The Implications and Impact of CIDTs at Public Health Laboratories

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Outline

- Background
- Status of CIDTs at MDH and other public health labs
- Effect of CIDTs on foodborne disease surveillance
- Opportunities

Current Foodborne Disease Surveillance in the US

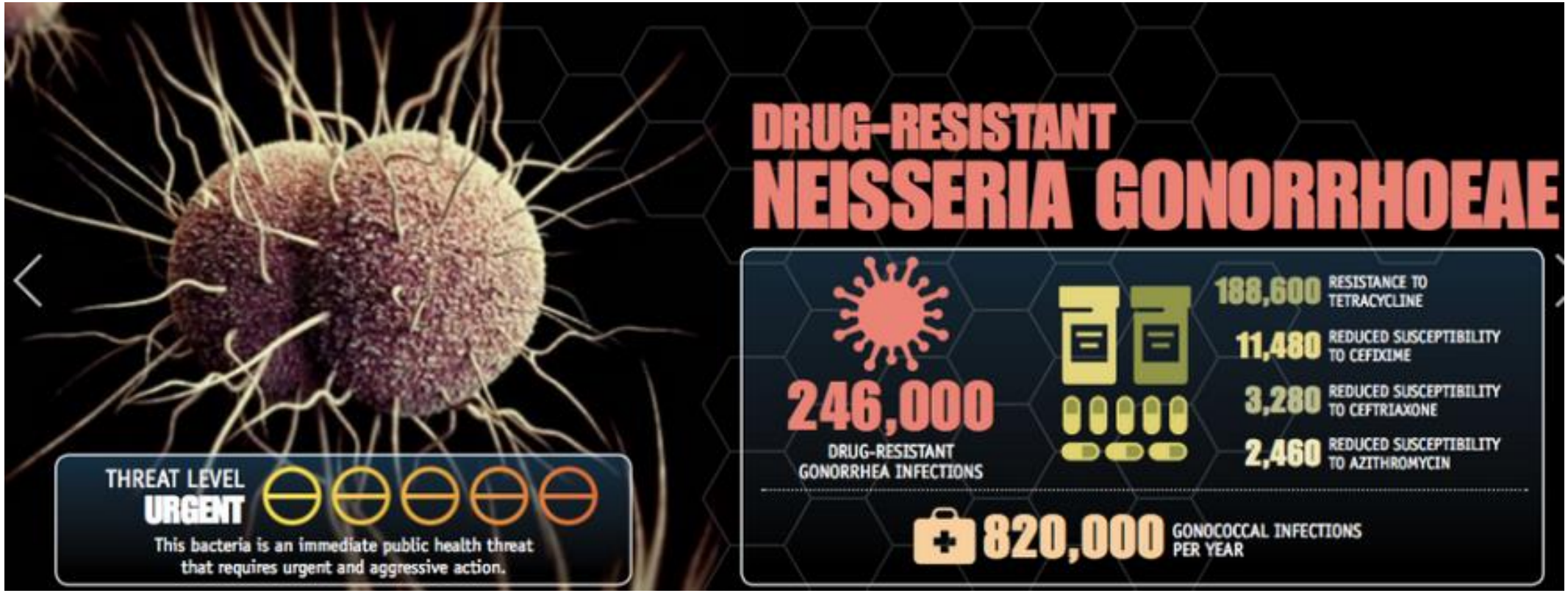
- Outbreak detection-REQUIRES ISOLATES
- Antibiotic Susceptibility Testing-REQUIRES ISOLATES
- Case counts-ACCURACY/CONSISTENCY REQUIRES ISOLATES

Demise of GC culture

- Developed early 1990s
- Rapid (hours)
- Urine specimen (vs urethral swab)
- Includes *Chlamydia trachomatis*
- High sensitivity/specificity

- Specimen incompatible with culture
- No susceptibility data

Implications of reduced culture-GC



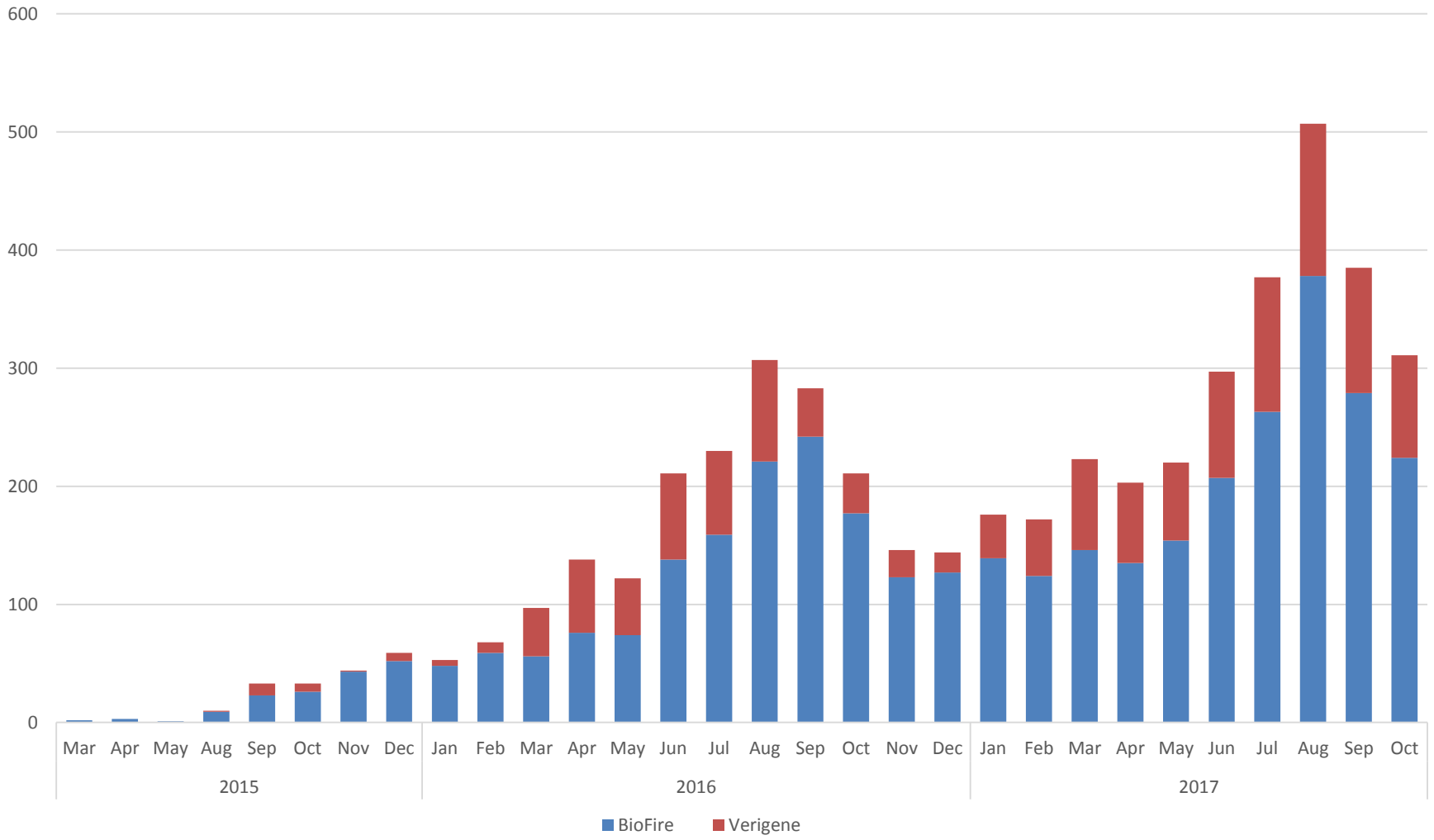
Preparing for CIDTs

- John Besser (MN/CDC)
- Workgroups
- APHL guidance documents, factsheets
- Working with industry
- Working with regulators

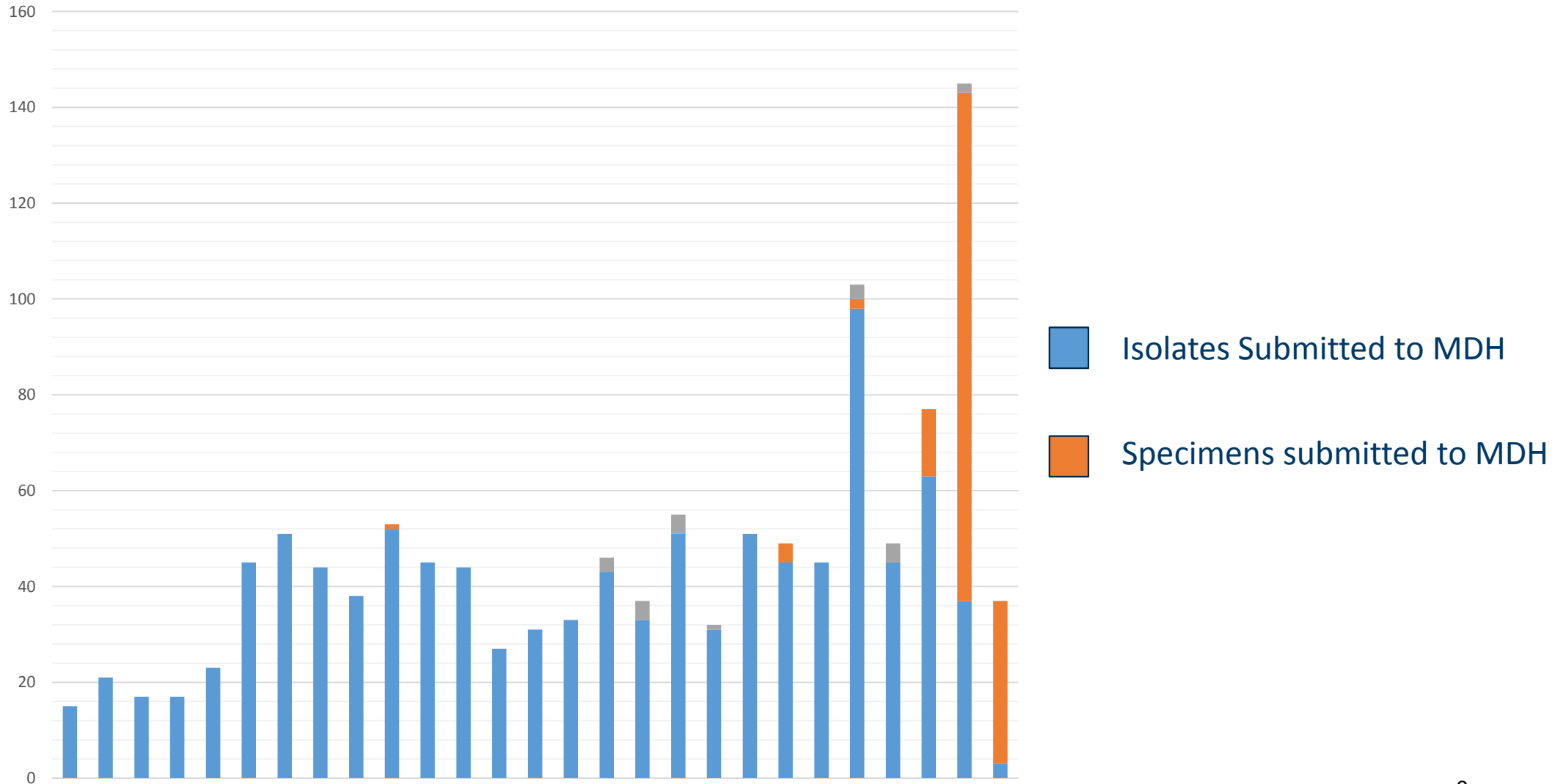
CIDT Questions

- Are we seeing a decrease in the number of isolates?
- Do CIDTs slow down surveillance?

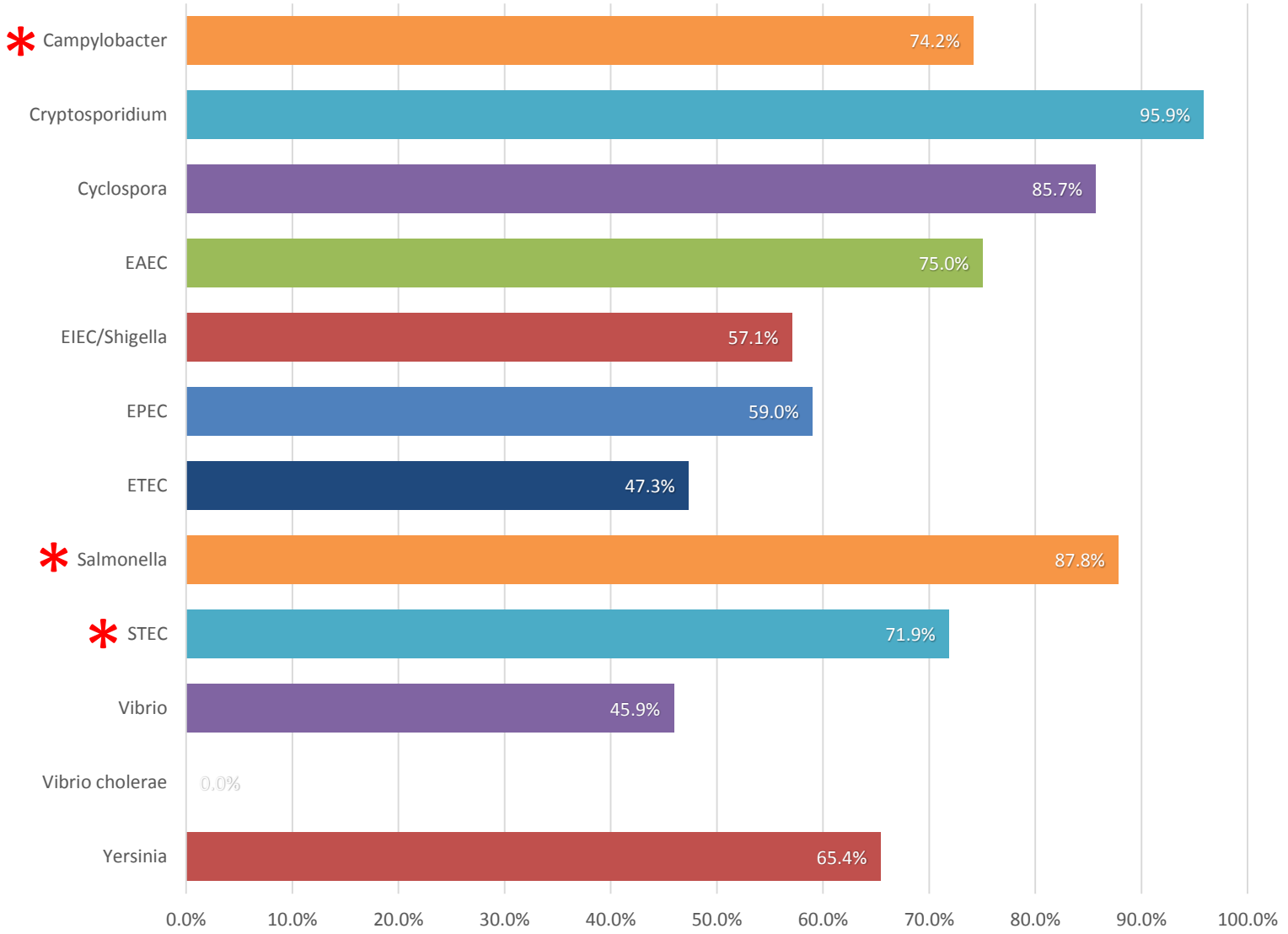
Molecular CIDT Specimens Received at MDH



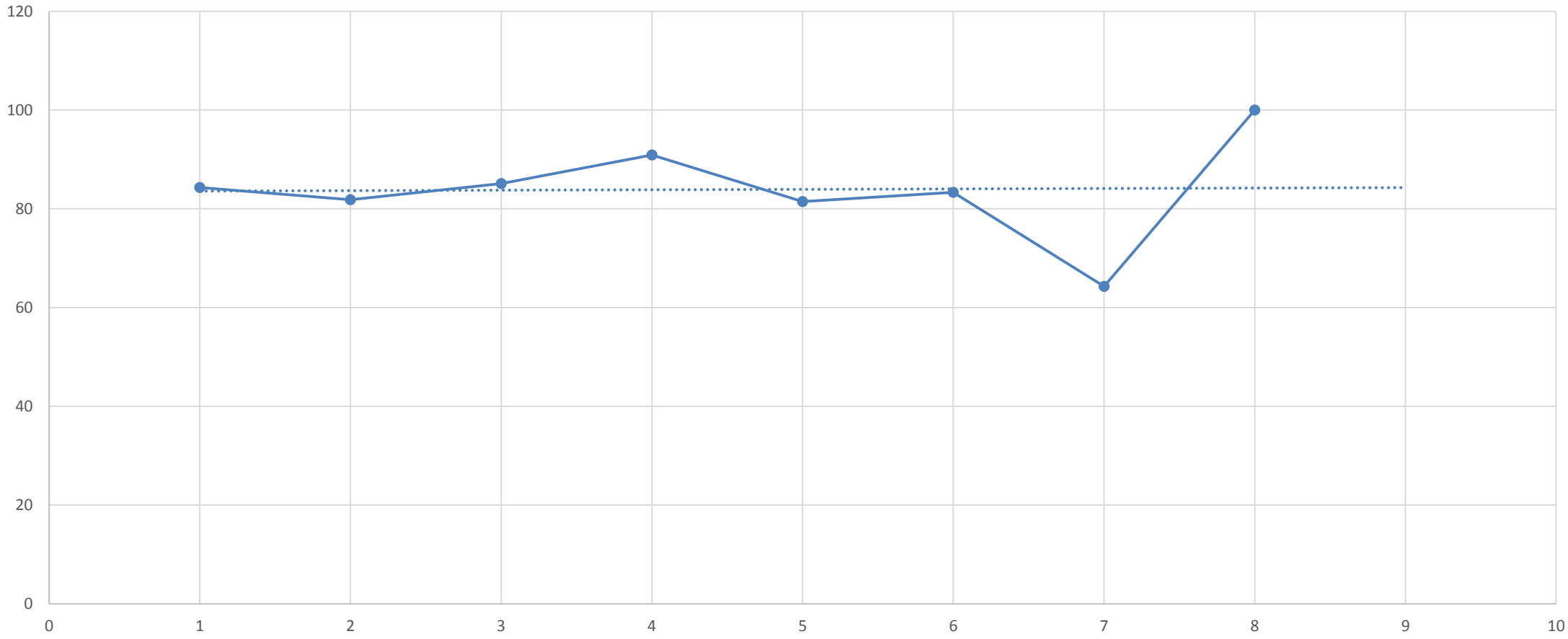
Large Metropolitan Hospital In Minnesota



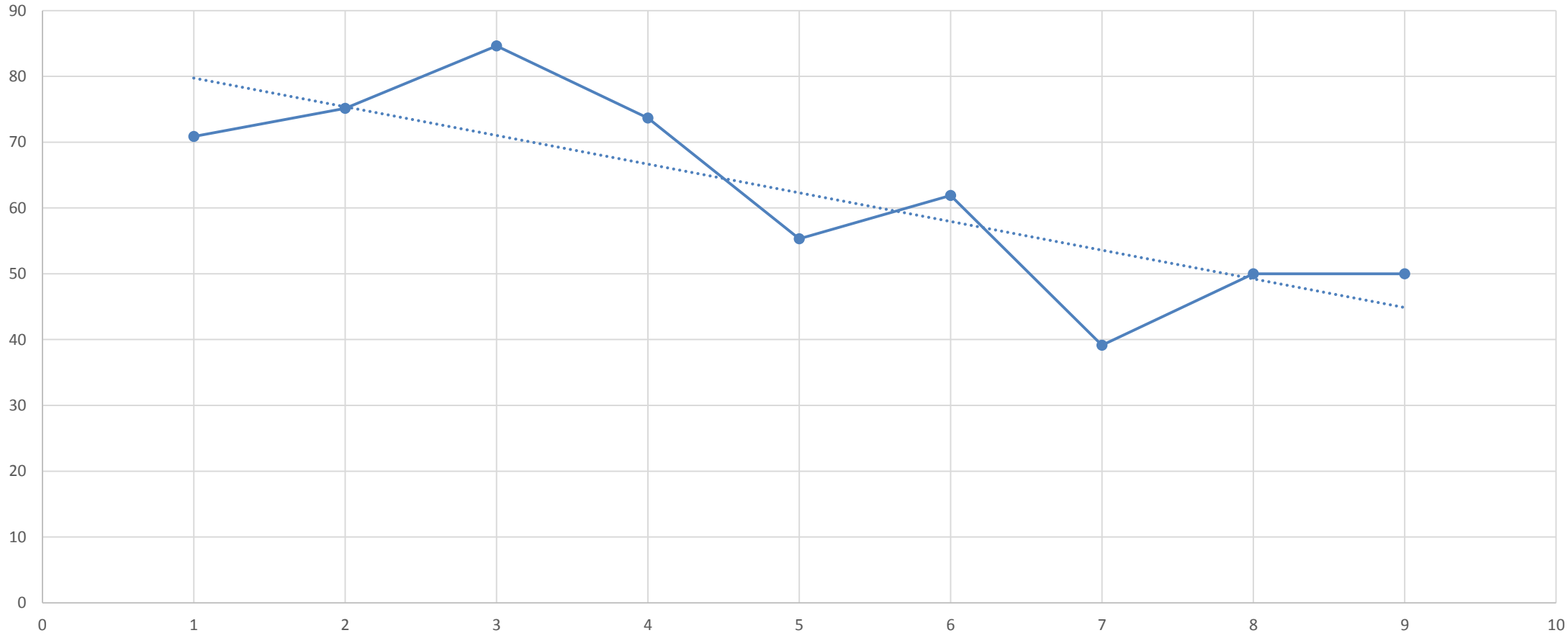
Confirmation Rate of CIDT Positive-MDH



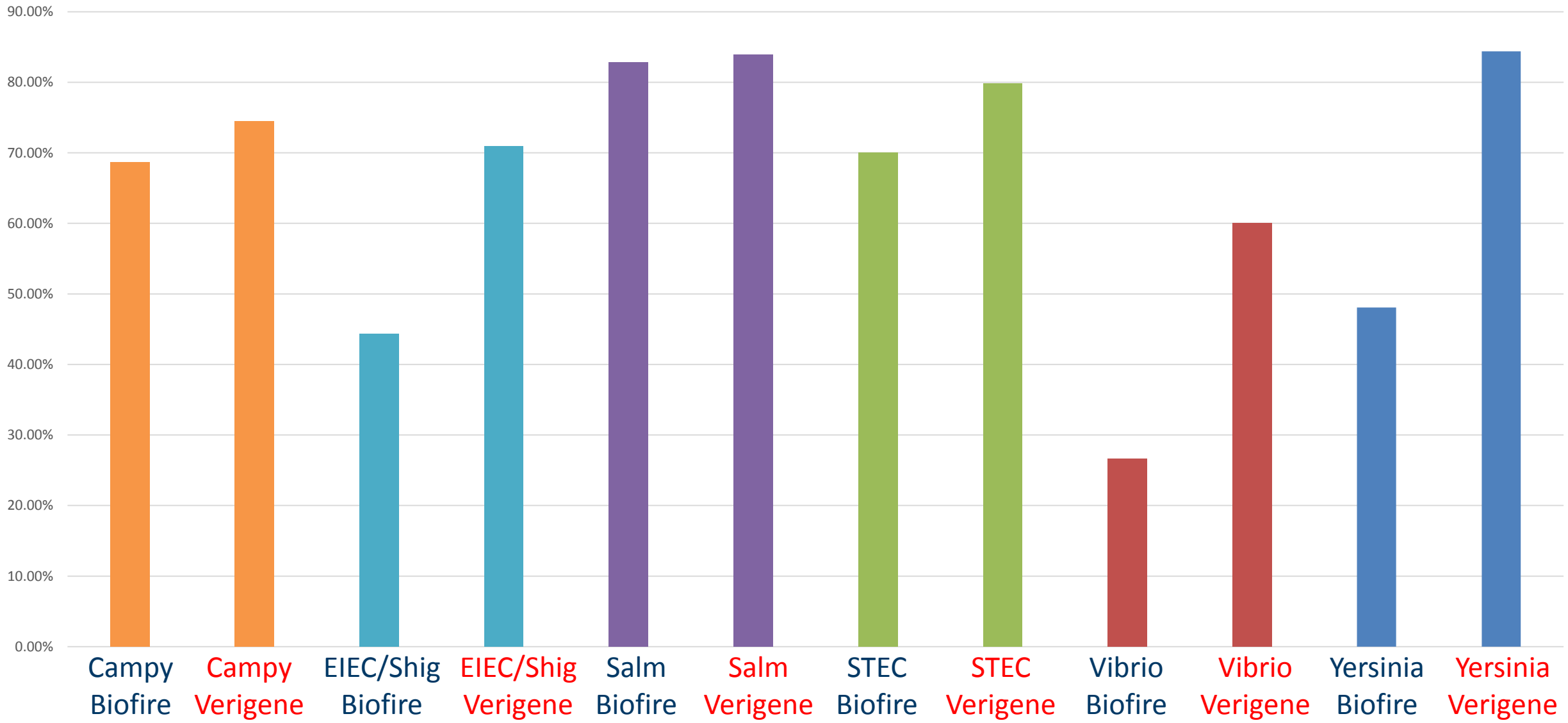
Percent Salmonella Confirmed for Days to Receipt at MDH



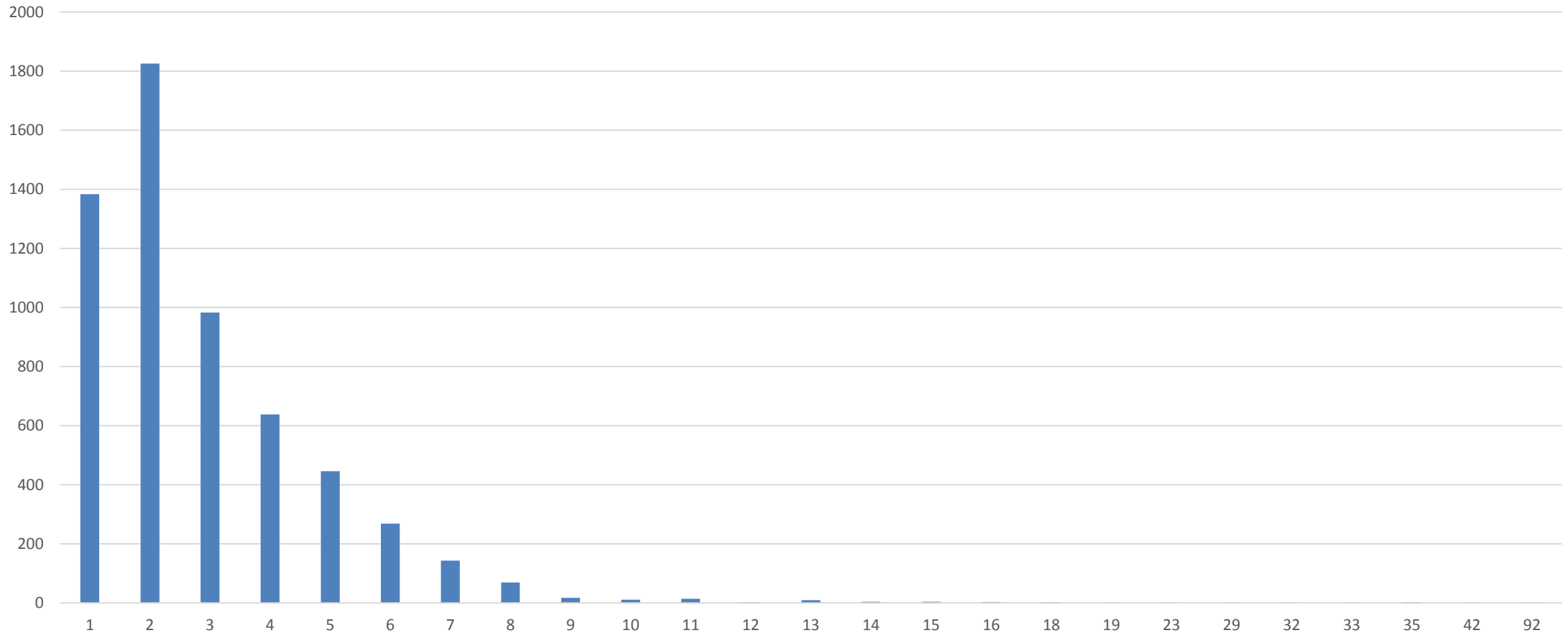
Percent Campylobacter Confirmed for Days to Receipt at MDH



Confirmation Rates of Biofire and Verigene



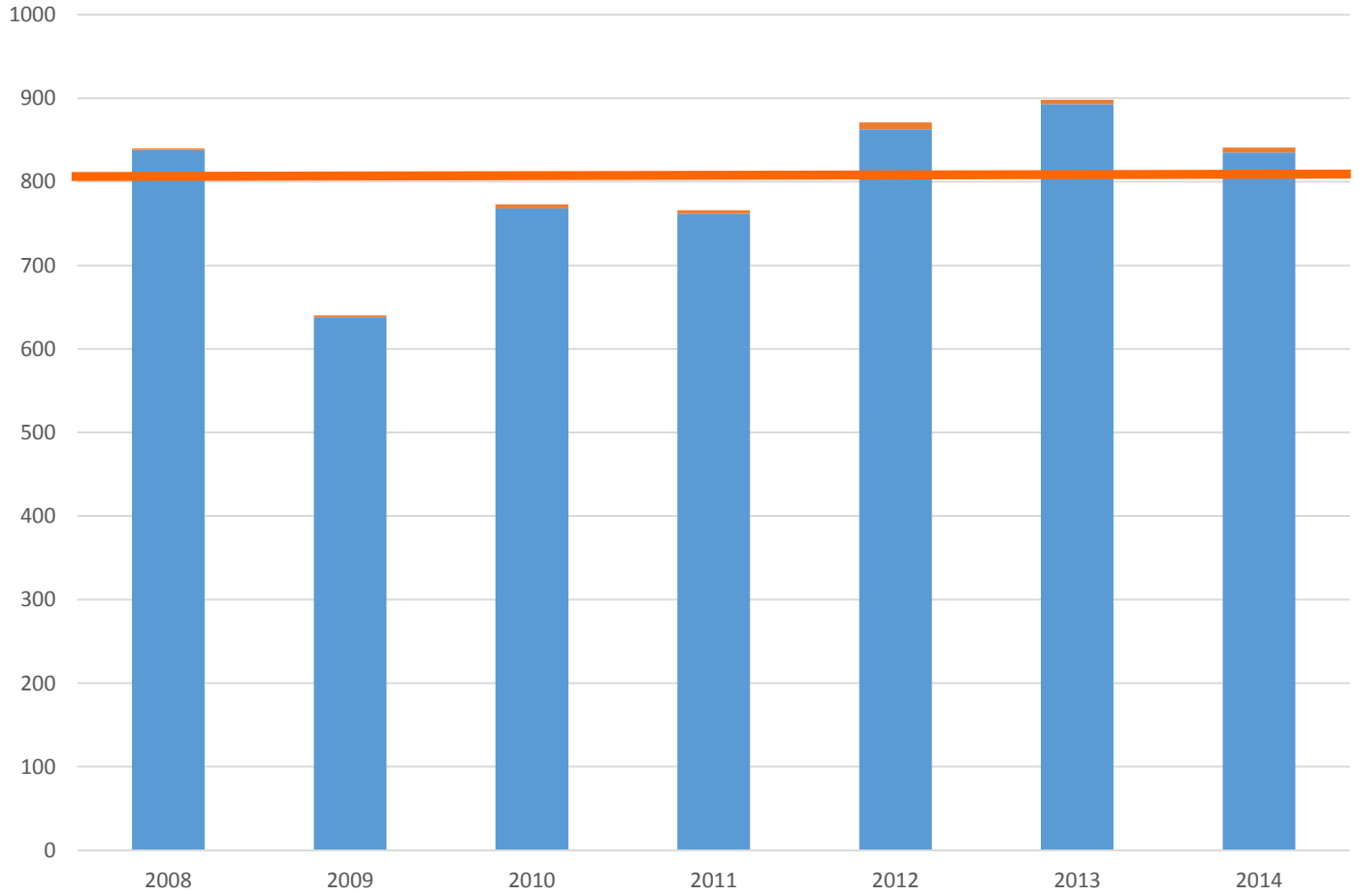
Number specimens received by days from collection to received date



Salmonella Trends Since CIDTs Were Introduced

- Important foodborne pathogen
- Before CIDTs, culture was main detection assay
  - STEC-rapid antigen assays, PCR
  - Campy-rapid antigen assays, not required submission in all states
- WARNING-IMPERFECT DATA AHEAD!!!!
  - May include outbreak isolates, duplicates

Salmonella Isolates-Minnesota, 2008-2014 (pre-CIDT)

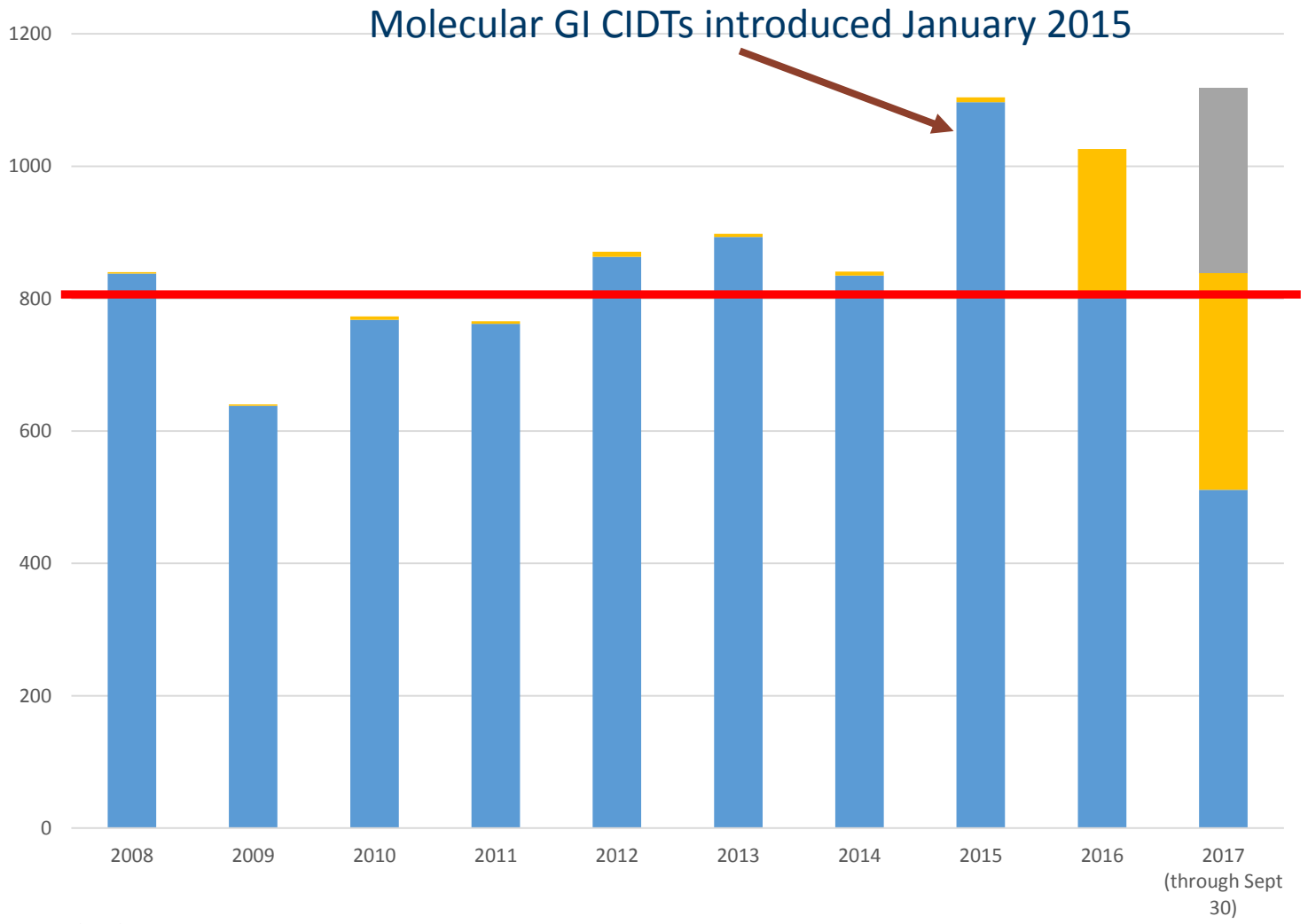


Yearly average=804

Salmonella isolates recd at PHL

Isolates recovered at PHL from stools

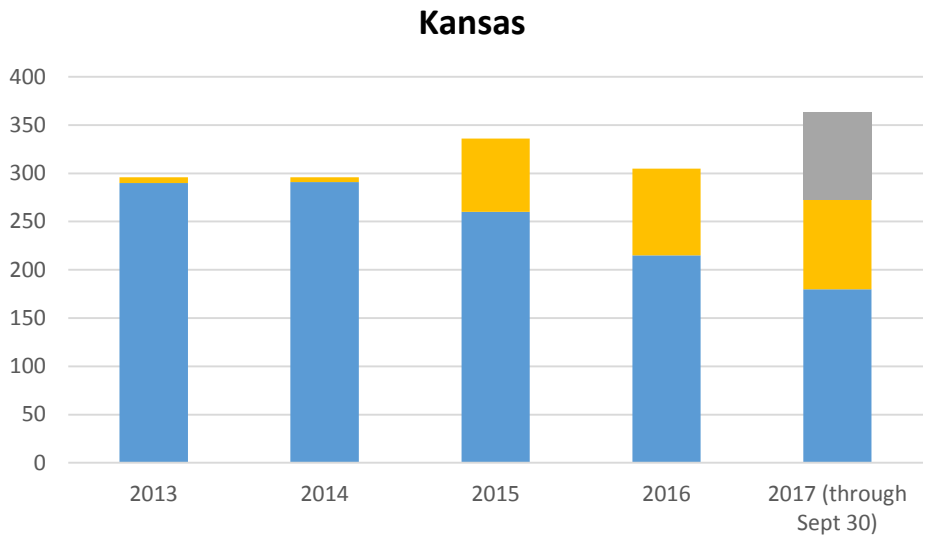
Salmonella Isolates-Minnesota, 2008-2017

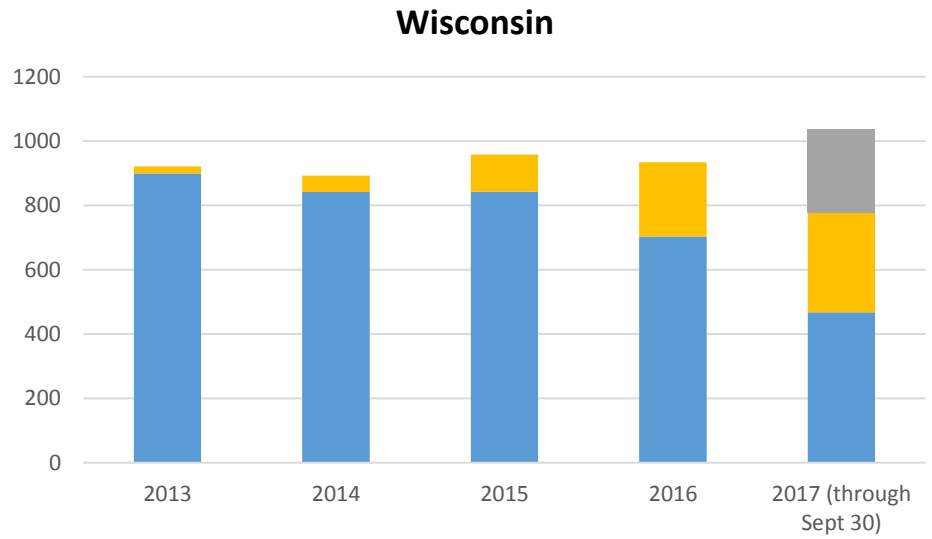


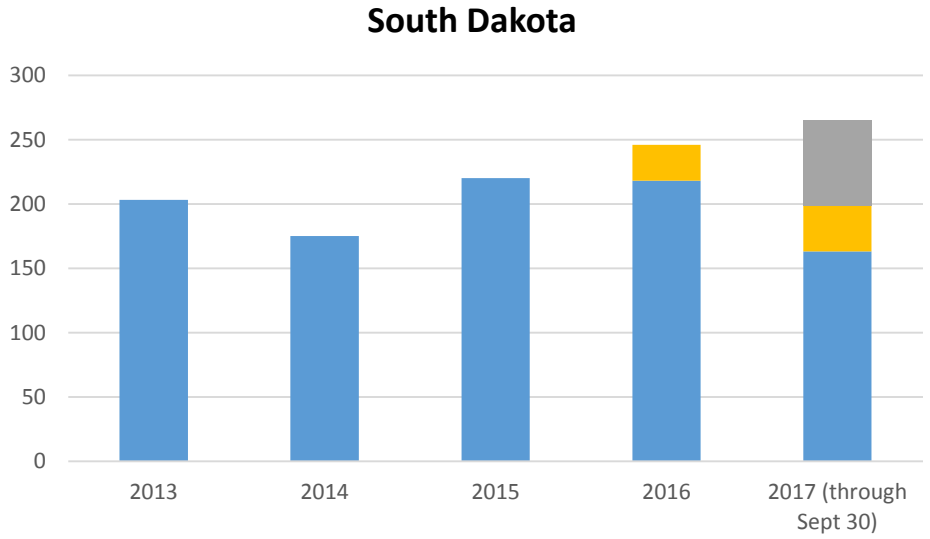
Yearly average (2008-2014)=804

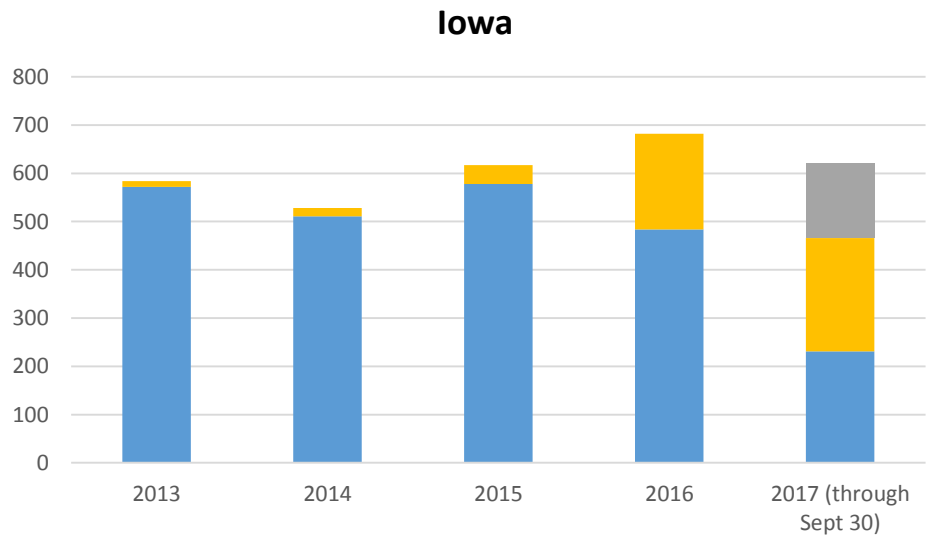
- Salmonella isolates recd at PHL
- Isolates recovered at PHL from stools
- Predicted isolates for remaining 2017

Salmonella Isolates-South Dakota, Iowa, Wisconsin, Kansas

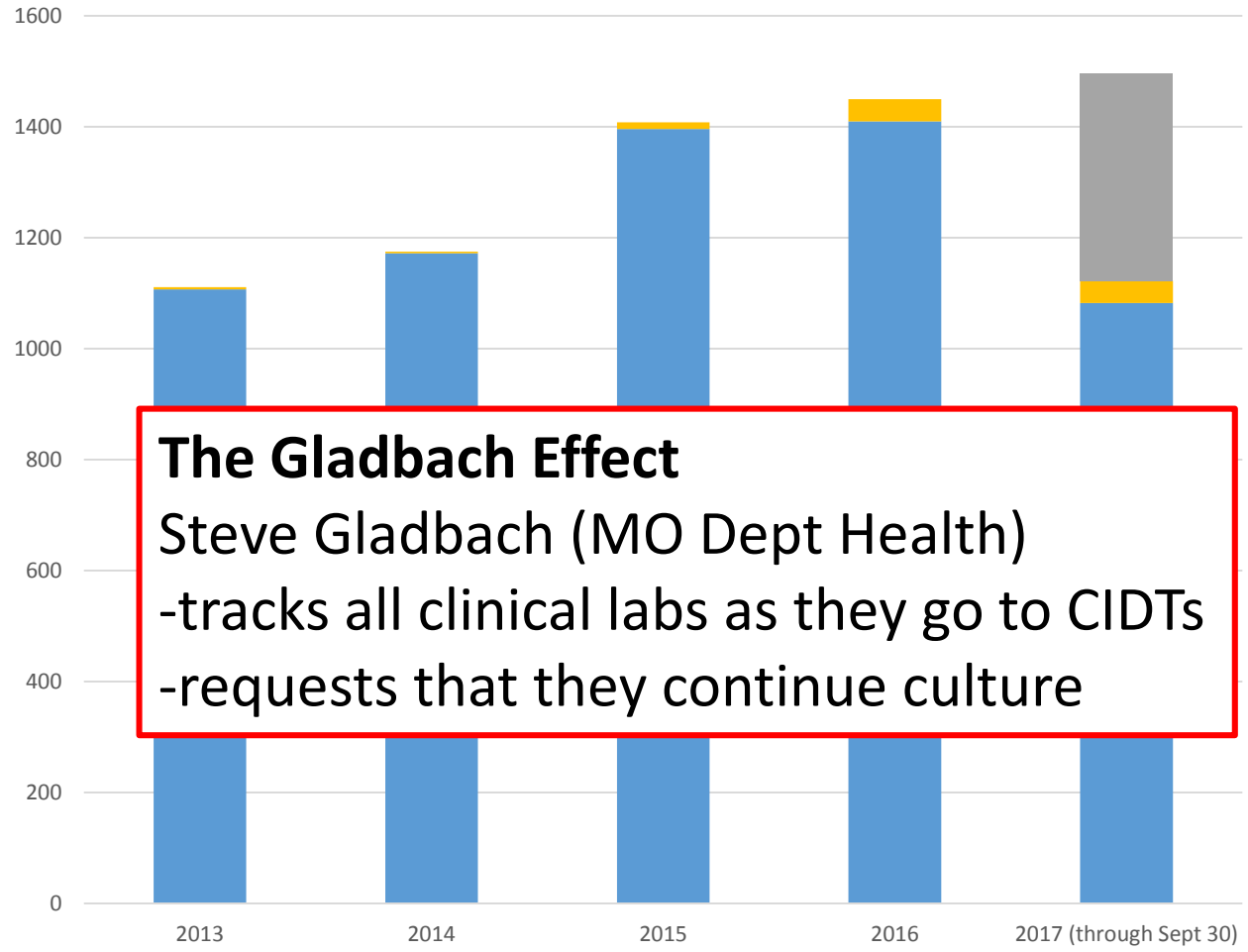








Salmonella Isolates-Missouri



The Gladbach Effect

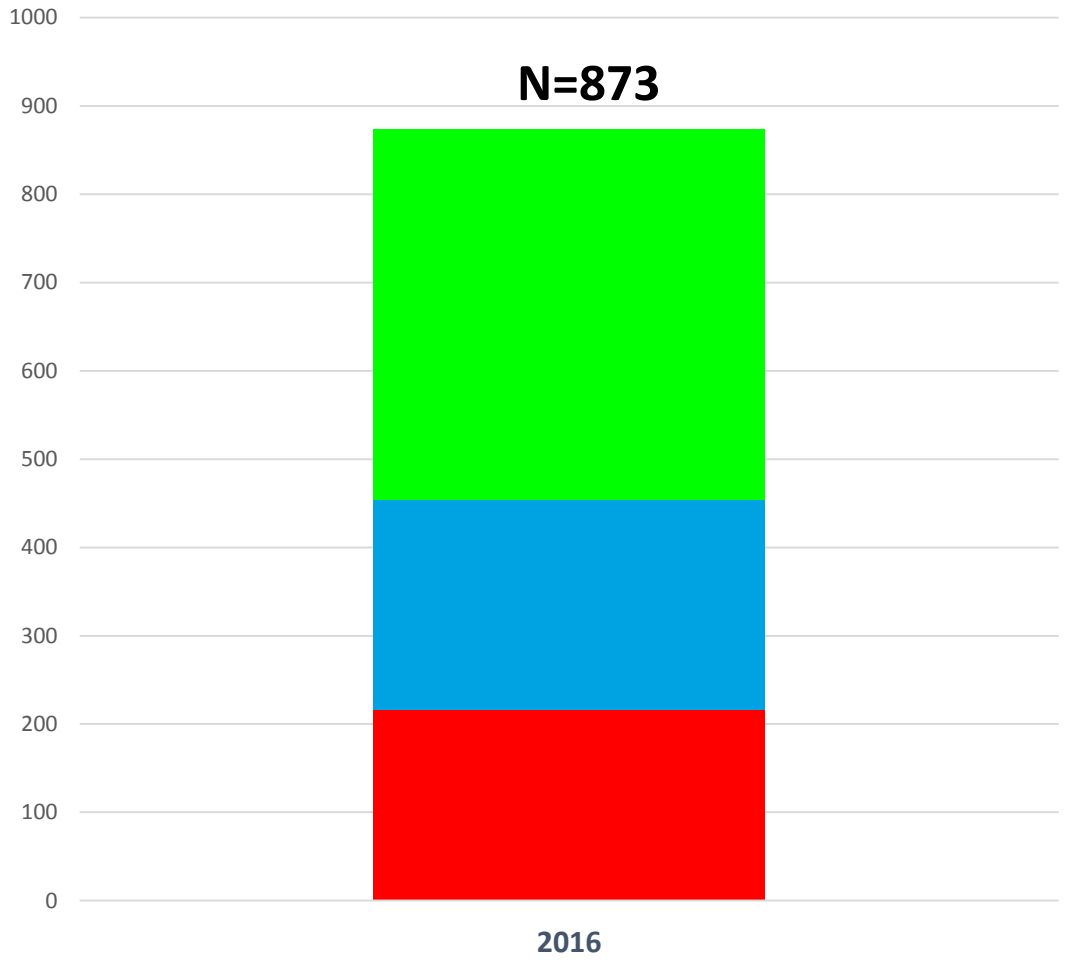
Steve Gladbach (MO Dept Health)

-tracks all clinical labs as they go to CIDTs

-requests that they continue culture

- Salmonella isolates recd at PHL
- Isolates recovered at PHL from stools
- Predicted isolates for remaining 2017

Minnesota Isolations-2016

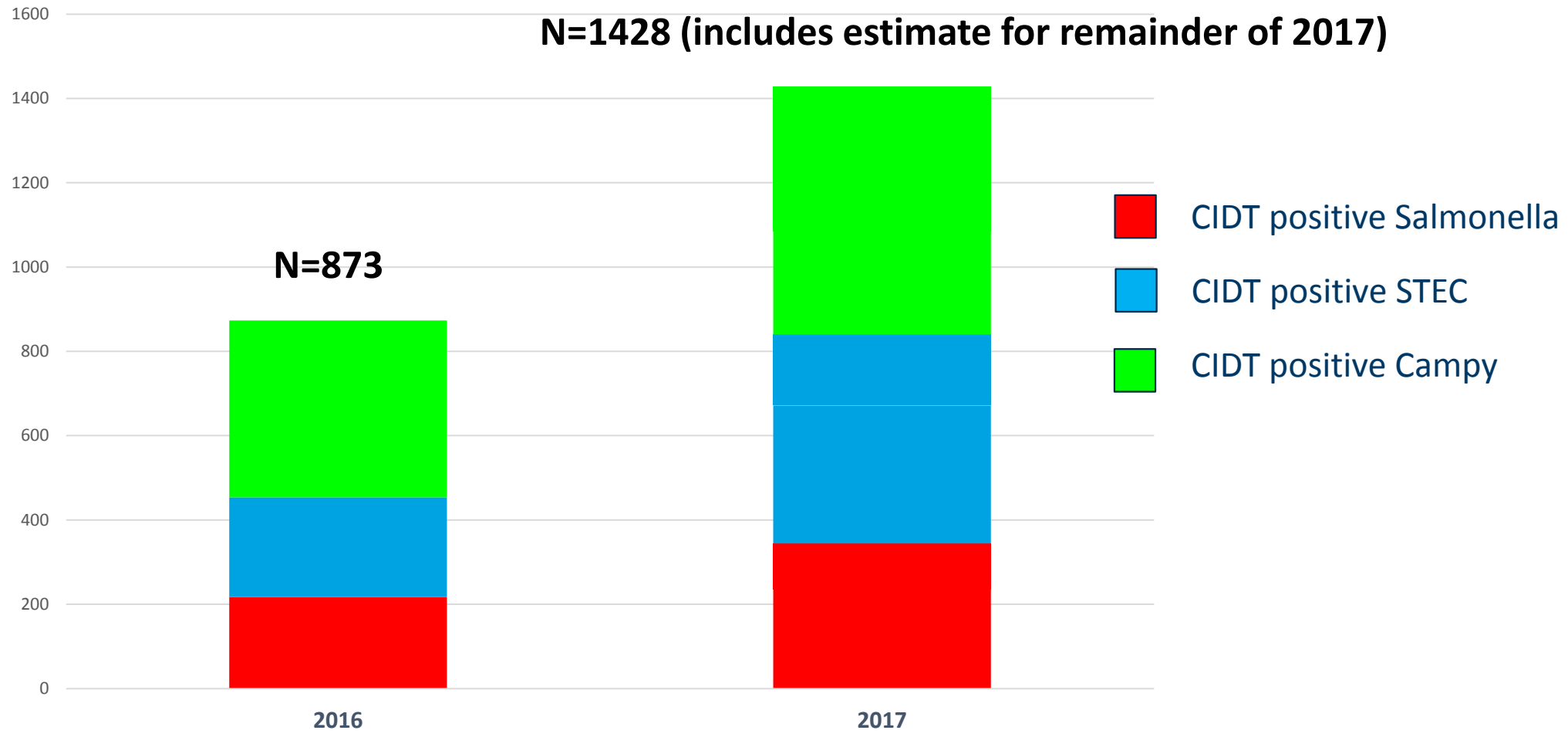


CIDT positive Salmonella

CIDT positive STEC

CIDT positive Campy

Minnesota Isolations-2016 and 2017 (includes projected)



ETEC

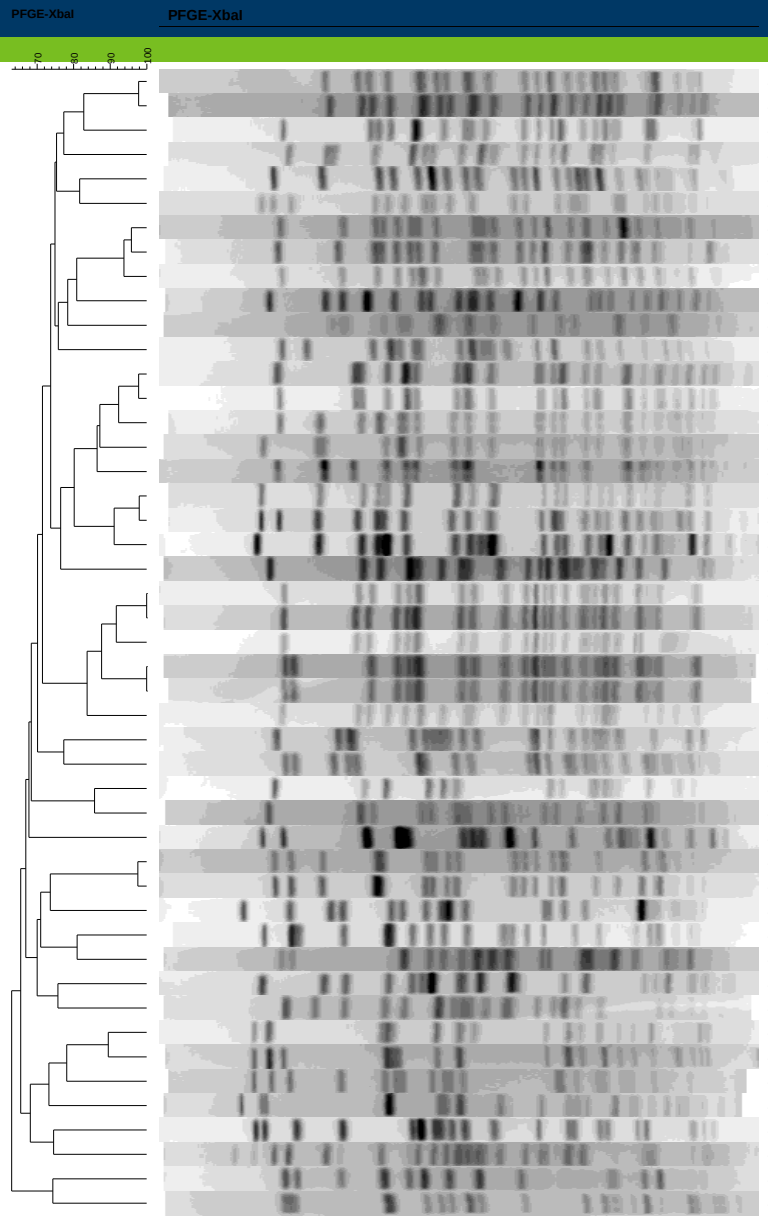
- Cause profuse, watery diarrheae
- One of the leading causes of diarrheae in the developing world
- As common as Salmonella*
- Need for additional investigation

*Medus et. al. Open Forum Infect Dis. 2016 Jan 18;3(1)

ETEC Co-Detections

Co-detected w/ETEC	#	% ETEC confirmed
Campylobacter + EAEC + Salmonella	1	0
Campylobacter + EAEC + EPEC	1	100
Campylobacter + EPEC	2	0
Campylobacter + rotavirus	1	100
Campylobacter	2	50
Campylobacter + STEC non-O157	2	0
Campylobacter + STEC O157	1	0
EAEC + EIEC/Shigella + EPEC	1	0
EAEC + EIEC/Shigella	1	100
EAEC + EPEC	16	69
EAEC + EPEC + norovirus	1	100
EAEC	3	100
EAEC + norovirus	2	0
EAEC + STEC nonO157	2	50
EIEC/Shigella	2	100
EPEC	14	64
EPEC + sapovirus	1	0
EPEC + Salmonella	2	50
EPEC + Salmonella + Plesiomonas	1	0
ETEC only	32	56
ETEC + adenovirus	1	0
ETEC + norovirus	2	50
Salmonella	1	0
STEC nonO157	5	60
STEC nonO157 + norovirus	1	0
STEC O157	2	0

ETEC

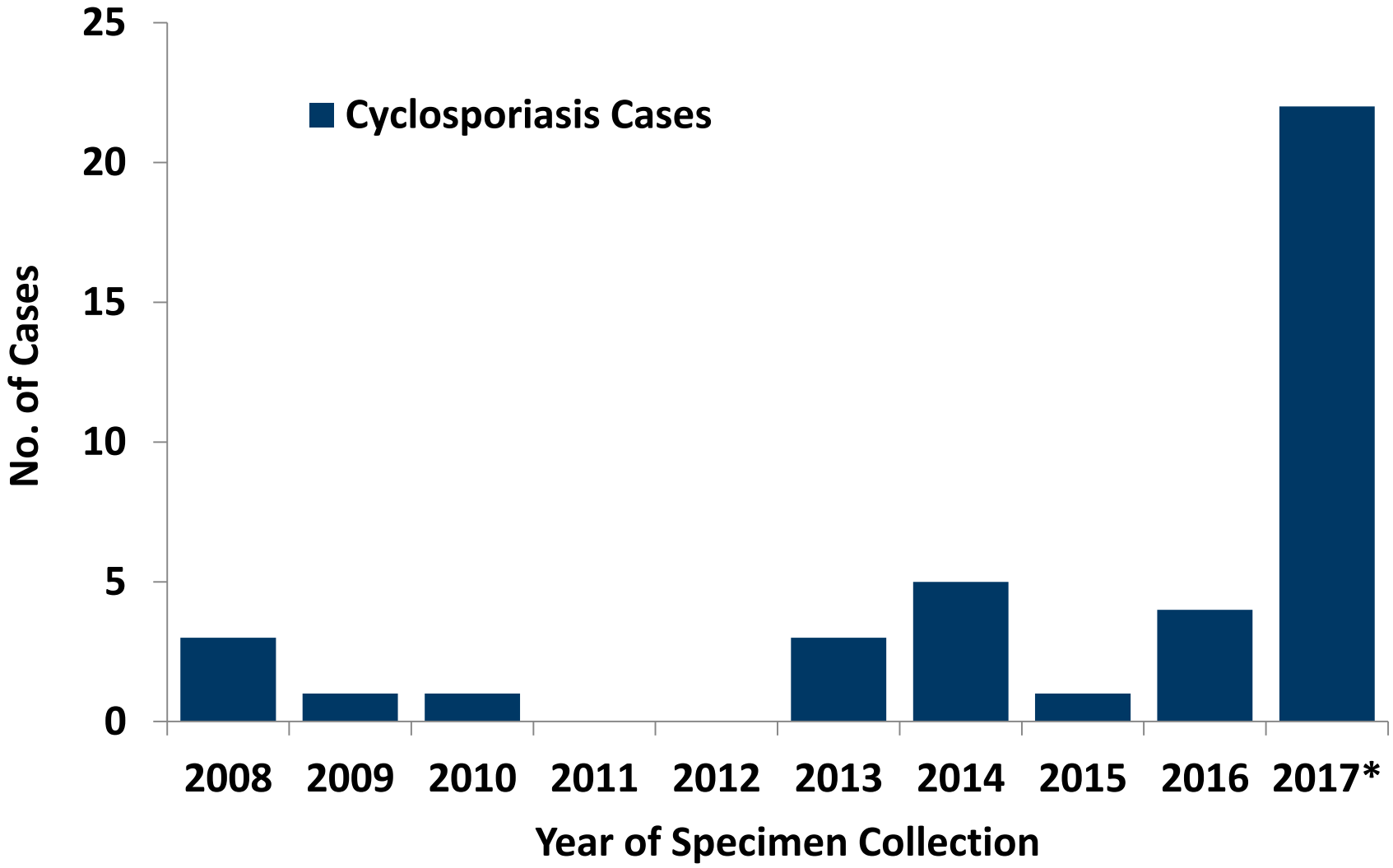


ETEC-WGS Characterization

Specimen	Serotype	MLST	Virulence factors	Antibiotic resistance*
I2017000684-1	O159:H4	ST-10	ltcA	Te
I2017000818-2	O15:H18	ST-69	eatA	A, Q, Tr
M2017000963-1	O169:H41	ST-182	sta1	A, B, S, Te, Tr
M2017000965-6	Onovel31:H18	ST-69		Te, Tr
I2017001980-2	O153var1:H12	ST-155		
I2017002797-3	O6:H16	ST-4	ltcA, eatA	
I2017002816-2	O169:H41	ST-182	sta1	A, B, Q, S, Te, Tr
I2017002942-ET2	O6:H16	ST-4	ltcA, eatA	
I2017003794-ET1	O64:H5	ST-3857	ltcA, eatA	A, B, S, Te
I2017003985-ET3	O6:H16	ST-4	ltcA, eatA	

A= Aminoglycoside
B=Beta-lactam
Q=Quinolone
S=Sulphonamide
Te=Tetracycline
Tr=Trimethoprim

Cases of Cylosporiasis, Minnesota, 2008-2017



*2017 data through 10/31/17

Conclusions

- Preliminary evidence shows that CIDTs are not having a negative impact on foodborne disease surveillance
  - Isolate numbers are stable or rising since CIDTs
  - Burden on PHLs
  - PHLs will need more resources for the future to maintain culture
- CIDTs are having a tremendous impact on resources at PHLs
- CIDTs may allow us to better identify and understand other pathogens

Acknowledgements

- Steve Gladbach-Missouri
- Tim Monson-Wisconsin
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- Ryan Jepson-Iowa
- Carissa Robertson-Kansas
- Elizabeth Cebelinski-Minnesota

DEPARTMENT OF HEALTH

Thank you!

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