

FOODBORNE ILLNESS, SURVEILLANCE AND OUTBREAKS

Nicole Lee
Foodborne
Epidemiologist

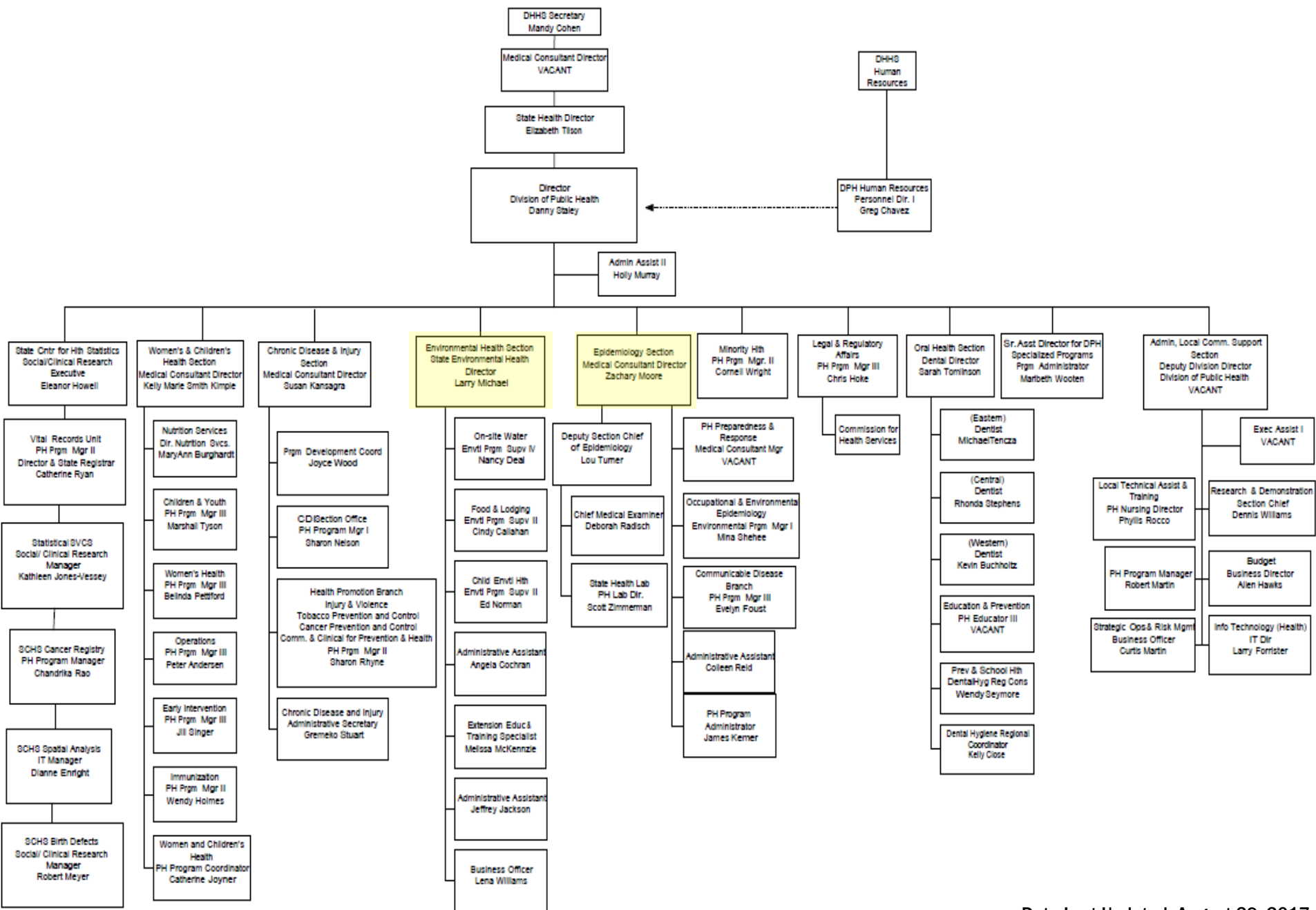
NC Division of
Public Health,
Communicable
Disease Branch

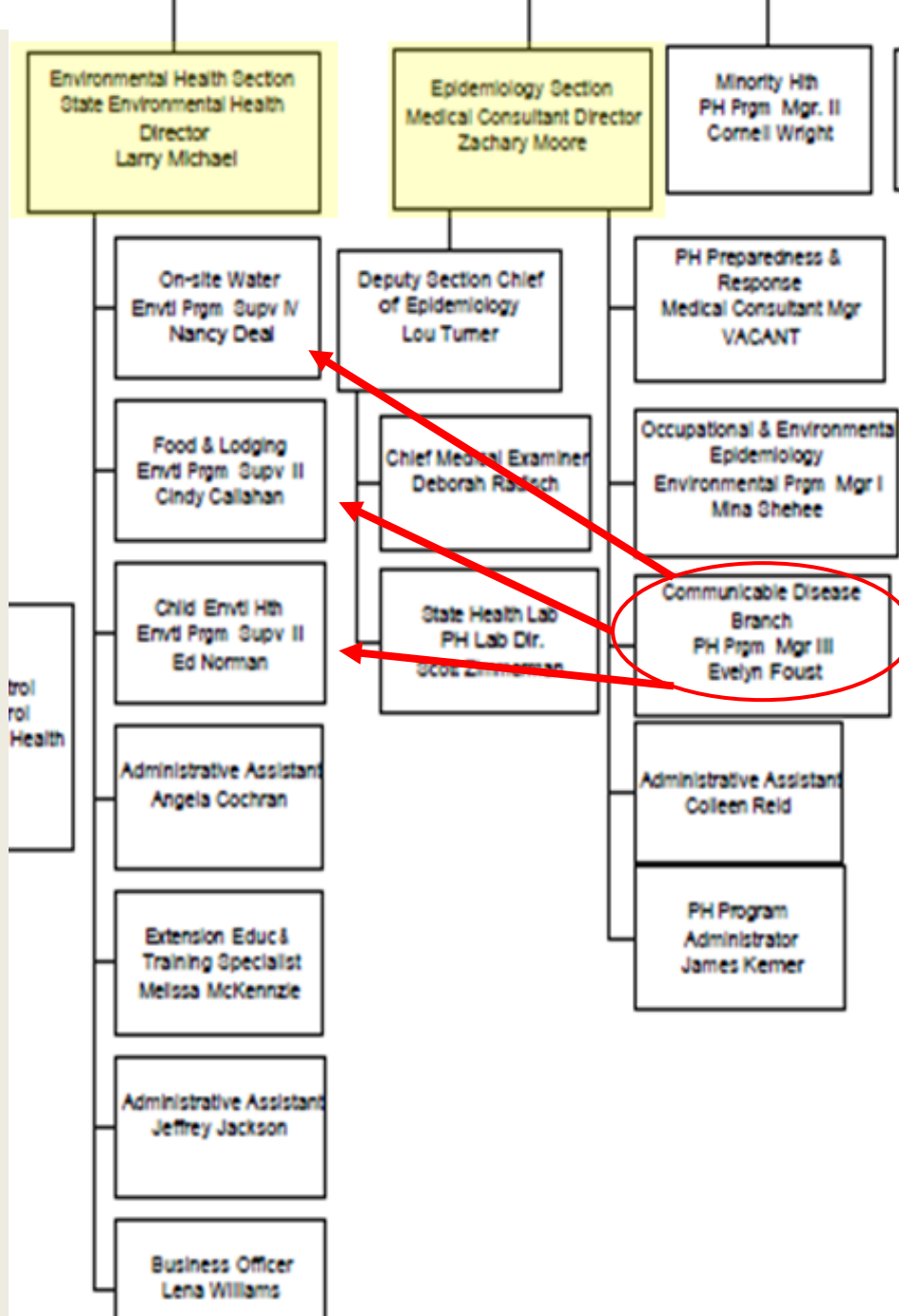
ENVIRONMENTAL HEALTH SPECIALIST TRAINING
JUNE 2019

PRESENTATION CONTENT

- **Communicable Disease Branch** – who we are and what two big things we do
- **Foodborne/waterborne outbreaks** - why we care
- **Partners** – who needs to be involved and why
- **Outbreaks from the past** - foodborne, person to person, waterborne
- **Common conflicts**
- **Q & A**

Department of Health and Human Services
DIVISION OF PUBLIC HEALTH

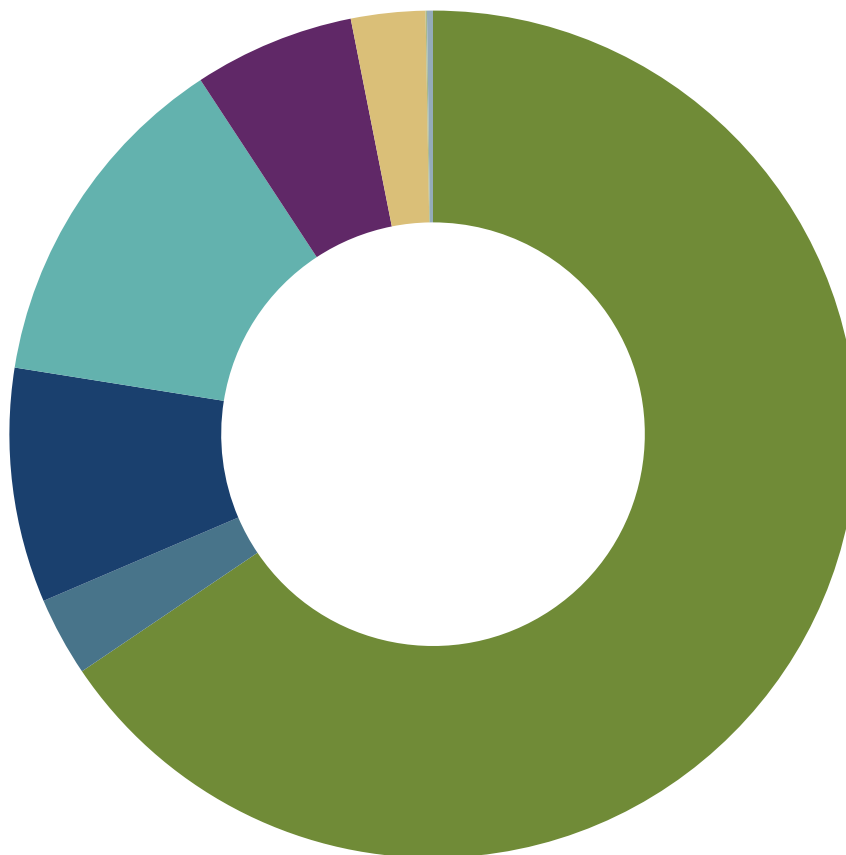




Communicable Disease
Branch
PH Prgm Mgr III
Evelyn Foust

Communicable Diseases Reported in 2017*

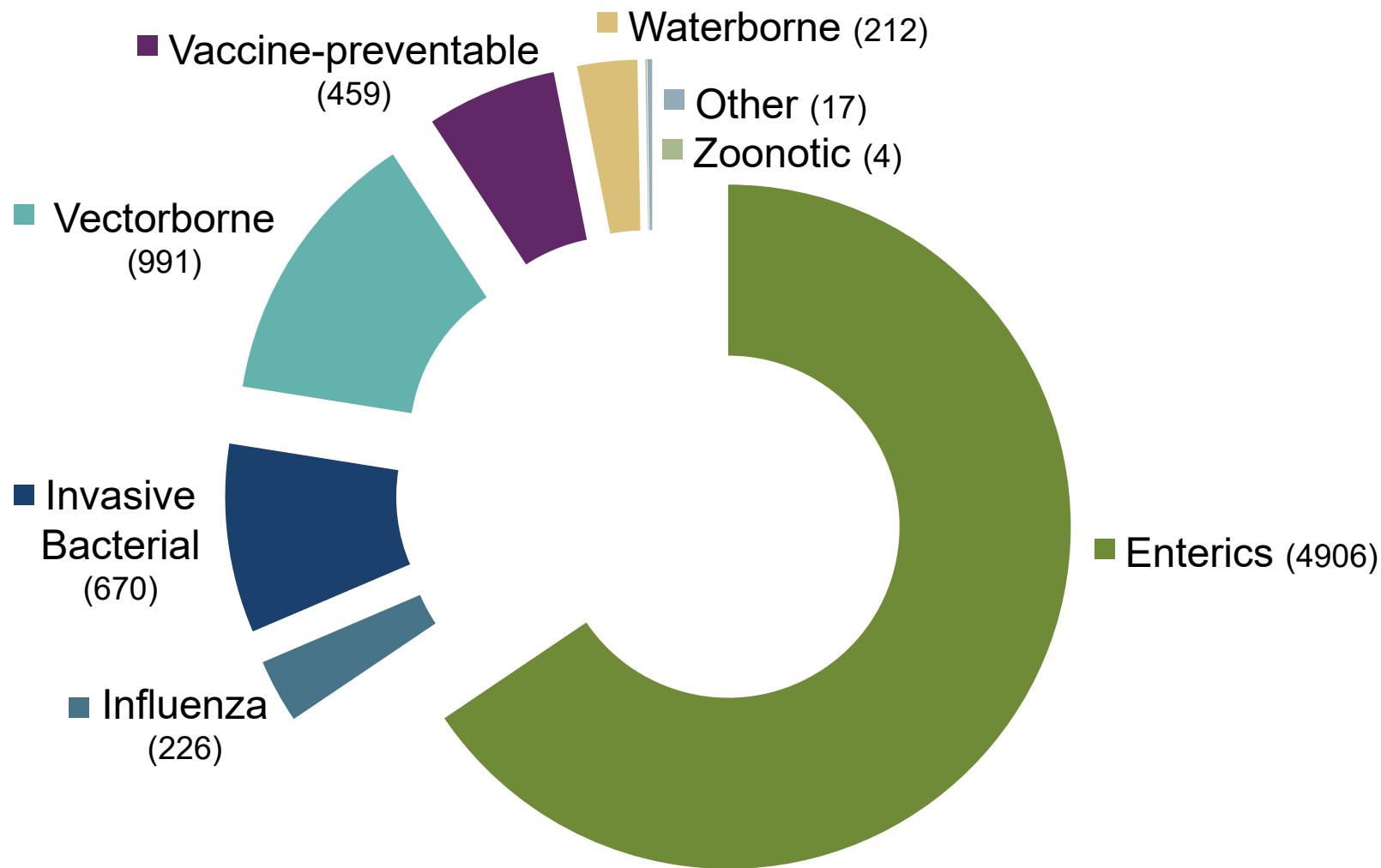
Confirmed and Probable



* Note: this data is preliminary and does not include STDs.

Communicable Diseases Reported in 2017*

Confirmed and Probable



* Note: this data is preliminary and does not include STDs.

COMMUNICABLE DISEASE BRANCH

Surveillance

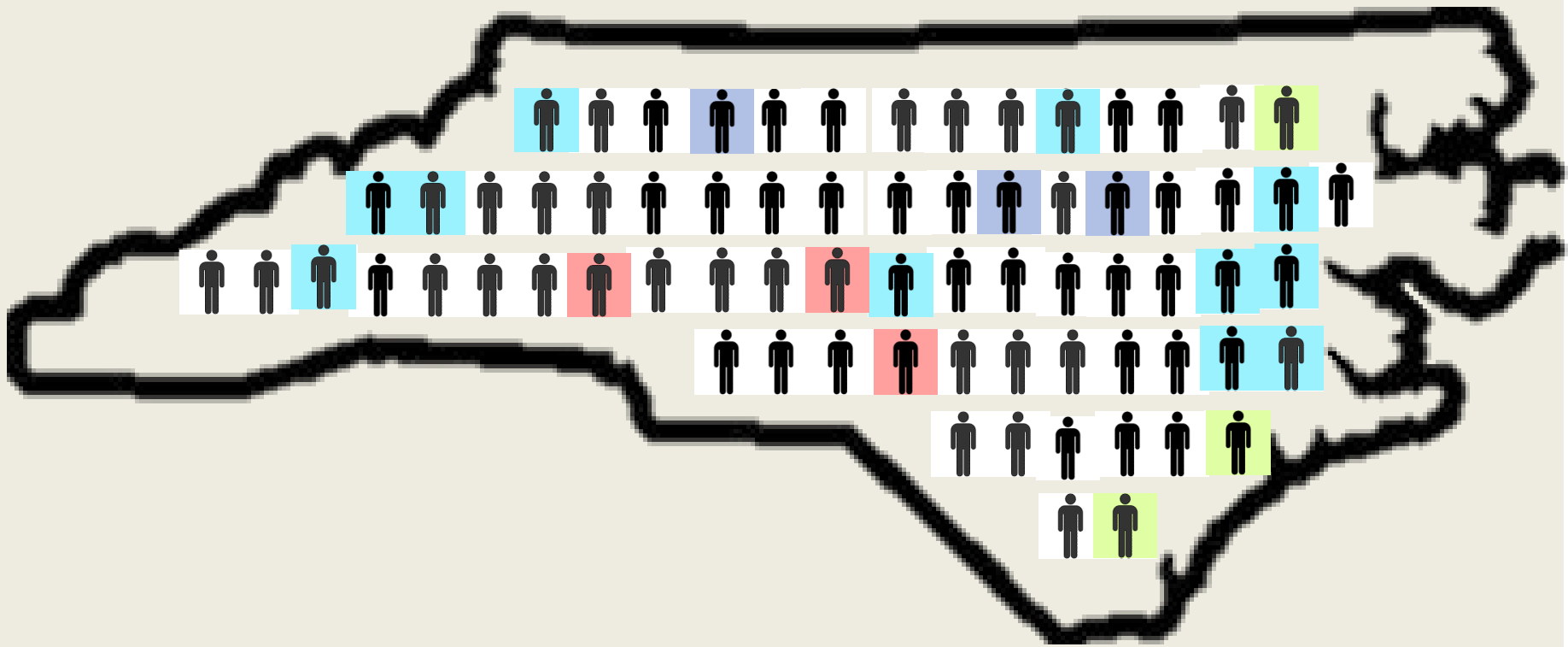
Outbreak Response

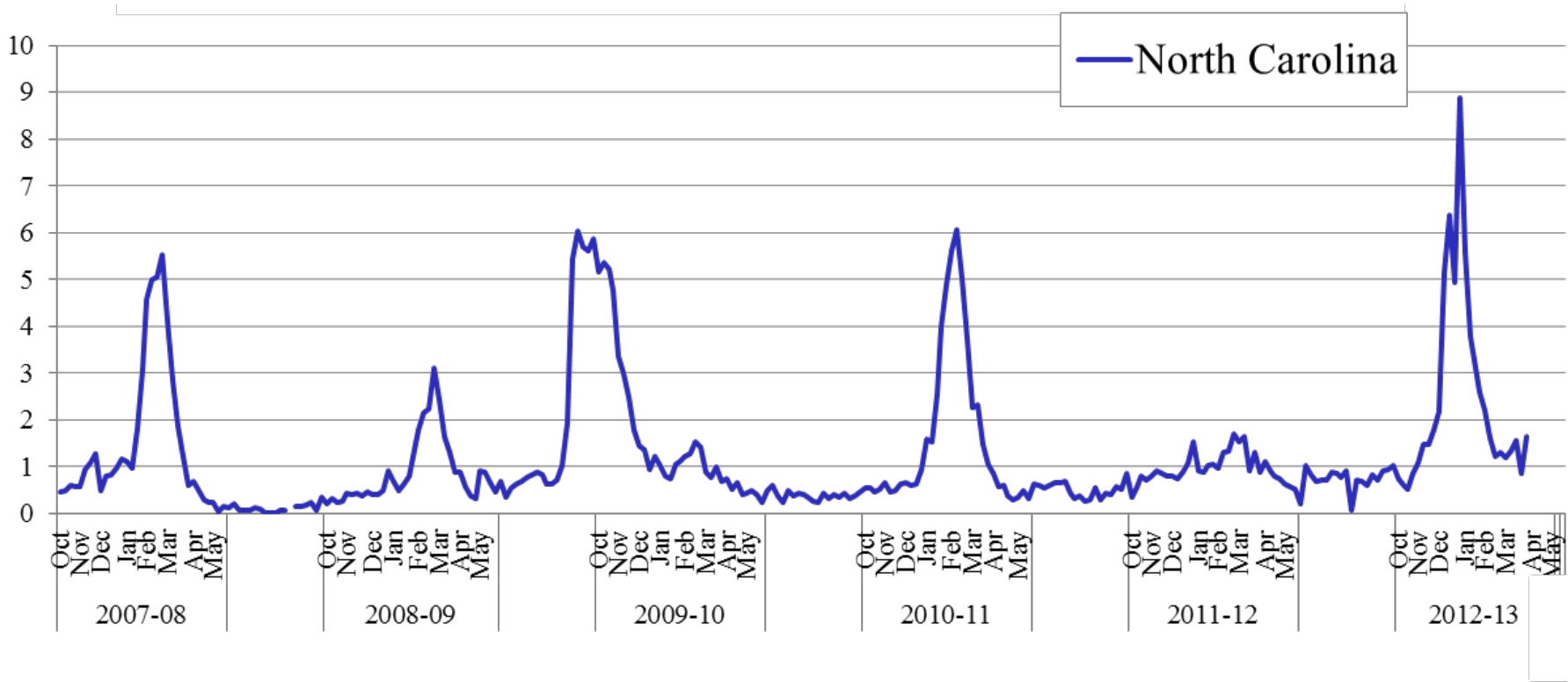
SURVEILLANCE



COMMUNICABLE DISEASE BRANCH

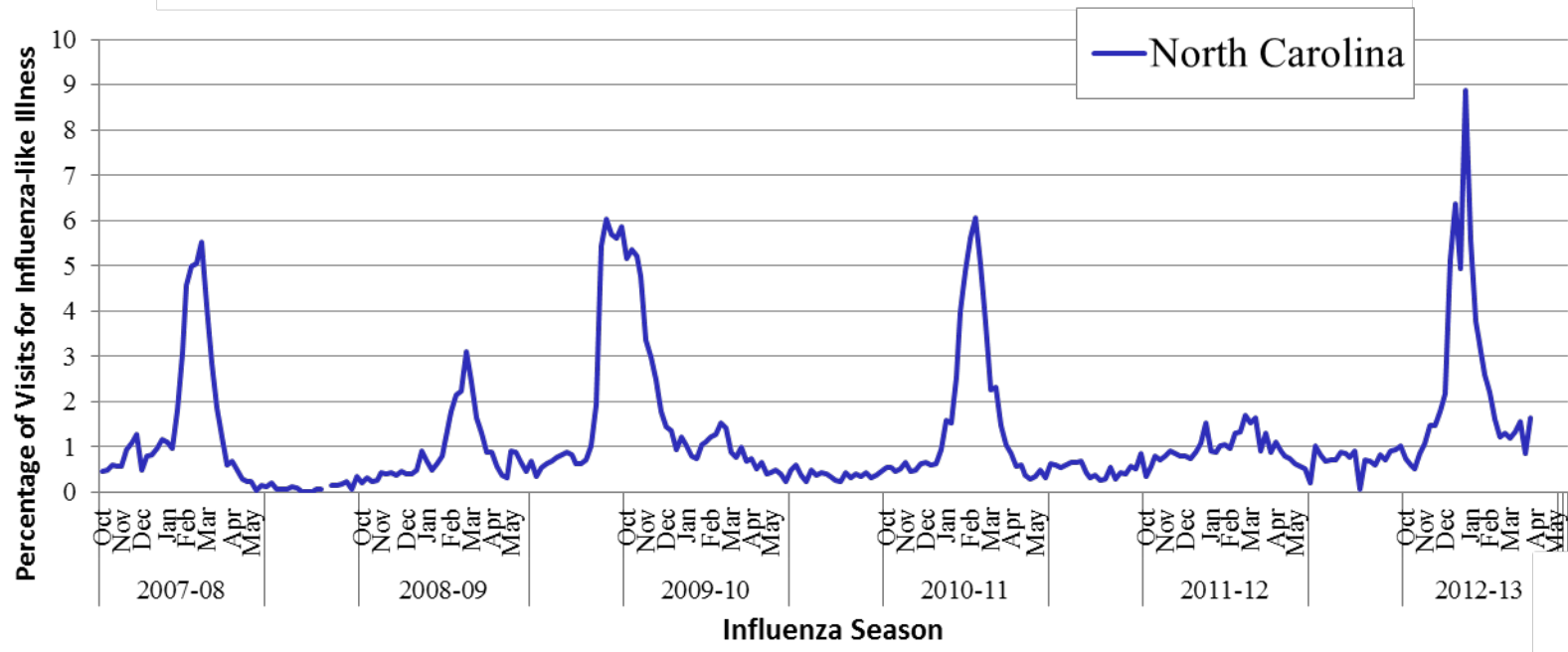
■ Surveillance



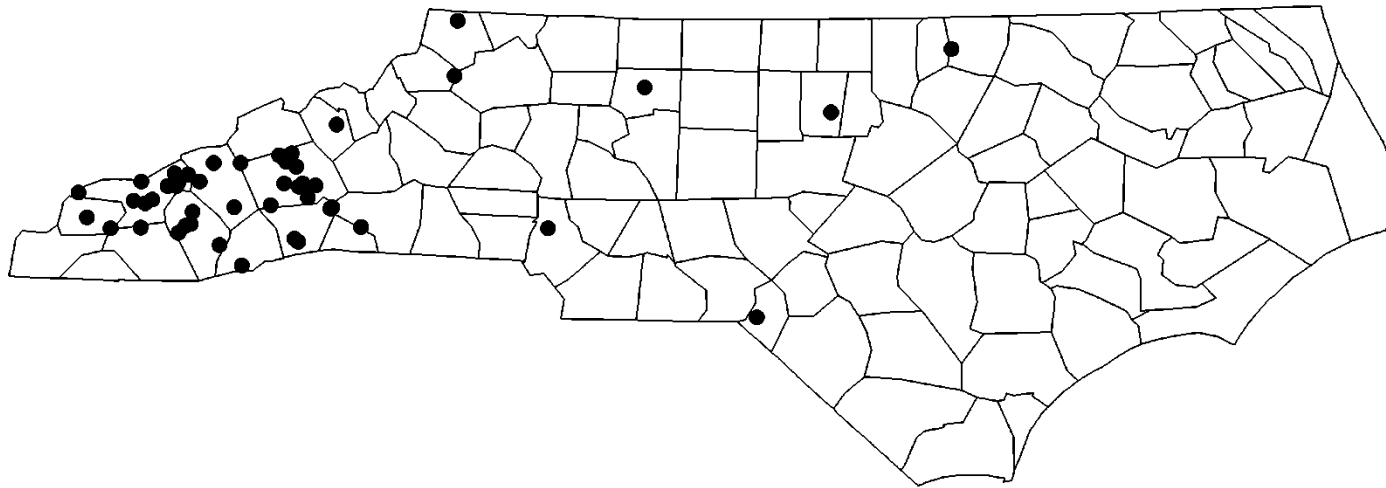


Sentinel Surveillance Network For Influenza-Like Illness

**Percentage of Visits for Influenza-like Illness (ILI) Reported
by Outpatient Providers in the ILINet Surveillance Network,
North Carolina: October 2007 - March 2013**



LaCrosse Encephalitis, NC Reported Cases
By Patient County of Residence
1997-2002 (N=17)



WWW.MENTI.COM

■ Audience polling

- Anonymous results appear on screen

■ Multiple choice

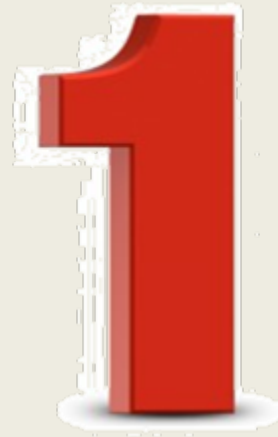
- You only have ~20 seconds to answer

■ Text entry

- Upper and lower case doesn't matter

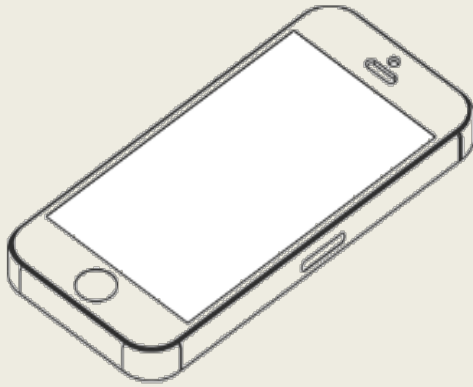
GET OUT YOU PHONES!

QUESTION #



**VISIT
WWW.MENTI.COM**

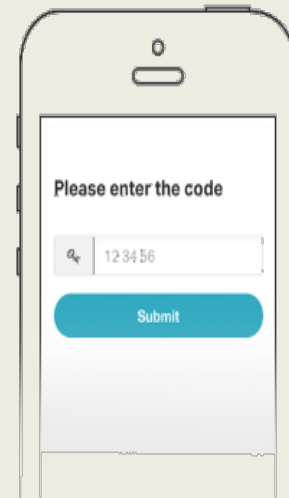
Go to **www.menti.com** and use the code **55 36 48**



1 Grab your phone

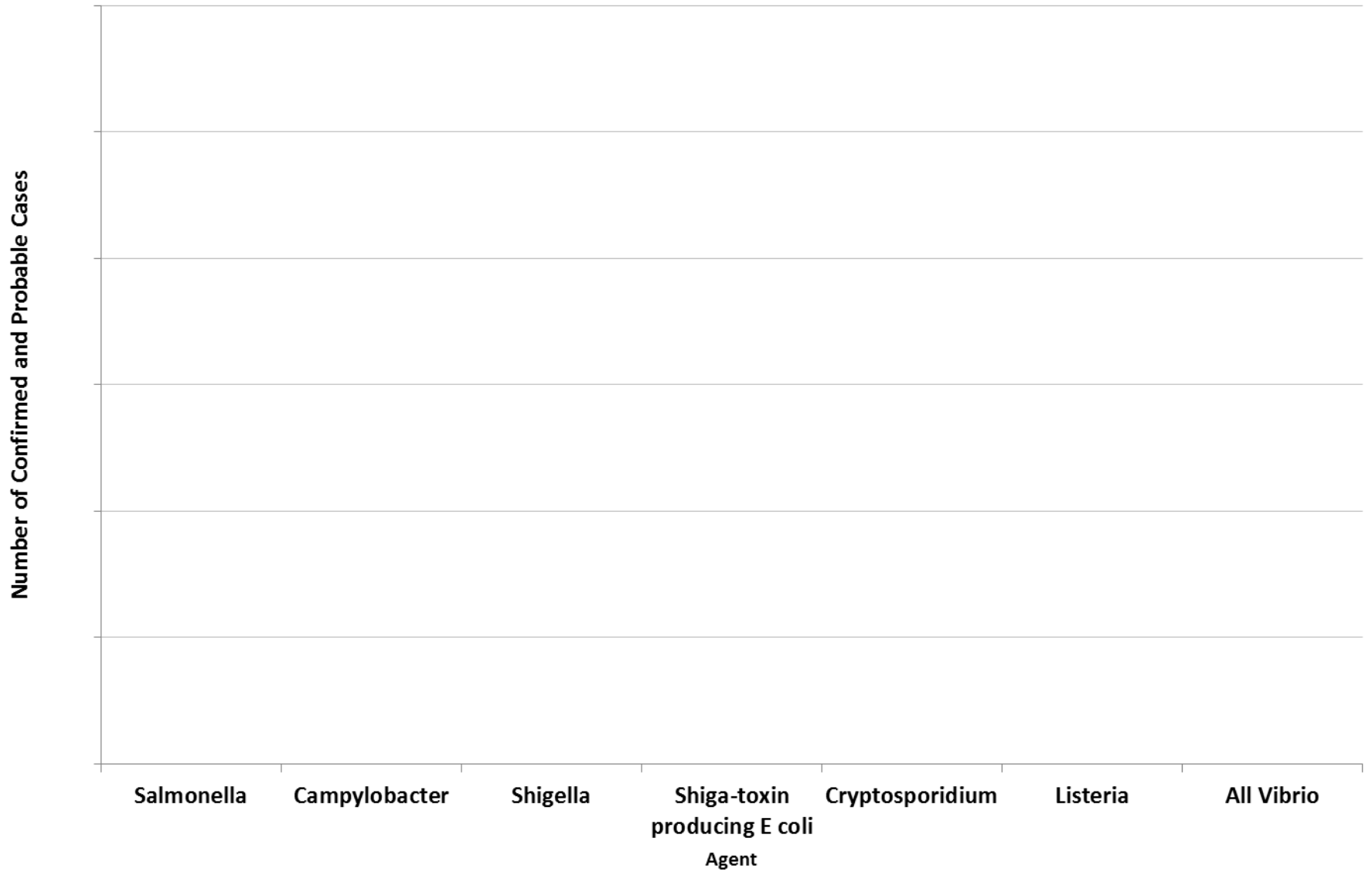
www.menti.com|

2 Go to **www.menti.com**

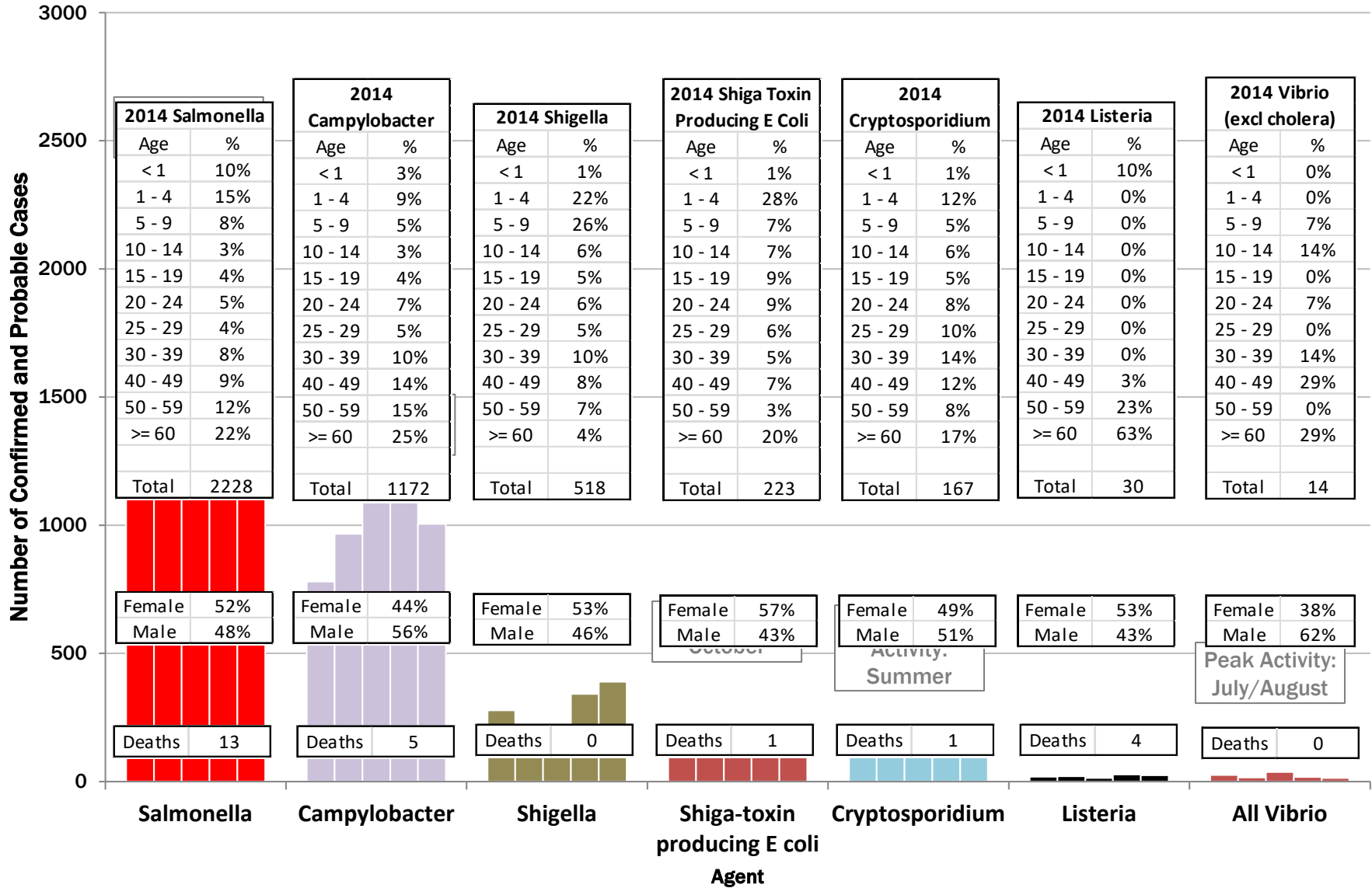


3 Enter the code
55 36 48 and vote!

Cases of Foodborne Illness Reported in North Carolina by Agent and Year



Cases of Foodborne Illness Reported in North Carolina by Agent and Year: 2014 Demographic Data



SURVEILLANCE

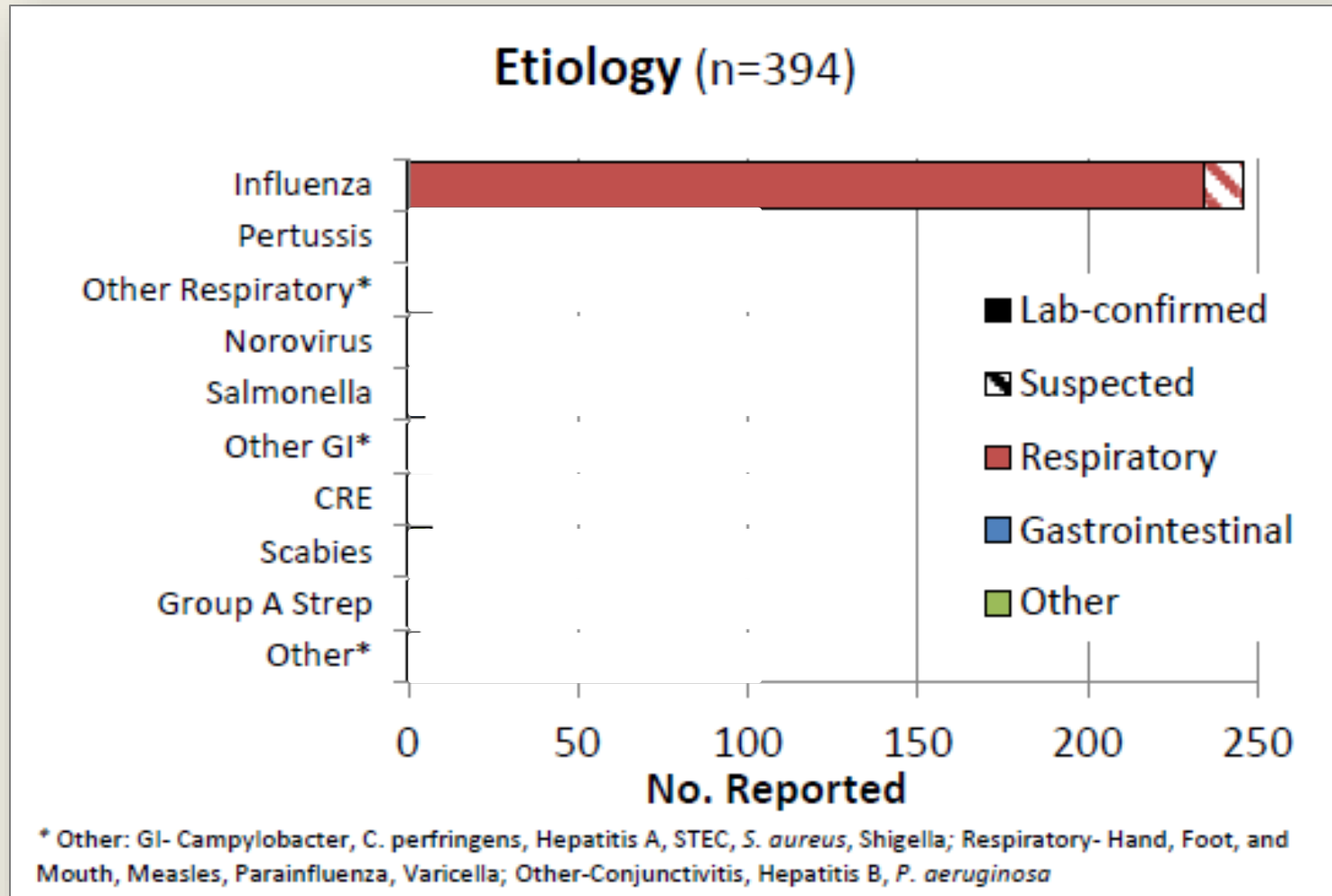


OUTBREAK RESPONSE

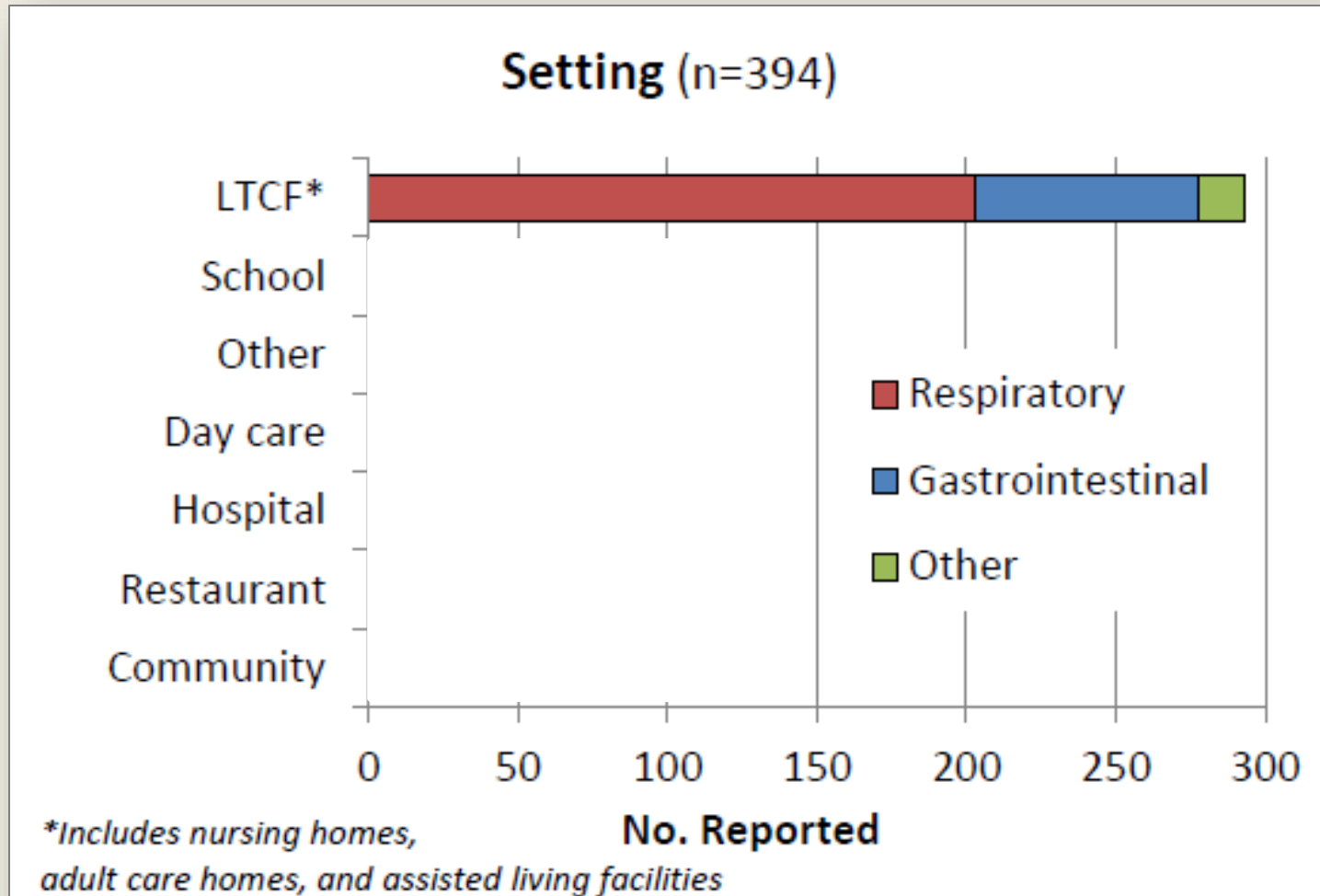


**# outbreaks
reported in
2018
(statewide)**

Flu causes the most outbreak reports



Outbreaks are in nursing home setting most often



GET OUT YOU PHONES!

QUESTION #



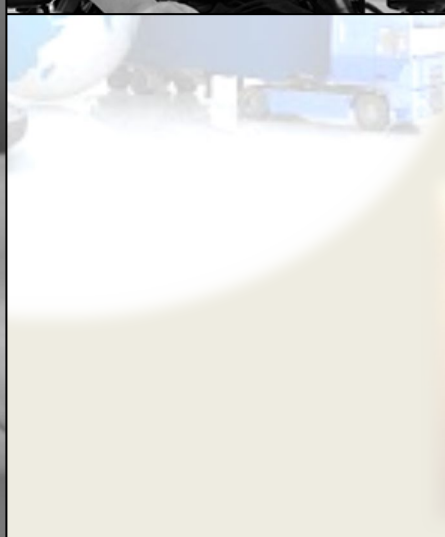
What pathogen causes the most GI outbreaks?



WHY DO WE CARE ABOUT FOODBORNE / WATERBORNE DISEASES?



WHY DO WE CARE ABOUT FOODBORNE / WATERBORNE DISEASES?



**WHAT PARTNERS NEED TO
BE INVOLVED AND WHY?**

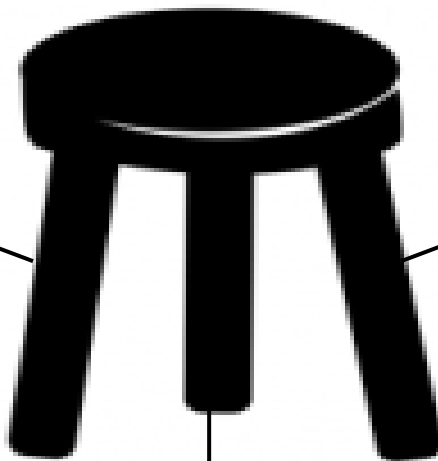
WHAT PARTNERS NEED TO BE INVOLVED?

3-legged stool

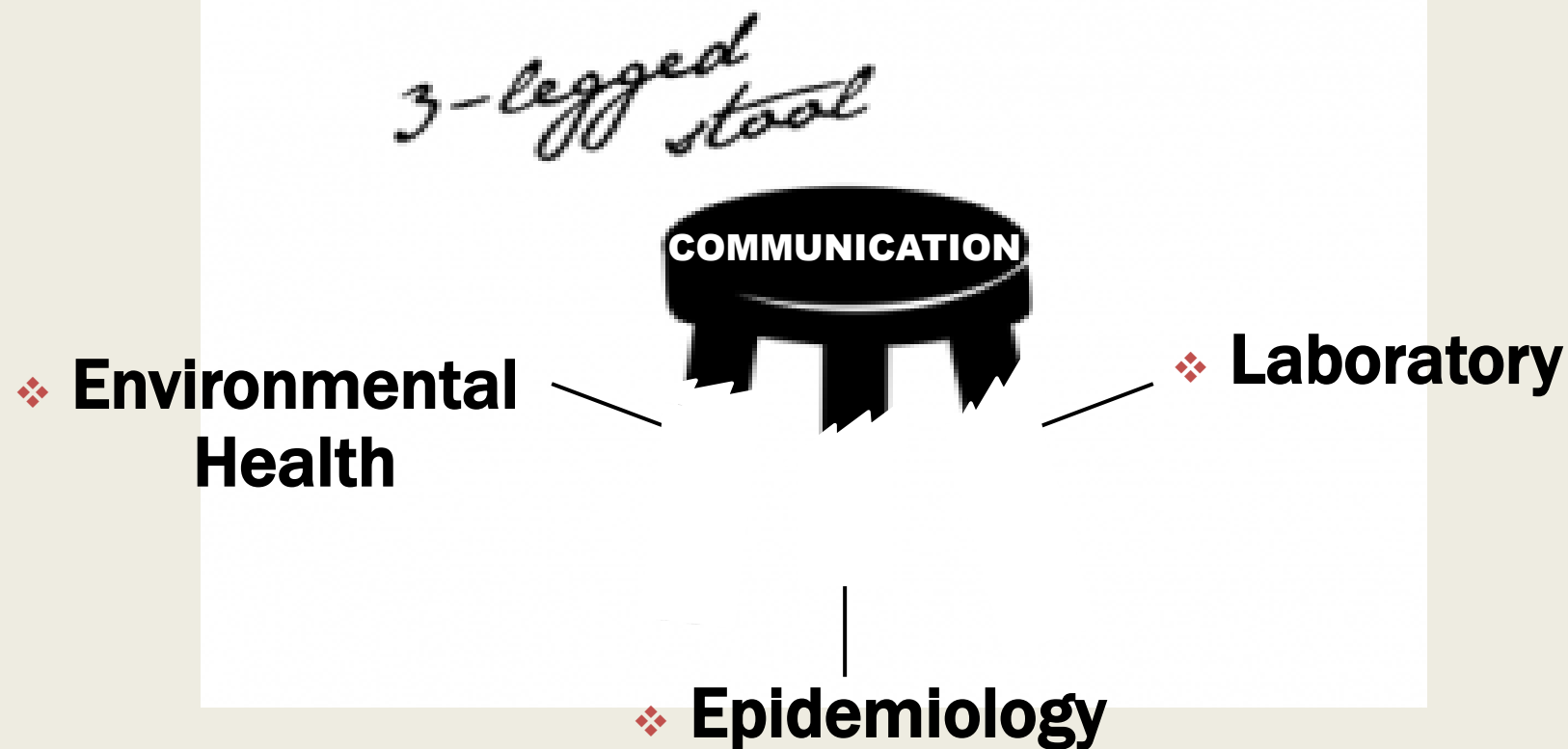
❖ **Environmental Health**

❖ **Laboratory**

❖ **Epidemiology**

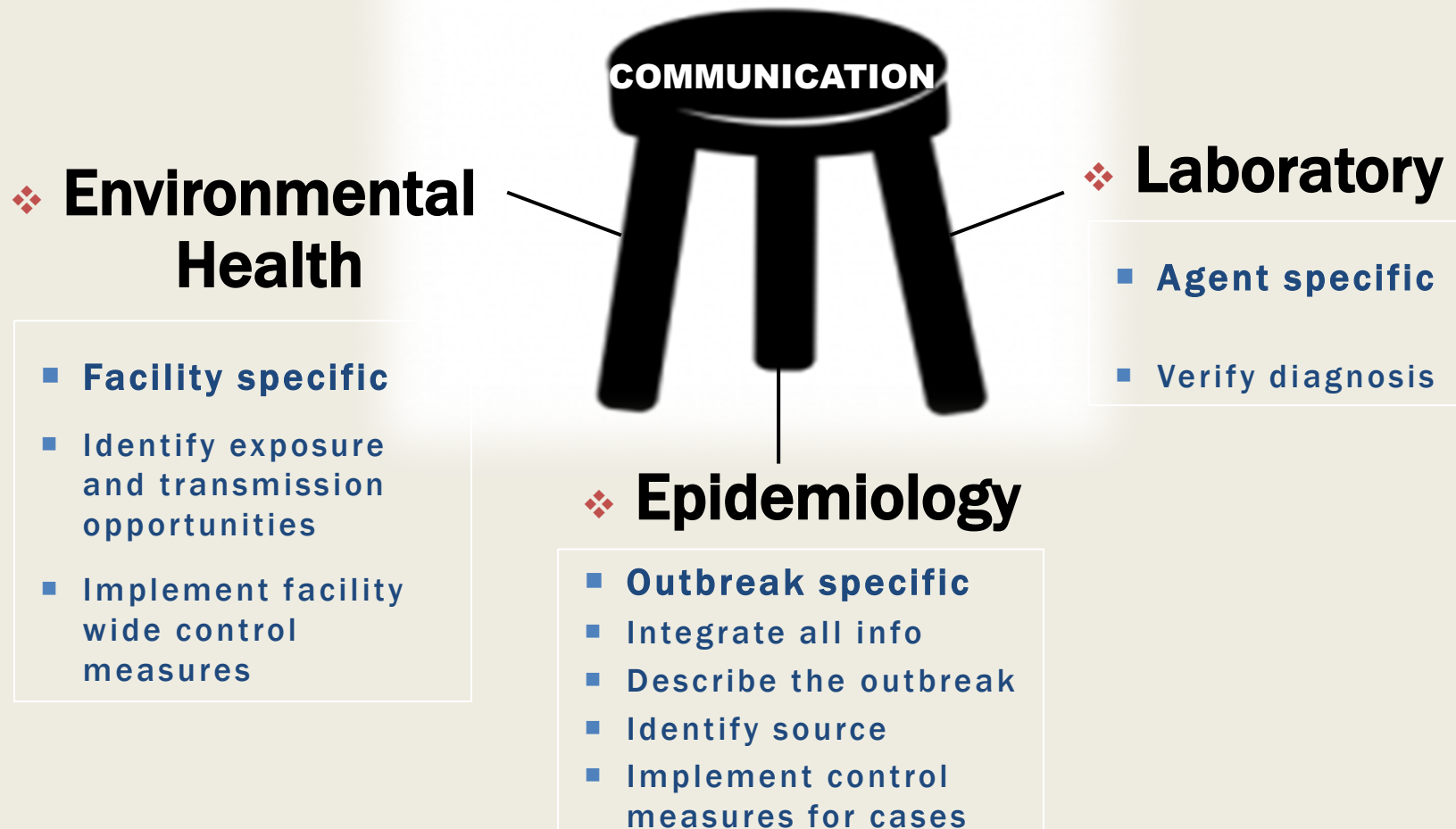


WHAT PARTNERS NEED TO BE INVOLVED?



PURPOSE OF PARTNERS DURING AN OUTBREAK

3-legged stool



FOODBORNE

WATERBORNE

PERSON TO PERSON

**North
Carolina
Outbreaks**

FOODBORNE

WATERBORNE

PERSON TO PERSON

**North
Carolina
Outbreaks**

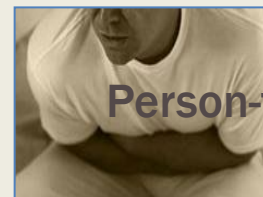
SALMONELLA



Animals and/or Animal Products



Cross-contamination



Person-to-person



SALMONELLA

■ Clinical picture

- Diarrhea, ab cramps, fever, sometimes vomiting



■ Incubation

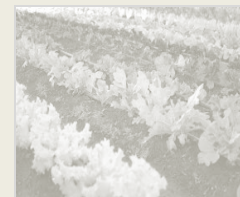
- Usually 12 - 36 hrs (range: 6 - 72 hrs)

Animals and/or Animal Products



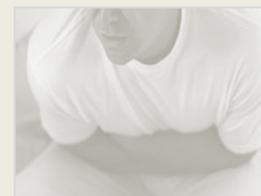
■ Duration

- 4 - 7 days



■ High risk groups

- Young, elderly, immunocompromised



MONDAY, MAY 13, 2013

Day 1

10:00AM – CALL FROM CD NURSE

- Fifteen ill with N/V/D (some bloody)
 - 10 / 15 hotel staff (3/10 food handlers)
- 1 hospitalized
- Two of three samples (+ Salmonella)
- May 8th was the first onset

4pm - Conference call

- Local Health Dept: Epi, Env Hlth
- State: Epi, Env Hlth, Lab, Public Affairs

DAY 1 SUMMARY OF ACTIONS/DECISIONS

- **Confirm** the story
- Implement **control measures** with hotel/rest.
- **Interview** ill
- Coordinate hotel assessment with Env Hlth
- Coordinate stool specimen collection, shipment, and **testing** with state lab
- Develop **communication** tools
- Send statewide & national **alerts** to identify additional cases
- Request **receipts** from hotel (case-control study)
- Develop **survey** from hotel menu
- **Send** state staff to Cumberland to assist with summarizing data and data entry

3 PARTNERS WITH 1 GOAL

Environmental Health



Laboratory

Epidemiology

Laboratory

- Test stool samples

Environmental Health

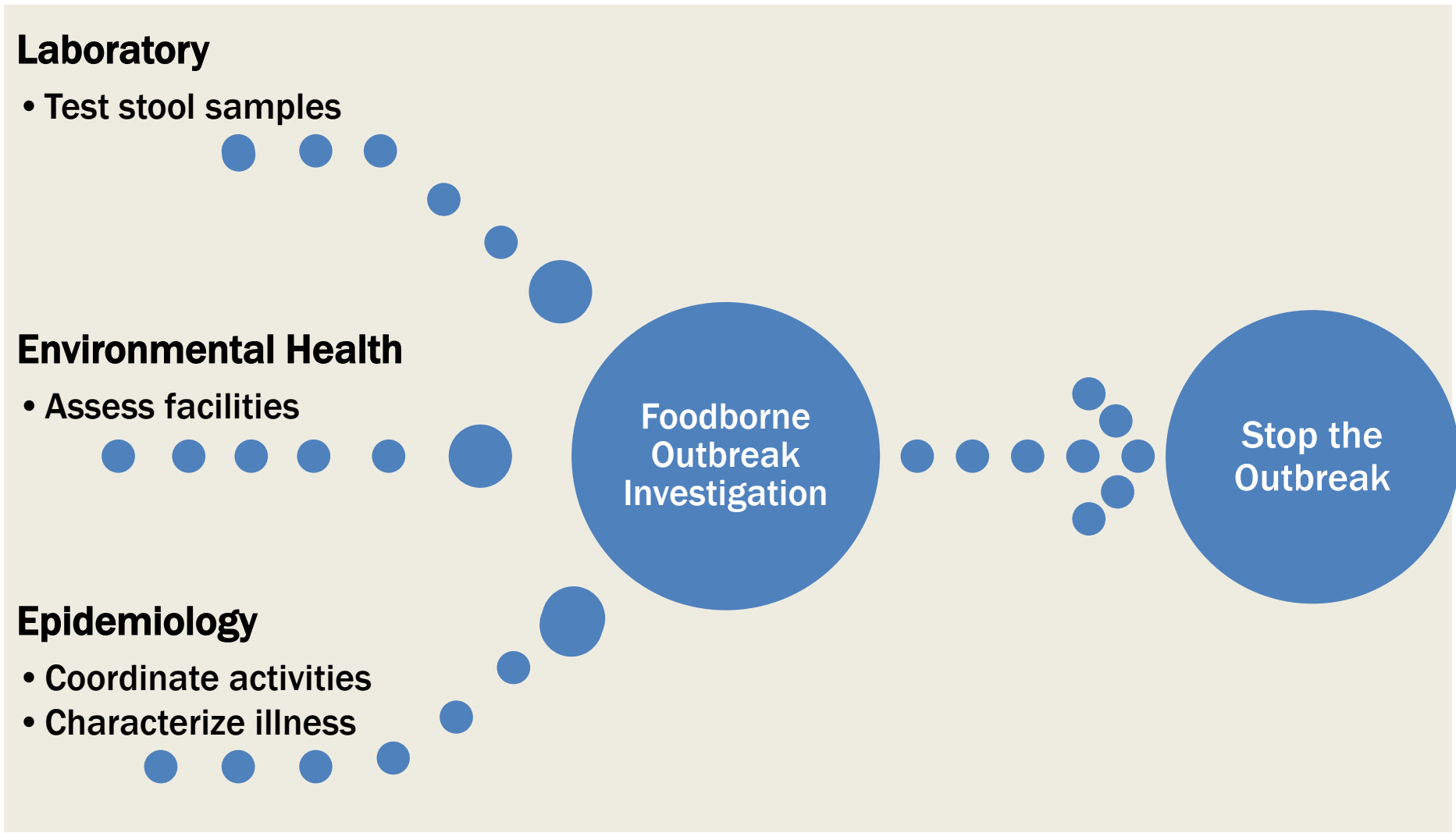
- Assess facilities

Epidemiology

- Coordinate activities
- Characterize illness

Foodborne
Outbreak
Investigation

Stop the
Outbreak



RESULTS

Laboratory

Environmental
Health

Epidemiology

LABORATORY RESULTS

- **54 specimens tested**
 - **2 (4%) unsatisfactory**
 - **27 (50%) negative**
 - **25 (46%) positive**
 - **25 (100%) *Salmonella typhimurium***
 - **25 (100%) had the same matching PFGE pattern**

ENVIRONMENTAL HEALTH RESULTS

- **Environmental Assessments**

- Risk Factors
- Personal Hygiene
- Approved Source
- Contamination
- Holding
- Cooking

- **Interviews**

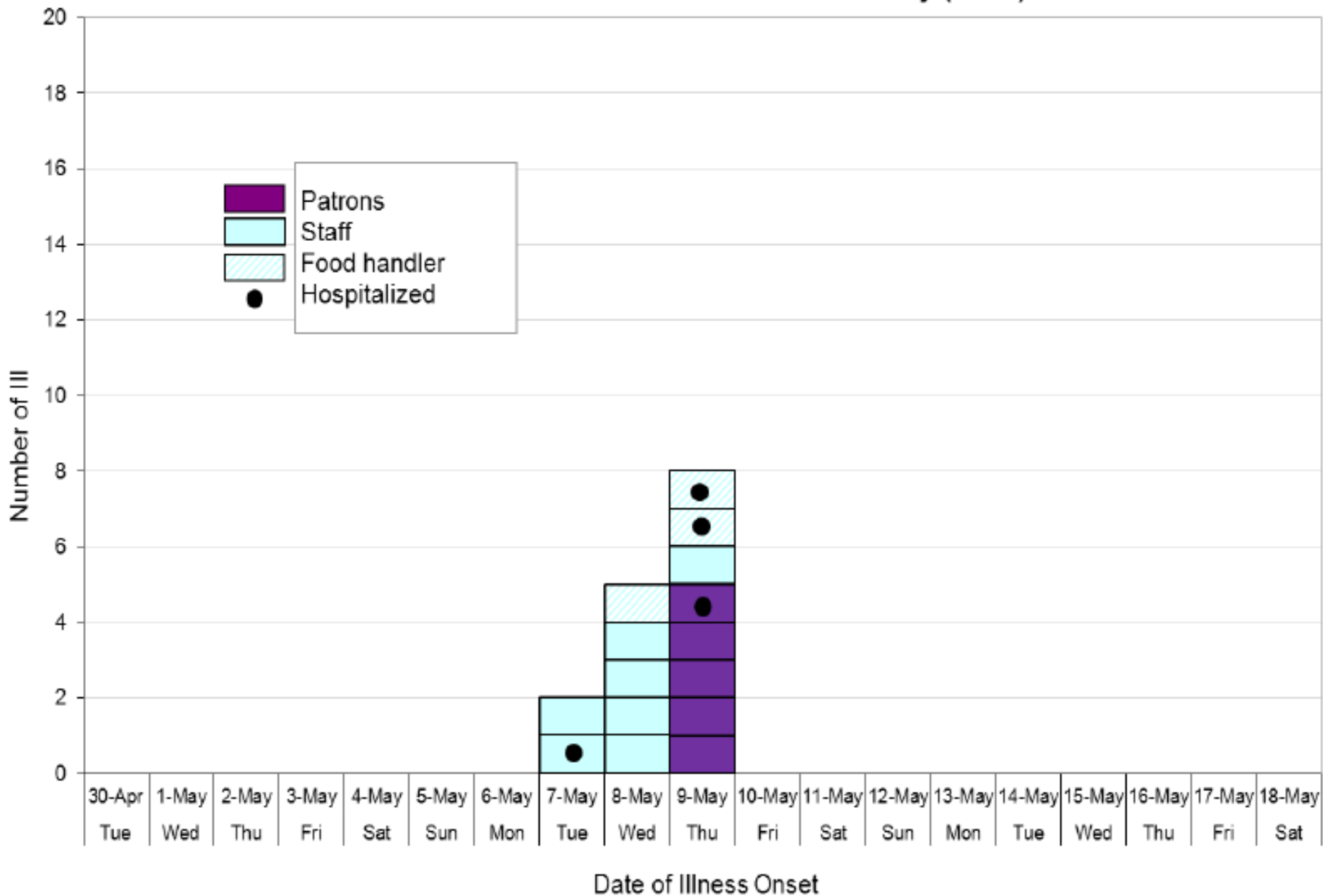
- **Trainings**

ENVIRONMENTAL HEALTH ACTIONS

- Required reportable BIG 5
- Tools
 - Three legged stool
 - Employee Health
 - Hand washing
 - No Bare Hand Contact of Ready to Eat food
 - Risk Control Plans
 - Enforcement

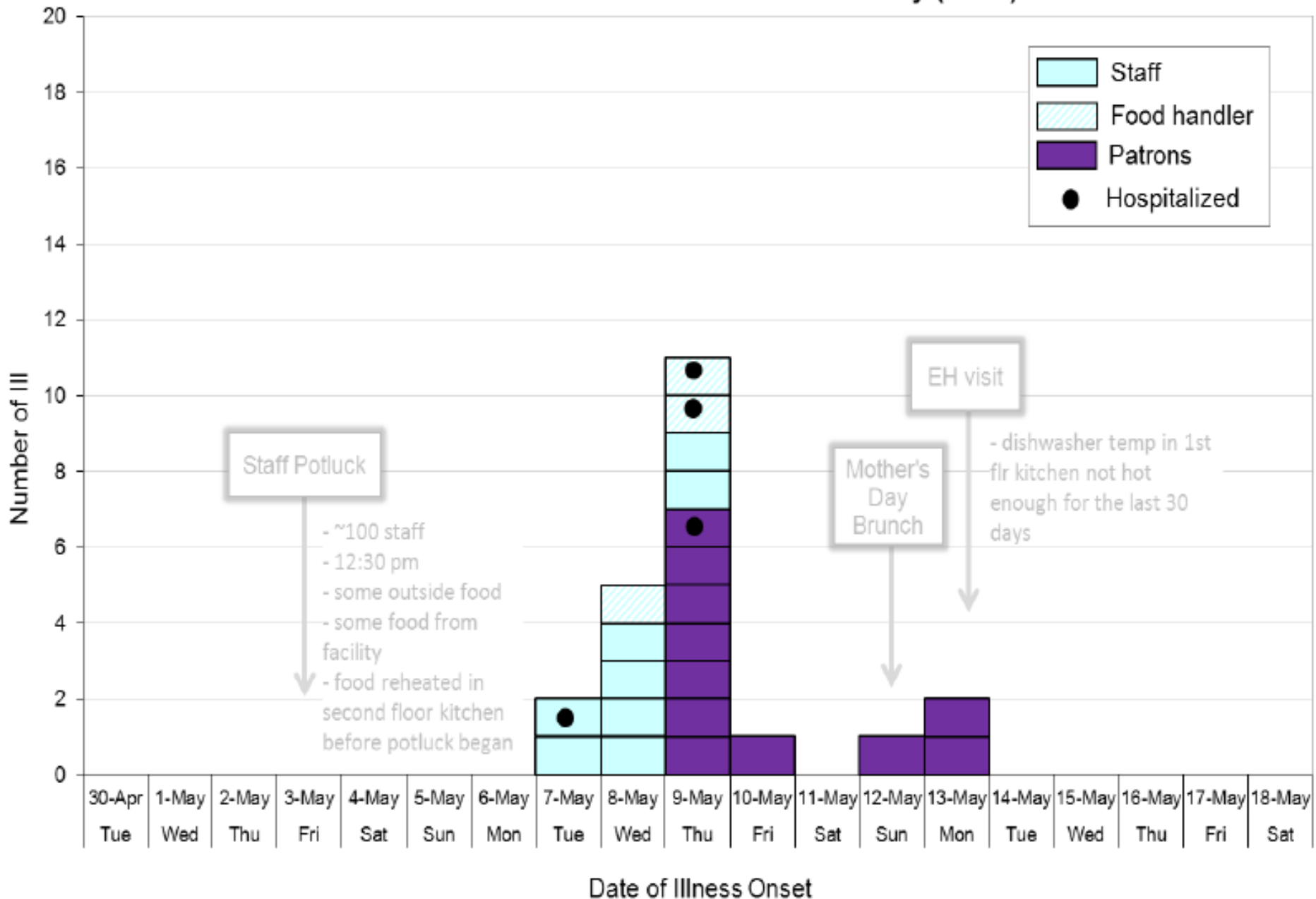
Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=15)



Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=22)



Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=100)

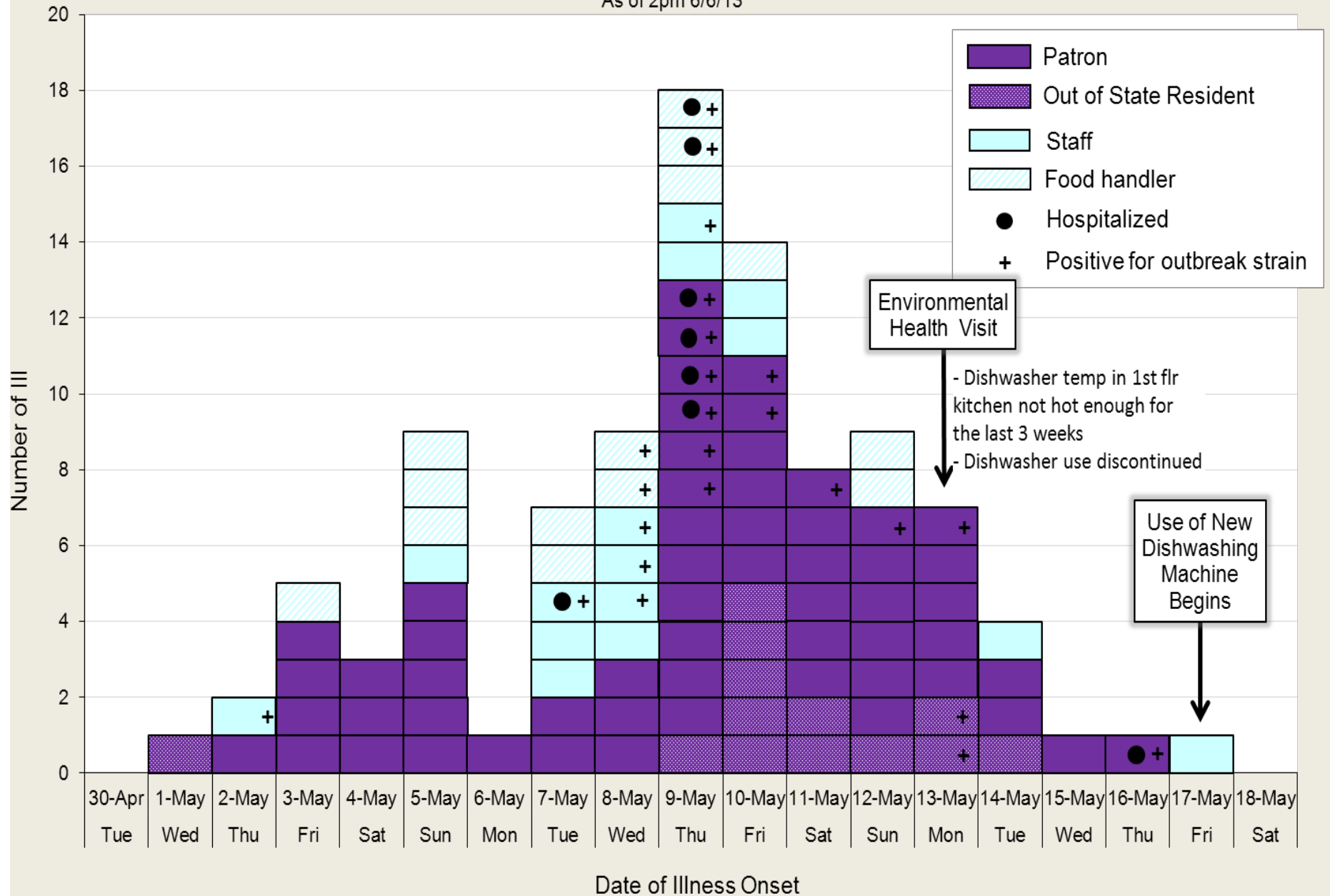
As of 2pm 6/6/13



Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=100)

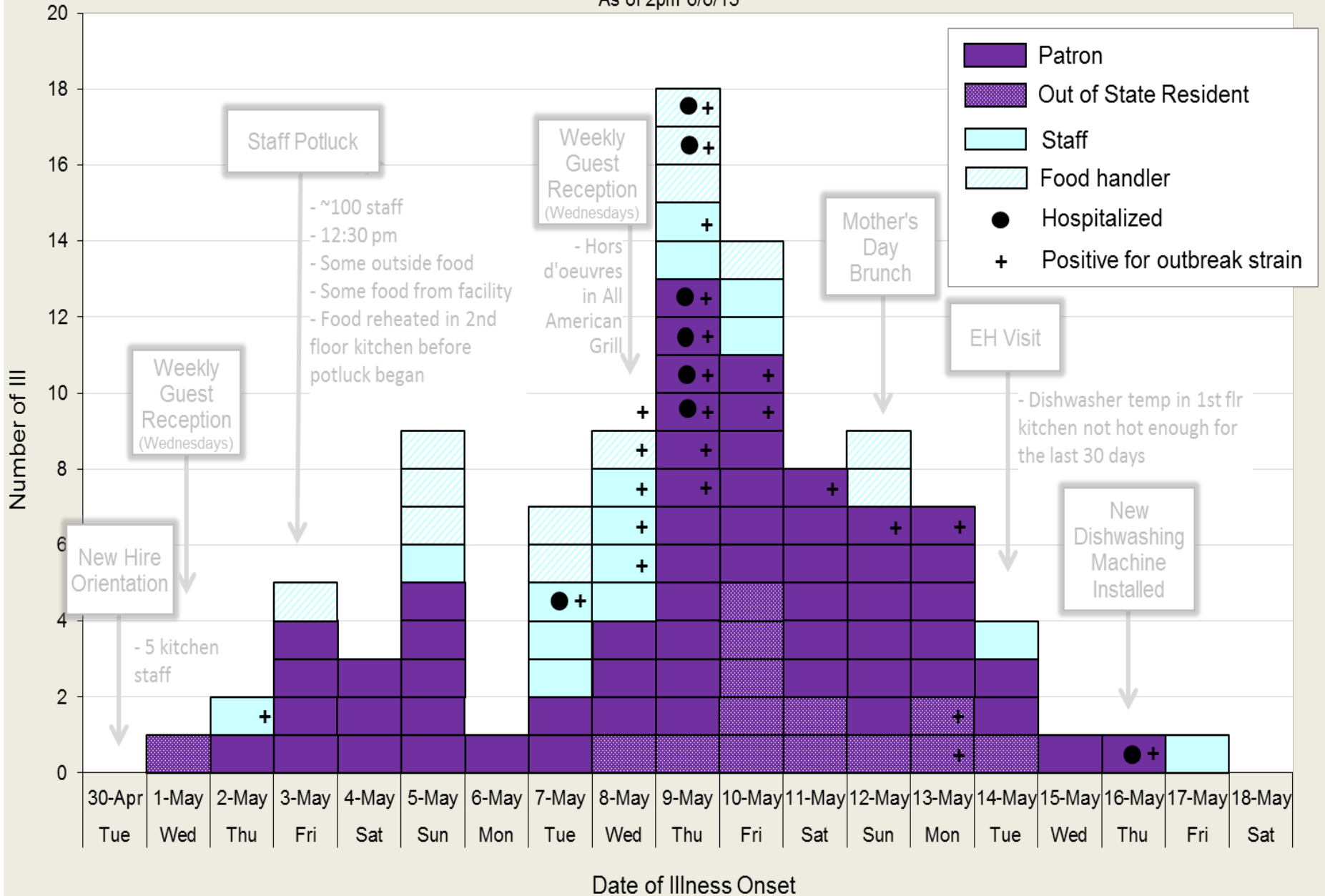
As of 2pm 6/6/13



Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=101)

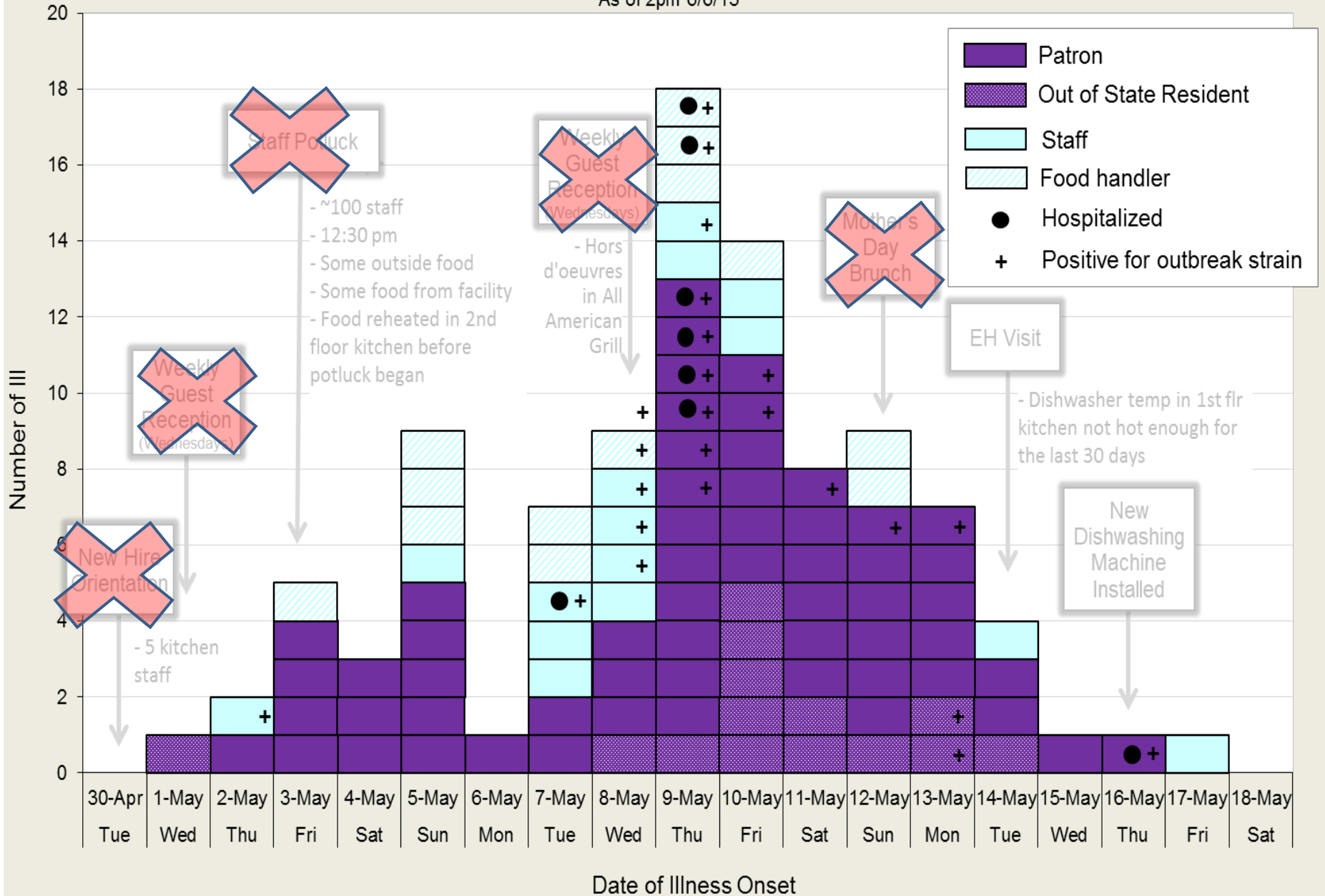
As of 2pm 6/6/13



Number of Ill Patrons and Staff by Date of Illness Onset

Salmonellosis Outbreak: Cumberland County (n=101)

As of 2pm 6/6/13



EPIDEMIOLOGY RESULTS

Total Ill
100

Hospitalized
8

Counties
Represented
11

Ages
17yrs-81yrs
Median: 45 yrs

Exposure	Relative Risk
FOOD	
Employee Potluck	0.62
Café Breakfast Buffet	0.89
Café Lunch Buffet	1.09
<i>All American Grill</i>	3.6
WORK TASK	
<i>All American Grill Supervisor</i>	4.3

RESULTS

Those who ate/drank at the All American Grill were 3.6 times more likely to become ill when compared to those who did not eat/drink at the All American Grill

CONCLUSION

- **Something was happening in the All American Grill**
 - Numbers were too small to implicate a specific food item
- **Based on the epi curve, cross-contamination was the likely culprit**
- **No increase in cases after visit by Environmental Health**
 - Better food handling practices implemented at that time

FOODBORNE

WATERBORNE

PERSON TO PERSON

North
Carolina
Outbreaks

The background of the slide is a photograph of water with gentle ripples. A bright, circular reflection, likely of a sunset or moon, is visible in the upper right quadrant, creating a soft glow. The overall color palette is a range of blues, from deep navy to light cyan.

What pathogen might be lurking in the water?



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WEATHER HOME

7 DAY FORECAST

FIRST ALERT DOPPLER RADAR

CLOSINGS CENTER

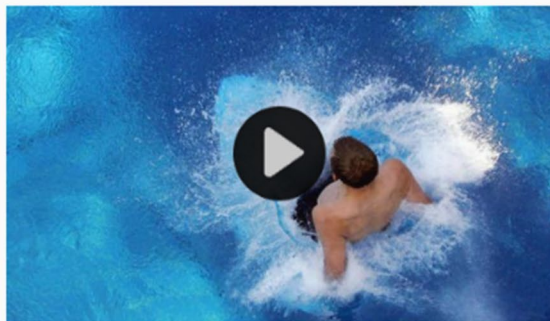
HURRICANE TRACKER

MORE TOPICS +

Local/State

Pool parasite sickens high school swimmers

Thursday, December 12, 2013



TAGS: north carolina news, durham county news, orange county news, local/state, caitlin knute

Comment Now Email Print Report a typo



Caitlin Knute

More: Bio, E-mail, Facebook, Twitter, Request Caitlin to speak at your event, News Team

DURHAM, N.C. (WTVD) -- Several high school swim team members in Durham and Orange Counties have tested positive for a disease caused by a swimming pool parasite.

Test results confirm at least three students have Cryptosporidiosis, more commonly known as Crypto. Two of the confirmed cases were in Durham County and one in Orange County. Three more suspected cases are awaiting test results.

"It's a water-borne illness. It is generally a diarrheal illness of short duration," said Susan Thompson, of the Durham County Department of Public Health. "Symptoms are generally diarrhea but you can also have abdominal cramps and vomiting."

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Pool-borne parasite spreads in Durham, Orange

BY TAMMY GRUBB

tgrubb@newsobserver.com December 12, 2013



This story incorrectly identified Cryptosporidium as a bacterium. The infection is caused by a parasite.

CHAPEL HILL - Health officials are warning residents to take precautions if they have visited or plan to visit indoor pools in Orange and Durham counties.

Three area swim team members have tested positive for Cryptosporidium since the first reported case last week temporarily closed the pool at Chapel Hill's Community Center Park. An additional three team members now have symptoms and are being tested, health officials said.

Cryptosporidiosis is caused by a parasite typically transmitted through contaminated food and water. It can survive for a number of days in swimming pools, even with proper

NEED TO KNOW

Orange and Durham health officials are asking the public to take precautions after several local swimmers reported Cryptosporidium infections.

Cryptosporidiosis is caused by a parasite and poses the most risk to the elderly, young children and pregnant women. Symptoms generally appear within 12 days of exposure and can include watery diarrhea, stomach pain, cramps, a low fever and, sometimes, nausea, vomiting, and dehydration.

If you suspect an infection, contact your doctor about being tested. Anyone who has had diarrhea for any reason should avoid pools for at least two weeks after it passes, health officials said.

WHAT ARE THE SYMPTOMS OF CRYPTO?

- **Frequent, watery diarrhea**
- **Other symptoms can include:**
 - Abdominal pain
 - Less often: nausea, vomiting, fever
 - Chronic or life-threatening symptoms in immunocompromised patients
- **Symptoms persist 2 to 20 days and can be intermittent**
- **Asymptomatic infections common**
- **Incubation period: 7 days (range: 2 -14 days)**



CONTROL

Hyperchlorination to Kill *Cryptosporidium**

Recommendations for Aquatics Operators of Treated Venues

Cryptosporidium (or “Crypto”) is an extremely chlorine-tolerant parasite, so even well-maintained pools and interactive fountains can spread Crypto among swimmers. If an outbreak of Crypto infections occurs in your community, the health department might ask you to hyperchlorinate. Additionally, to help keep Crypto levels low, you might choose to hyperchlorinate periodically (for example, weekly). If necessary, consult an aquatics professional to determine or identify the feasibility, practical methods, and safety considerations before attempting to hyperchlorinate at your facility.

Step 1: Close the pool to swimmers. If you have multiple pools that use the same filtration system — all of the pools will have to be closed to swimmers and hyperchlorinated. Do not allow anyone to enter the pool(s) until hyperchlorination is completed.

Step 2: Raise the water’s free chlorine concentration (see Table) and maintain pH 7.5 or less and the temperature at 77°F (25°C) or higher.

Step 3: Achieve a concentration time inactivation value (Ct) of 15,300^{†,§} to kill Crypto. The Ct refers to the concentration of free chlorine in parts per million (ppm) multiplied by time in minutes at a specific pH and temperature (see footnote [§] for guidance if chlorine stabilizer is used).

Use the formula below to calculate the time required for Crypto inactivation

Concentration time inactivation value (Ct)	÷	Free chlorine concentration (C) (parts per million)	Time (t) (minutes)
15,300 ^{†,§}	÷	20 [¶]	= 765
15,300	÷	10	= 1,530

HEALTHY SWIMMING

Hyperchlorination to Kill *Cryptosporidium* When Chlorine Stabilizer¹ is in Water

Recommendations for Aquatic Staff

<https://www.cdc.gov/healthywater/swimming/pdf/hyperchlorination-to-kill-crypto-when-chlorine-stabilizer-is-in-the-water.pdf>

HEALTHY SWIMMING

Hyperchlorination to Kill *Cryptosporidium* When Chlorine Stabilizer¹ is NOT in Water

Recommendations for Aquatic Staff

<https://www.cdc.gov/healthywater/swimming/pdf/hyperchlorination-to-kill-crypto-when-chlorine-stabilizer-is-not-in-the-water.pdf>

FOODBORNE

WATERBORNE

PERSON TO PERSON

North
Carolina
Outbreaks

Plumbing issue may have led to illnesses at Dunkin Donuts in Monroe

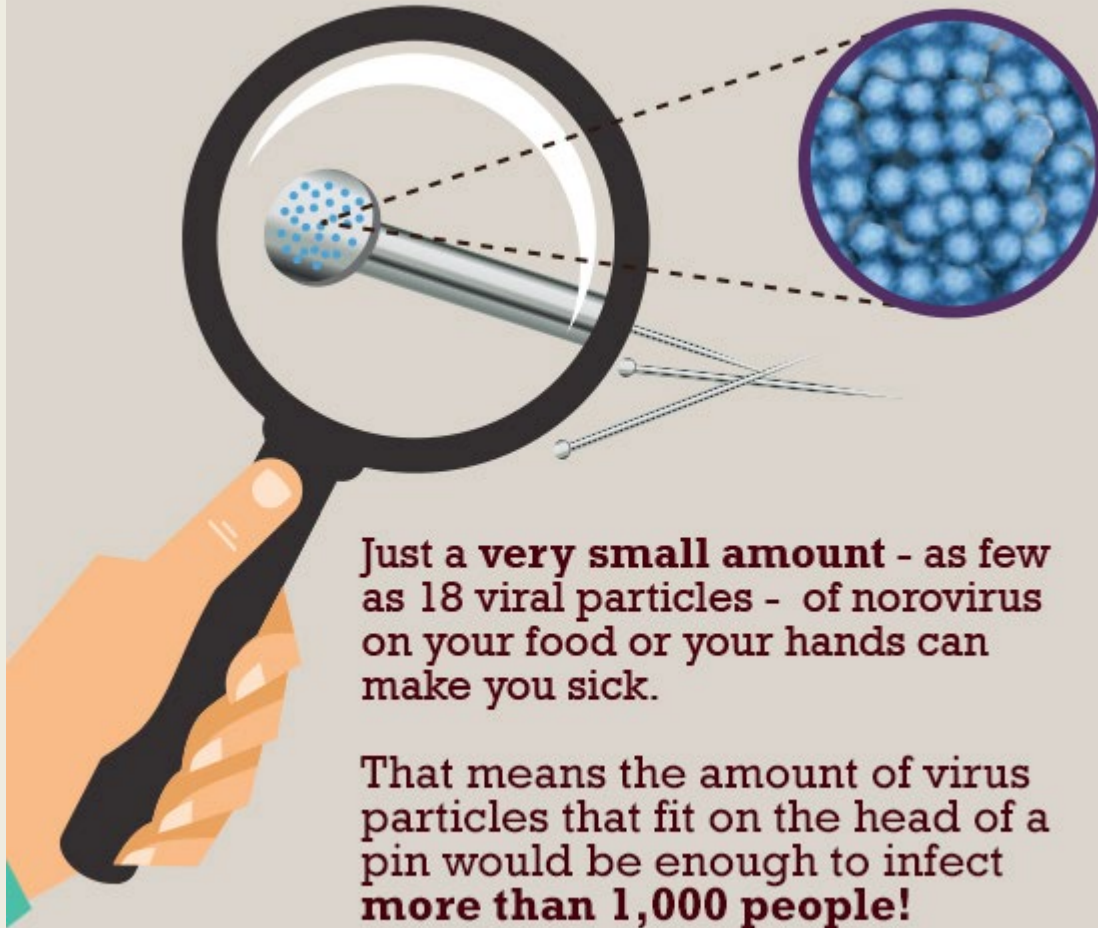
Posted: Feb 22, 2014 4:09 PM EST

Updated: Feb 24, 2014 8:39 PM EST

By Ashton Pellom - email



How contagious is norovirus?

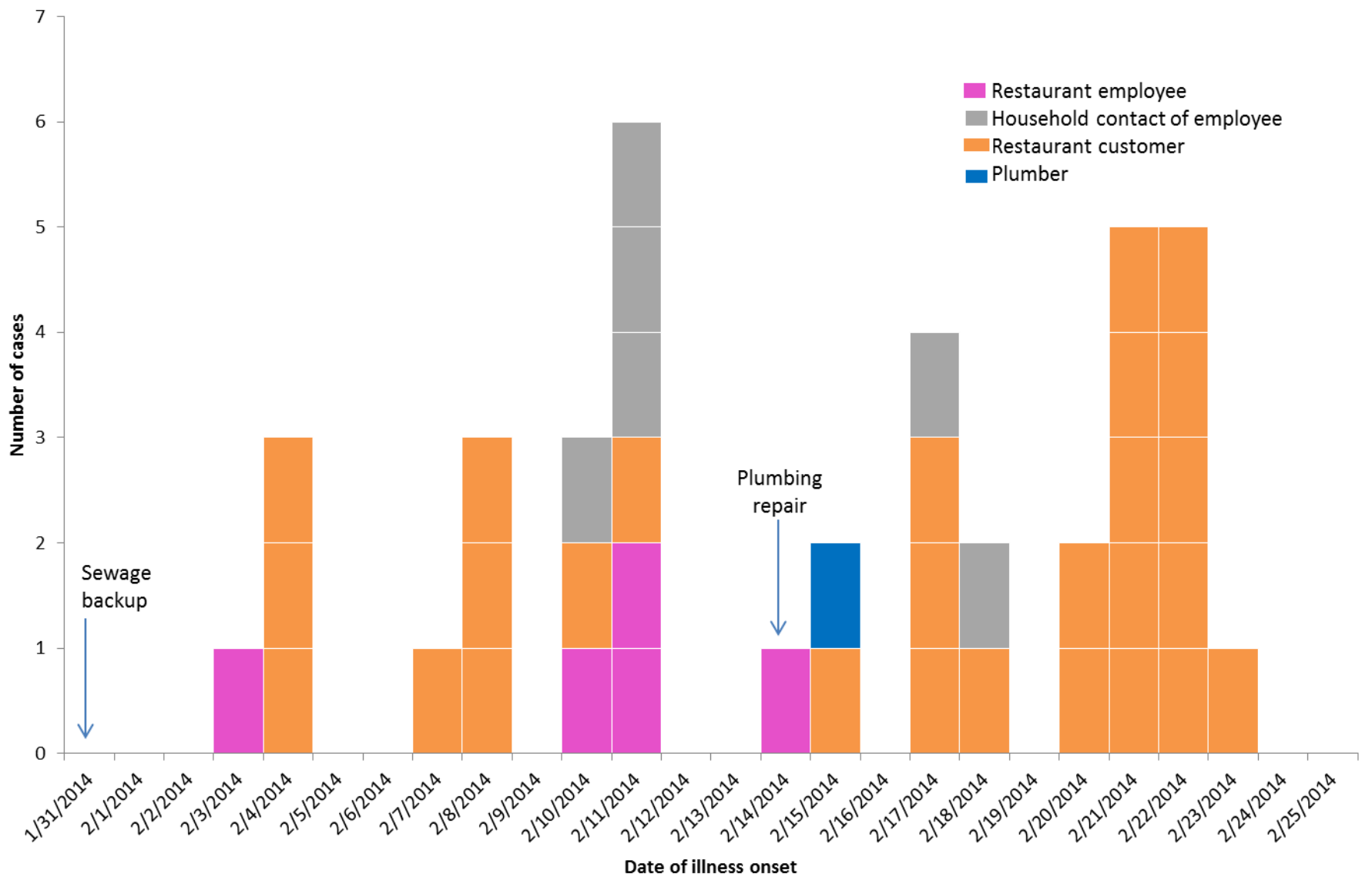


Just a **very small amount** - as few as 18 viral particles - of norovirus on your food or your hands can make you sick.

That means the amount of virus particles that fit on the head of a pin would be enough to infect **more than 1,000 people!**

SOURCE: Journal of Medical Virology, August, 2008

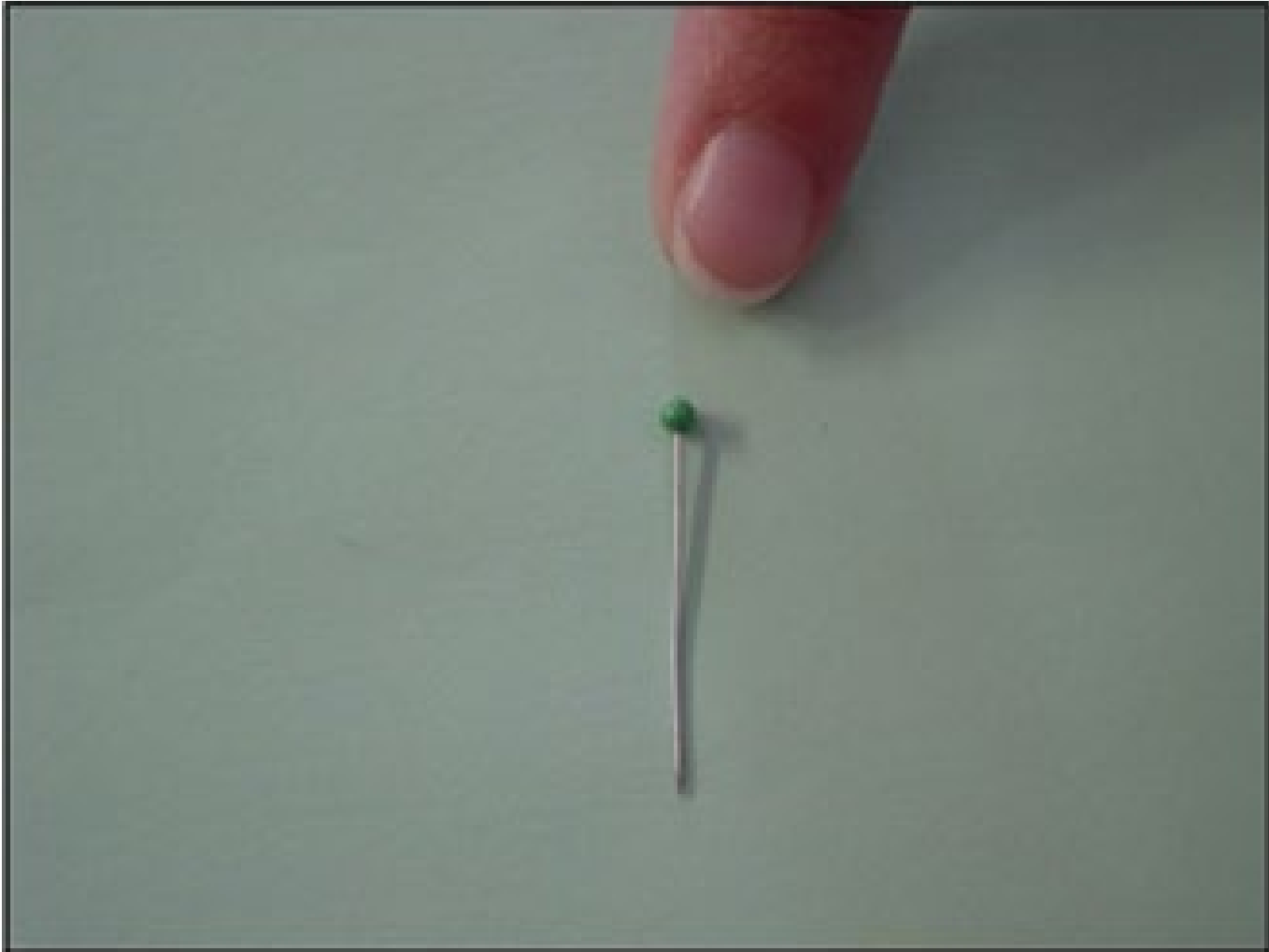
Cases by date of illness onset, Union County restaurant-associated gastrointestinal illness outbreak, 2014 (n=39*)



*Unknown onset date for 1 employee and 1 customer not included



SHIGELLA



GET OUT YOU PHONES!

QUESTION #



WHAT ARE SOME COMMON CONFLICTS BETWEEN PARTNERS?



CONFLICT RESOLUTION

- **Establish relationships with partners before or outside of an outbreak situation**
 - Who is your point of contact and what can they do for you?
- **Understand the role of each partner**
 - What do they do and why?
 - Do they have the resources the response requires?
- **Communication**
 - How often is everyone updated and through what method?
- **Take the opportunity to both learn from others and share your knowledge**

QUESTIONS?

Nicole Lee
Foodborne Epidemiologist
nicole.lee@dhhs.nc.gov

QUESTIONS?

919-546-1661

