



CD Webinar  
Thursday, June 15, 2017

*Enterics Update*

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# Topics

## Nicole

- Training Opportunity
  - Free by reimbursement
- Case definition changes
  - What it ultimately means for you
- Interpretation of lab results
  - What to do about PCRs
- CDC case report forms

## Erica

- PFGE & WGS
- OBNE
- Prep for enterics season

# *Training Opportunity*





**Integrated Food Safety**  
Centers of Excellence

## **Epi-Ready Team Training**

**2-day Workshop on Foodborne Illness Response Strategies**

**July 18<sup>th</sup> -19<sup>th</sup>; 8am-4:45pm**

To be held at the Durham Hilton near Duke University  
3800 Hillsborough Rd., Durham, NC 27705

Register here: <https://www.surveymonkey.com/r/MDWQTMN>

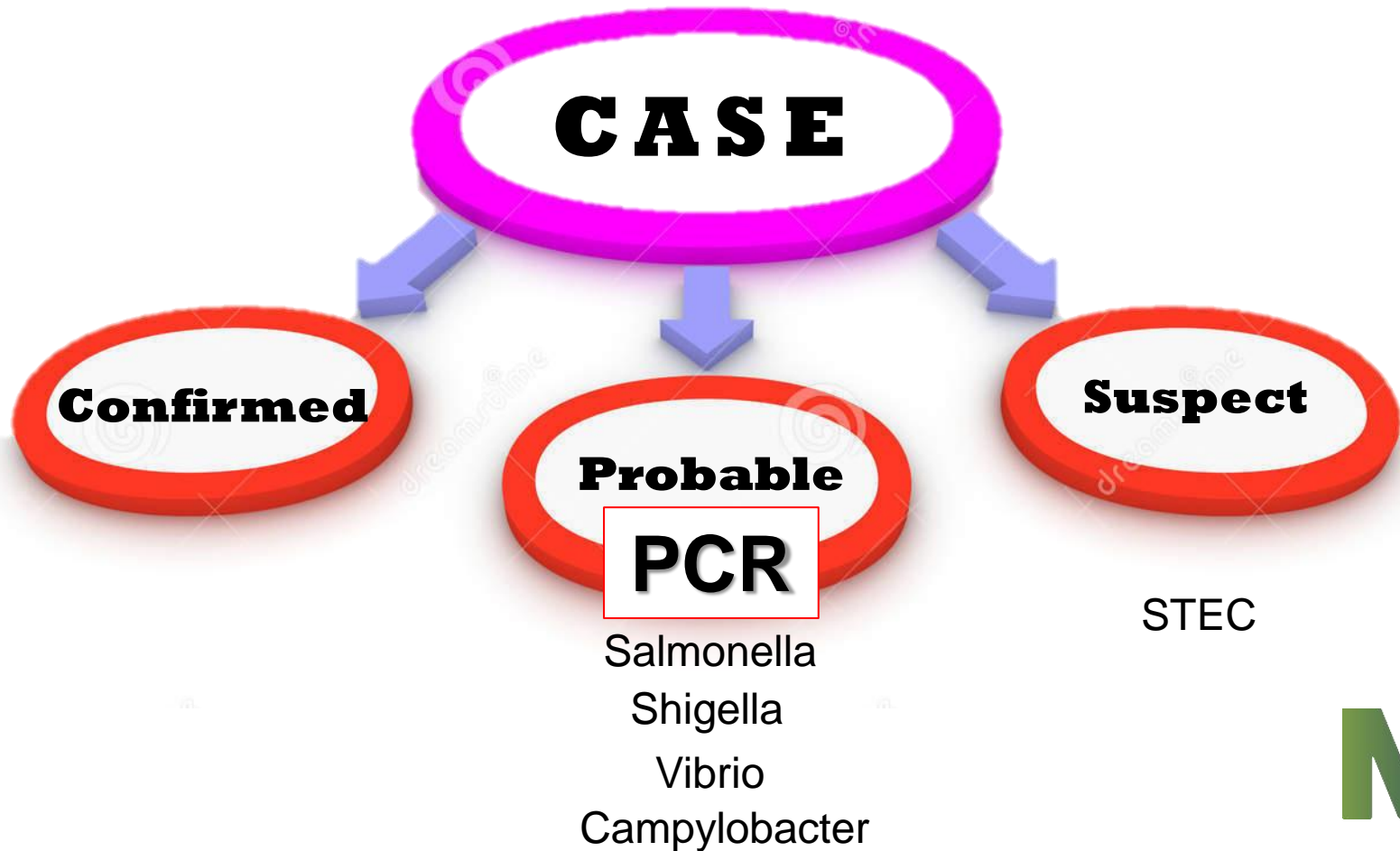
**Training cost:** There is no charge for the training. The North Carolina Department of Agriculture will reimburse attendee lodging, mileage and per diem costs. Once registered, additional information regarding reimbursement will be provided.

**Friday, June 30<sup>th</sup>, 2017 – DEADLINE for completing room reservations and registration.**

## *Case definition changes (review)*



# Case Definition Changes (review)



## *Case Definition Changes (review)*



## *Case Definition Changes (review)*

**SAME  
PUBLIC HEALTH  
ACTION**

**Confirmed**

**Probable**

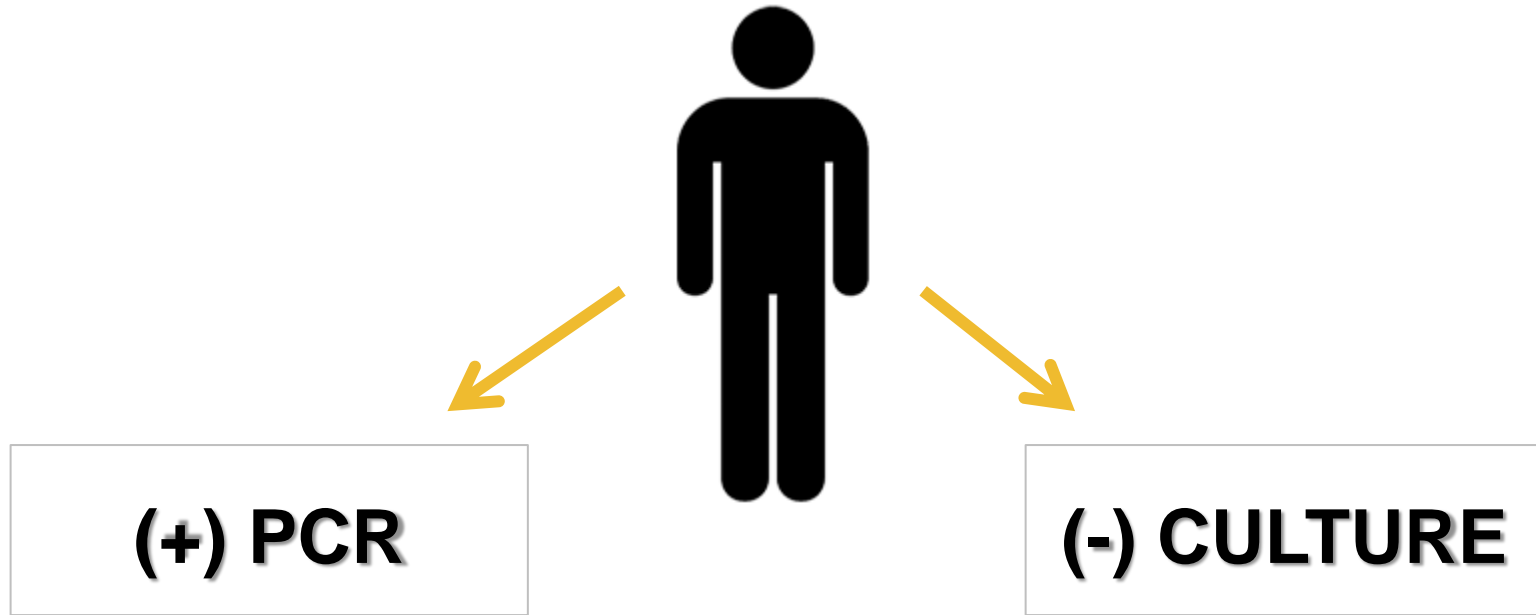
**Suspect**



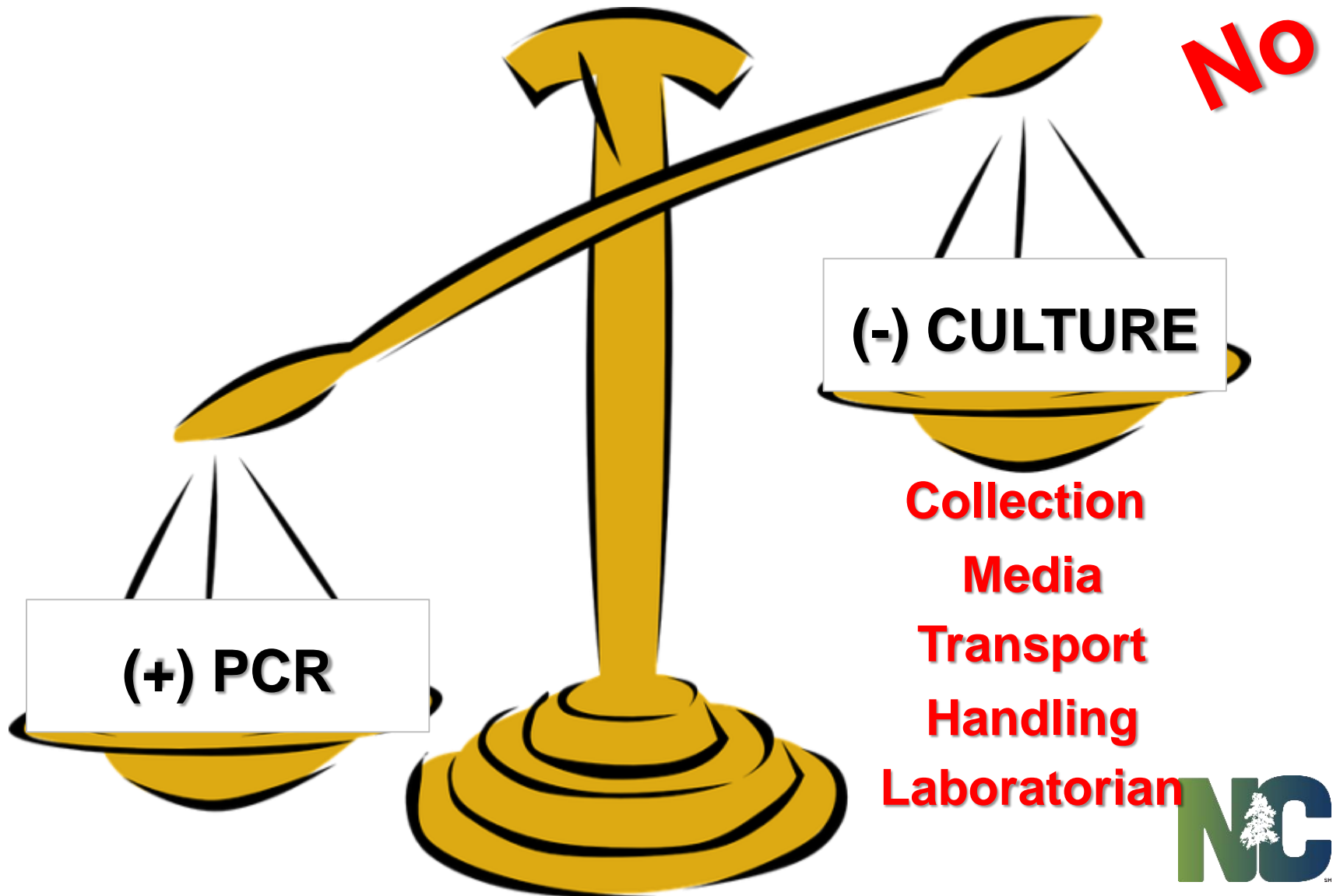
# *INTERPRETATION OF LAB RESULTS*



# Do we ignore the PCR result?



# Do we ignore the PCR result?



PATIENT:				ORDERING PHYSICIAN:	
Gender:	Age:	DOB:	ID:	Name:	
			Ethnicity:	Phone:	
SPECIMEN:				CLIENT:	
Source Type:		Collected:		Name:	
Specimen ID:		Received:		Code:	
Accession ID:		Reported:		Address:	

Gastrointestinal Panel:	COMMENTS
Adenovirus 40, 41 Not reportable	
Norovirus Not reportable as a single case	
Rotavirus Not reportable	
Enterohemorrhagic E. coli (EHEC) Shiga-like toxin gene (stx1) Shiga-like toxin gene (stx2) Reportable	
Enteropathogenic E. coli (EPEC) Not reportable – has virulence markers but does not produce shiga toxin	
Enterotoxigenic E. coli (ETEC) Not reportable	
Enteroinvasive E. coli/Shigella Reportable- Shigella	
(EIEC) Salmonella enterica Reportable	
Campylobacter jejuni Reportable	
Vibrio parahaemolyticus Reportable	
Clostridium difficile (Toxin B gene) Not reportable	
Cryptosporidium parvum Reportable	
Giardia lamblia Not reportable	

Scan and attach confusing paper reports to the NCEDSS event if possible.



This is Shigella, not STEC

# GI Panel

MICRO			
TEST NAME	RESULT	AS	SITE
GI Panel (PCR)			
GI Panel (PCR)	Positive	A	
Campylobacter	Not Detected		
C. difficile A/B	Detected		
Shigella	Not Detected		
Salmonella	Not Detected		
Vibrio	Not Detected		
Vibrio cholerae	Not Detected		
Yersinia enterocolitica	Not Detected		
E. coli (EPEC)	Not Detected		
E. coli (EPEC)	Not Detected		
E. coli (EPEC)	Not Detected		
E. coli (STEC)	Detected		
E. coli O157	Detected		
Shigella/E. coli (EIEC)	Not Detected		
Cryptosporidium	Not Detected		
C. cayetanensis	Not Detected		
Entamoeba histolytica	Not Detected		
Giardia lamblia	Not Detected		
Adenovirus P 40/41	Not Detected		
Astrovirus	Not Detected		
Norovirus GI/GII	Not Detected		
Rotavirus A	Not Detected		
Sapovirus	Not Detected		

Check the fine print for test type!

GI Panel (PCR)

Panel of multiple pathogens tested at once suggests PCR

On some PCR panels, the "PCR" labeling will be at the very bottom in small print

E. coli and C. difficile Positive PCR Panel



# Interpreting GI Pathogen Panels

<b>Bacteria</b>	
Campylobacter (jejuni, coli and upsaliensis)	Reportable
Clostridium difficile (toxin A/B)	Not Reportable
Plesiomonas shigelloides	Not Reportable
Salmonella	Reportable
Yersinia enterocolitica	Not Reportable
Vibrio (parahaemolyticus, vulnificus and cholerae)	Reportable
Vibrio cholerae	Reportable
<b>Diarrheagenic E. coli/Shigella</b>	
Enteraggregative E. coli (EAEC)	Not Reportable
Enteropathogenic E. coli (EPEC)	Not Reportable
Enterotoxigenic E. coli (ETEC) lt/st	Not Reportable
Shiga-like toxin-producing E. coli (STEC) stx1/stx2	Reportable
E. coli O157	Reportable
Shigella/Enteroinvasive E. coli (EIEC)	Reportable (this is Shigella)
<b>Parasites</b>	
Cryptosporidium	Reportable
Cyclospora cayetanensis	Reportable
Entamoeba histolytica	Not Reportable
Giardia lamblia	Not Reportable
<b>Viruses</b>	
Adenovirus F 40/41	Not Reportable
Astrovirus	Not Reportable
Norovirus GI/GII	Not Reportable
Rotavirus A	Not Reportable
Sapovirus (I, II, IV and V)	Not Reportable



Culture Stool  
\* Final Report \*

1998-38066

\* Final Report \*

Report Campylobacter

Stool Culture

“Stool Culture”

PROCEDURE: Stool Culture

SOURCE: Stool

BODY SITE:

FREE TEXT SOURCE: stool

COLLECTED: 03/03/2015 08:30

STARTED: 03/03/2015 15:59

\*\*\* FINAL REPORT \*\*\*

Final Report

Verified: 03/05/2015 12:14

\*\*\*\*\*

Positive for Campylobacter species by EIA

Sensitivity of this procedure is LESS than 100% therefore a negative result does not rule out infection.

\*\*\*\*\*

\*\*PLEASE NOTE\*\*

NC law requires the communicable diseases be reported to the local health department by the attending physician.

In addition, this report has been released to the appropriate federal, state, or county health agency as dictated by law.

The following links can be utilized to assist with reporting

NC Reportable Diseases: [http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/reportable\\_diseases.html](http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/reportable_diseases.html)

NC Health Departments by County: <http://www.ncslhd.org/county.htm>

NC DOH Communicable Diseases Site: <http://epi.publichealth.nc.gov/cd/report.html>

If the disease must be reported within 24 hours, the initial report shall be made by telephone to the local health department, and the written disease report be made within 7 days. If unable to contact your local health department, call the 24/7 pager for North Carolina Communicable Disease Branch at (919)733-3419.

\*\*\*\*\*

Notified [redacted] at 16:26 03/03/2015 [redacted]

\*\*\*\*\*

Abundant Yeast

Scant Normal fecal flora isolated

No Salmonella or Shigella isolated

No Escherichia coli O157:H7 isolated

No Aeromonas or Plesiomonas isolated.

No enteric gram negative bacilli present

Printed by: [redacted]  
Printed on: 3/6/2015 1:03 PM EST

Page 1 of 3  
(Continued)



“Stool Culture”

Source: Stool - Accession: 000002016254001884 Result Status - \*\*\* In Progress \*\*\*

Pre - September 11, 2016 11:10 -  
\* \* \* \* \*

“Shiga Toxin detected by immunoassay”

Shiga Toxin detected by immunoassay indicating the likely presence of a Shiga-toxin-- producing Escheric  
Sensitivity of this procedure is less than 100% therefore a negative result does not rule out infection.

\* \* \* \* \* \*\*PLEASE NOTE\*\*

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NC Health Departments by County: <http://www.ncalhd.org/county.htm>

NC DOH Communicable Diseases Site: <http://epi.publichealth.nc.gov/cd/report.html>

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\* \* \* \* \* Notified Dr. Spies/rb and faxed to Mission Internal Medicine and Buncombe County Health Dept.  
\* \* \* \* \*

Abundant Normal fecal flora isolated

\* \* \* \* \*

Negative for Campylobacter species by EIA

Sensitivity of this procedure is 100%



Event Data

Lab Results

Concerns

Persons

Tasks

Event Properties

E

### Labs

Lab No.	Specimen Date	Specimen Number	Specimen Source
▶ 1	09/09/2016		Stool

Add Lab Result

Update Lab Result

Delete Lab Result

### Details

Last Update:	09/14/2016
Updated By:	Erica Berl [eberl]
Specimen Info	
Specimen Date:	09/09/2016
Specimen Source:	Stool
Report Change Date:	09/11/2016
Tests	
Test:	..Antigen Detection
Result:	Positive
Result Local Desc:	Shiga Toxin detected by immunoassay
Result Date:	09/11/2016
Lab Facility	
Lab Facility:	Mission Hospital - Memorial Campus
Ordering Facility	
Ordering Facility:	Ashe County Health Dept
Ordering Facility (Other):	Mission Internal Medicine
Ordering Provider	

# *Interpretation of Lab Results*

## **Bacillus cereus**

- **Not reportable** unless in an outbreak
- Ignore blood cultures

## **Staphylococcus aureus**

- Only interested in stool specimens
- AND
- Clinically compatible illness

## **Clostridium perfringens**

- Ignore blood cultures


# *CDC Case Report Forms*



# CDC Case Report Forms

- Vibrio (COVIS)
- Listeria (Listeria Initiative)
- Typhoid/paratyphoid
- Cyclospora
- Trichinella
- Multistate clusters

State: \_\_\_\_\_ Year: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_ Last Name: \_\_\_\_\_



**CHOLERA AND OTHER VIBRIO ILLNESS SURVEILLANCE REPORT**  
OMB 0920-0728 Exp. Date 01/31/2013

REPORTING HEALTH DEPARTMENT			SEND COMPLETED REPORT TO STATE HEALTH DEPARTMENT																
State <input type="checkbox"/>	City	County/Parish	State will forward to: cdc.vibrio@cdc.gov T: 404-255-1735 Centers for Disease Control and Prevention Enteric Diseases Epidemiology Branch 1600 Clifton Road, NE Atlanta, GA 30333																
<b>1. PATIENT CASE INFORMATION</b>																			
1. First 3 letters of patient's last name: _____		2. Sex: <input type="checkbox"/> M <input type="checkbox"/> F <input type="checkbox"/> Unk																	
3. Date of birth (MM/DD/YYYY): ____/____/____		4. Age: ____ YRS ____ MONTHS																	
6. Race: <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or other Pacific Islander		7. Ethnicity: <input type="checkbox"/> Hispanic/Latino <input type="checkbox"/> Not Hispanic/Latino <input type="checkbox"/> Unk/Not Provided																	
<input type="checkbox"/> White <input type="checkbox"/> Other <input type="checkbox"/> Not provided/Unknown <input type="checkbox"/> Asian		8. Occupation: _____																	
<b>2. LABORATORY INFORMATION</b>																			
Use the Vibrio Species key to indicate which species were positively identified by culture or CDT result as applicable.																			
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;"><i>V. cholerae</i> spec. key</td> <td style="width: 33%; border: none;"><i>V. cholerae</i> spec. key</td> <td style="width: 33%; border: none;"><i>V. cholerae</i> spec. key</td> <td style="width: 33%; border: none;"><i>V. cholerae</i> spec. key</td> </tr> <tr> <td style="border: none;"><i>V. cholerae</i> O1—O1</td> <td style="border: none;"><i>V. cholerae</i> O139—O139</td> <td style="border: none;"><i>V. cholerae</i> non-O1, non-O139—O139</td> <td style="border: none;"><i>V. cholerae</i> spec. not identified—NI</td> </tr> <tr> <td style="border: none;"><i>V. parahaemolyticus</i>—ALG</td> <td style="border: none;"><i>V. vulnificus</i>—FLU</td> <td style="border: none;"><i>V. vulnificus</i>—FUR</td> <td style="border: none;"><i>V. vulnificus</i>—VUL</td> </tr> <tr> <td style="border: none;"><i>V. parahaemolyticus</i>—PAR</td> <td style="border: none;"><i>V. parahaemolyticus</i>—PAR</td> <td style="border: none;"><i>V. parahaemolyticus</i>—PAR</td> <td style="border: none;"><i>V. parahaemolyticus</i>—PAR</td> </tr> </table>				<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key	<i>V. cholerae</i> O1—O1	<i>V. cholerae</i> O139—O139	<i>V. cholerae</i> non-O1, non-O139—O139	<i>V. cholerae</i> spec. not identified—NI	<i>V. parahaemolyticus</i> —ALG	<i>V. vulnificus</i> —FLU	<i>V. vulnificus</i> —FUR	<i>V. vulnificus</i> —VUL	<i>V. parahaemolyticus</i> —PAR	<i>V. parahaemolyticus</i> —PAR	<i>V. parahaemolyticus</i> —PAR	<i>V. parahaemolyticus</i> —PAR
<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key	<i>V. cholerae</i> spec. key																
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Laboratory results (If more than one specimen is tested, complete one row per specimen. If more than two specimens were tested, please check here _____ and attach additional sheet. CDT indicates a culture-independent diagnostic test.)																			
1. <u>Specimen one:</u> Date collected: ____/____/____ Received at public health laboratory? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> U If yes, State lab ID: _____																			
Specimen source: <input type="checkbox"/> Stool <input type="checkbox"/> Blood <input type="checkbox"/> Wound <input type="checkbox"/> Other (if wound or other, specify site): _____	Culture result: <input type="checkbox"/> Pos <input type="checkbox"/> Neg <input type="checkbox"/> Unk <input type="checkbox"/> Not Done If positive, species identified: _____ If species identified as multiple or other, specify: _____	CDT result: <input type="checkbox"/> Pos <input type="checkbox"/> Neg <input type="checkbox"/> Unk <input type="checkbox"/> Not Done If applicable, species identified: _____ Name/type of diagnostic test used: _____																	
2. <u>Specimen two:</u> Date collected: ____/____/____ Received at public health laboratory? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> U If yes, State lab ID: _____																			
Specimen source: <input type="checkbox"/> Stool <input type="checkbox"/> Blood <input type="checkbox"/> Wound <input type="checkbox"/> Other (if wound or other, specify site): _____	Culture result: <input type="checkbox"/> Pos <input type="checkbox"/> Neg <input type="checkbox"/> Unk <input type="checkbox"/> Not Done If positive, species identified: _____ If species identified as multiple or other, specify: _____	CDT result: <input type="checkbox"/> Pos <input type="checkbox"/> Neg <input type="checkbox"/> Unk <input type="checkbox"/> Not Done If applicable, species identified: _____ Name/type of diagnostic test used: _____																	
3. If other non-Vibrio organism(s) isolated from same specimen, list: _____																			
Complete <u>only</u> if isolate is <i>Vibrio cholerae</i> O1 or O139:																			
4. Serotype: <input type="checkbox"/> Inaba <input type="checkbox"/> Ogawa		5. BioType: <input type="checkbox"/> El Tor <input type="checkbox"/> Classical <input type="checkbox"/> Not done <input type="checkbox"/> Unk																	

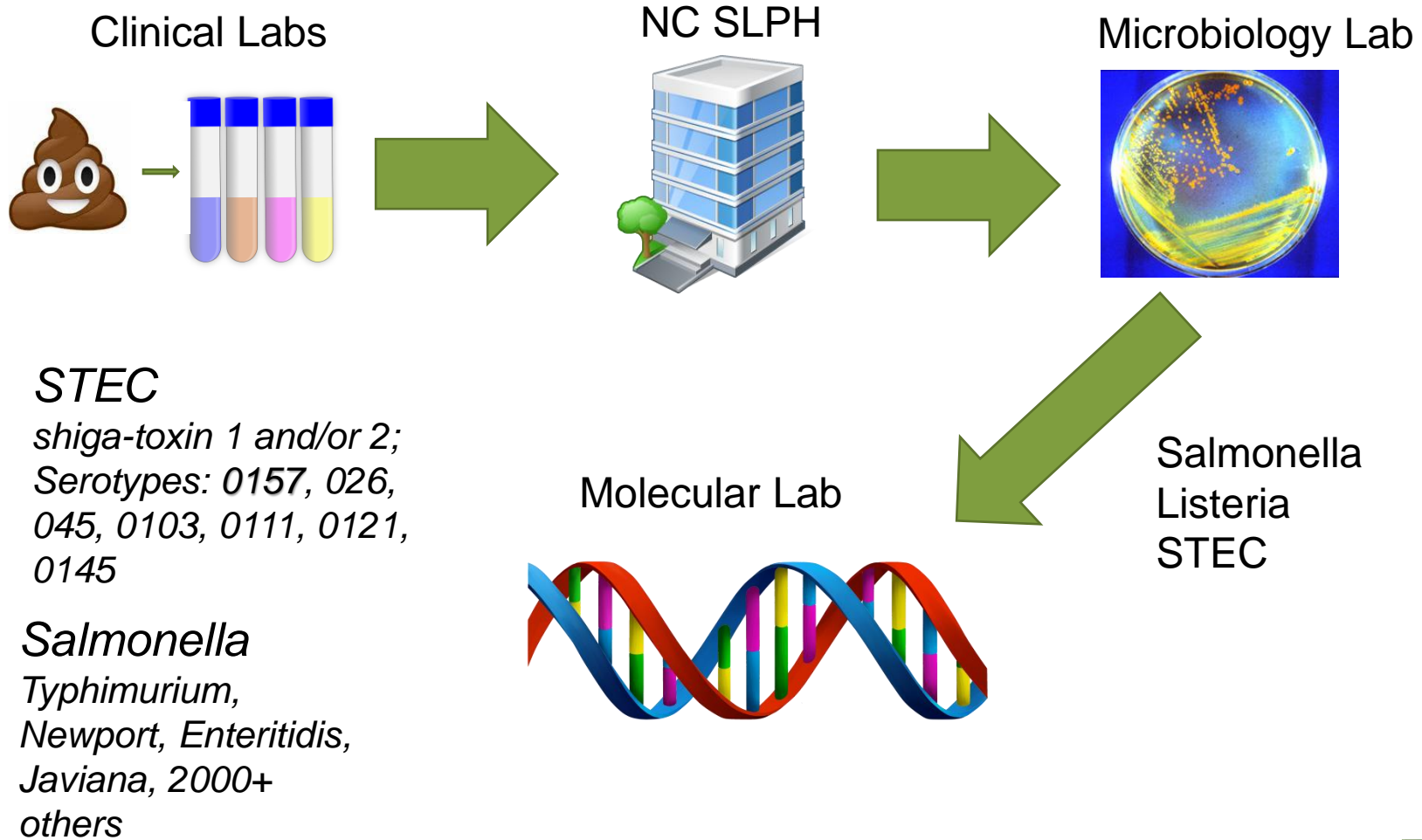
# *OUTBREAK DETECTION*



# *Outbreak Detection*

- Cases report common source
- Lab-identified clusters

# Cluster Detection





# Cluster Detection



## PulseNet Laboratory Network



PulseNet Database Managers (CDC) communicate with states and epidemiologists

PulseNet Labs submit PFGE Patterns and Demographic Data to the CDC



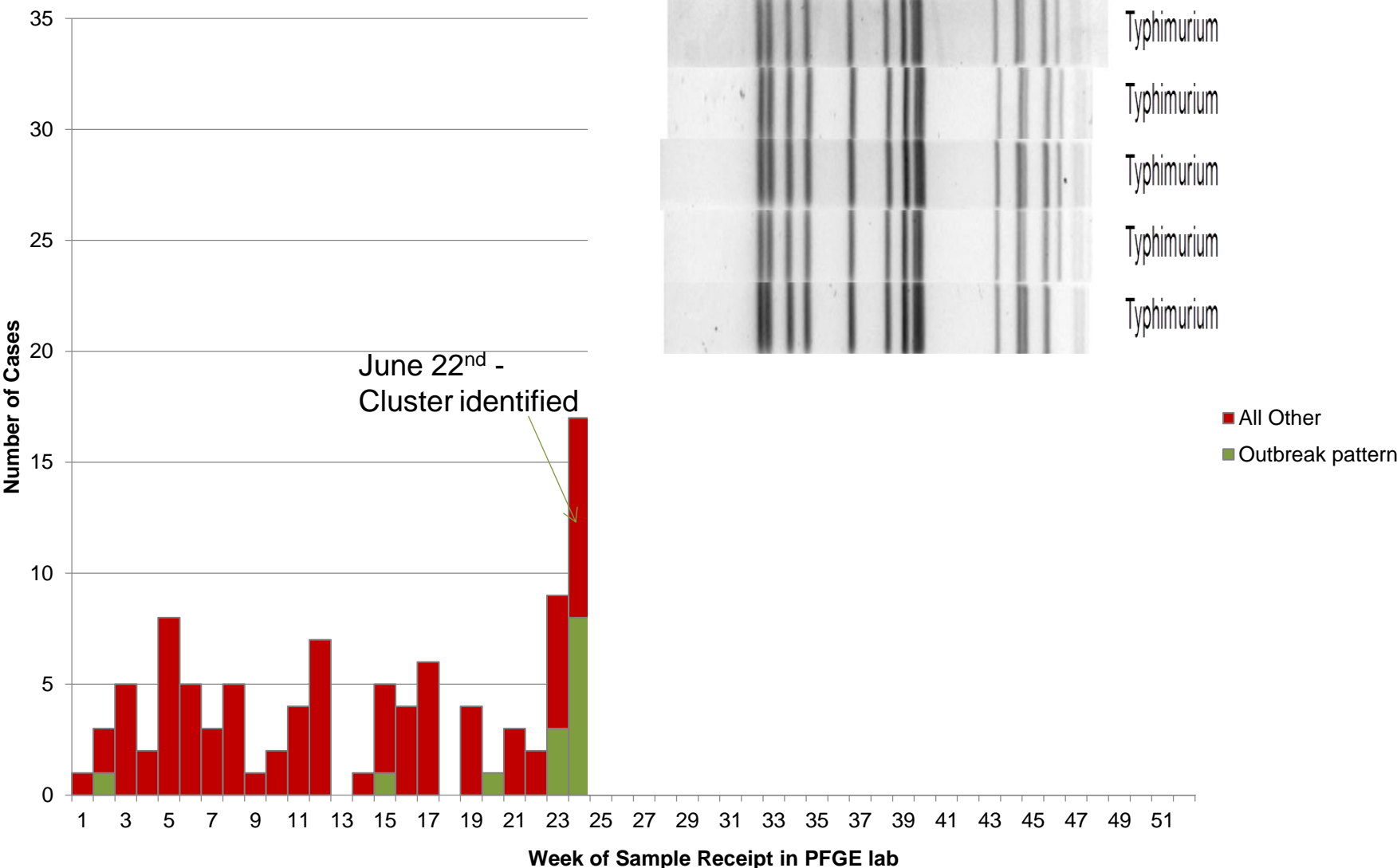
Cluster Detection





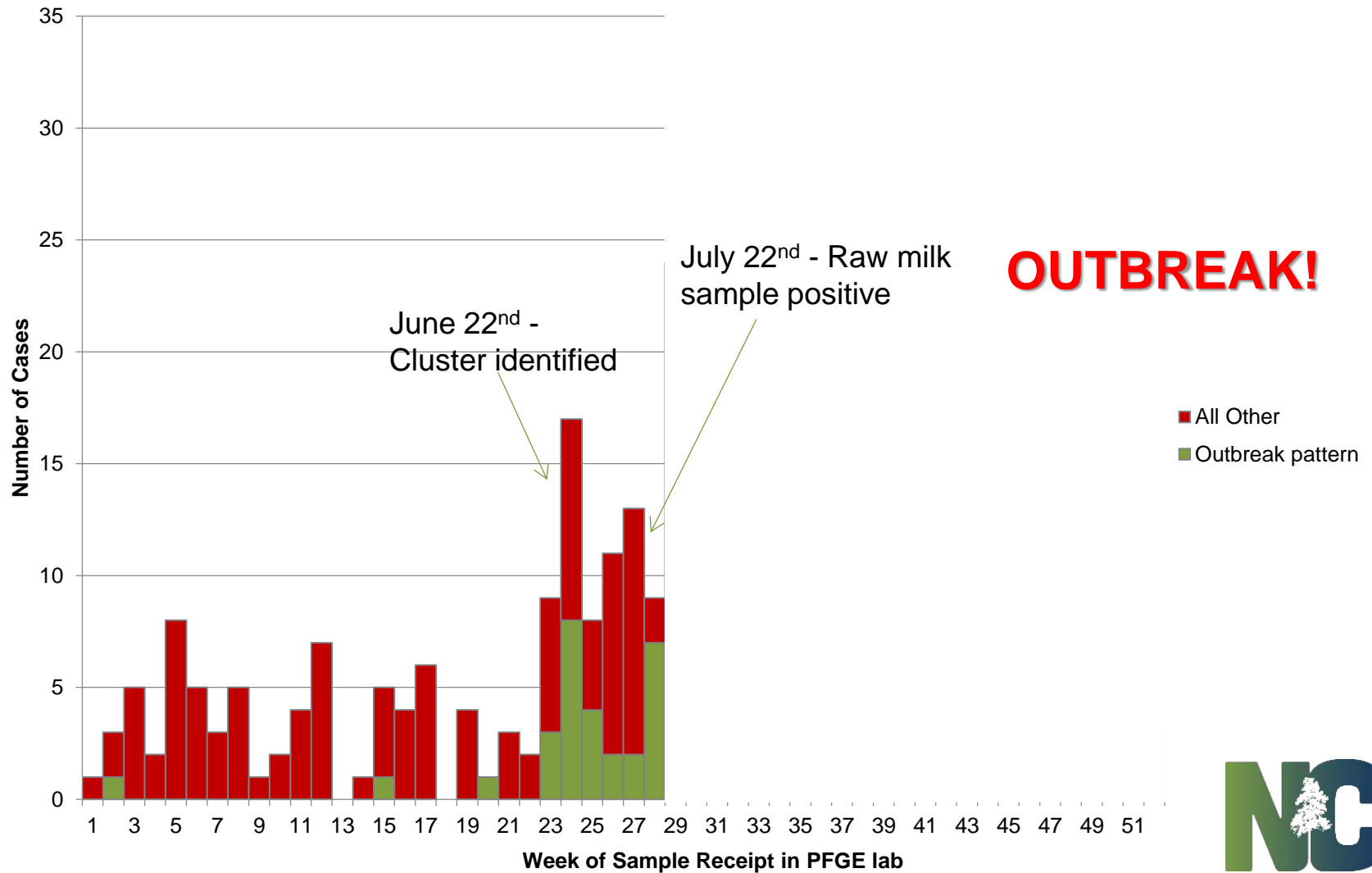
# Cluster of NC Salmonella Typhimurium isolates

## Salmonella Typhimurium - PFGE Pattern, 2016



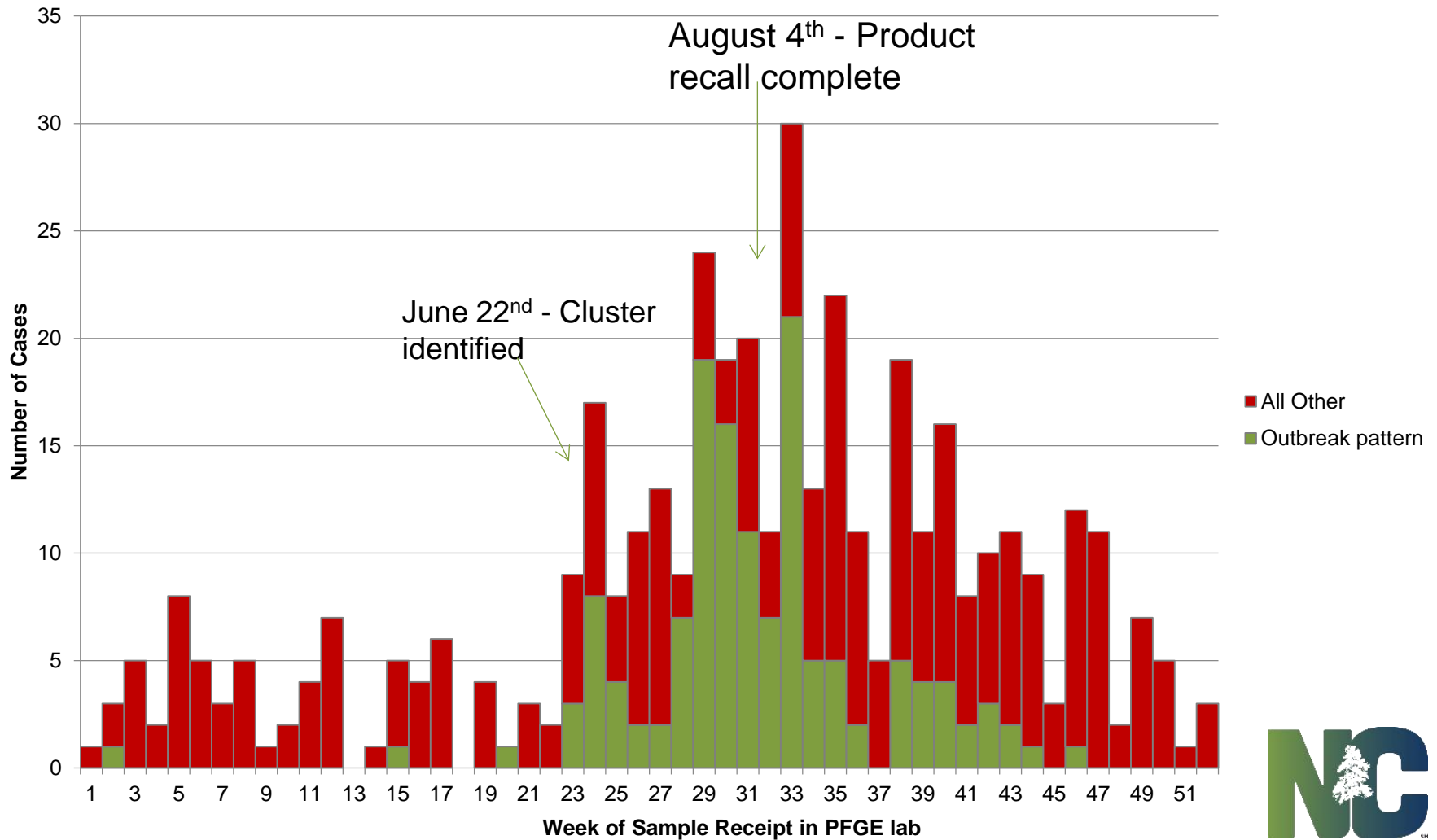


## Salmonella Typhimurium - PFGE Pattern, 2016





## Salmonella Typhimurium - PFGE Pattern, 2016



# *Whole Genome Sequencing (WGS)*



- More detailed and precise data for identifying outbreaks
- WGS used for listeria since 2013
  - More outbreaks identified
  - Fewer cases per outbreak
- Currently used on organisms if needed to help with a cluster or outbreak investigation

~~PIGE~~ WGS



## *Cluster investigations*



Subject line: NCEDSS event # 1012123454

Dear CD Nurse,

There is a case of Salmonella Enteritidis in your county that has been identified as a PFGE (WGS) match to others in the state (country).

Please complete the Risk History in NCEDSS as soon as possible. If the case is lost to follow-up, please indicate that in the record.

CDC is conducting a multistate investigation, please reinterview the case with the attached outbreak-specific questionnaire. Please let us know if the case is lost to follow-up,



# *OutbreakNet Enhanced*



# *OutbreakNet Enhanced*



- CDC grant funded program
- Focus on improving detection and rapid interviewing of cases of *Salmonella*, Shiga-toxin producing *Escherichia coli* (STEC), and *Listeria*
- NC focus
  - Improving timeliness and completeness of interviews of *Salmonella* and STEC cases
  - Improving data quality and analysis
- NC proposal
  - Expanded questionnaire
  - Centralized interviewing
  - Centralized data entry



# *OutbreakNet Enhanced*



What does this mean for your local health department?

- You can opt out and continue to investigate your own cases
  - More extensive risk history
  - More emphasis on data quality
- If you opt in
  - The student team will interview your cases and enter data into NCEDSS
    - Can work evening hours and weekends
  - LHD still responsible for control measures
  - The process for investigating outbreaks will not change
- Exact flow of work and information still TBD
  - Requesting 10 – 12 counties to be part of pilot





# *Preparing for Enterics Season*



# *Preparing for enterics season*

- Communication
- Utilize resources
- Keep an updated rolodex
- Epi teams
  - Contact TATP nurse consultant for info on epi team training



**FEDERAL**



**STATE**



**Public Health**  
Prevent. Promote. Protect.

**LOCAL**





***QUESTIONS?***

