



LISTERIA

What is it, why do we care,
and what do we do about it?

Nicole Lee (Communicable Disease Branch)

Paula Whitley (Gaston County)

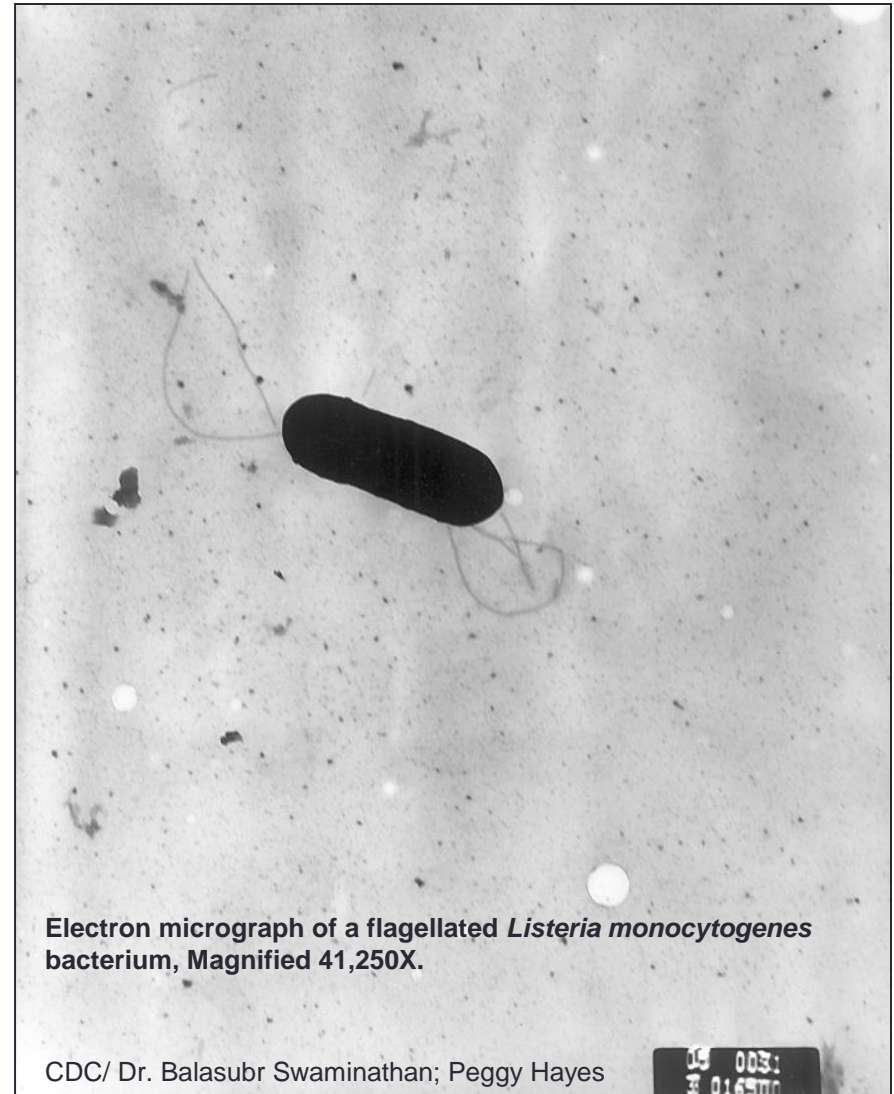
2014 Communicable Disease Conference

Presentation Outline

- What is it?
- Why do we care?
 - Perspectives
 - National
 - State
 - Local
- What do we do about it?

Listeria: What is it?

- *Listeria monocytogenes*
- Primarily foodborne
- High risk groups
 - Elderly
 - Immunocompromised
 - Pregnancy



Electron micrograph of a flagellated *Listeria monocytogenes* bacterium, Magnified 41,250X.

Listeria: What is it?

- Clinical Picture
 - Includes spontaneous abortions, stillbirths
- Long incubation
 - 3-70 (~2 weeks)
- Duration

Listeriosis (*Listeria monocytogenes*)

1999 CDC Case Definition

Clinical description

In adults, invasive disease caused by *Listeria monocytogenes* manifests most commonly as meningitis or bacteremia; infection during pregnancy may result in fetal loss through miscarriage or stillbirth, or neonatal meningitis or bacteremia. Other manifestations can also be observed.

Laboratory criteria for diagnosis

- A. Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid)
- B. In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue

Case classification

Confirmed: A clinically compatible case that is laboratory-confirmed

Comment:

The usefulness of other laboratory methods such as fluorescent antibody testing or polymerase chain reaction to diagnose invasive listeriosis has not been established.

Why do we care?

- CDC estimates:
 - 1600 ill/yr
 - 260 deaths/yr
 - > 1,400 hospitalized/yr
- Low incidence / high mortality
- Most often foodborne



<http://www.cdc.gov/vitalsigns/listeria/infographic.html>



Why do we care?

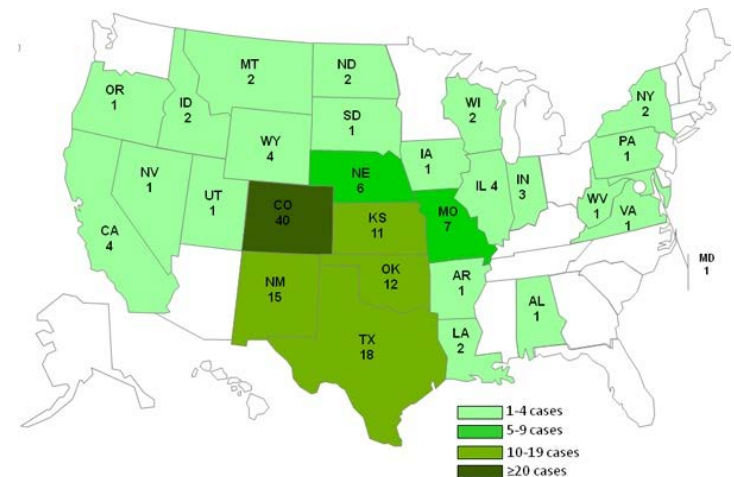
- Roos Foods (2014)
- Crave Brothers (2013)
- Cantaloupes (2011)

Complete outbreak reports can be found at CDC's website:

<http://www.cdc.gov/outbreaks/>

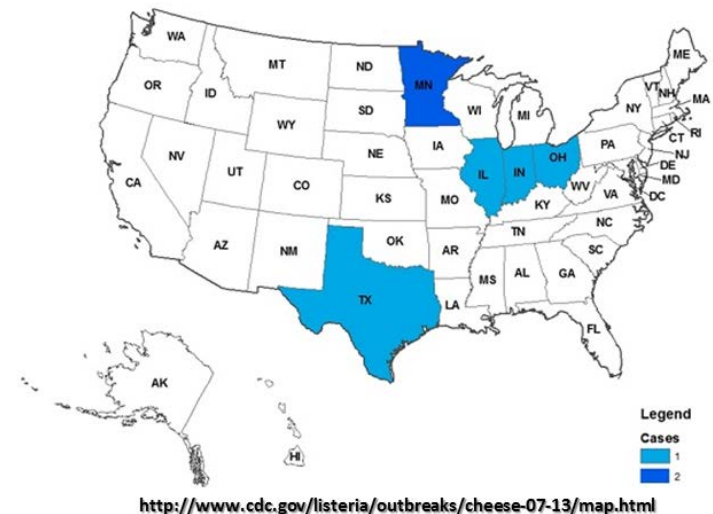
Cantaloupes (2011)

- 147 ill from 27 states
 - Onsets: July 31 – Oct 21
 - 132/134 (99%) hospitalized
 - 33 deaths
 - One miscarriage
- Laboratory & epi evidence
- Recall: Sept 14 – Oct 6
- Outbreak over: Oct 2011



Crave Brothers (2013)

- 6 ill from 5 states
 - Onsets: May 20 – July 7
 - All hospitalized
 - One died
 - One miscarriage
- Laboratory & epi evidence
- Production stopped: July 1, 2013
- Recall: July 3, 2013 (Crave)
July 5, 2013 (Whole Foods)
- Outbreak over: Sept 24, 2013



Roos Foods (2014)

- 8 ill from 2 states
 - Onsets: Oct 1 – Nov 29
 - 7 / 8 (88%) hospitalized
 - One died
 - 5 related to pregnancy
- Laboratory (whole genome sequencing) & epi evidence
- Recall: Feb 23, 2013
- Food facility registration suspended: March 11, 2014
- Outbreak over: April 18, 2014



PERSPECTIVES

National

State

Local

National Perspective

- Listeria Initiative
 - Piloted in 2004 and implemented nationwide in 2005
 - Lab + Epi components
 - Epi – database of ~2,000 cases

- Grant performance metric (reported annually)
 - Time from case identification to completion of Listeria Initiative form

 - % of lab-confirmed cases with a completed listeria initiative form submitted to CDC

National: Listeria Initiative (Epi)

LISTERIA CASE FORM Completed by _____ Date completed _____

Form Approved
OMB No. 0920-0004

BOX 1: CASE-PATIENT INFORMATION
Case-patients = adults and children >1 month of age. For fetal or neonatal infections, the MOTHER is the case-patient.

Patient's name: _____ Surrogate's name: _____
 Patient's street address: _____
 City: _____ State: _____ Zip: _____
 Phone numbers: (h) _____ (w) _____ (m) _____
 Hospital name(s): _____ Hospital contact name(s): _____
 Hospital contact numbers: _____

detach here to remove personal identifiers if necessary

Sex: M F
 State of residence: _____
 Age: _____
 DOB: _____

Ethnicity (check one):
 Hispanic/Latino
 Non-Hispanic/Latino
 Unknown

Race (check all that apply):
 African American/Black
 Asian
 Native Hawaiian or Other Pacific Islander
 Native American/Alaska Native
 White
 Unknown

State or local epi case ID: _____
 CDC outbreak (EFORS) ID: _____

BOX 2: IS LISTERIA CASE ASSOCIATED WITH PREGNANCY? (Illness in pregnant woman, fetus, or neonate ≤1 month)

Yes *If yes, skip to Box 4.*
 No *If no, continue with Box 3.*
 Unknown *If unknown, continue with Box 3.*

BOX 3: CASES NOT ASSOCIATED WITH PREGNANCY (Illness in non-pregnant adults and children > 1 month of age)

Type(s) of specimen(s) that grew Listeria (check all that apply)	Specimen collection date	Submitting Lab (state, city, county)	State Public Health Lab Isolate ID Number (important: must have at least one)
<input type="checkbox"/> Blood			
<input type="checkbox"/> CSF			
<input type="checkbox"/> Stool			
<input type="checkbox"/> Other			
<input type="checkbox"/> Other			

Type(s) of illness (check all that apply)	Was patient hospitalized for listeriosis?	Patient's outcome
<input type="checkbox"/> Bacteremia/sepsis	<input type="checkbox"/> Yes <i>If yes:</i>	<input type="checkbox"/> Survived
<input type="checkbox"/> Meningitis	Admit date: _____	<input type="checkbox"/> Died
<input type="checkbox"/> Febrile gastroenteritis	Discharge date: _____	<input type="checkbox"/> Unknown
<input type="checkbox"/> Other	<input type="checkbox"/> Still hospitalized	
<input type="checkbox"/> Unknown	<input type="checkbox"/> No	
	<input type="checkbox"/> Unknown	

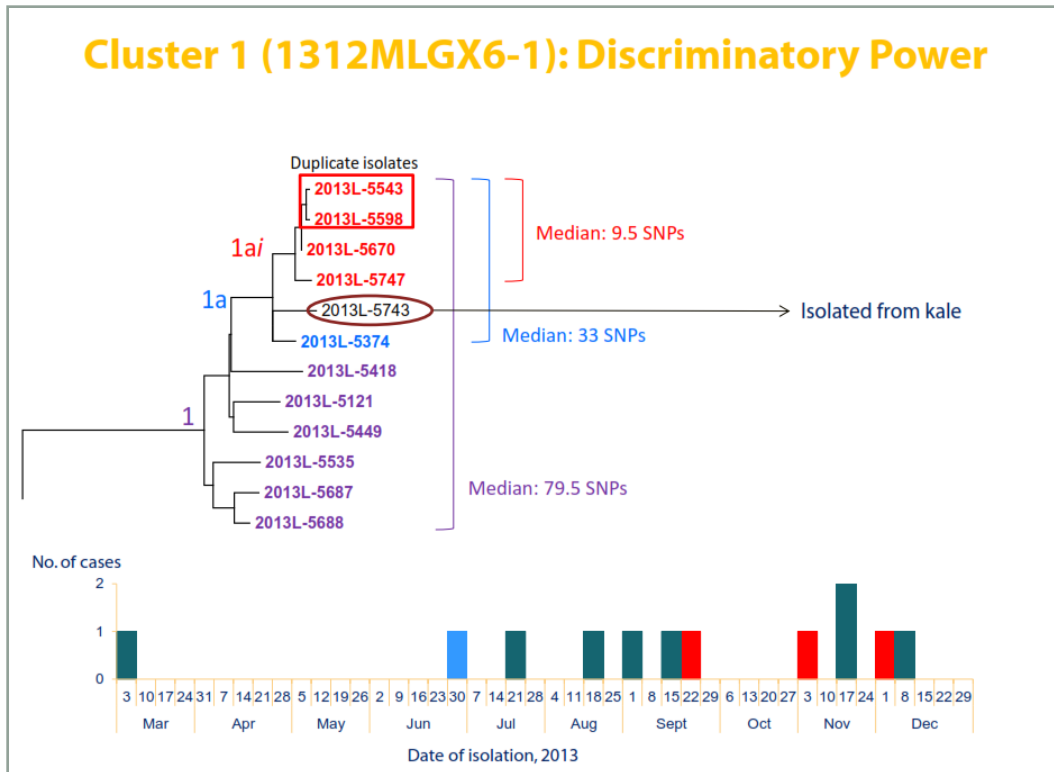
Public reporting burden of this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC/ATSDR Reports Clearance Officer, 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0920-0004).

Please send completed forms to: Enteric Diseases Epidemiology Branch, Centers for Disease Control and Prevention, Mailstop A-38, Atlanta, GA 30333. Fax (404) 639-2205.

- Complete for all cases
- Content
 - Lab results
 - Severity of illness
 - Mother/infant outcomes
 - Food exposures
 - Likelihood of consumption
 - Frequency of consumption
 - Purchase location
 - Brand

National: Listeria Initiative (Lab)

Cluster 1 (1312MLGX6-1): Discriminatory Power



- Forward all samples to State Lab
 - Pulsed-field gel electrophoresis (PFGE)
- Isolates will be forwarded to CDC
 - Whole genome sequencing (WGS)

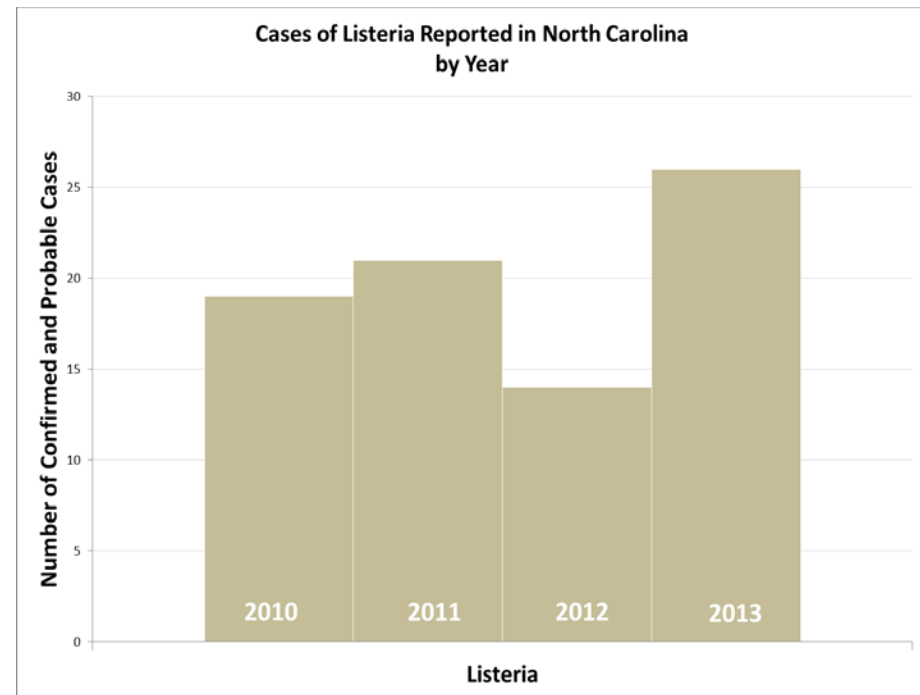


National: Analysis

- Lab
 - Comparison of PFGE patterns (Yes/No)
 - Analysis of whole genome sequence (alike vs not-alike)
- Epi
 - Most cases of listeria are sporadic
 - Case-case analysis
 - LI forms for sporadic vs LI forms for clusters
 - Behaviors of sporadic cases vs behaviors of outbreak cases

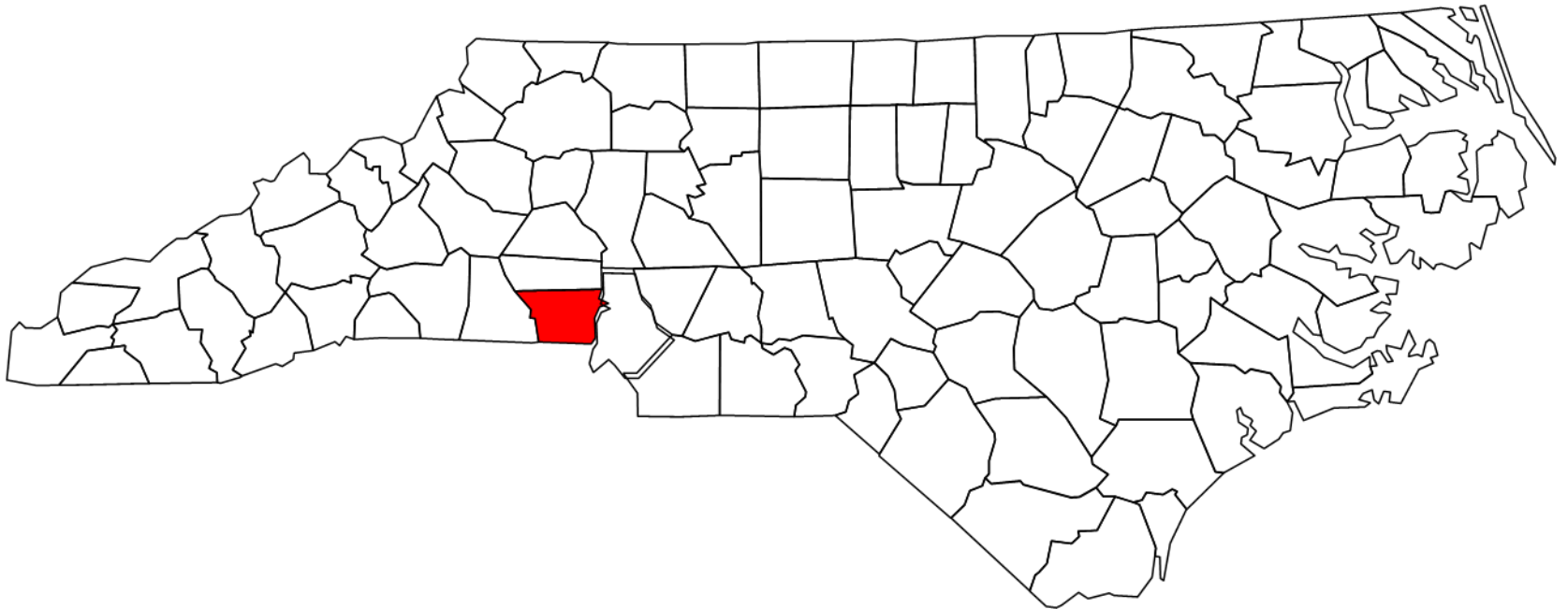
State Perspective

- Performance Metric
 - % of lab-confirmed cases with a complete LI form
 - Time from identification to completed LI form
- Timely response



Local Perspective

- Gaston County



Background

- Notification
 - Local hospitals reported to CD nurse via paper lab.



Background

- Beginning of Outbreak
 - First case reported on 09/22/2013.
 - Male in Cherryville, NC.
 - Second case reported 11/18/2013.
 - Female in Gastonia, NC.
 - Third case reported on 12/16/2013.
 - Female in Gastonia, NC.

Methods

- Steps Taken to Respond to Outbreak
 - CD Nurse requested records from respective local hospitals.
 - CD Nurse made various telephone attempts to contact patients.
 - CD nurse sought guidance from the Communicable Disease State Consultant.
 - CD nurse completed investigation disease report as contact was made with each patient.
 - CD nurse completed additional follow up as requested by the State/CDC.

Results (Epi)

Demographics

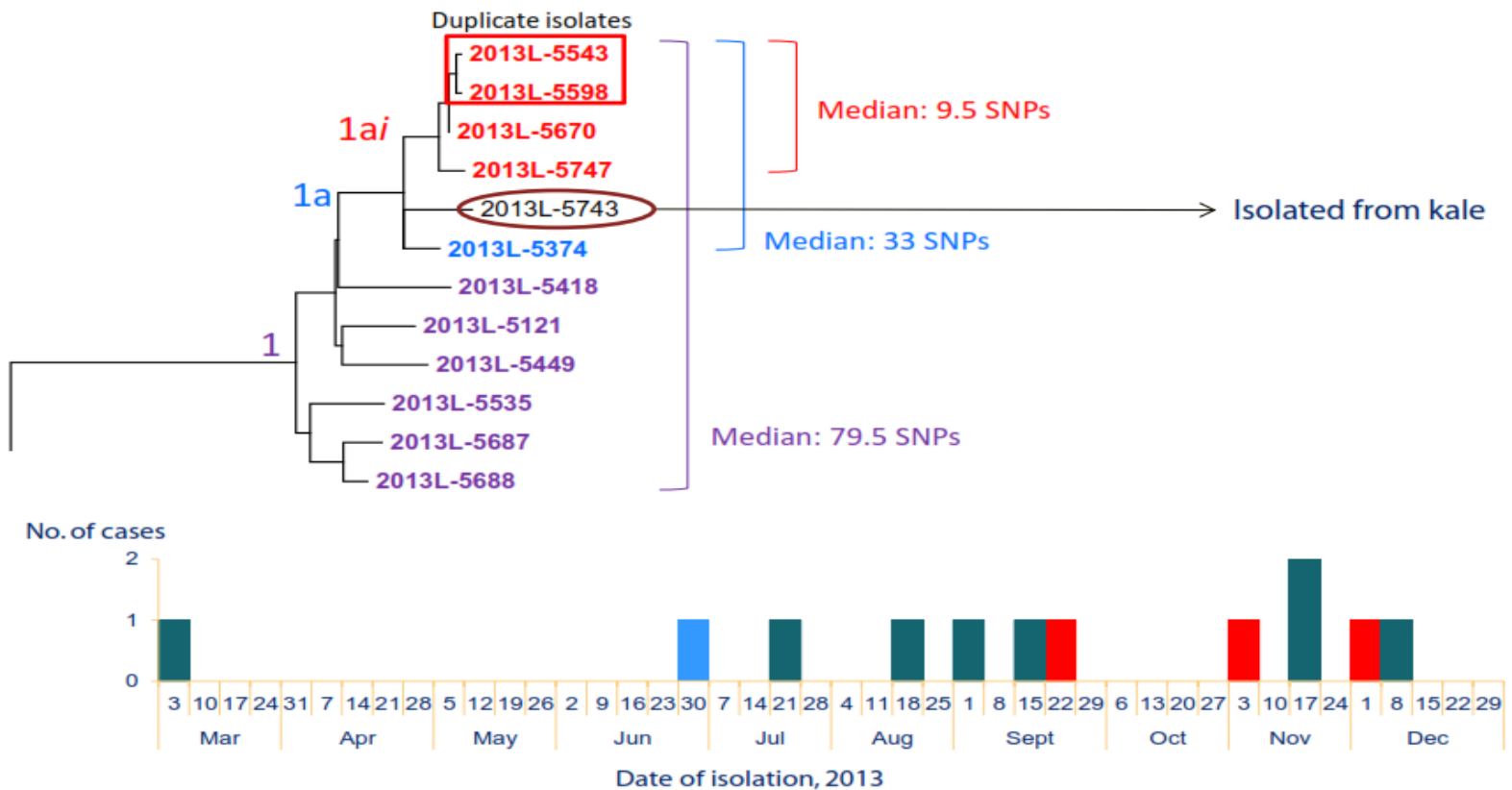
- Age (years)
 - < 60: 1 / 3
 - >= 60: 2 / 3
- Gender
 - Male: 1 / 3
 - Female: 2 / 3
- Onset Range
 - July – December 2013
- Hospitalizations
 - 3 / 3
 - Days hospitalized: 3 – 14 (median: 11)
- Deaths
 - 0 / 3

Epidemiology

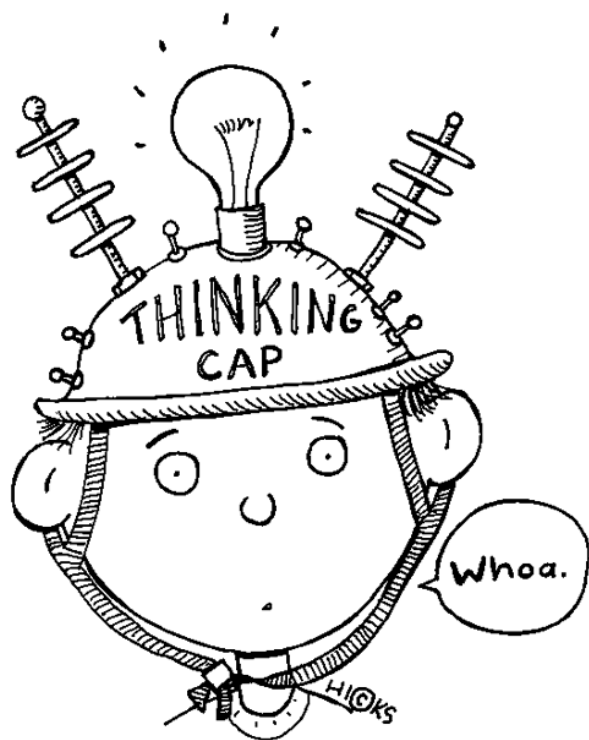
- Common exposures

Results (Lab)

Cluster 1 (1312MLGX6-1): Discriminatory Power



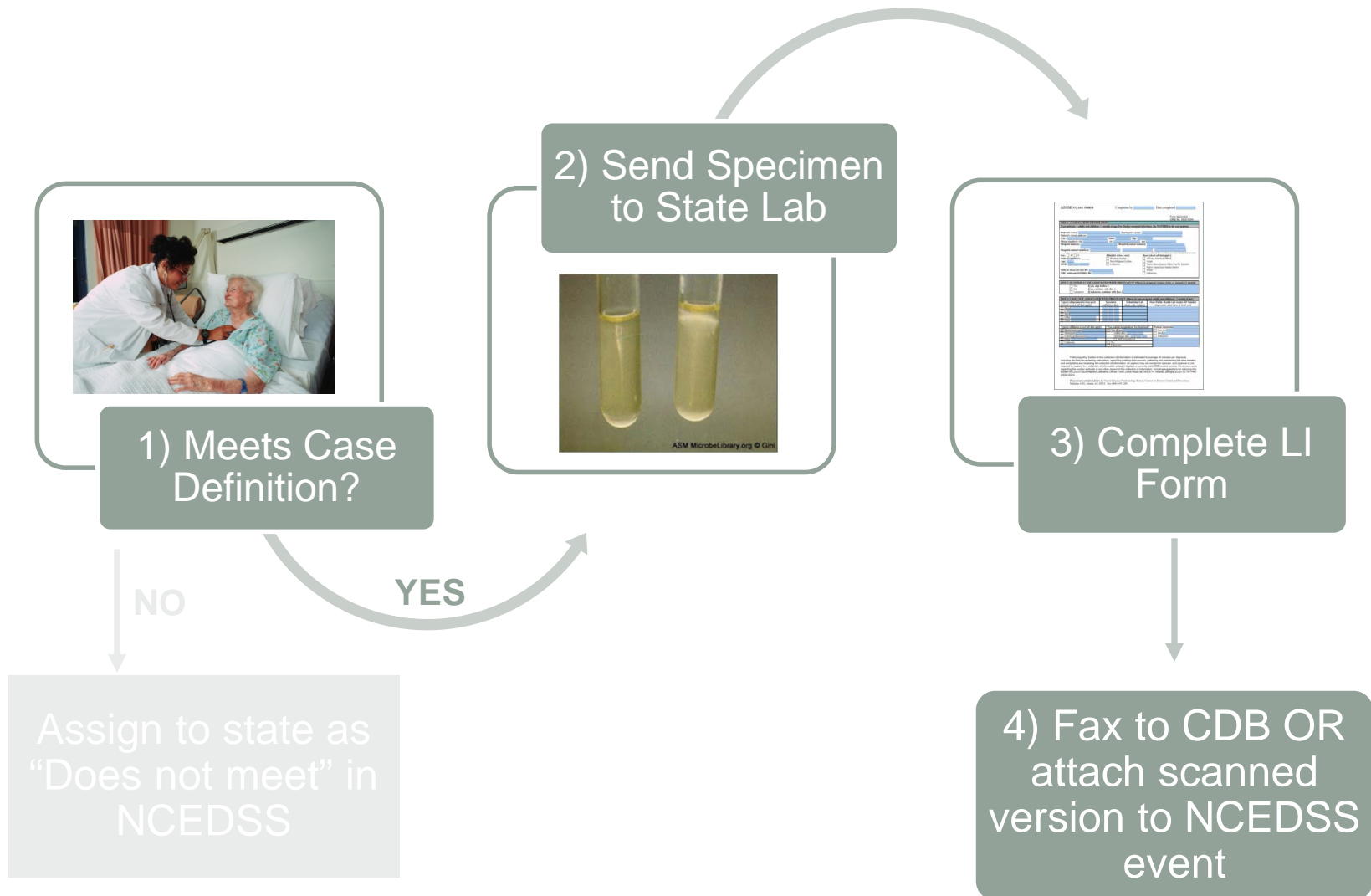
Lessons Learned



- Seek guidance from state CD consultant.
- Start investigation as soon as possible.
- Be prepared to complete further investigation as requested by the State/CDC.

WHAT DO WE DO ABOUT
IT?

Listeria Cases: What do we do about it?



In Summary

Listeria Initiative Form

LISTERIA CASE FORM Completed by _____ Date completed _____

Form Approved
OMB No. 0920-0004

BOX 1: CASE-PATIENT INFORMATION
Case-patients = adults and children >1 month of age. For fetal or neonatal infections, the MOTHER is the case-patient.

Patient's name: _____ Surrogate's name: _____
 Patient's street address: _____
 City: _____ State: _____ Zip: _____
 Phone numbers: (h) _____ (w) _____ (m) _____
 Hospital name(s): _____ Hospital contact name(s): _____
 Hospital contact numbers: _____

Sex: M F Ethnicity (check one): Hispanic/Latino Non-Hispanic/Latino Unknown
 State of residence: _____ Race (check all that apply): African American/Black Asian Native Hawaiian or Other Pacific Islander White Unknown
 Age: _____ DOB: _____
 State or local epi case ID: _____
 CDC outbreak (EFORS) ID: _____

BOX 2: IS LISTERIA CASE ASSOCIATED WITH PREGNANCY? (Illness in pregnant woman, fetus, or neonate ≤1 month)
 Yes *If yes, skip to Box 4.*
 No *If no, continue with Box 3.*
 Unknown *If unknown, continue with Box 3.*

BOX 3: CASES NOT ASSOCIATED WITH PREGNANCY (Illness in non-pregnant adults and children > 1 month of age)

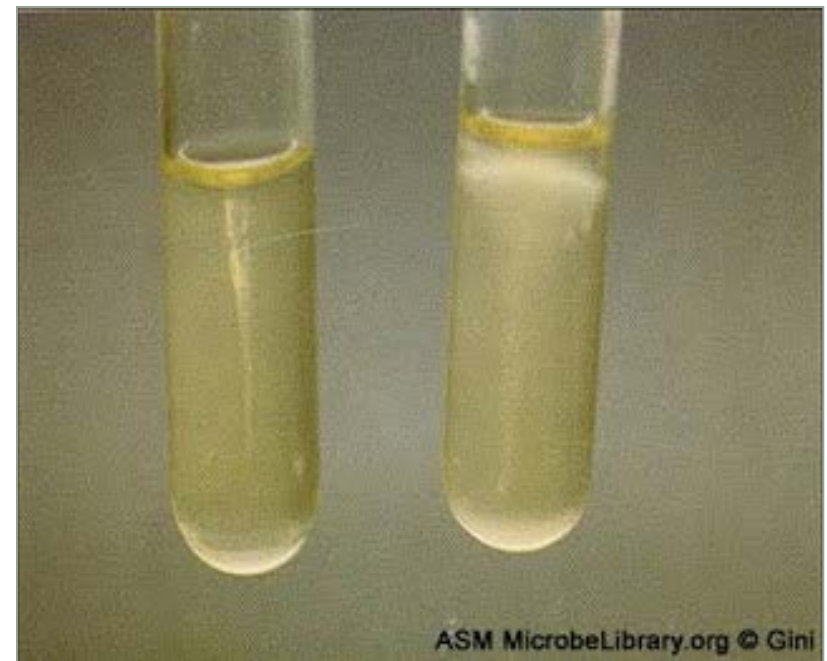
Type(s) of specimen(s) that grew Listeria (check all that apply)	Specimen collection date	Submitting Lab (state, city, county)	State Public Health Lab Isolate ID Number (important: must have at least one)
<input type="checkbox"/> Blood			
<input type="checkbox"/> CSF			
<input type="checkbox"/> Stool			
<input type="checkbox"/> Other			
<input type="checkbox"/> Other			

Type(s) of illness (check all that apply)	Was patient hospitalized for listeriosis?	Patient's outcome
<input type="checkbox"/> Bacteremia sepsis	<input type="checkbox"/> Yes <i>If yes:</i>	<input type="checkbox"/> Survived
<input type="checkbox"/> Meningitis	Admit date: _____	<input type="checkbox"/> Died
<input type="checkbox"/> Focal gastroenteritis	Discharge date: _____	<input type="checkbox"/> Unknown
<input type="checkbox"/> Other	<input type="checkbox"/> Still hospitalized	
<input type="checkbox"/> Unknown	<input type="checkbox"/> No	
	<input type="checkbox"/> Unknown	

Public reporting burden of this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC/ATSDR Reports Clearance Officer, 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0920-0004).

Please send completed forms to: Enteric Diseases Epidemiology Branch, Centers for Disease Control and Prevention, Mailstop A-38, Atlanta, GA 30333. Fax (404) 639-2205.

Laboratory



Be sure to have the specimen forwarded to the State Lab!

Local Feedback

Listeria Cases

- Have you had any listeria cases?
- Was a Listeria Initiative form completed?
- Was a sample sent to the state lab?

Suggestions for improving this process?

Thank you!

Acknowledgements

CD Nurses

Local laboratory staff

State laboratory staff

Any additional questions?



References

- www.foodsafety.gov
- www.cdc.gov