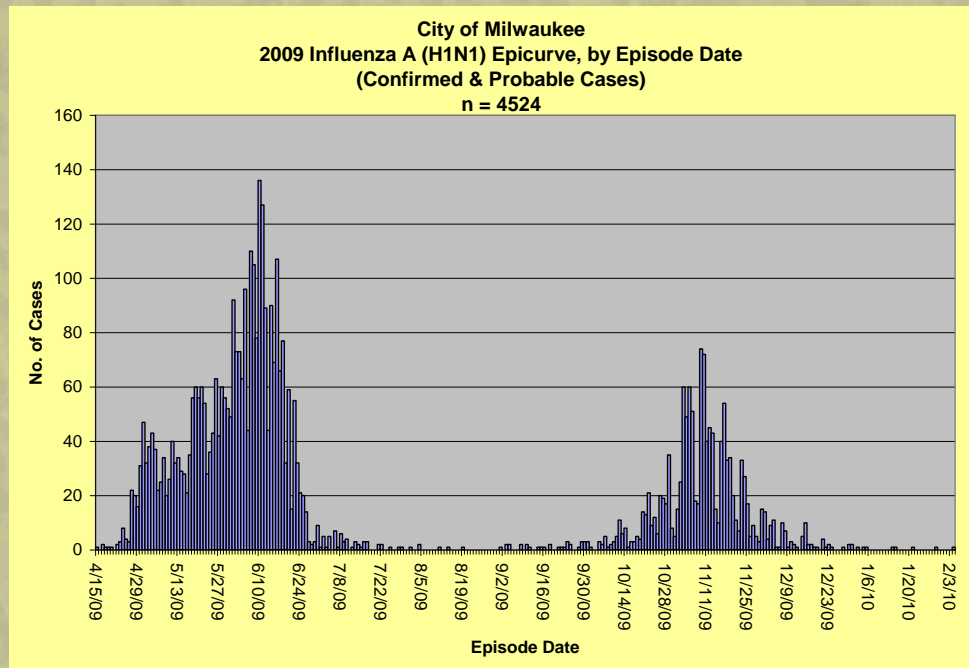
H1N1: Partnerships to Handle Laboratory Surge Capacity in SE Wisconsin

3 Confirmatory Labs



Total MHDL RT-PCR for H1N1

- 42 providers coordinated w WSLH
- April '09- Apr.'10: 5,804 tests
- 1,663 (28.6%) positive



Workforce Development MHDL Internships with Academic Partners

2009-2010 Interns @ MHDL

Alverno

UWM

Cardinal Stritch



The Beginning.....

CLOSING REMARKS

The Assessment Process

- Orient to process
- Review & discuss
 - Capture issues to address later
 - Gain consensus responses
- Input responses
 - For each ES identify the top 1-3 next steps
- Discuss results & evaluate process
- Summarize next steps

Sample of the Tool

- **Essential Service: 7 Link people to needed personal health services and assure the provision of healthcare when otherwise unavailable**
 - **Intent: Members of the Local Public Health Laboratory System work to assure access to laboratory services to people in the community, especially when services are otherwise unavailable. To accomplish this, system members establish processes to identify laboratory services that are needed, and collaborate within the system to fill any identified gaps.**

Note: terms underlined in the instrument are defined in the Assessment Glossary

Sample of the Tool

- **Indicators: Availability of Laboratory Services**

- **The LPH Laboratory System Model Standard: The LPH Laboratory System collaborates to assure access to laboratory services. To accomplish this, the LPH Laboratory System: identifies laboratory service needs and collaborates to fill gaps**

Note: terms underlined in the instrument are defined in the Assessment Glossary

Sample of the Tool

- **Key Ideas: 7.1.1 The LPH Laboratory System identifies laboratory service needs and collaborates to fill gaps.**
 - **Points for discussion:**
 - **Does the LPH Laboratory System:**
 - » **assess availability, accessibility and timeliness of laboratory services?**
 - » **make projections of future capacity needs?**
 - » **collaborate to fill gaps?**
 - » **seek resources to fill gaps?**
 - **Discuss questions as a group**

Laboratory System Improvement Program Rating Categories

9	1	2	3	4
No Activity	Minimal Activity	Moderate Activity	Significant Activity	Optimal Activity

No Activity	0% or absolutely no activity.
Minimal Activity	Greater than zero, but no more than 25% of the activity described within the question is met within the public health system
Moderate Activity	Greater than 25%, but no more than 50% of the activity described within the question is met within the public health system
Significant Activity	Greater than 50%, but no more than 75% of the activity described within the question is met within the public health system
Optimal Activity	Greater than 75% of the activity described within the question is met within the public health system

Things to Consider

- Discuss up front what consensus means
- “Can you live with this?”
- Remember this is NOT research
- Capture key issues to address later

A Few More Things to Consider:

- **Opposing views to consider opposite perspective**
- **Gold standard – perfection is not expected**
- **Give credit and acknowledge great work!**
- **Path for improvement**

What will be collected:

- The score for each set of questions
- Items for later follow up
- For each ES identify top 1-3 next steps and rate as to importance (immediate, high, medium, low)

Next Steps

- Results shared along with the top 1-3 next steps for each Essential Service
- Evaluation
- Summarize, briefly discuss and plan next steps

Part of a National Agenda

- Aim to have assessments in all 50 states by 2012
- Sustainable public health laboratory system assessment plan which includes an improvement component
 - Online Resource Center