

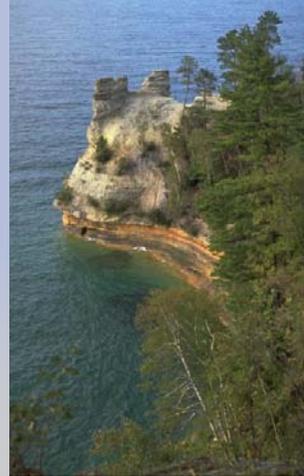
Laboratorian to the Rescue: The lab's role in foodborne outbreak detection

Moe Sullivan

Minnesota Department of Health

Public Health Laboratory
Emergency Preparedness
and Response Unit
Supervisor

June 15, 2007



Today's Outline

- ❖ Lab Subcommittee
 - Accomplishments
 - Challenges
 - Future projects
 - Ongoing efforts
- ❖ Lab role in foodborne outbreak detection



Laboratory Subcommittee

Accomplishments

- ❖ Reportable disease list
- ❖ Identified Border hospitals
- ❖ Communication guidelines



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Laboratory Subcommittee

Accomplishments

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Laboratorian to the Rescue:

As presented by Maureen Sullivan at the Great Lakes Border Health Initiative Conference, June 15, 2007.

Disease/Agent	Michigan	Minnesota	New York	Ohio	Wisconsin	Ontario	United States (CDC)
Acute Flaccid Paralysis			√ ¹⁸				
Acquired Immune Deficiency Syndrome (AIDS)	√ ^{2,3}	√ ⁷	√ ¹¹	√ ²⁴	√ ^{11,12,13,15}	√	√
Amoebiasis/ Amebiasis	√ ¹	√	√	√ ²¹	√ ^{11,12,14,15}	√	
Anthrax	√ ^{1**}	√ ^{7*}	√ ⁸	√ ¹⁹	√ ^{12,14,16}	√ [*]	√
Arboviral disease (incl. West Nile Virus, Eastern Equine Encephalitis, St. Louis Encephalitis, California-group [LaCrosse Encephalitis])	√ ¹	√	√ ⁸	√ ²⁰ (also Powassan virus disease, Western equine encephalitis virus disease and other arthropod-borne disease)	√ ^{11,12,13,15} (encephalitis/meningitis)	√ (encephalitis/meningitis and West Nile illness)	
Aseptic (viral) meningitis	√ ¹	√	√ ¹⁸	√ ²⁰	√ ¹¹ (other than arbovirus)	√	
Avian Influenza	√ ¹	√	√ ¹⁸				
Babesiosis		√	√		√ ^{11,13,15,16}		
Blastomycosis	√ ¹	√	√ ¹⁸	√ ²³	√ ^{11,13,15}		
Botulism	√ ^{1**}	√ [*]	√ ⁸	√ ¹⁹ foodborne √ ²¹ wound, infant	√ ^{12,15} √ ^{12,13,15,16} (infant)	√ [*]	√ foodborne, infant, other
Brucellosis	√ ¹	√ ^{7*}	√ ⁸	√ ²¹	√ ^{11,12,15}	√ [*]	√
BSE (bovine spongiform encephalopathy)	Reportable to the Michigan Department of Agriculture		√ ¹⁸				
Campylobacter enteritis	√ ¹	√ ⁷	√	√ ²¹	√ ^{11,14,15}	√	

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COMMUNICABLE DISEASE TABLE FOOTNOTES

Michigan Communicable Disease footnotes:

- ¹ Immediate report requested, reporting within 24 hours of discovery or diagnosis is required.
- ² Report as soon as possible, reporting within 7 days of discovery or diagnosis is required.
- ³ Required to be reported on a special form supplied by local health departments.
- ⁴ Report weekly aggregate counts.
- ⁵ Report as soon as possible, reporting within 3 days of diagnosis or discovery is required.
- ** Category A Bioterrorism agent, please notify the MDCH Laboratory: (517) 335-8063

Minnesota Department of Health footnote:

All diseases are to be reported within one working day unless otherwise noted.
⁷ Submission of clinical materials required. Submit isolates, or if an isolate is not available, submit material containing the infectious agent in the following order of preference: a patient specimen; nucleic acid, or other laboratory material.
 Should be reported to the MDH immediately by telephone.

New York State Department of Health footnotes:

- ⁶ Immediately reported by phone to local or city health department in which patient resides.
- ⁹ Creutzfeldt-Jakob disease (and suspicion of) should be reported directly to the New York State Department of Health Alzheimer's disease and Other Dementias Registry
- ¹⁰ New York City only.
- ¹¹ Must be reported directly to the New York State Department of Health, not the local health department.
- ¹⁸ While individual cases of some diseases are not reportable, a cluster or outbreak of any communicable disease is a reportable event.

Wisconsin Department of Health and Family Services footnotes:

- I Immediate report to local health officer and written report within 24 hours of identification of case or suspected case is required.
- II Report to local health officer within 72 hours of identification of a case or suspected case in required. Public health intervention is expected.
- III Report to state epidemiologist within 72 hours of identification of a case or suspected case is required.

Laboratory Subcommittee

Reportable Disease Rules

- ❖ Importance
 - Mandates Statewide surveillance program for agents of public health significance
 - Requires isolate submission
 - Utilized for outbreak investigation
 - Connection to clinical labs
 - Timeliness of submission is important
- ❖ Challenges
 - Not all states have same reportables



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Laboratory Subcommittee

Accomplishments

- ❖ Reportable disease list
- ❖ Identified Border hospitals
- ❖ Communication guidelines



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Minnesota Laboratory System



An integrated network of public and private clinical laboratories working together to protect and improve the health of all Minnesotans



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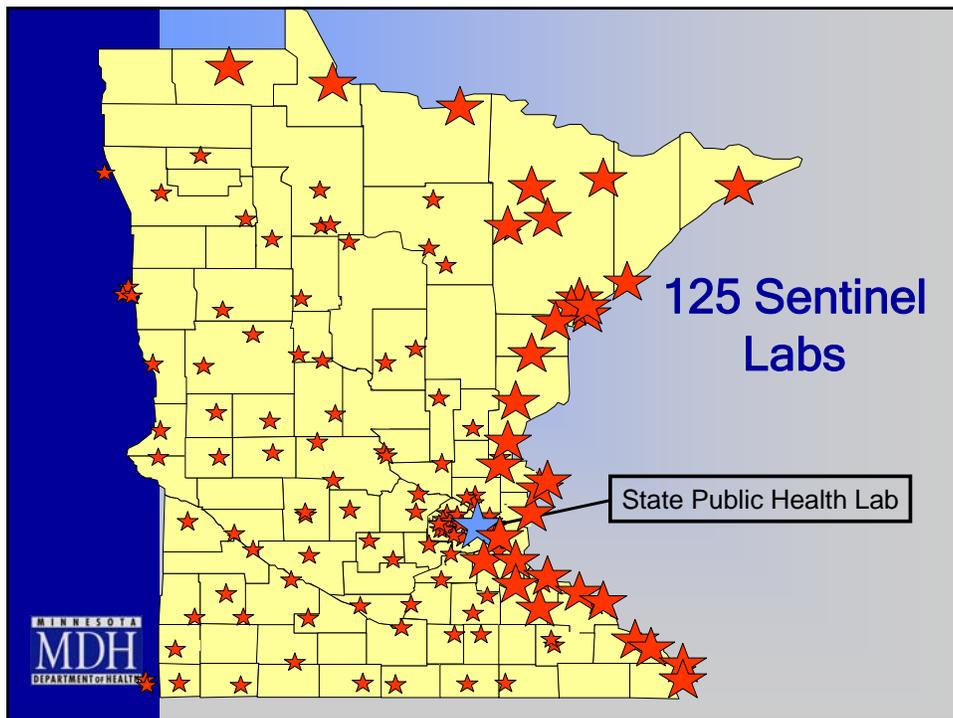
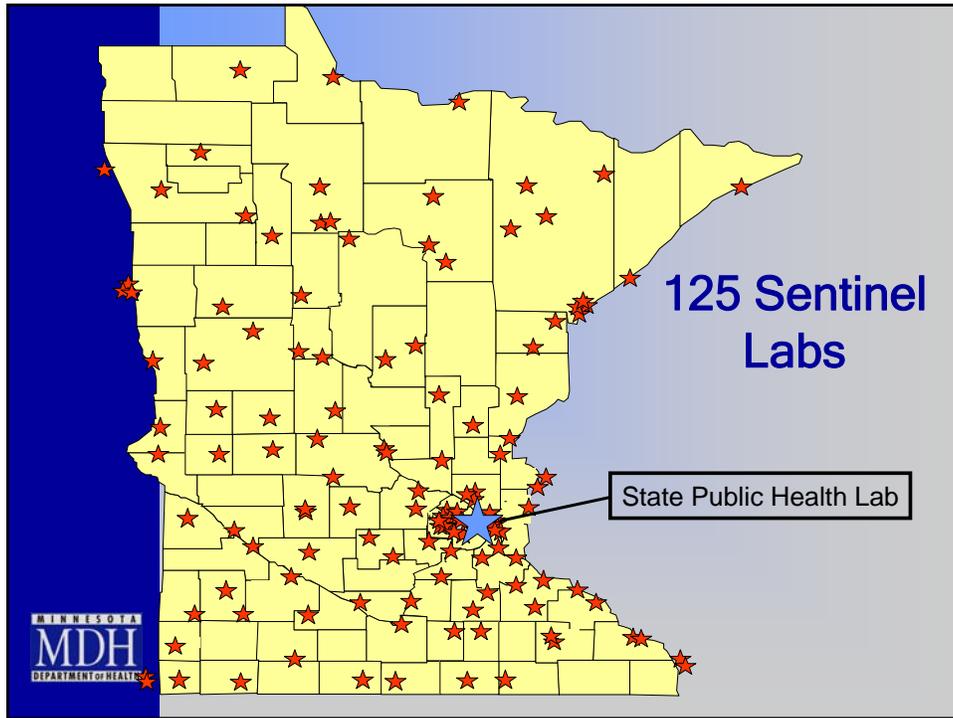
MLS Lab Connections

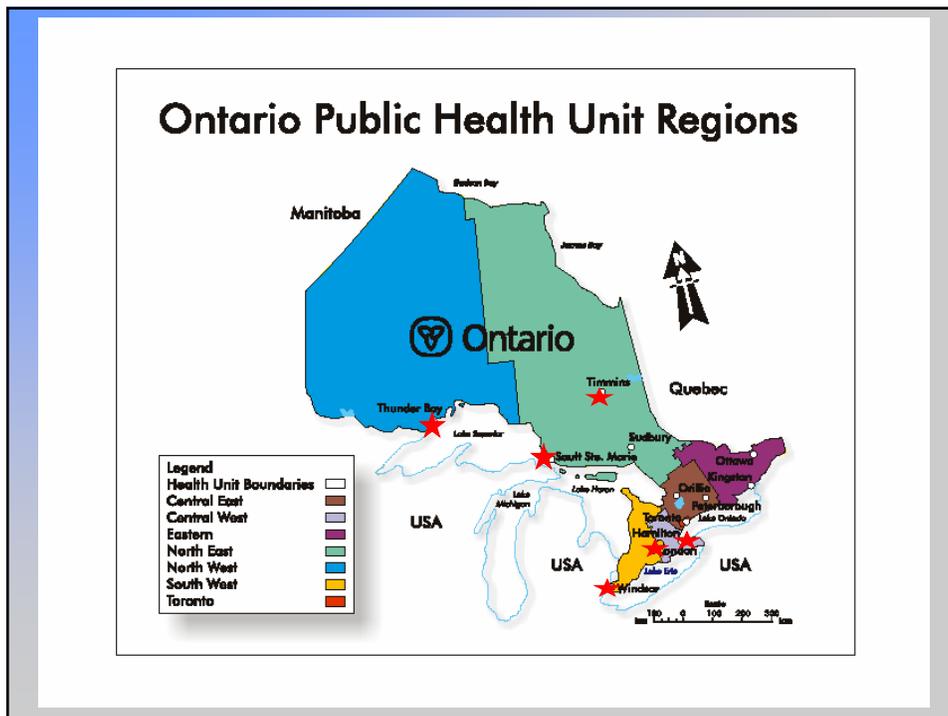
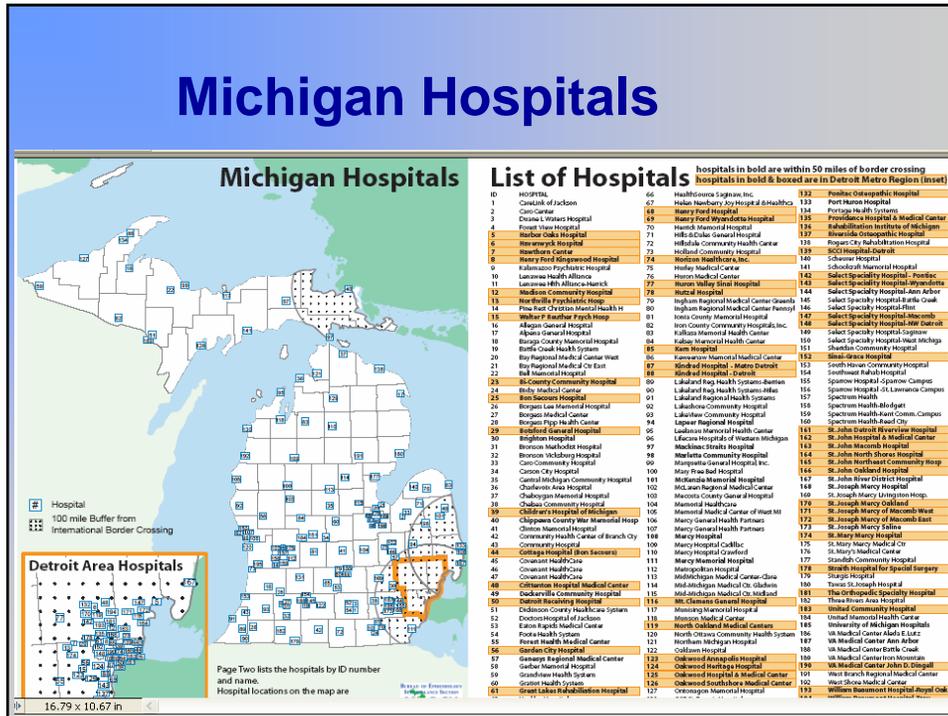
Quality Practice & Collaboration

- Anti-Microbial Resistance
- Emerging Infectious Disease
- Infectious Disease Outbreaks
- Food Borne Outbreaks
- Chemical Terrorism
- Bio-Terrorism

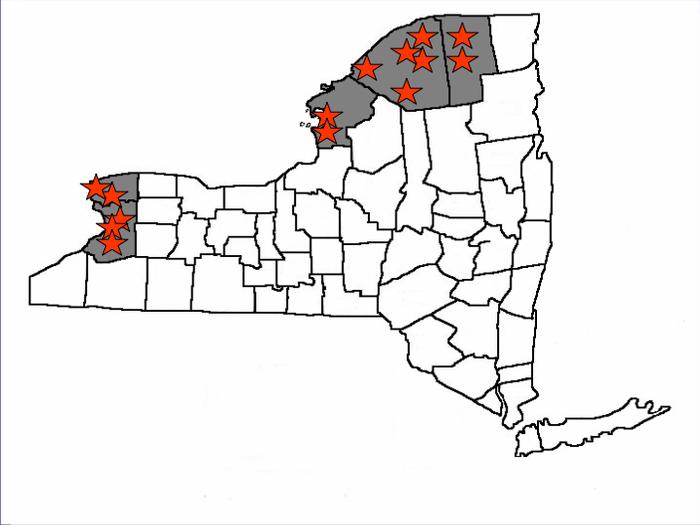


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New York State Cross Border Counties



A map of New York State with county boundaries. The counties along the western border with Minnesota are shaded in grey. Red stars are placed on the following counties: Hamilton, Warren, Rensselaer, Schoharie, and Albany in the north; and Fulton, Hamilton, and Warren in the west.

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Laboratory Databases

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- ❖ Each state notifies their own clinical laboratories during an event
- ❖ Each state maintains own database of clinical laboratories

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Laboratory Subcommittee

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- ❖ Reportable disease list
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- ❖ Communication guidelines



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Michigan Department of Community Health
MDCH
Jennifer M. Granholm, Governor
Janet Olaszewski, Director

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 **Ontario**
Ministry of Health and Long-Term Care
Ministère de la Santé et des soins de longue durée

DOH
STATE OF NEW YORK
DEPARTMENT OF HEALTH

**GREAT LAKES
BORDER HEALTH INITIATIVE**

*Infectious Disease Emergency
Communications Guideline*

PARTNERS

- Michigan Department of Community Health*
- Minnesota Department of Health*
- Ontario Ministry of Health and Long-Term Care*
- New York State Department of Health*
- Wisconsin Division of Public Health*
- Local and tribal units bordering Ontario*

Laboratory Subcommittee

Communication guidelines

- ❖ Notification decision tree
- ❖ State and providence specific 24/7 notification guidelines
- ❖ Disease reporting rule
- ❖ Epi data sharing across borders

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Challenges

- ❖ Legal issues
- ❖ Transport issues
- ❖ Time constraints
- ❖ Travel restrictions

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Future projects

- ❖ Explore surge capacity
- ❖ Site visits
- ❖ Regional drill/exercise



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Laboratory Subcommittee

Ongoing efforts

- ❖ LRN membership
- ❖ Communications/Health Alerts



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Laboratory Subcommittee

Ongoing efforts

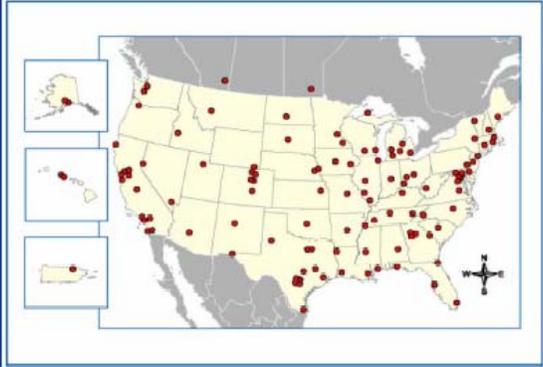
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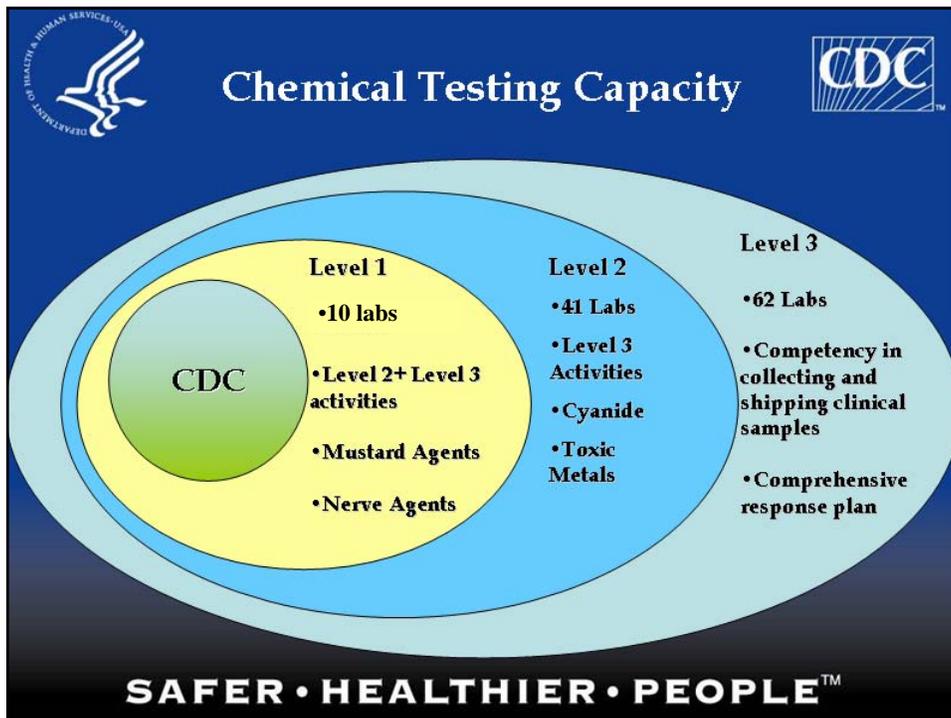
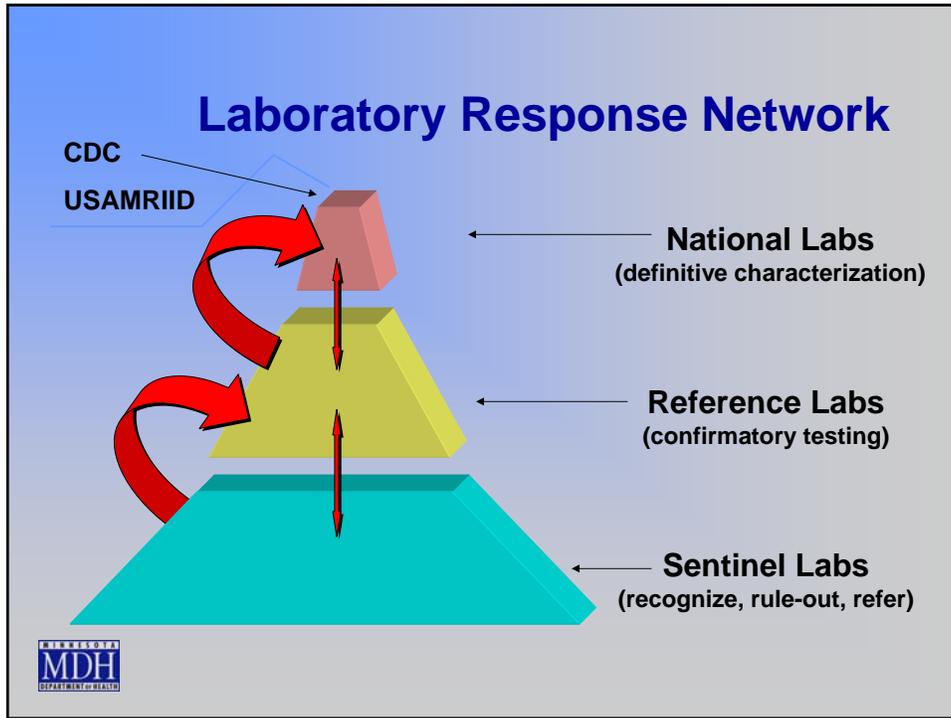


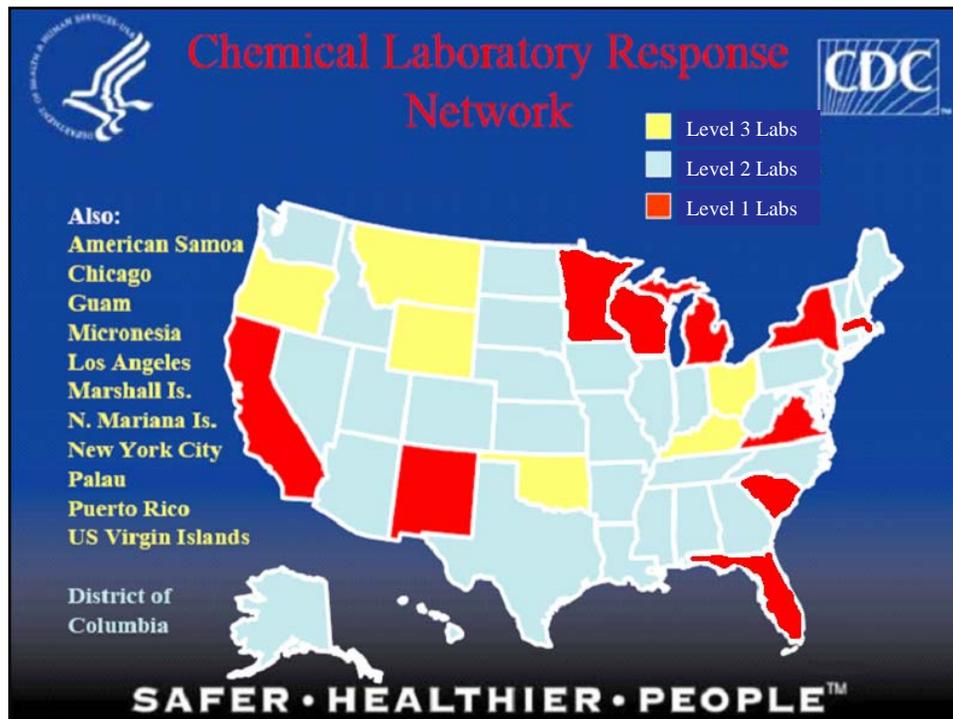
The Laboratory Network



- More than 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.

SAFER • HEALTHIER • PEOPLE™





Laboratory Response Network

Essential Features

- ❖ Three-tiered network of collaborating labs
- ❖ Exclusive use of validated, standard test methods
- ❖ Training and Proficiency program
- ❖ Secure communications and results reporting
- ❖ Data flows through State Health Departments
- ❖ State PHL serves as primary lab to contact
- ❖ Controlled expansion of confirmatory lab capacity

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Ongoing efforts

Laboratory Subcommittee

- ❖ LRN membership
- ❖ Communications/Health Alerts



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From: WebMaster CFIA <CFIAMaster@INSPECTION.GC.CA> 11/14/06 6:06 PM
To: <FOODRECALLS_RAPPELSALIMENTS@www.agr.gc.ca>
Subject: 20061114 - HEALTH HAZARD ALERT (salmonella) / DANGER POUR LA SANTÉ (salmonella)

Le texte français suit le texte anglais.

UPDATED HEALTH HAZARD ALERT - CHOCOLATE COATED ALMONDS PURCHASED AT HERSHEY'S SMITHS FALLS CHOCOLATE SHOPPE MAY CONTAIN SALMONELLA BACTERIA

OTTAWA, November 14, 2006 - The public warning issued on November 12, 2006 has been updated to include additional information.

The Canadian Food Inspection Agency (CFIA) and Hershey Canada Inc. are warning the public not to consume chocolate-coated almonds purchased in bulk only at Hershey's Smiths Falls, Ontario Chocolate Shoppe. These chocolate-coated almonds may be contaminated with Salmonella.

The affected product was sold in bulk by weight between October 23 and November 10, 2006. This product was not included in Halloween, Christmas or any type of gift pack items sold from the Chocolate Shoppe.

Consumers who may have purchased chocolate-coated almonds at Hershey's Smiths Falls, Ontario Chocolate Shoppe and are unsure of the date of purchase should not consume the product.

Hershey Canada Inc., Mississauga, Ontario, is voluntarily recalling this product from the market place.

There have been no reported illnesses associated with the consumption of this product.

Food contaminated with Salmonella may not look or smell spoiled. Consumption of a food contaminated with Salmonella may cause symptoms such as high fever, severe headache, vomiting, nausea, abdominal pain and diarrhea. Long term complications may include severe arthritis. These symptoms could be serious and life-threatening in young children, the elderly, and people with weakened immune systems.

For more information, consumers and industry may call one of the following numbers:
Hershey Consumer Relations, at 1-800-468-1714.
CFIA, at 1-800-442-2342 / TTY 1-800-465-7735 (8:00 a.m. to 8:00 p.m. Eastern time, Monday to Friday).

For information on Salmonella, visit the Food Facts web page at



NML STRAIN CHARACTERIZATION COMPLETED ON INFLUENZA ISOLATES IN CANADA
FROM SEP. 15, 2006 TO JAN. 25, 2007

INFLUENZA	PROVINCE													TOTAL
	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALTA	BC	YT	NT	NU	
TYPE A (H1N1) (see notes) A/New Caledonia/20/99-like	1	1	0	0	1	6	0	20	40	32	0	0	0	101
TYPE A (H3N2) (see notes) A/Wisconsin/67/05-like	0	0	1	0	0	83	0	4	1	10	0	0	0	99
TYPE B (see notes) B/Malaysia/2506/04-like	0	0	0	0	0	1	0	0	0	2	0	0	0	3
B/Shanghai/361/2002-like	0	0	0	0	1	0	0	0	0	2	0	0	0	3
TOTAL	1	1	1	0	2	90	0	24	41	46	0	0	0	206

Notes:

- A/New Caledonia/20/99 virus is the recommended H1N1 component for the 2006/2007 influenza vaccine.
- A/Wisconsin/67/05 is an antigenic variant of A/California/07/04 and is the recommended H3N2 component for the 2006/2007 influenza vaccine.
- B/Malaysia/2506/04-like is a new antigenic variant which belongs to the B/Victoria/02/87 lineage and is the recommended influenza B component for the Northern Hemisphere 2006-2007 influenza vaccine.
- B/Shanghai/361/2002-like virus, which belongs to the Yamagata lineage, was the B component of the 2005/2006 influenza vaccine

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- ❖ Lab role in foodborne outbreak detection


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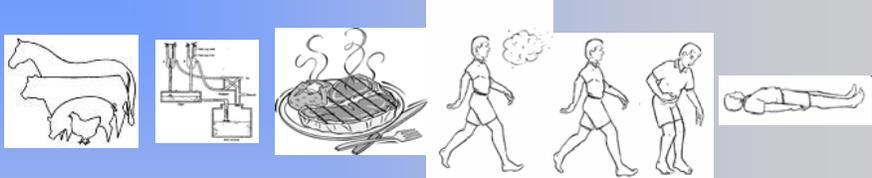
Laboratory Role in Foodborne Outbreak Detection



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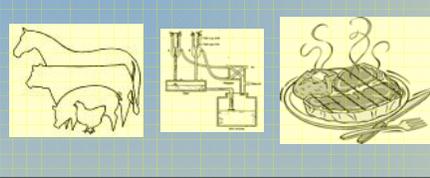
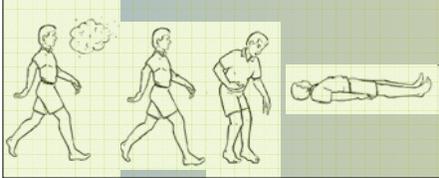
Foodborne Disease Detection Timeline



Farm Transport Processing Distribution Preparation Exposure Incubation Illness Death

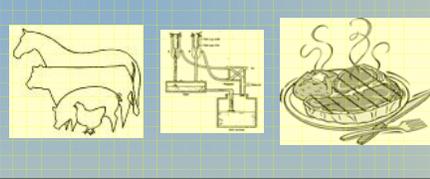
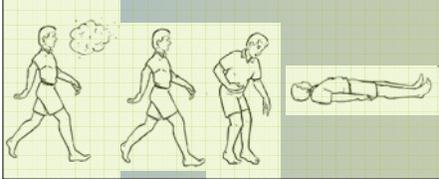
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Inherent Benefits / Limitations

Farm-to-table food safety	Human disease surveillance
	
<ul style="list-style-type: none">• Primary prevention• Faster detection	<ul style="list-style-type: none">• Secondary prevention only• Slower detection



Inherent Benefits / Limitations

Farm-to-table food safety	Human disease surveillance
	
<ul style="list-style-type: none">• Primary prevention• Faster detection• Sensitivity generally low	<ul style="list-style-type: none">• Secondary prevention only• Slower detection• Sensitivity generally high



Sensitivity Issues

	Human disease surveillance	Food pathogen surveillance
Denominator	280 <u>million</u> people	356 <u>billion</u> lbs food/yr*
Selection	Self selection	By risk or control point
Agent Distribution	Generally homogeneous	Uneven
Contamination introduction points	Mouth	Many

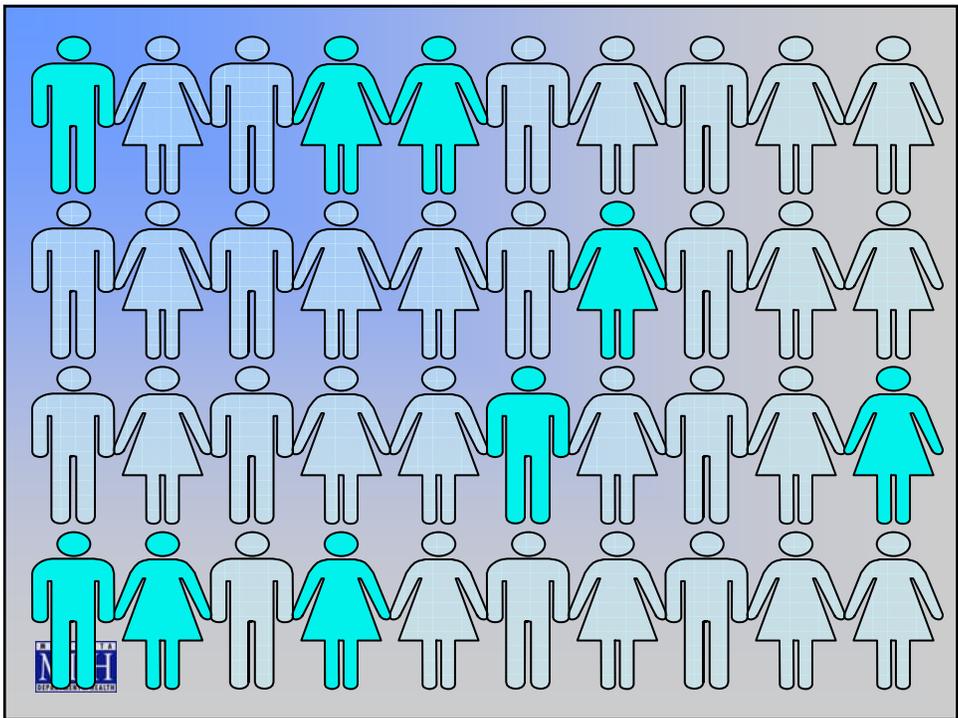
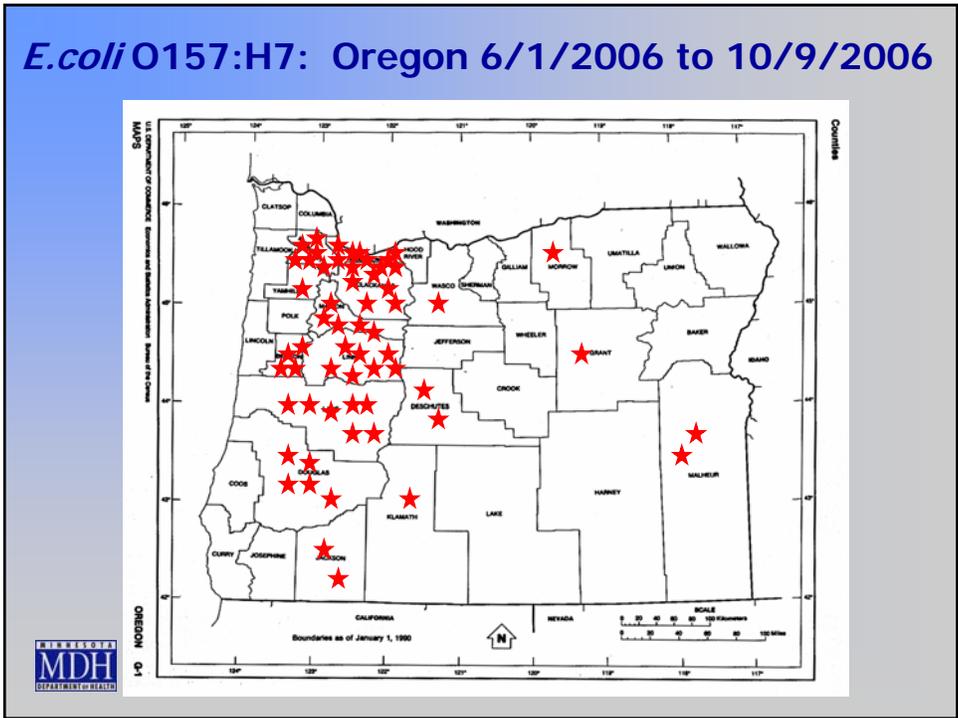


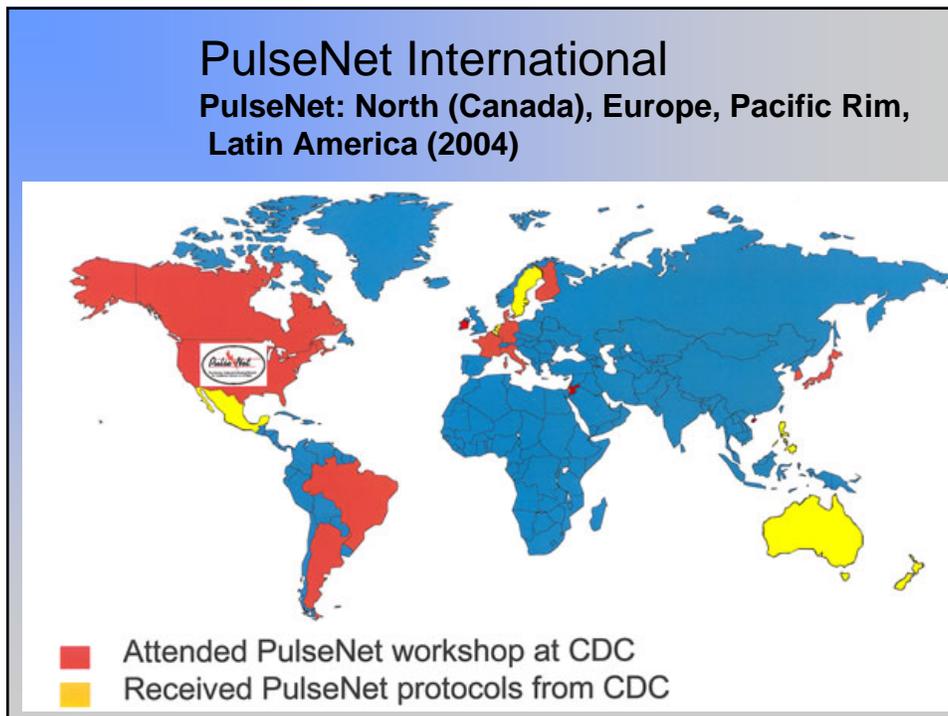
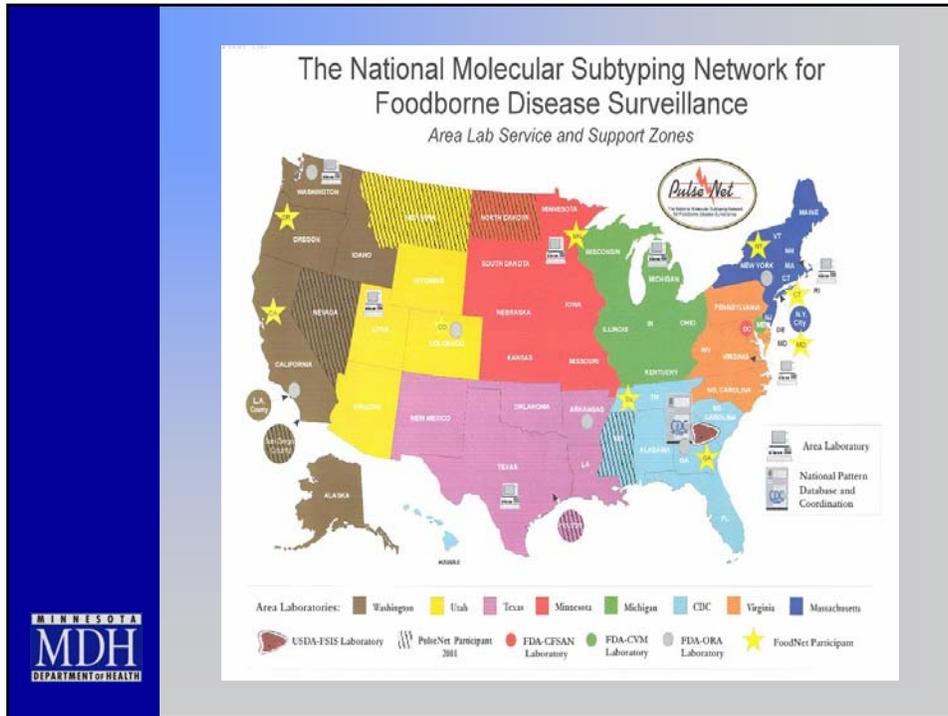
*1997 data; <http://www.ers.usda.gov/publications/foodreview/jan1997/jan97a.pdf>

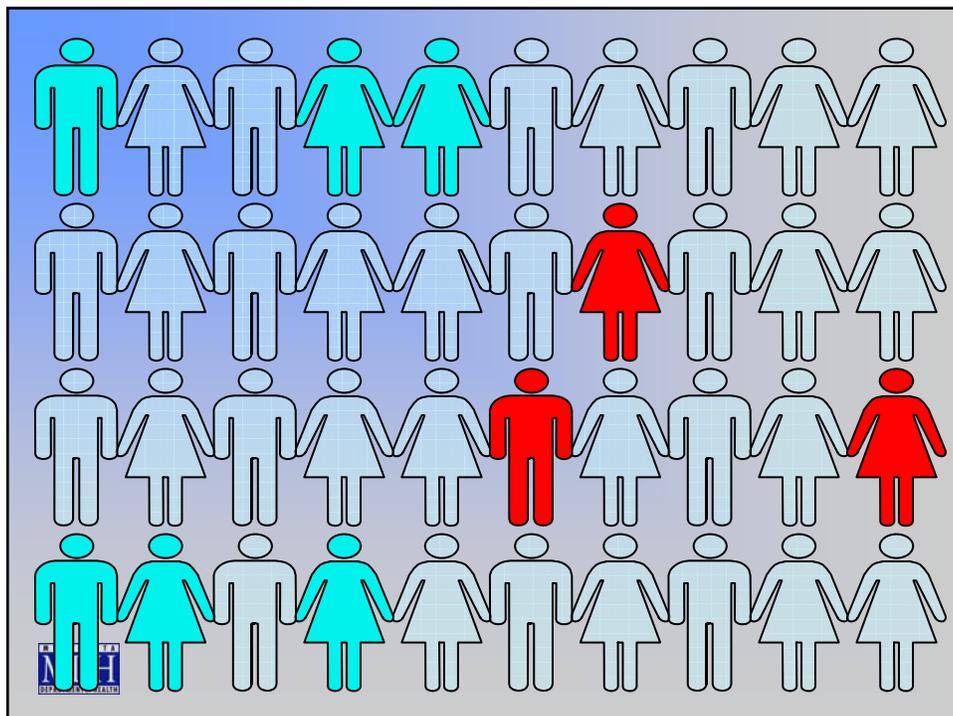
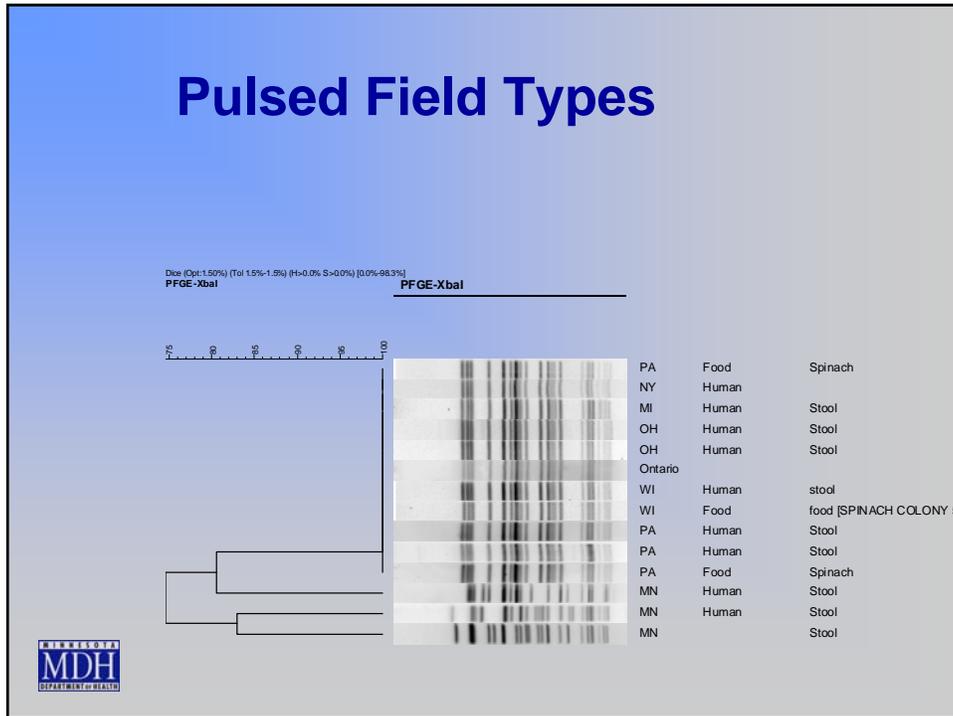
Testing Issues

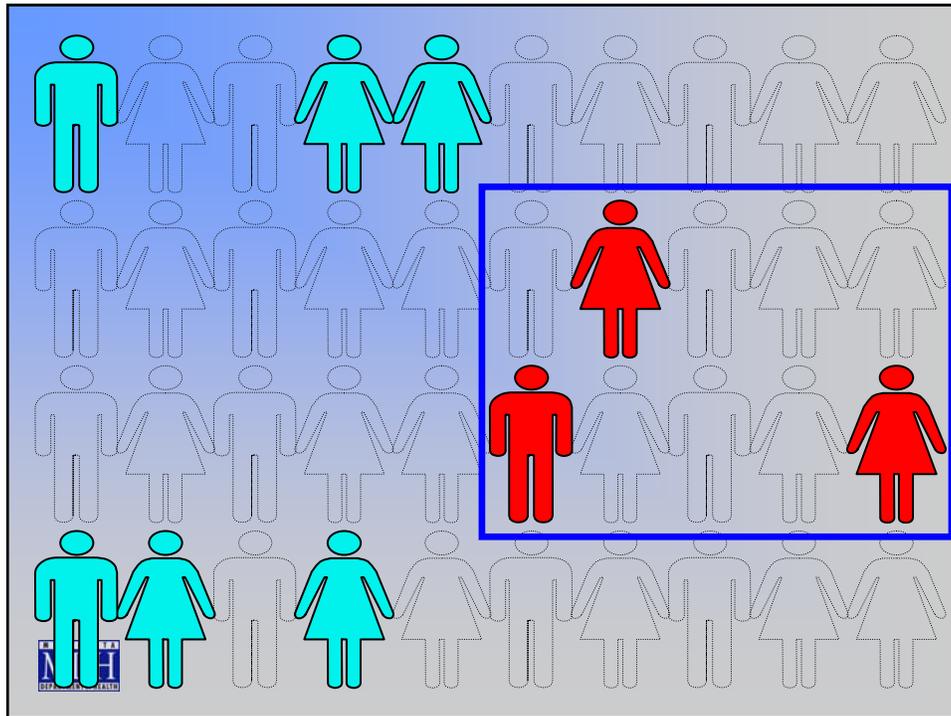
	Human disease surveillance	Food pathogen surveillance
Pathogen load	Generally high	Generally low
Matrices	Predictable	Varied, complex
Damaged (microbial) cells?	Patients taking antibiotics	Generally yes
Inhibitory substances	Few	Many











Web board announcement

The screenshot shows a Microsoft Internet Explorer browser window displaying a web board. The browser's address bar shows the URL: <http://11.161.240.96:56160/epi/our.asp>. The web board contains a table of announcements with the following data:

Topic	Created By	Created	Read Only	Moderated	No Verification	Views	Replies	Last Post
E.coli	Brenda Brown	02/01/02 11:32am	Read Only	No	No	29	294	02/09/07 12:03pm
Information about Salmonella	Brenda Brown	02/01/02 11:37am	Moderated	No	No	42	670	02/16/07 02:05pm
Listeria	Brenda Brown	02/01/02 11:38am	Read Only	No	No	7	8	02/16/07 12:48pm
Shigella	Brenda Brown	02/01/02 11:36am	Read Only	No	No	18	200	01/16/07 05:30pm
Campylobacter	Susan Hunter	03/04/02 04:07pm	Read Only	No	No	0	0	12/22/06 12:17pm
Tuberculosis	Brenda Brown	10/20/04 04:21pm	Read Only	No	No	0	0	10/20/04 04:21pm
Yersinia (Pestis (Plague))	Brenda Brown	10/21/04 07:21am	Read Only	No	No	1	1	04/17/06 05:53pm
Other Organizations	Susan Hunter	09/22/02 10:43am	Read Only	No	No	10	21	10/06/06 01:48pm
Bioluminescence	Brenda Brown	02/01/02 11:38am	Read Only	No	No	6	14	10/20/06 09:13am
Image Acquisition	Susan Hunter	03/04/02 04:03pm	Read Only	No	No	4	11	11/20/06 12:05pm
Troubleshooting PIG	Brenda Brown	05/08/02 08:21am	Read Only	No	No	4	14	01/16/07 12:07pm
Proficiency Testing/Certification	Brenda Brown	01/03/03 10:35am	Read Only	No	No	9	12	01/23/07 11:58am

The first row of the table is highlighted with a red border. The MDH logo is visible in the bottom left corner of the browser window.

Web board announcement

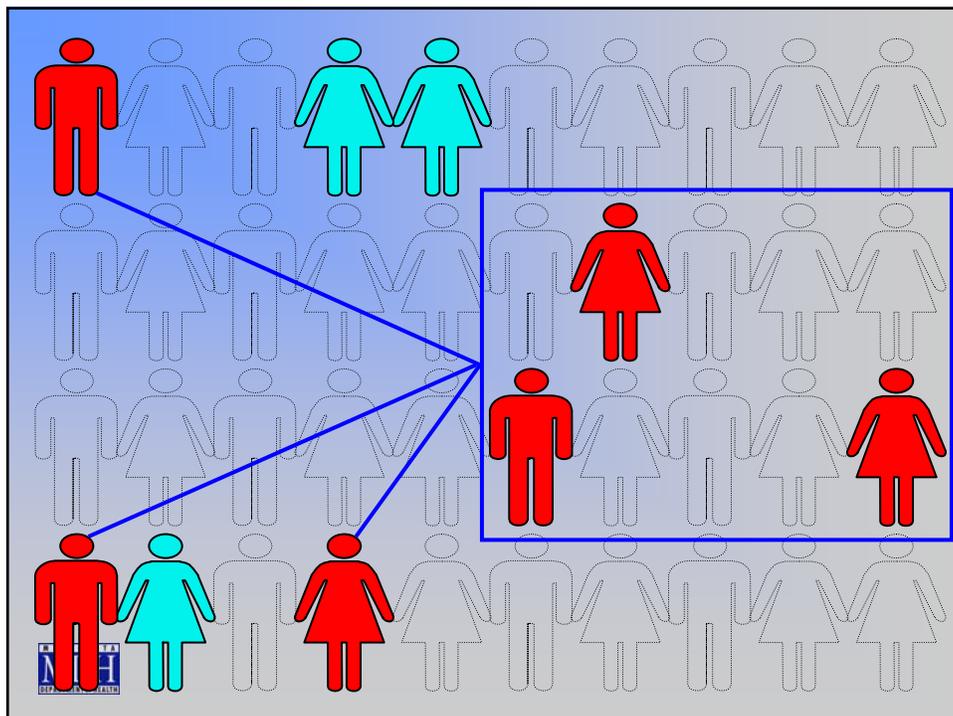
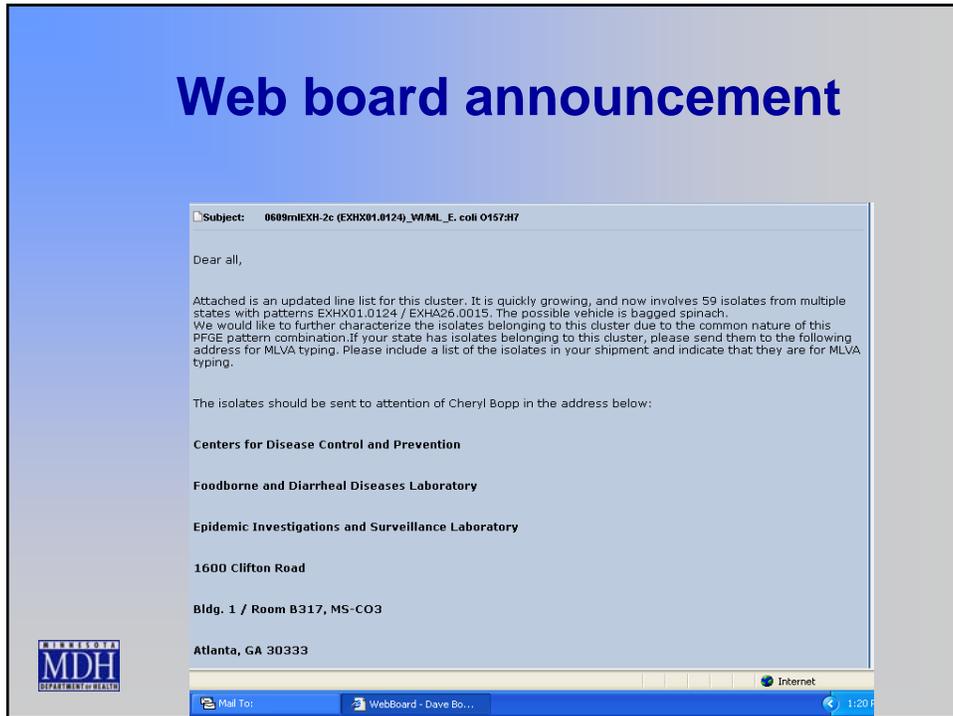
Subject: 0609mEXH-2c (EXHX01.0124)_WIML_E.coli O157:H7

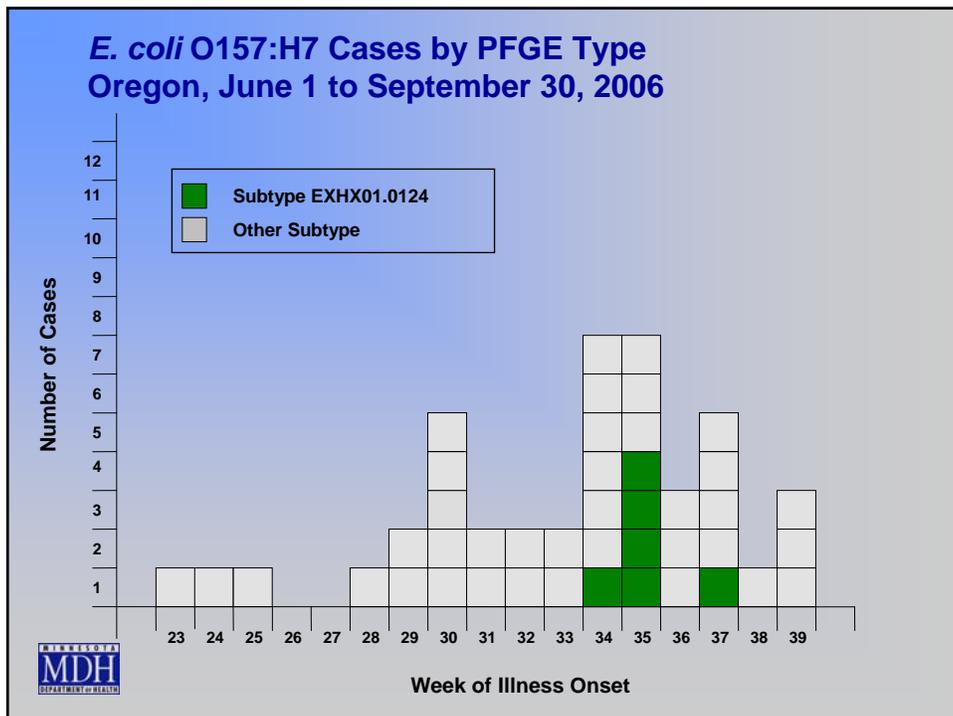
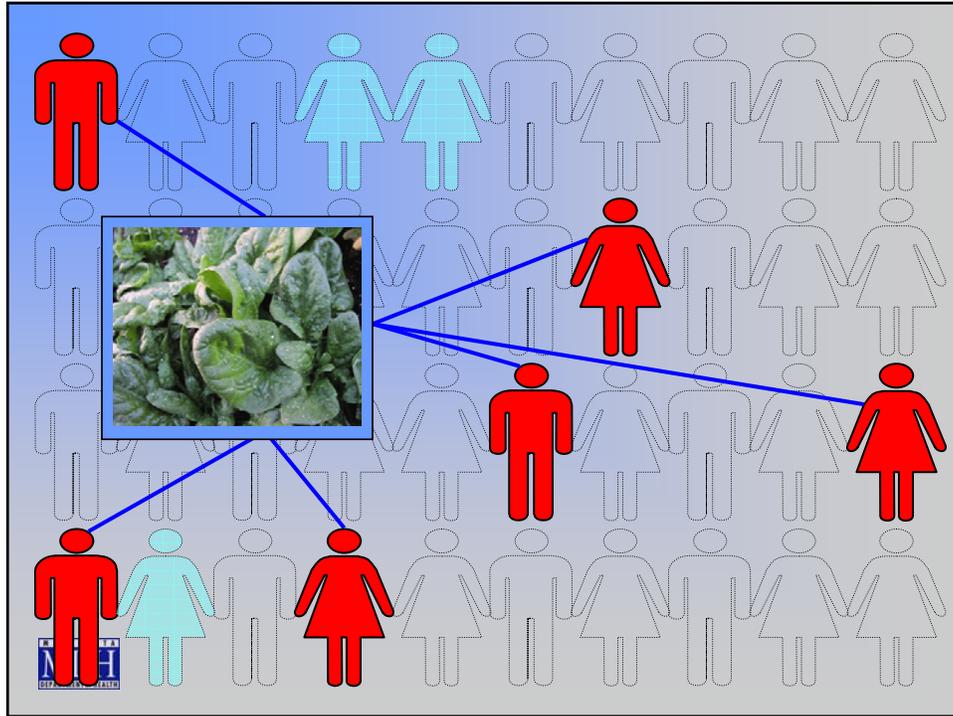
Dear all,

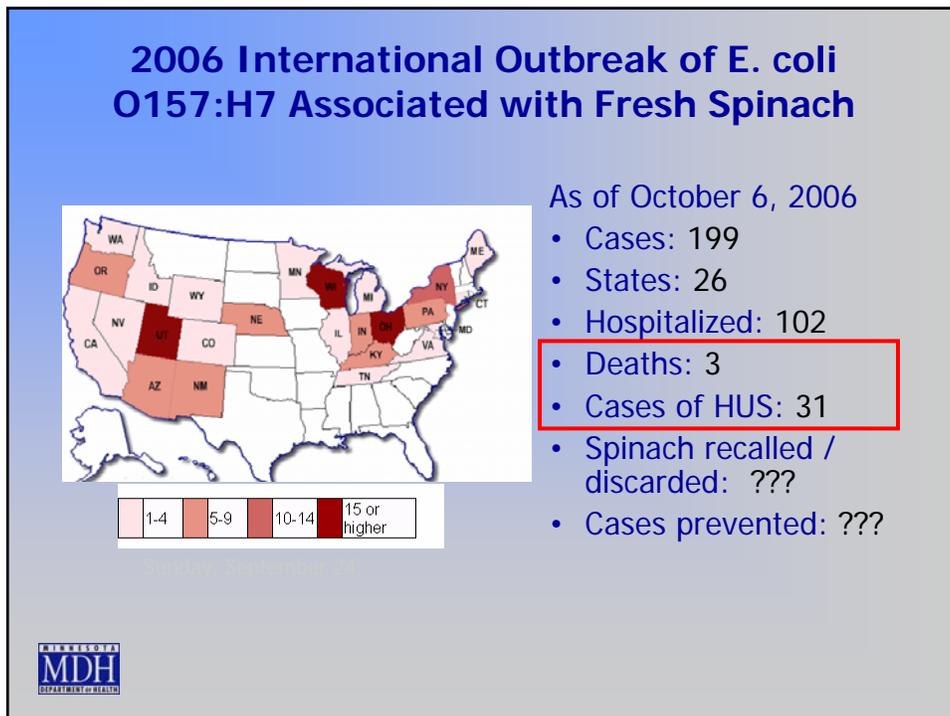
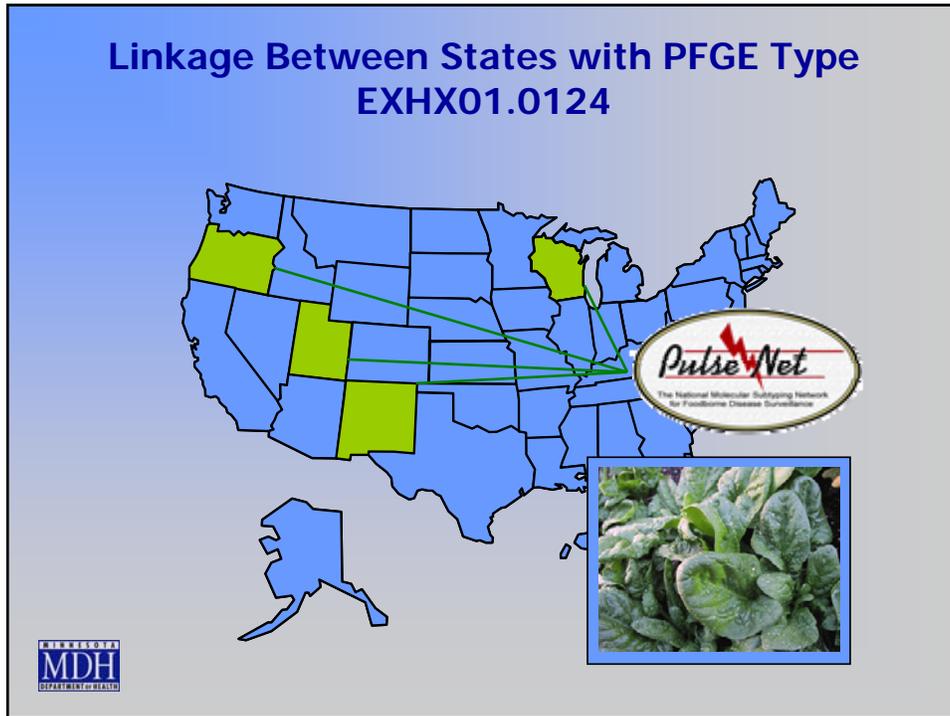
Attached is an updated line list for this cluster. It is quickly growing, and now involves 59 isolates from multiple states with patterns EXHX01.0124 / EXHA26.0015. The possible vehicle is bagged spinach.
We would like to further characterize the isolates belonging to this cluster due to the common nature of this PFGE pattern combination. If your state has isolates belonging to this cluster, please send them to the following address for MLVA typing. Please include a list of the isolates in your shipment and indicate that they are for MLVA typing.

The isolates should be sent to attention of Cheryl Bopp in the address below:

Centers for Disease Control and Prevention
Foodborne and Diarrheal Diseases Laboratory
Epidemic Investigations and Surveillance Laboratory
1600 Clifton Road
Bldg. 1 / Room B317, MS-CO3
Atlanta, GA 30333







Every isolate is important!



59

Pathogen Specific

Case re

Clinical



Case int



Supplemental Interview Form:

Name: [redacted]
 Date became ill: 4/26
 Onset Time: 2:00

Did you eat lettuce before your illness? Y N DK
 When did you eat the lettuce (date)? 4/22

Was the lettuce prepackaged? Y N DK

Do you recall brand name of prepackaged lettuce?
 If yes, list brand name: Y N DK

ASK about these brands as well:

FRESH EXPRESS BRAND	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
DOLE	<input checked="" type="radio"/> Y	<input type="radio"/> N	<input type="radio"/> DK
EARTH BOUND FARM	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
ARCHER FARM	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK

Do you recall the type of lettuce or salad components?
 If yes, list type of lettuce: romaine Y N DK
 If no, was it romaine lettuce? Y N DK
 was it iceberg lettuce? Y N DK

Do you recall the store purchased from?
 If yes, list name: Rainbow - Quarry Y N DK

Did you purchase the lettuce from any of the following stores?

RAINBOW	<input checked="" type="radio"/> Y	<input type="radio"/> N	<input type="radio"/> DK
CUB	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
TARGET	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
LUNDY'S	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
BYERLY	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
Kowalkis	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
Walmart	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK
other (name):	<input type="radio"/> Y	<input checked="" type="radio"/> N	<input type="radio"/> DK

Location of Store (City/Street): The Quarry

DATE PURCHASED LETTUCE OR SALAD: 9/3

ORIGINAL GROCERY STORE RECEIPT AVAILABLE? Y N DK

REMAINING LETTUCE FROM PACKAGE AT HOME? Y N DK

IF YES, expiration date? 9/23
 How was it stored when tested?
 May we obtain it for testing? Yes

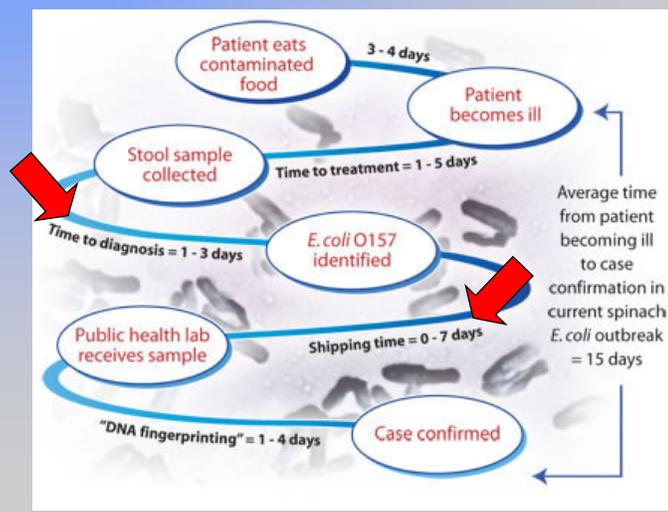
Interview Strategies

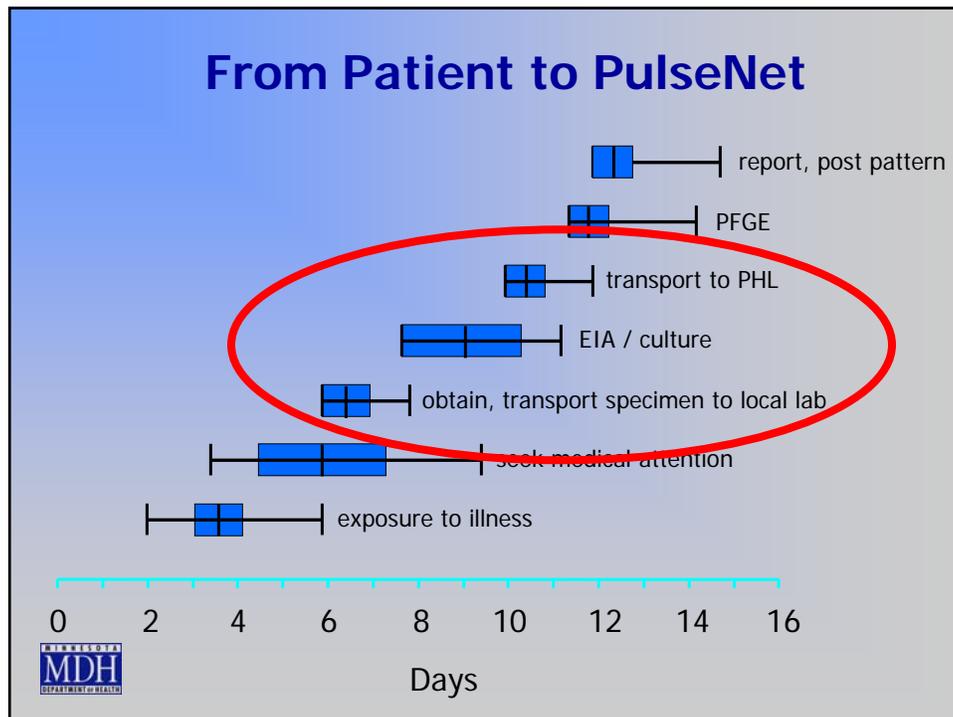
- Hypothesis generating interview after diagnosis, dynamic follow-up after cluster detection
- Preliminary interview after clinical diagnosis, detail interview after cluster detection
- Interview after cluster detection

Common theme: Rapid PHL characterization is critical



Time to Outbreak Identification

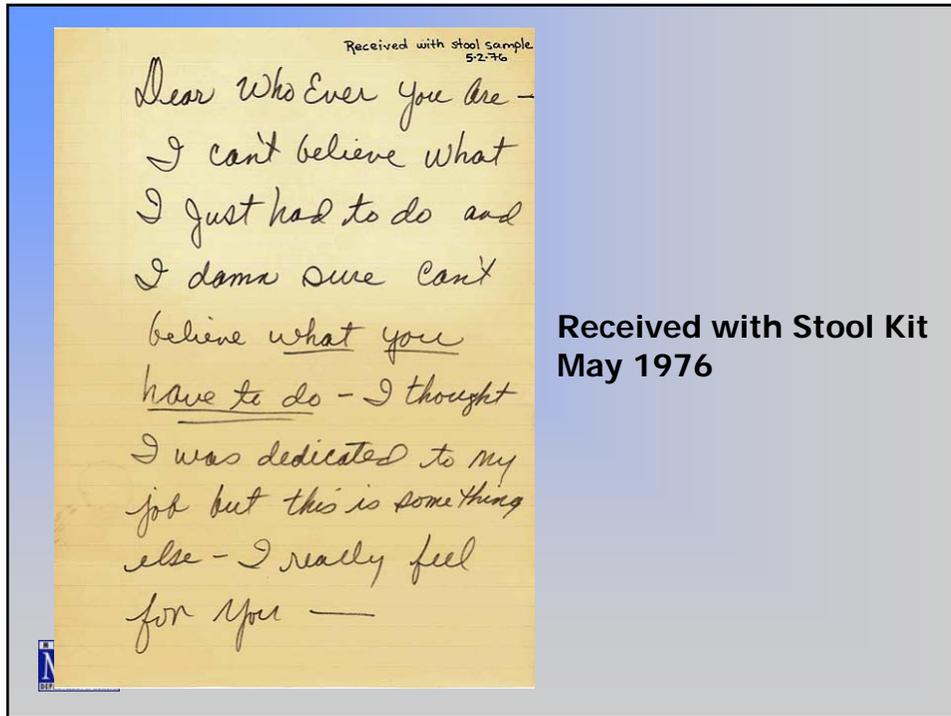




Summary

- Foodborne disease surveillance is a vital part of our healthcare system
- Every isolate is important
- Laboratory Networks are key
- Timing is everything

MDH
DEPARTMENT OF HEALTH



Questions ?

Moe Sullivan
Maureen.sullivan@health.state.mn.us
651-201-5582

? ? ? ? ?
? ? ? ? ?
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The slide features a blue header with the word 'Questions' and a large question mark. Below this, the name 'Moe Sullivan' is listed, followed by the email address 'Maureen.sullivan@health.state.mn.us' which is underlined. The phone number '651-201-5582' is also provided. The lower half of the slide contains a collection of question marks and exclamation points arranged in three rows. In the bottom left corner, there is a logo for the Minnesota Department of Health (MDH).