USDA
United States Department of Agriculture

One Team, One Purpose

Food Safety and Inspection Service

Protecting Public Health and Preventing Foodborne Illness

FSIS Update:
Office of Public Health Science

NCC Technical and Regulatory Committee Meeting
January 30, 2018

Kis Robertson Hale, DVM, MPH, DACVPM
CAPT, US Public Health Service
Deputy Assistant Administrator, Office of Public Health Science
USDA/Food Safety and Inspection Service

Food Safety and Inspection Service:

Topics

- FSIS outbreak investigations
- Latest in antimicrobial resistance
- Update on other chicken parts sampling
- Laboratory methods changes
- Status of Accredited Laboratory Program

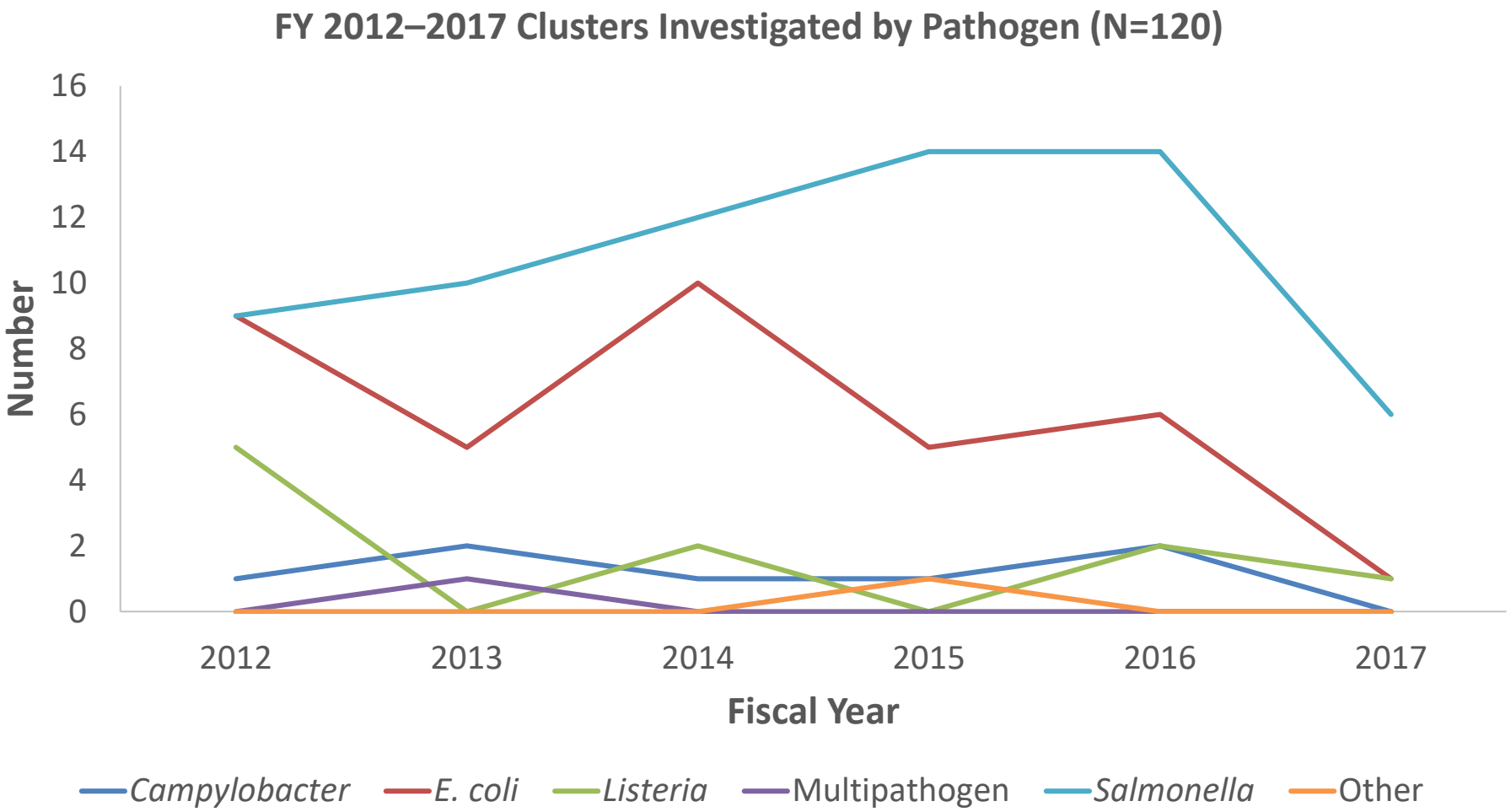
Food Safety and Inspection Service:

FSIS: A Public Health Regulatory Agency

Ensure meat, poultry, and processed egg products are safe, wholesome, and correctly labeled and packaged.

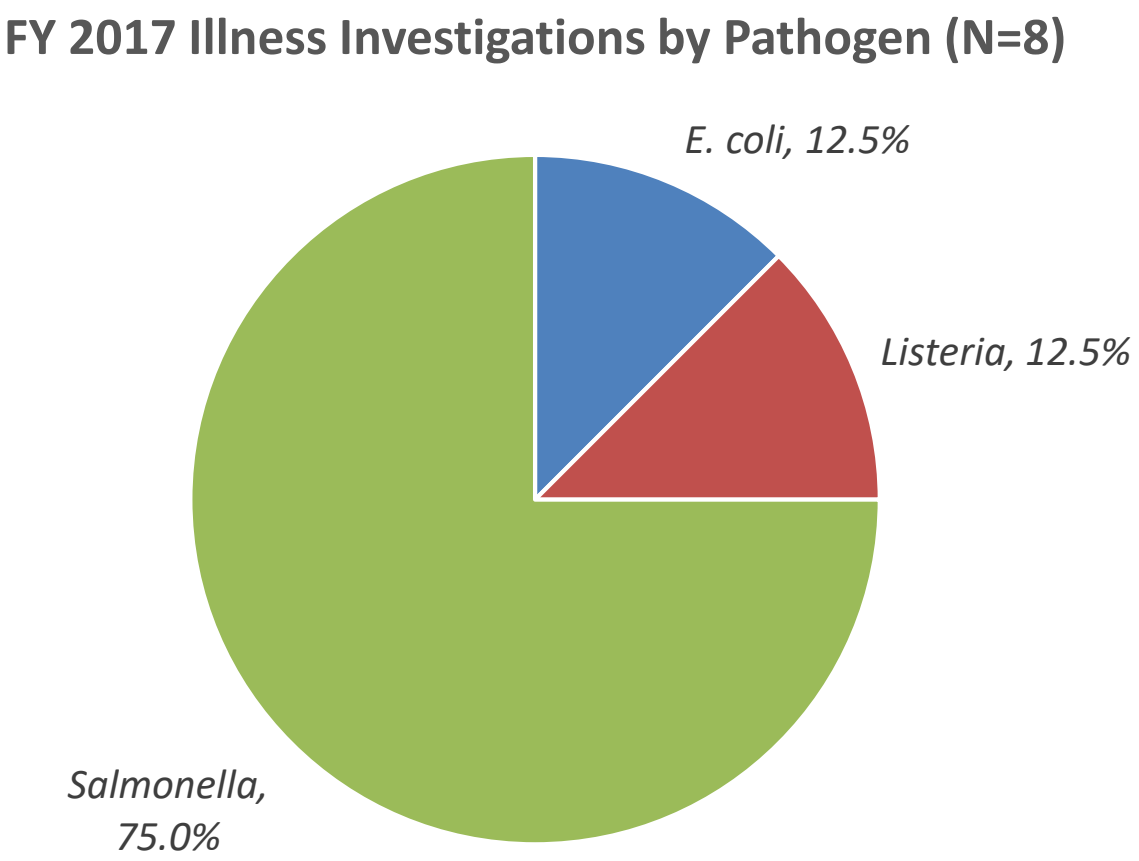
Food Safety and Inspection Service:

FY 2012–2017 Illness Investigations



Food Safety and Inspection Service:

FY 2017 Illness Investigations



Food Safety and Inspection Service:

Chicken-Associated Investigations*, FY 2015–2017

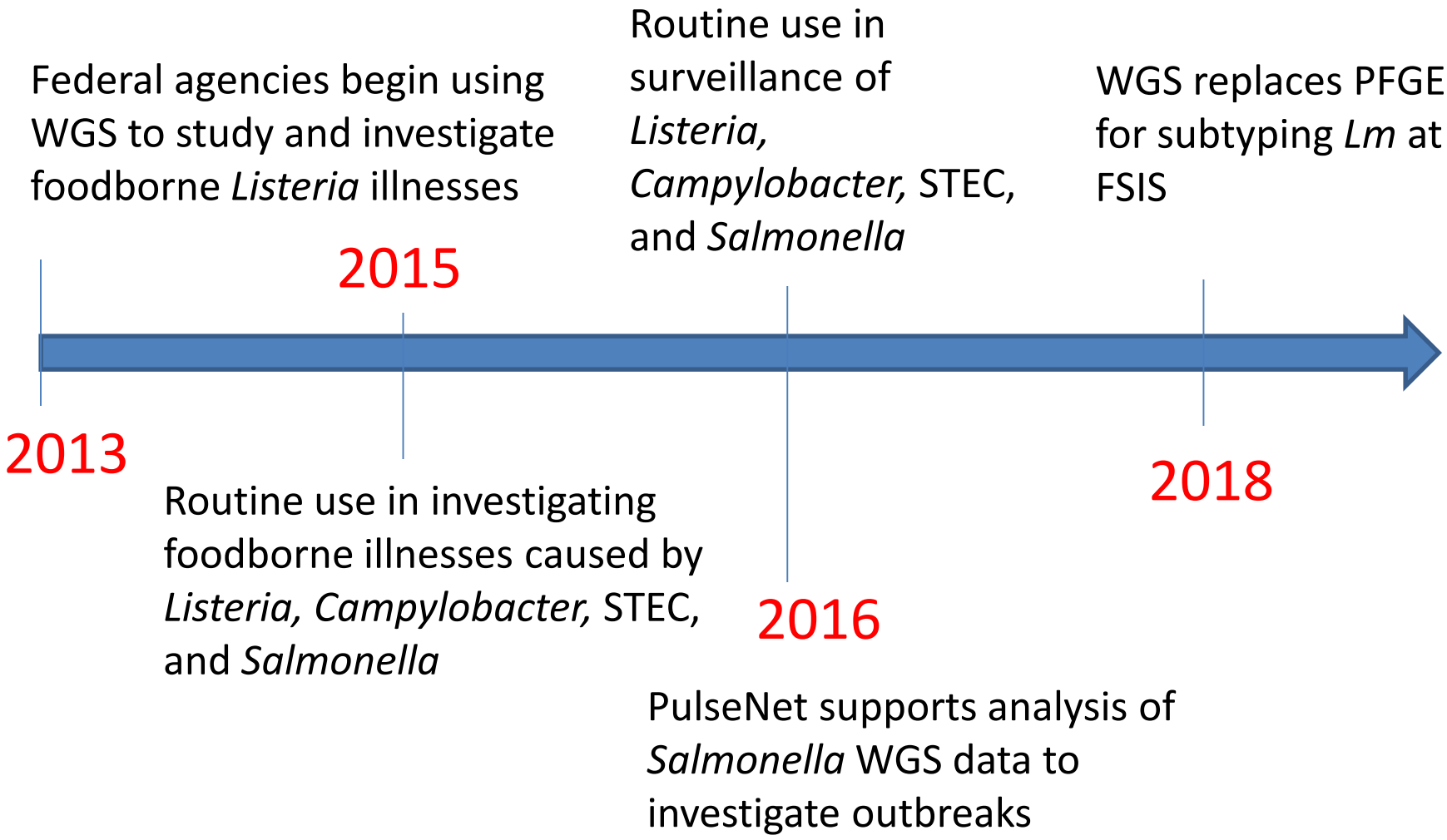
	FY2015	FY2016	FY2017
Number of investigated outbreaks with evidence of potential link* to FSIS-regulated product	20	18	6
Outbreaks (% of total) with evidence of potential link to chicken	8 (40%)	7 (39%)	2 (33%)
RTE	0 (0%)	1 (14%)**	1 (50%)**
Raw	8 (100%)	7 (100%)	2 (100%)
Total number of illnesses from outbreaks with evidence of potential link to chicken	352	336	59
Chicken-associated outbreaks (% of total) resulting in FSIS recall	3 (38%)	0 (0%)	0 (0%)
***Salmonella* serotype responsible for most outbreaks**	Heidelberg	I 4,[5],12:i:- and Enteritidis	I 4,[5],12:i:- and Enteritidis

*Includes outbreaks definitely, likely/presumptive, and possibly associated with FSIS-regulated product

**1 outbreak in FY2016 and 1 outbreak in FY2017 involved both RTE and raw poultry

Food Safety and Inspection Service:

Major WGS Milestones



Food Safety and Inspection Service:
How WGS has Impacted Outbreak Investigations

Grouped isolates with different PFGE patterns into single cluster

Determined the source of older unsolved illnesses/clusters

Refined outbreak case definitions by excluding unrelated isolates

Linked sporadic illnesses to contaminated food

Identified outbreaks following product testing

Helped in understanding the ecology of pathogen reservoirs

Food Safety and Inspection Service:

How WGS has Impacted Outbreak Investigations

Grouped isolates with different PFGE patterns into single cluster

Determined the source of older unsolved illnesses/clusters

Refined outbreak case definitions by excluding unrelated isolates

Linked sporadic illnesses to contaminated food

Identified outbreaks following product testing

Helped in understanding the ecology of pathogen reservoirs

Food Safety and Inspection Service:

2017 *Salmonella* Enteriditis Investigation

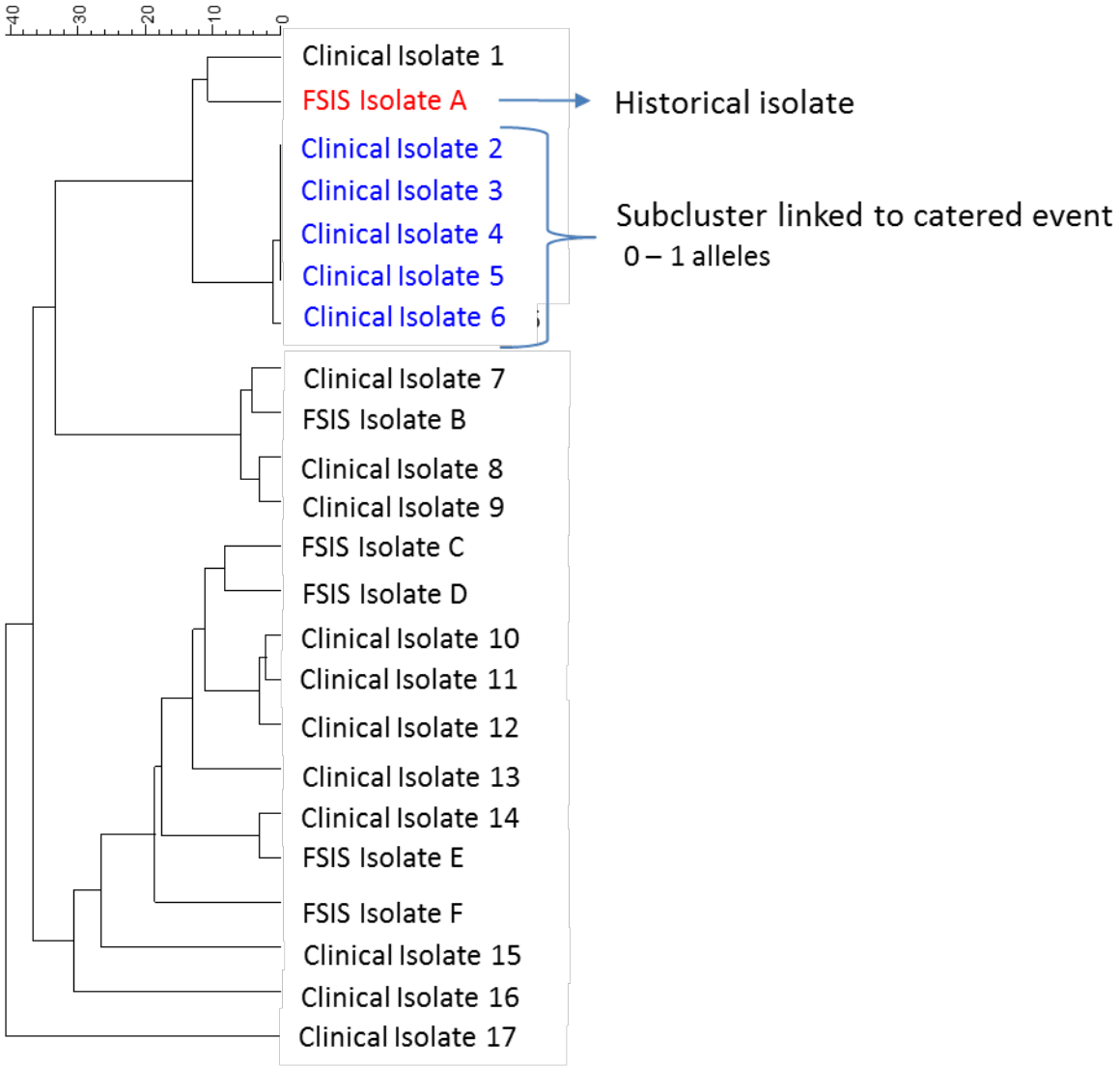
- 53 illnesses in 25 states; not uncommon PFGE pattern
- Available epidemiologic data limited to a single-state subcluster linked to a catered event
  - Attendees consumed chicken traced to a federal establishment
  - Historic isolate from establishment matched clinical PFGE pattern
- No known links between subcluster cases and other illnesses
- **Question**: Were all these illnesses part of an outbreak?

Food Safety and Inspection Service:

Using WGS to Exclude Unrelated Cases

- Clinical isolates in subcluster found related to each other by WGS
  - 0 SNP differences (0-1 alleles)
  - However, these isolates were not closely related to the historic product isolate (10-17 SNP differences)
- Other clinical isolates found unrelated to subcluster isolates
- WGS helped inform decision not to conduct additional case-patient interviews because evidence did not support existence of a larger outbreak associated with chicken

Food Safety and Inspection Service:
2017 *Salmonella* Enteritidis, WGS Tree



Source: CDC

Antimicrobial Resistance

- NARMS public meeting highlights
- AMR findings in poultry

Food Safety and Inspection Service

Takeaways from NARMS Public Meeting (10/24 – 10/25)

- Overall, isolates of Salmonella have become more susceptible since NARMS began, and resistance to multiple drugs has declined
- Low levels of resistance to critically important antibiotics ceftriaxone and ciprofloxacin
- Apparent differences between cecal and HACCP findings
- Overall, US doing well in managing AMR: For the first time, we have been able to compare critically important antimicrobials tested in NARMS - third-generation cephalosporins, ciprofloxacin, and nalidixic acid – to Salmonella data from European Union (EU) countries. In the United States, resistance to third-generation cephalosporins, ciprofloxacin, and nalidixic acid compares very favorably to the EU findings.

NARMS Public Meeting (cont.)

- **Public Comments Highlights:**
  - Publication of summary data by agencies should be within the calendar year after data is collected
  - All three Agencies should harmonize formatting and presenting data
  - Representativeness of cecal data and conclusions based on a nation wide data collection program need to be discussed further

- **Next Steps:**
  - NARMS is considering to broaden collaboration with other programs and intends to take a One Health approach by considering animal pathogens, on-farm testing, companion animals, and an environmental component
  - NARMS will focus on developing the next Strategic Plan considering the recent recommendations from the Science Board and the input from this Public Meeting

Food Safety and Inspection Service

NARMS at FSIS: Sampling and Results –*Salmonella*

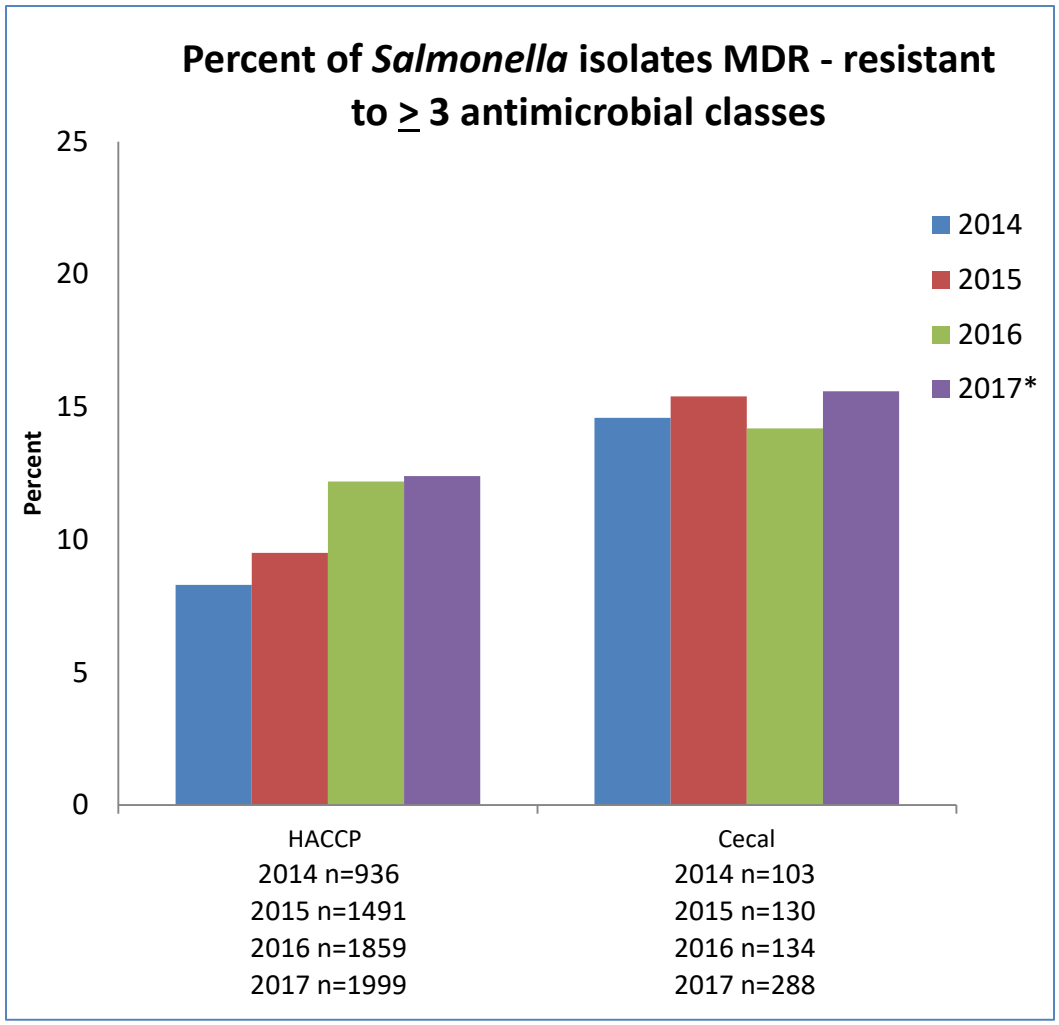
Chickens

	2014			2015			2016			2017*		
	No. Samples	No. Isolates	Percent Positive	No. Samples	No. Isolates	Percent Positive	No. Samples	No. Isolates	Percent Positive	No. Samples	No. Isolates	Percent Positive
HACCP	10,446	936	**9.0%**	11,453	1,491	**13.0%**	16,973	1,859	**10.9%**	18,461	1,999	**10.8%**
Cecal	575	103	**17.9%**	553	130	**23.5%**	568	134	**23.4%**	799	288	**36.0%**

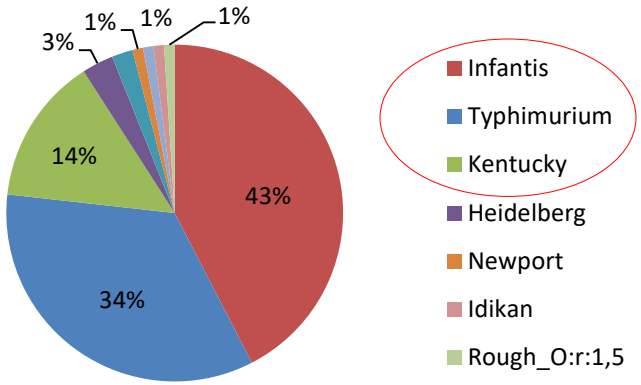
*Preliminary 2017 Data

Food Safety and Inspection Service

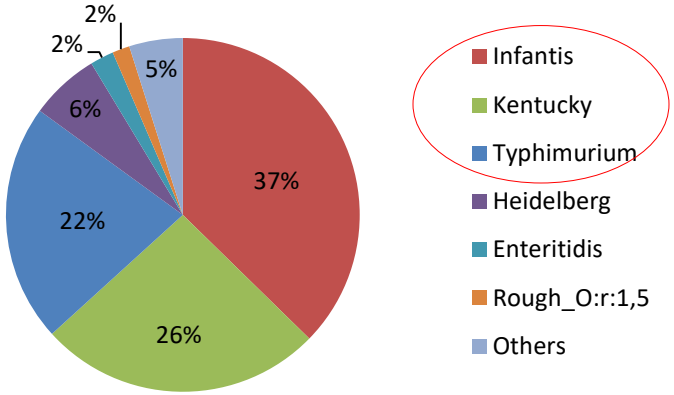
Multi-Drug Resistance (MDR) in *Salmonella* from Chickens



Cecal Chicken – MDR Serotypes



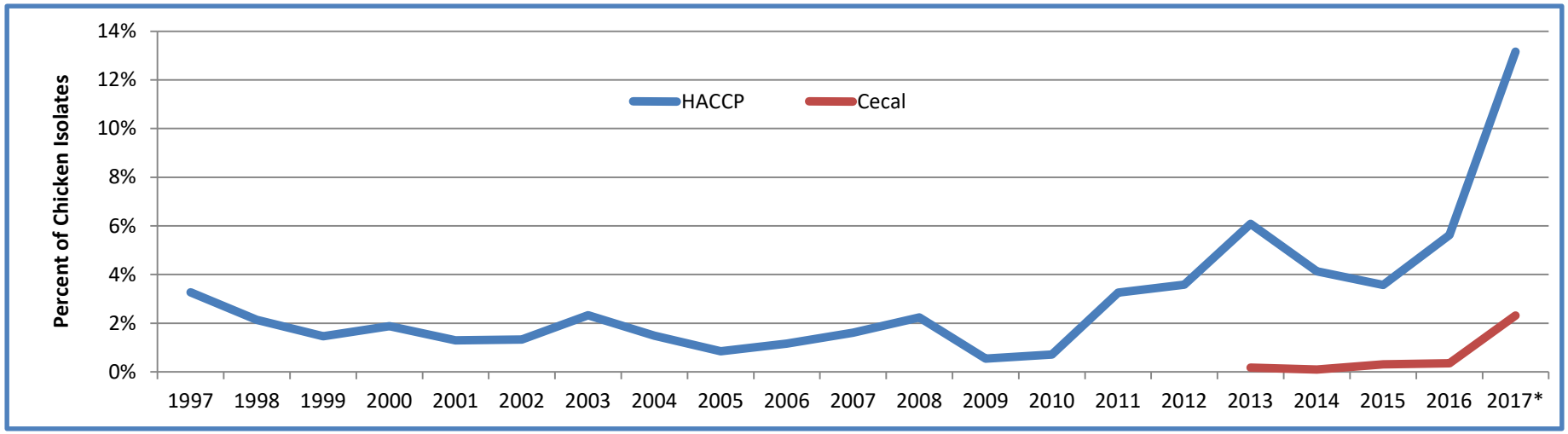
HACCP Chicken – MDR Serotypes



*Preliminary 2017 Data

Food Safety and Inspection Service

Salmonella Infantis in Chickens

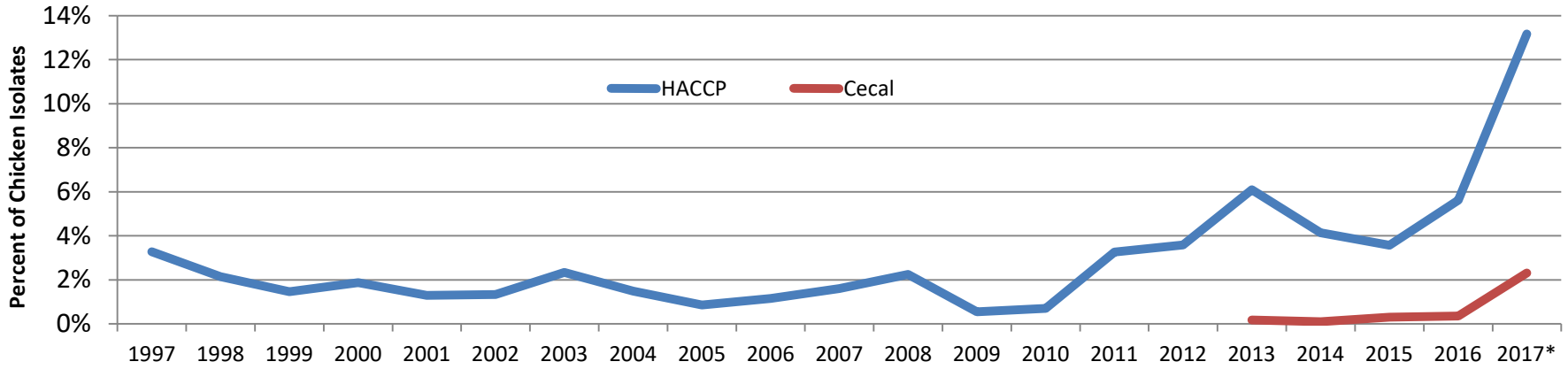


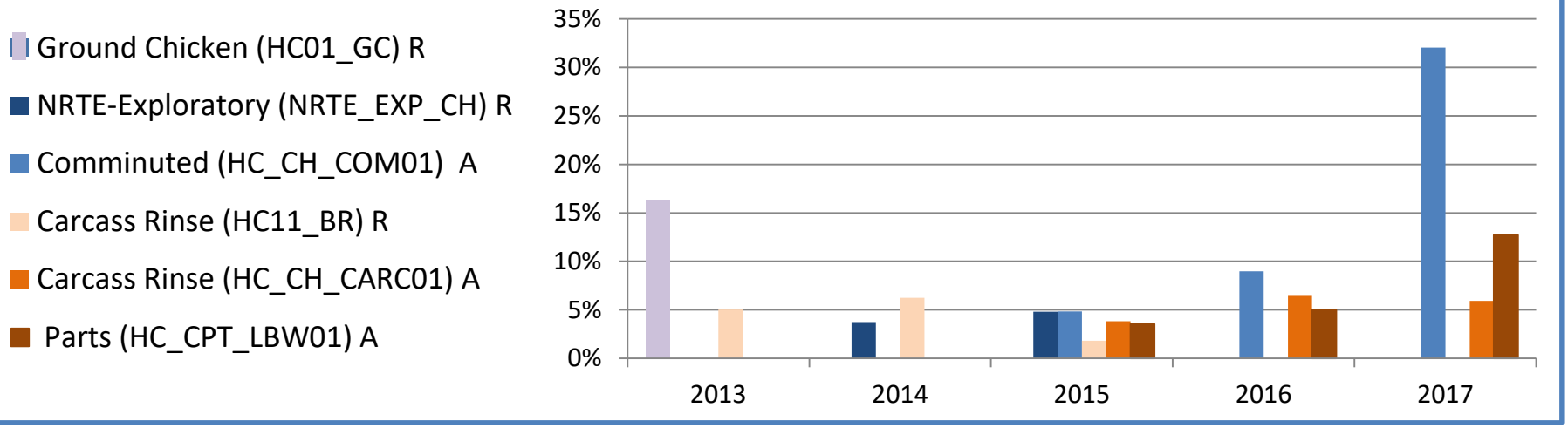
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HACCP	No. Infantis	7	12	21	22	17	20	27	19	17	16	16	14	3	4	16	31	35	43	58	112	301
	No. MDR	1	1	1	2	1	0	0	1	1	3	0	0	0	1	1	0	2	2	2	62	193
Cecal	No. Infantis																	1	1	5	7	53
	No. MDR																	0	0	4	4	34

*Preliminary 2017 Data

Food Safety and Inspection Service

Salmonella Infantis in Chickens – Distribution by Sample Type/Project Code



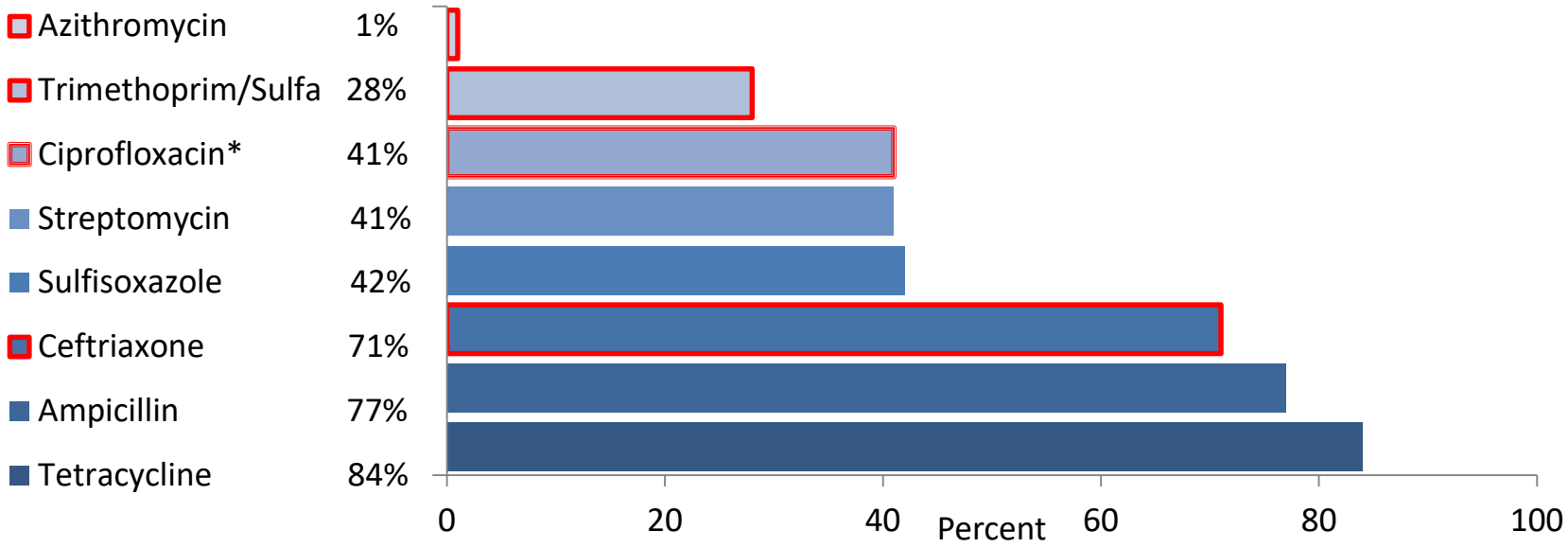


*Preliminary 2017 Data | R=Retired Project Code | A: Active Project code

Food Safety and Inspection Service

Multi-Drug Resistance (MDR) in *Salmonella* from Chickens

MDR – Which antimicrobial drugs are involved?



Extreme Drug Resistance (XDR) 2014-2017

- Four isolates from HACCP (1 Thompson, 1 Typhimurium, 2 Kentucky)
- None from Cecal

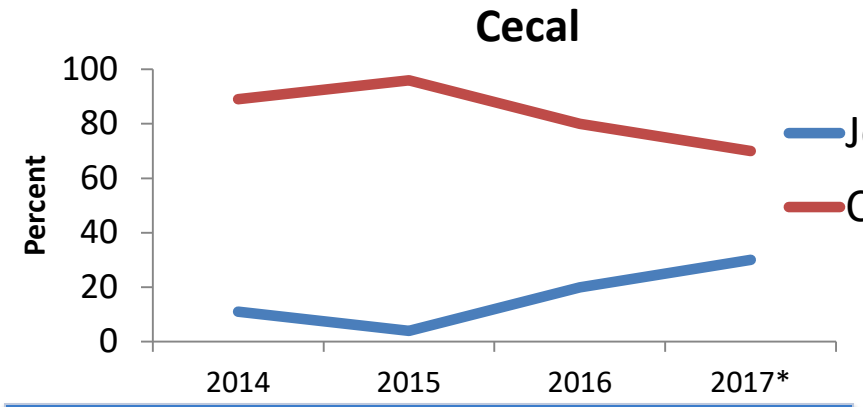
Critical – FDA Guidance 152 rank

*Includes those classified as intermediate

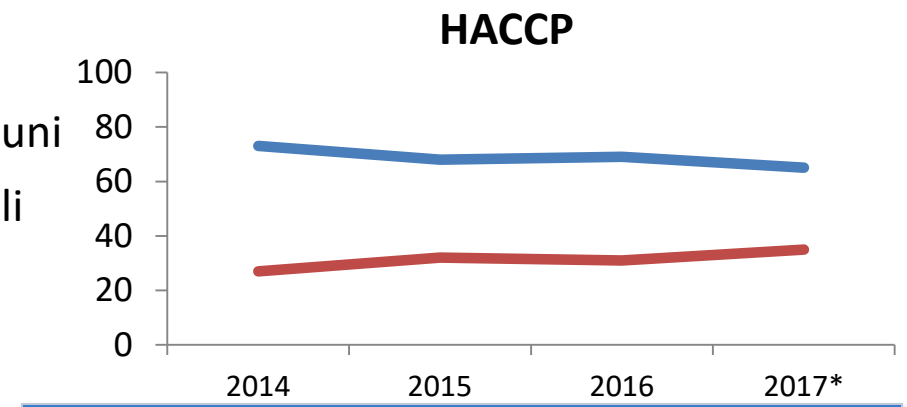
Food Safety and Inspection Service

Campylobacter in Chickens

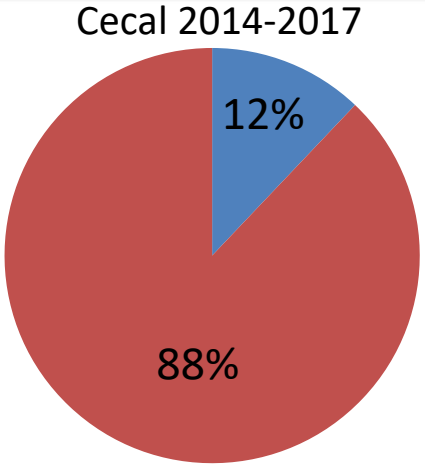
Campylobacter Species Distribution - Chickens

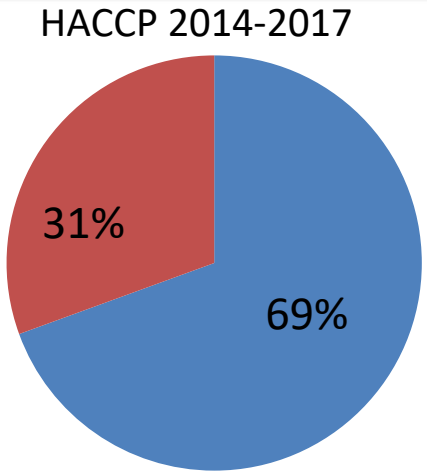


Total n Campy	70	53	59	197



Total n Campy	574	751	923	450

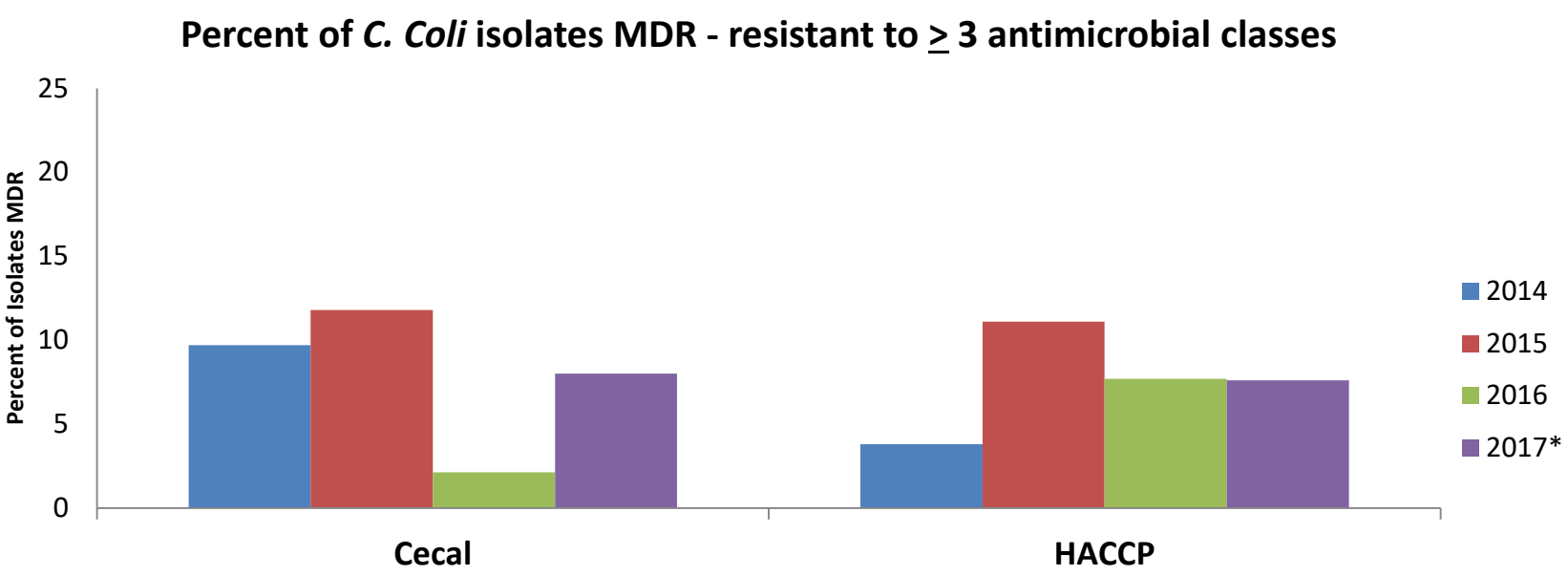




*Preliminary 2017 Data

Food Safety and Inspection Service

MDR *Campylobacter coli* from Chickens



	2014	2015	2016	2017
No. MDR	6	6	1	11
Total No. of Isolates	70	53	59	197

	2014	2015	2016	2017
No. MDR	6	27	22	12
Total No. of Isolates	574	751	923	450

MDR in *C. Jejuni* was <2% for in both Cecal and HACCP

*Preliminary 2017 Data

Update on Other Chicken Parts Sampling

Food Safety and Inspection Service:

FSIS Notice 72-16 (Sep 21, 2016)

- Sampling implemented on November 1, 2016
- Included sampling of necks, giblets, & quarters and halves
- Two Project Codes using one PHIS product group to schedule samples
  - EXP_CPT_OT01: Uses 50 ml of rinsate for a specified number of parts (necks, hearts, giblets, and livers)
  - EXP_CPT_QH01: Uses 400 ml of rinsate for a specified of parts (quarters and halves)

Food Safety and Inspection Service:

Number of Parts to Collect

Table 1. Number of Quarter and Half Carcasses to Collect for EXP_CPT_QH01 (for all live bird weights)	
Type of Raw Chicken Part	**Number of Raw Chicken Parts to Collect**
Half Carcasses	2
Quarter Carcasses	4

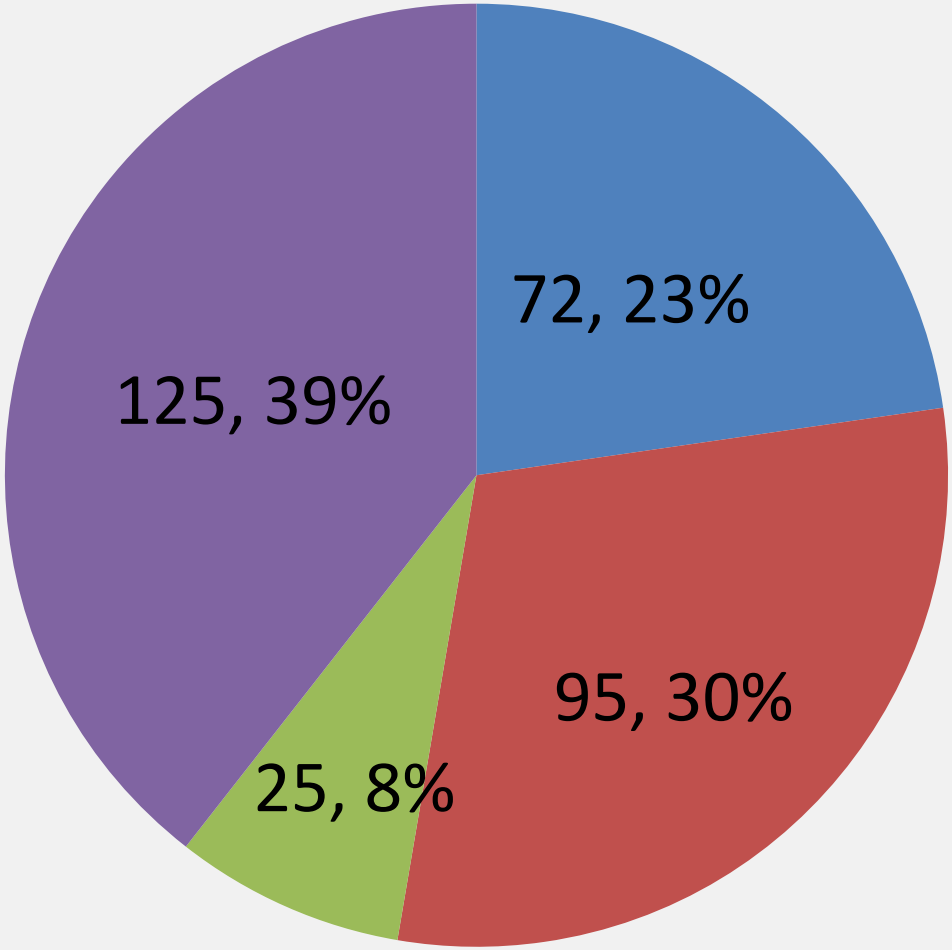
Table 2. Number of Necks, Livers, Hearts, and Gizzards to Collect for EXP_CPT_OT01				
Type of Raw Chicken Part	**Number of Raw Chicken Parts to Collect, by Average Live Bird Weight**			
	≤ 4 lb	**5-6 lb**	**7 lb**	**≥ 8 lb**
Hearts	52	42	36	27
Livers	12	9	6	6
Gizzards	40	32	32	24
Necks	3	2	2	1

Food Safety and Inspection Service:

Types of Parts Collected Under EXP_CPT_OT01

A total of 317 eligible product samples have been collected under this project code.

This includes 22 discards.



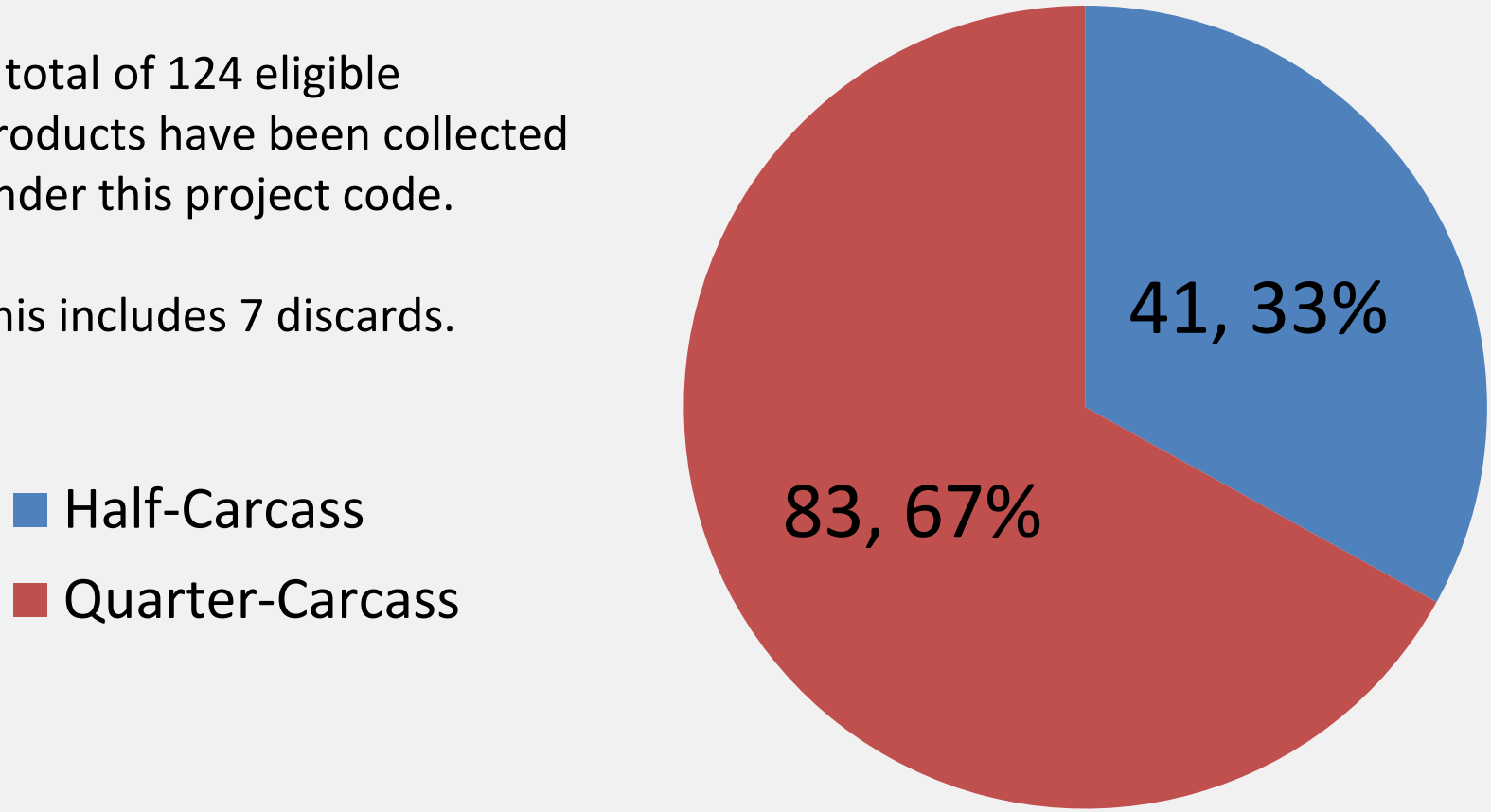
*Data pulled from FSIS data warehouse on 12/18/17

Food Safety and Inspection Service:

Types of Parts Collected under EXP_CPT_QH01

A total of 124 eligible products have been collected under this project code.

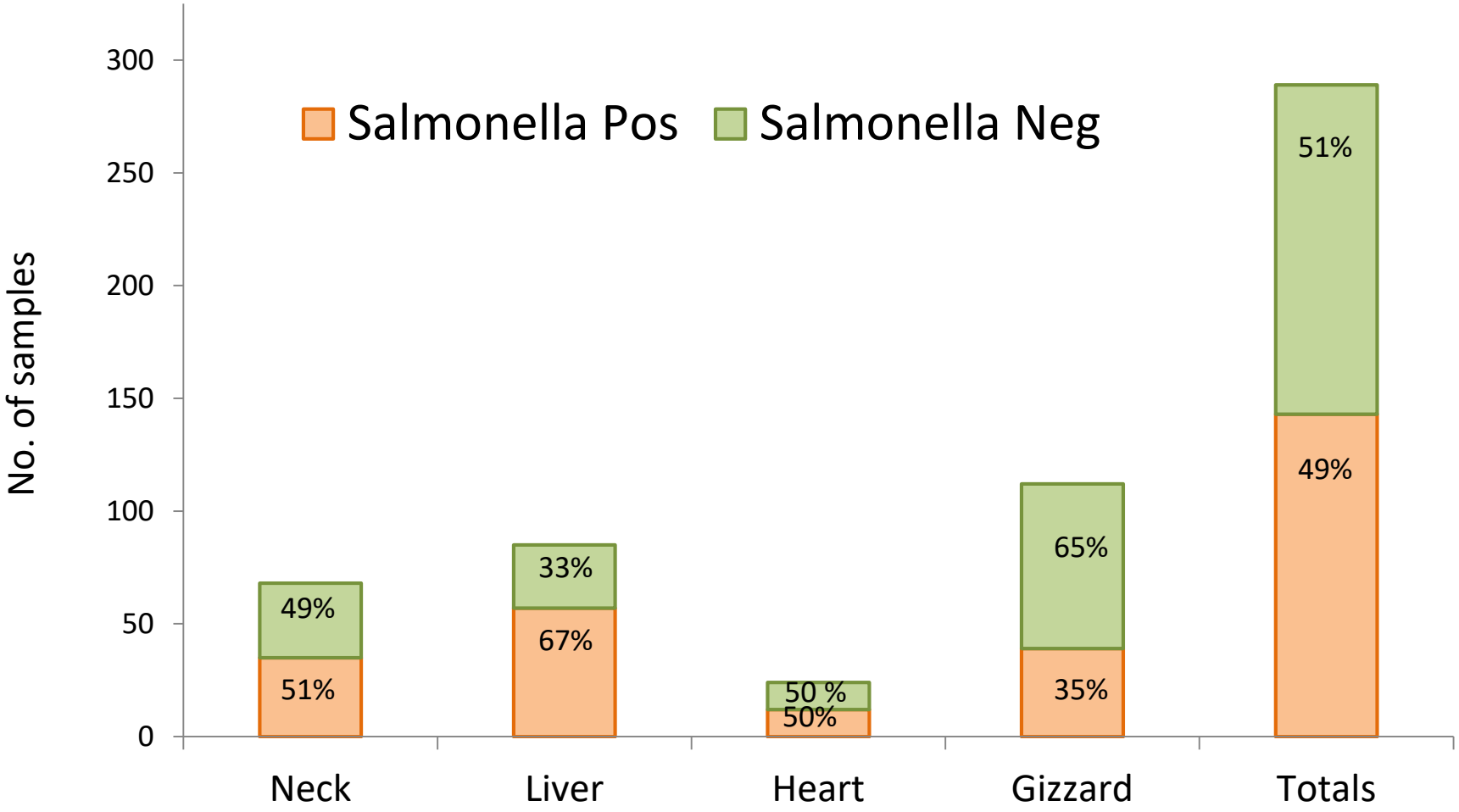
This includes 7 discards.



*Data pulled from FSIS data warehouse on 12/18/17

Food Safety and Inspection Service:

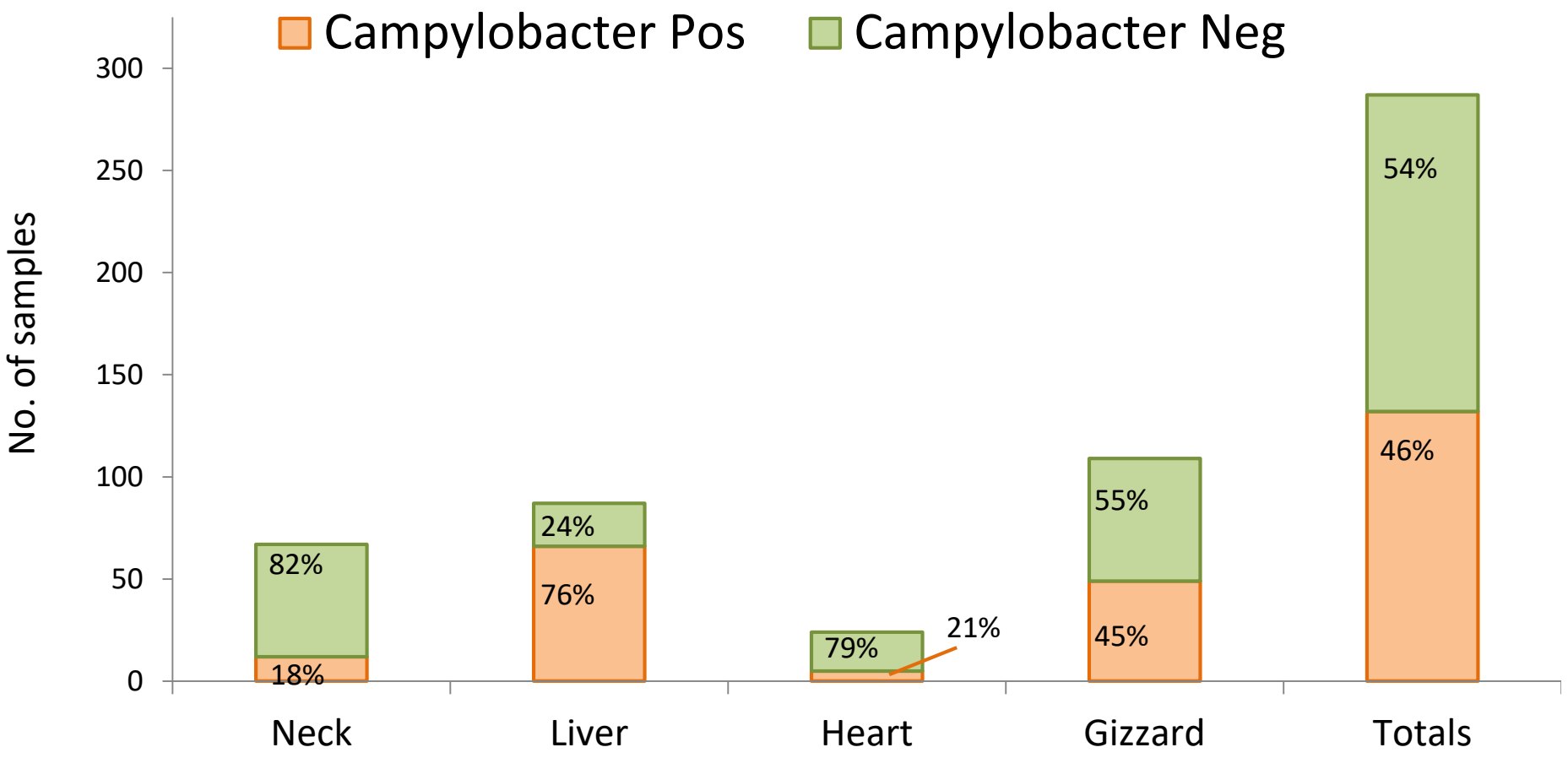
Salmonella Results for Neck and Giblets



*Data pulled from FSIS data warehouse on 12/18/17

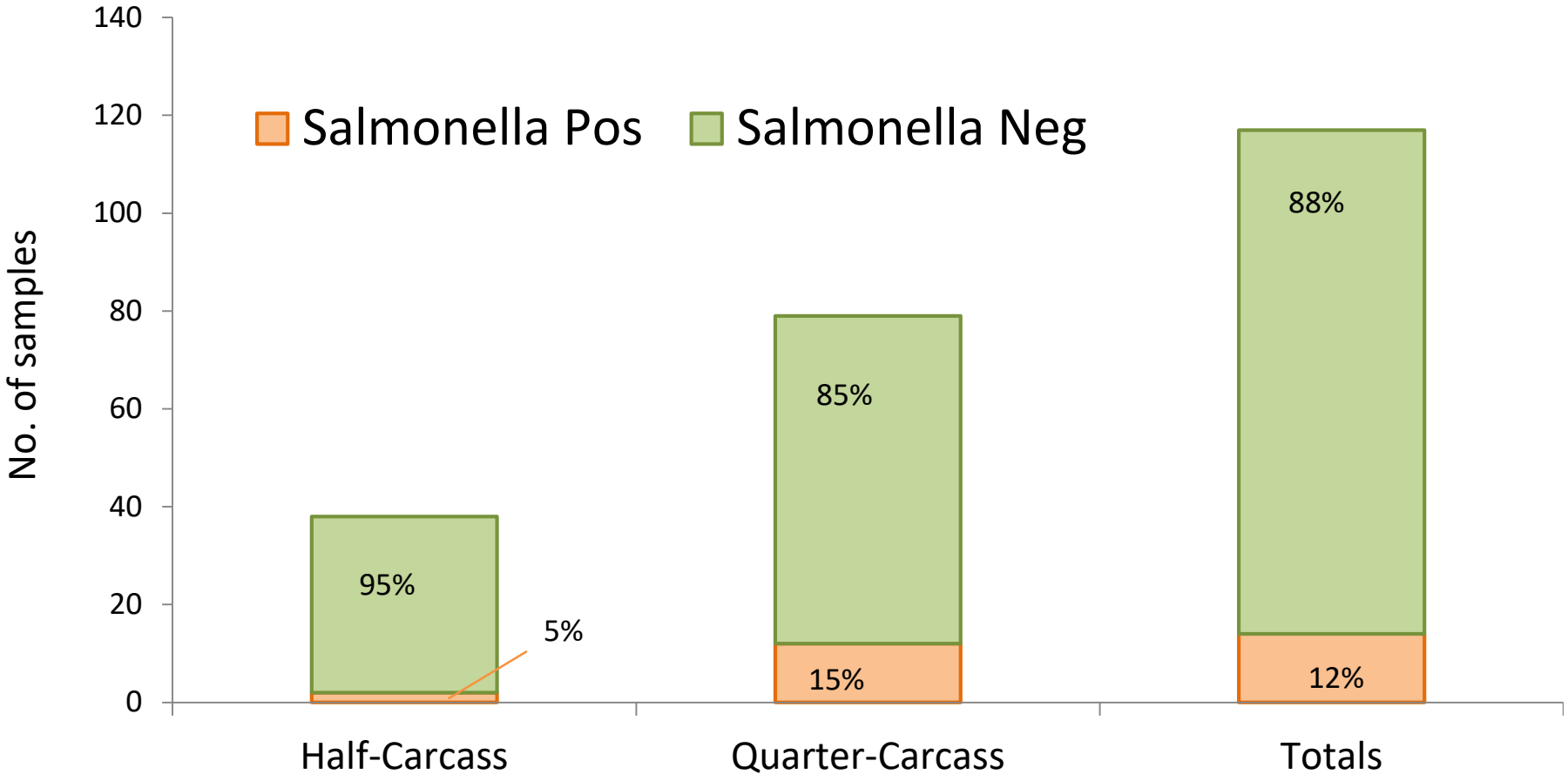
Food Safety and Inspection Service:

Campylobacter Results for Necks and Giblets



*Data pulled from FSIS data warehouse on 12/18/17

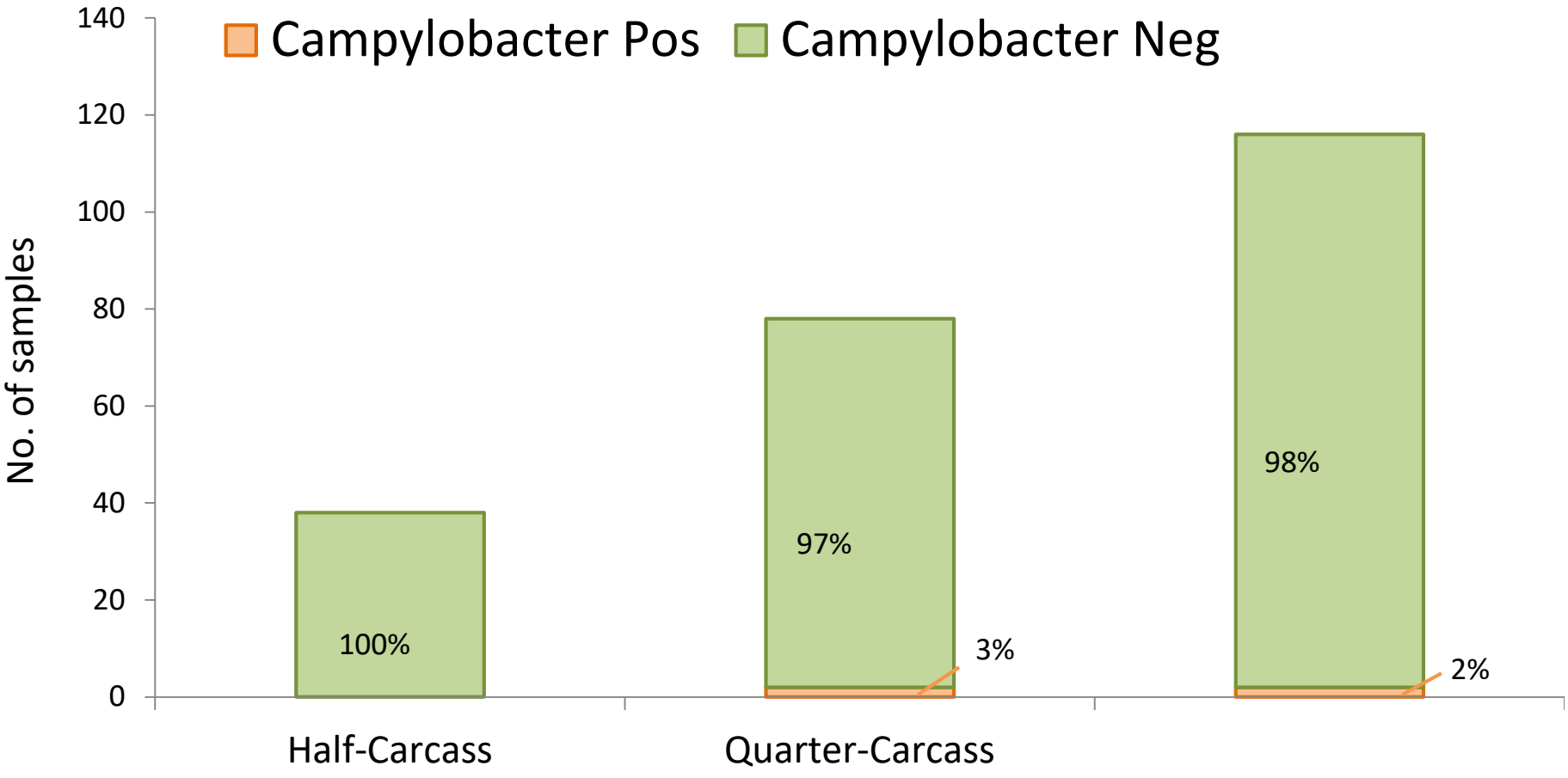
Food Safety and Inspection Service:
Salmonella Results for Halves and Quarters



*Data pulled from FSIS data warehouse on 12/18/17

Food Safety and Inspection Service:

Campylobacter Results for Halves and Quarters



*Data pulled from FSIS data warehouse on 12/18/17

Lab Method Changes and Accredited Lab Program

Food Safety and Inspection Service:

Poultry-Related Method Changes in FY17

Microbiology

- No new method updates applicable to poultry
- In Dec 2017, the Microbiology Laboratory Guidebook (MLG) was revised to include the recipe for neutralizing Broth Peptone Water (nBPW)

Chemistry

- No new method updates applicable to poultry
- Pesticide screening method extended to processed egg products

Food Safety and Inspection Service:

Latest on Accredited Laboratory Program (ALP)

- Currently, non-FSIS laboratory can be accredited for analysis of food chemistry (fat, protein, etc.) and select chemical residues
- Under consideration:
  - Change statistical methods used in measuring chemical lab performance
  - Expansion of program to include pathogen testing
- Modernizing ALP is aimed at increasing efficiencies

Food Safety and Inspection Service:

Closing Thoughts

- Technological advances are expanding FSIS' insight into foodborne illness and antimicrobial resistance
- Data from other chicken parts sampling highlight potential gaps in pathogen reduction
- FSIS' laboratories and associated programs are a major focus of Agency modernization efforts

Questions?

Kis.Robertson@fsis.usda.gov