

Use of Multiplex Polymerase Chain Reaction (PCR)-Based Diagnostic Testing for Enteric Infections in New York City (NYC), 2014–2016

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Enteric Disease Surveillance

- **Based on bacterial culture**
 - **Cases defined as culture-confirmed**
 - **Isolation necessary for**
 - antimicrobial susceptibility testing
 - serotyping
 - pulsed-field gel electrophoresis
 - whole genome sequencing



Multiplex PCR Testing in NYC

- Began receiving multiplex results in 2014
- Gastrointestinal syndromic panels
- No isolation of microorganism

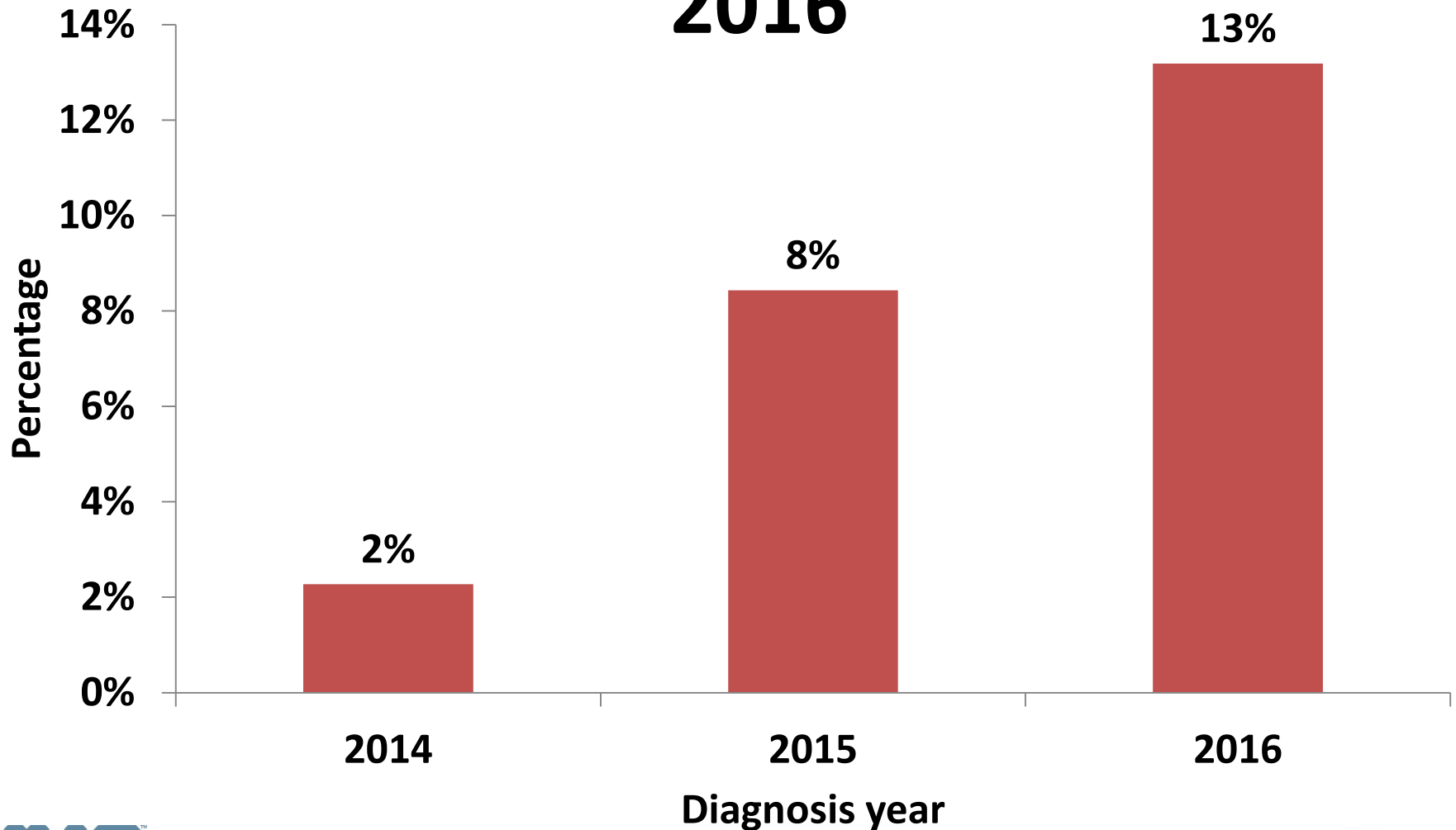


Multiplex PCR GI Testing in NYC, 2014–2016

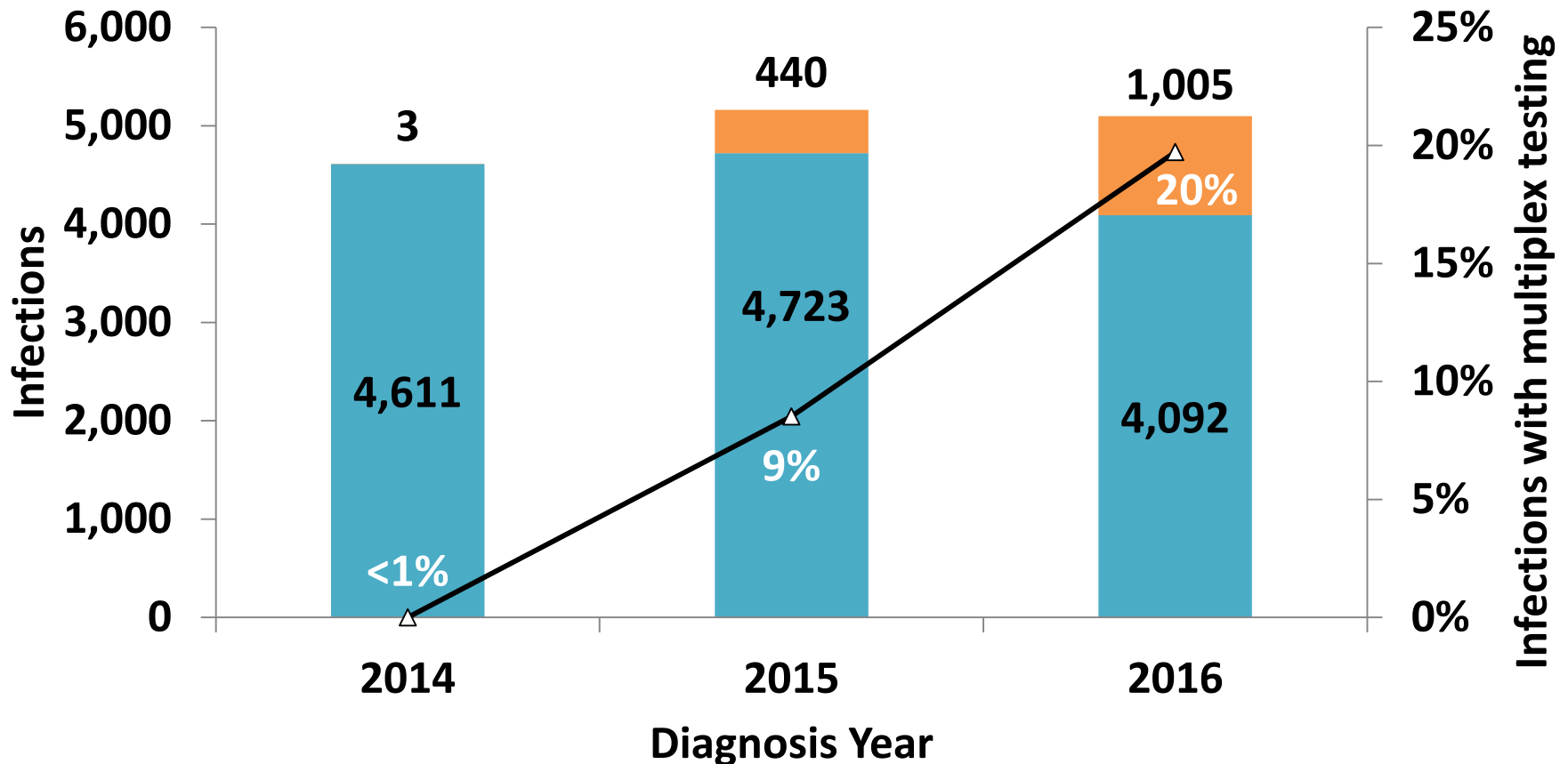
- NYC residents diagnosed in 2014–2016
- Positive laboratory test for selected enteric bacteria and parasites

Routinely investigated pathogens	Non-routinely investigated pathogens
<i>Cryptosporidium</i> (CSP)	<i>Entamoeba</i> (AMB)
<i>Cyclospora</i> (CYC)	<i>Campylobacter</i> (CAM)
Non-typhoidal <i>Salmonella</i> (SAL)	<i>Giardia</i> (GIA)
Shiga toxin-producing <i>E. coli</i> (STEC)	<i>Shigella</i> (SHG)
Non-cholera <i>Vibrio</i> (VIB)	Non-plague <i>Yersinia</i> (YER)

Percentage of labs testing NYC residents using multiplex tests, 2014–2016

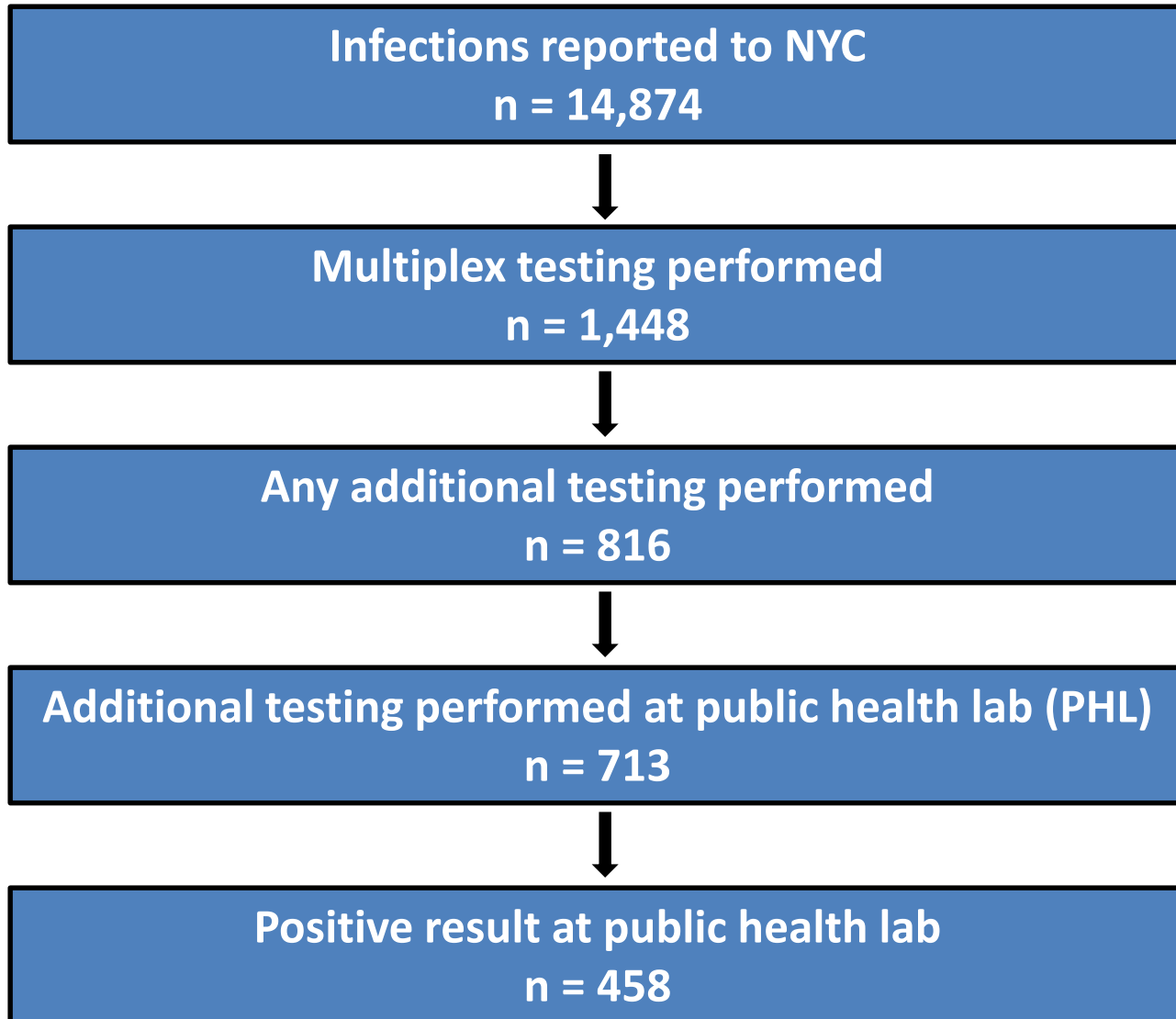


Reported infections with multiplex testing — NYC, 2014–2016

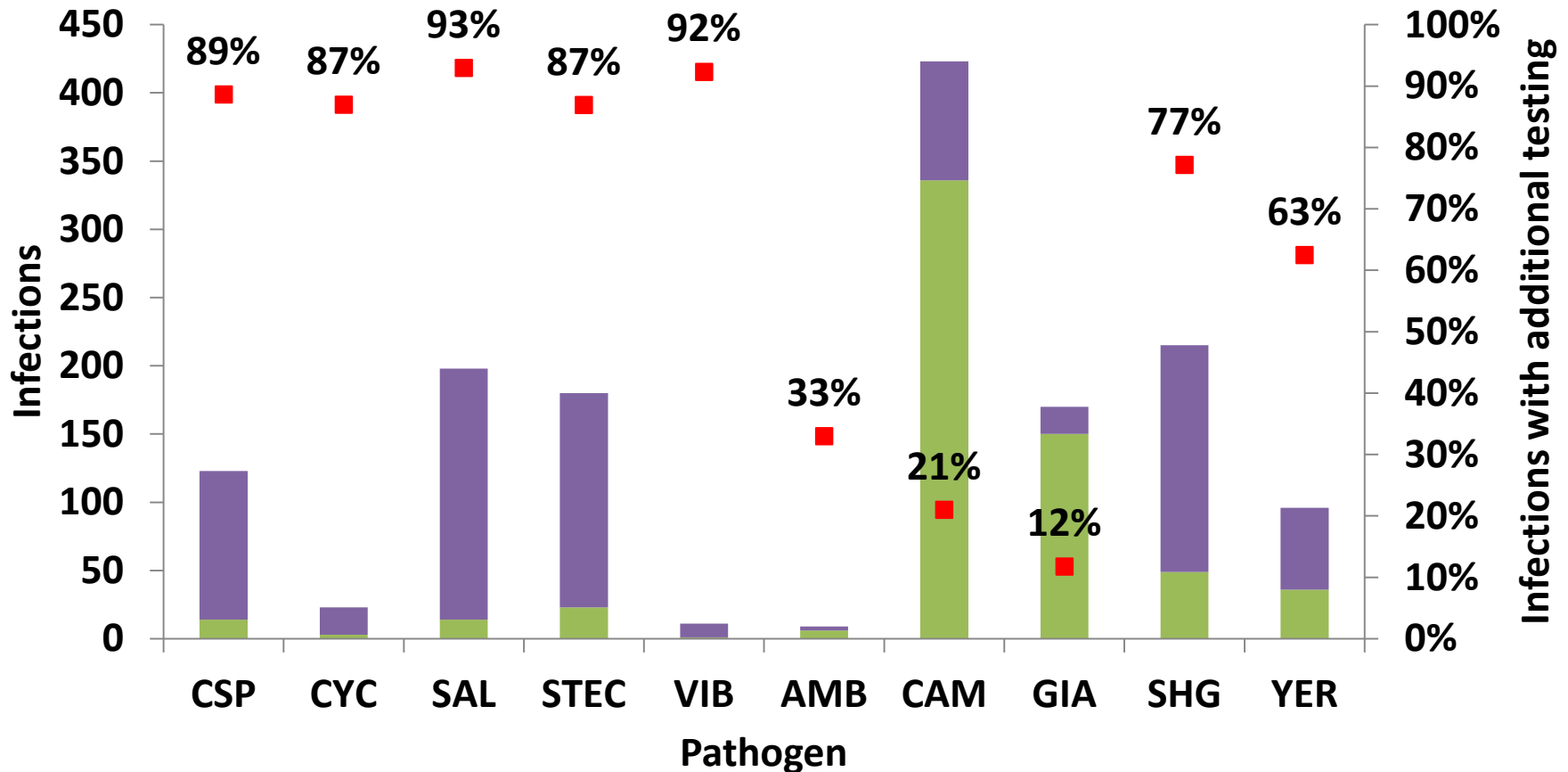


- Number of infections diagnosed with a multiplex test
- Number of infections diagnosed without a multiplex test
- Percentage of infections diagnosed with a multiplex test

Testing cascade, reported infections — NYC, 2014–2016



Any additional testing performed — NYC, 2014–2016

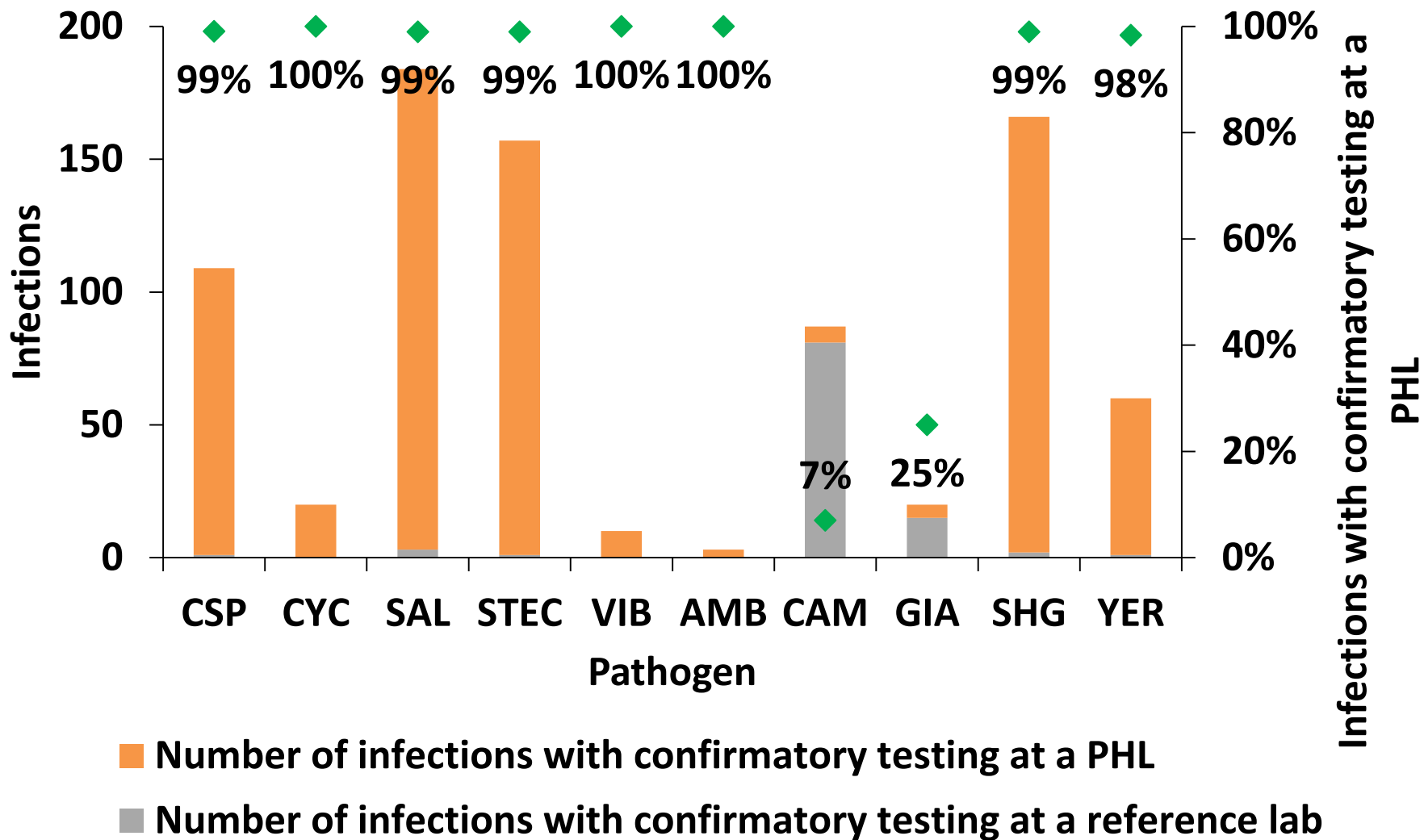


■ Number of infections with multiplex and additional testing

■ Number of infections with only multiplex testing

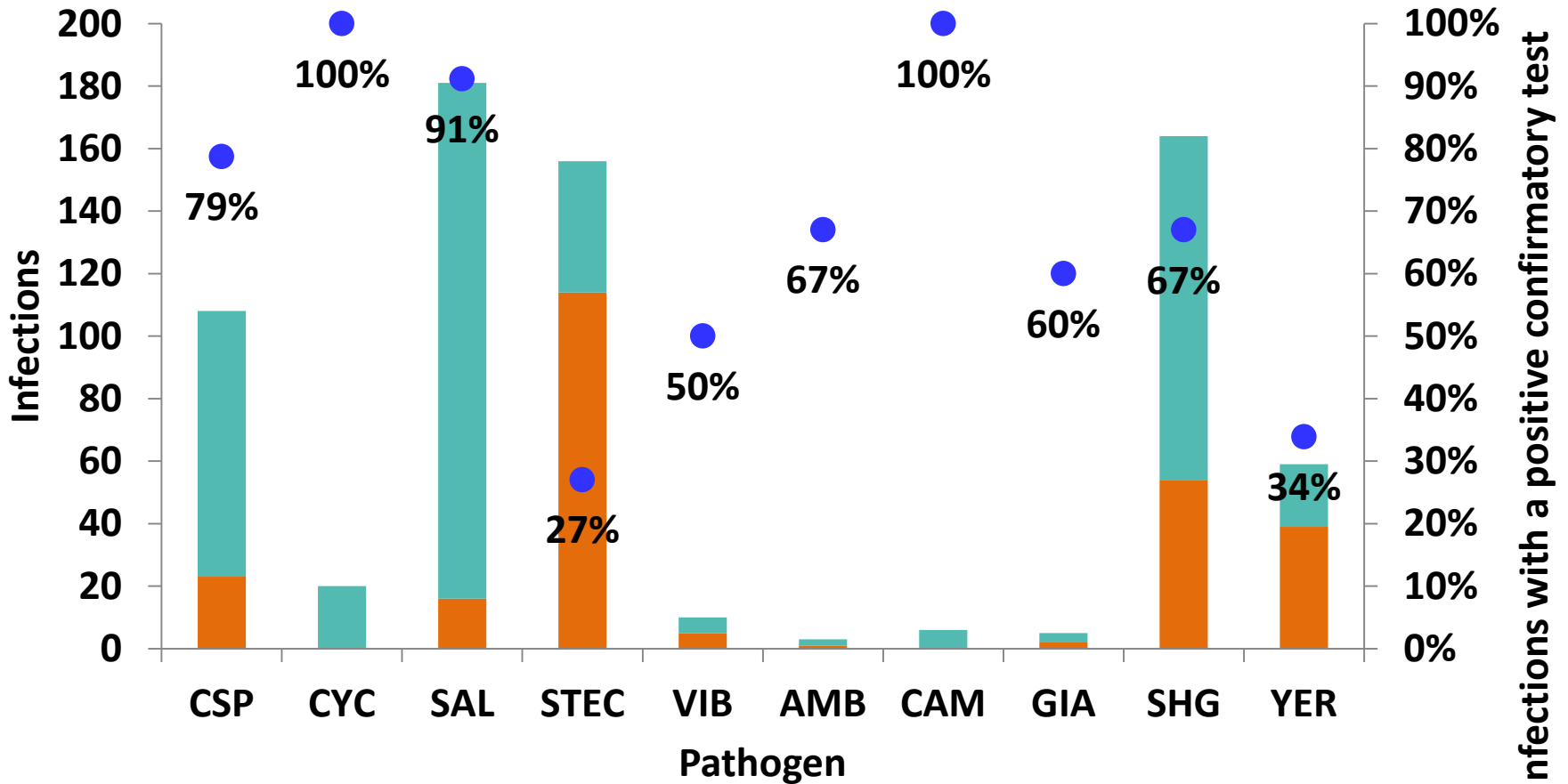
■ Percentage of infections with multiplex and additional testing

Additional testing performed at a PHL— NYC, 2014–2016



- Number of infections with confirmatory testing at a PHL
- Number of infections with confirmatory testing at a reference lab
- Percentage of infections with confirmatory testing at a PHL

Positive confirmatory test at a PHL — NYC, 2014–2016

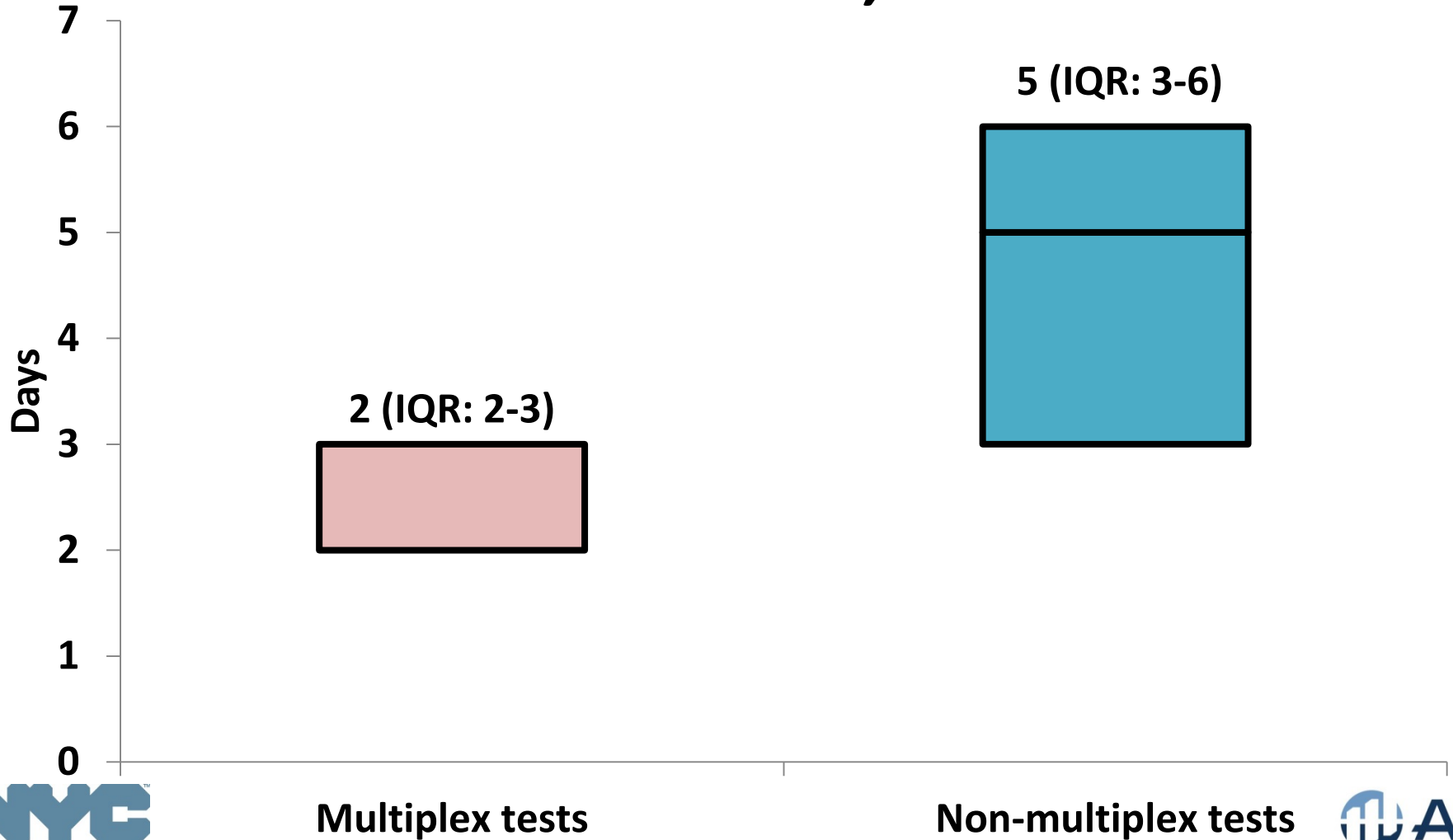


■ Number of infections with a positive confirmatory test

■ Number of infections with a negative or indeterminate confirmatory test

● Percentage of infections with a positive confirmatory test

Median (interquartile range) time between specimen collection, result notification—NYC, 2014–2016



Factors Associated with Multiplex PCR GI Test Receipt in NYC, 2014–2016

- Infection with routinely investigated pathogens (CSP, CYC, SAL, STEC, VIB)
- Specimens tested at labs using multiplex tests

Factors considered	
Diagnosis year	Age
Sex	Race
Ethnicity	County of residence
Hospitalization status	Exclusion status
International travel	Area-based poverty

Factors Associated with Multiplex PCR GI Test Receipt in NYC, 2014–2016

- **Multivariable logistic regression**

Factors strongly associated with multiplex test receipt

Diagnosis in 2016

Hispanic ethnicity

**Residence in Bronx,
Manhattan**

Hospitalization



Factors Associated with Multiplex PCR GI Test Receipt in NYC, 2014–2016

- **Multivariable logistic regression**

Factors strongly associated with multiplex test receipt

Diagnosis in 2016

Hispanic ethnicity*

Residence in Bronx, Manhattan*

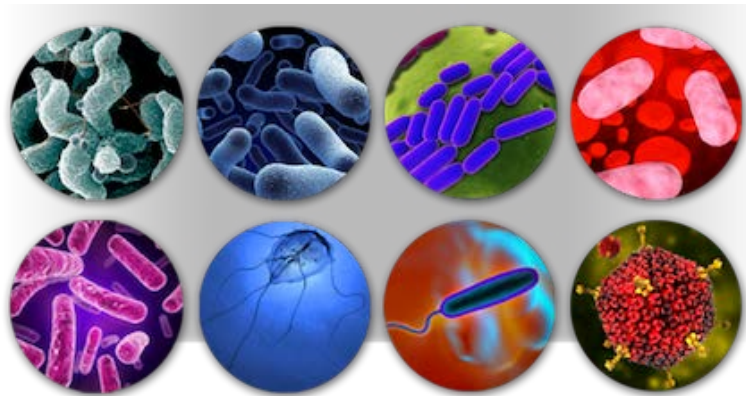
Hospitalization*



*likely due to types and locations of labs performing testing

Use of Multiplex PCR GI Tests in NYC – Findings

- Multiplex use increased over time
- Timelier reporting, but additional testing needed for public health action
- Proportions of infections with reflex testing, positive confirmatory tests varied by pathogen



Use of Multiplex PCR GI Tests in NYC – Follow Up

- **NYC Health Code amended December 5, 2016**
 - Reflex to culture if positive culture-independent result
 - Report positive and negative reflex culture result
 - Submit isolates/broth to public health lab



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NYS Wadsworth Center

Many others...

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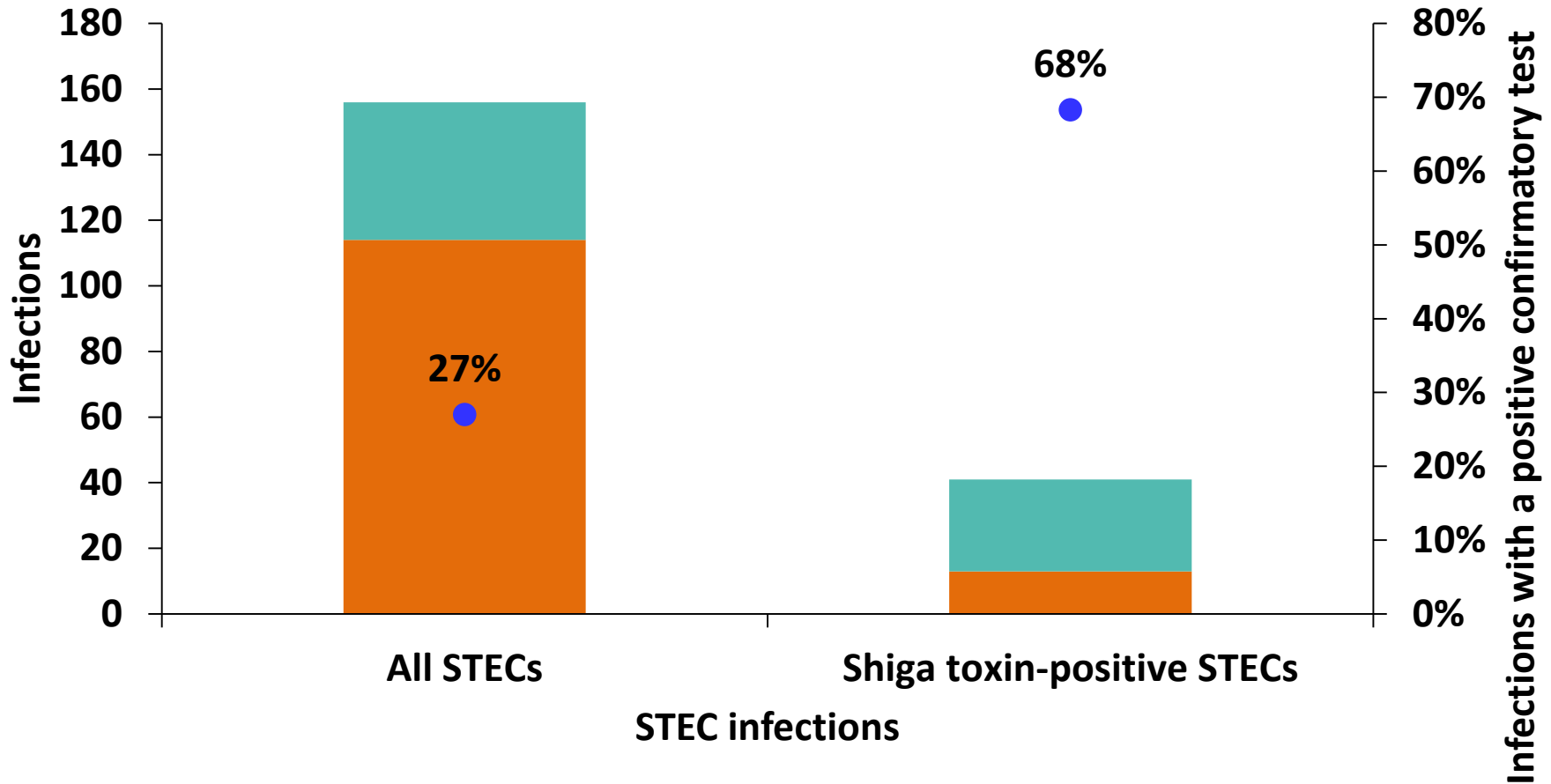
(CDC) Cooperative Agreement Number 1U38OT000143-04.

Thank you!

Questions: jlatash1@health.nyc.gov

Additional slides

Positive confirmatory test at a public health lab: STECs — NYC, 2014–2016



- Number of infections with a positive confirmatory test
- Number of infections with a negative or indeterminate confirmatory test
- Percentage of infections with a positive confirmatory test

Criteria for excluded food handlers to return to work in NYC

Disease	2 follow-up stools	2 sets of 2 follow-up stools taken 30 days apart	3 follow-up stools
Campylobacteriosis	X		
Cholera	X		
Salmonellosis	X		
Shigellosis	X		
STEC infection	X		
Typhoid / paratyphoid fever		X	
Yersiniosis	X		
Amebiasis			X
Cryptosporidiosis			X
Giardiasis			X

Criteria for excluded child care worker or attendee to return to school in NYC

Disease	Until asymptomatic	2 follow-up stools	2 sets of 2 follow-up stools, taken 30 days apart	3 follow-up stools
Campylobacteriosis	X			
Cholera		X		
Salmonellosis	X			
Shigellosis		X		
STEC infection		X		
Typhoid / paratyphoid fever			X	
Yersiniosis	X			
Amebiasis				X
Cryptosporidiosis				X
Giardiasis				X

Criteria for excluded health care workers to return to work in NYC

Disease	Until asymptomatic	2 follow-up stools	2 sets of 2 follow-up stools, taken 30 days apart	3 follow-up stools
Campylobacteriosis	X			
Cholera		X		
Salmonellosis	X			
Shigellosis		X		
STEC infection		X		
Typhoid / paratyphoid fever			X	
Yersiniosis	X			
Amebiasis				X
Cryptosporidiosis				X
Giardiasis				X