



# ***NVSL Salmonella Update***

Brenda Morningstar-Shaw  
Microbiologist

U.S. Department of Agriculture  
Animal and Plant Health Inspection Service  
Veterinary Services  
Science, Technology and Services



# Salmonella Group D Proficiency Test

- 106 PT's shipped to 85 laboratories
- All NPIP authorized laboratories participated
- 2 NPIP labs did not report test results on approved NPIP *Salmonella* tests

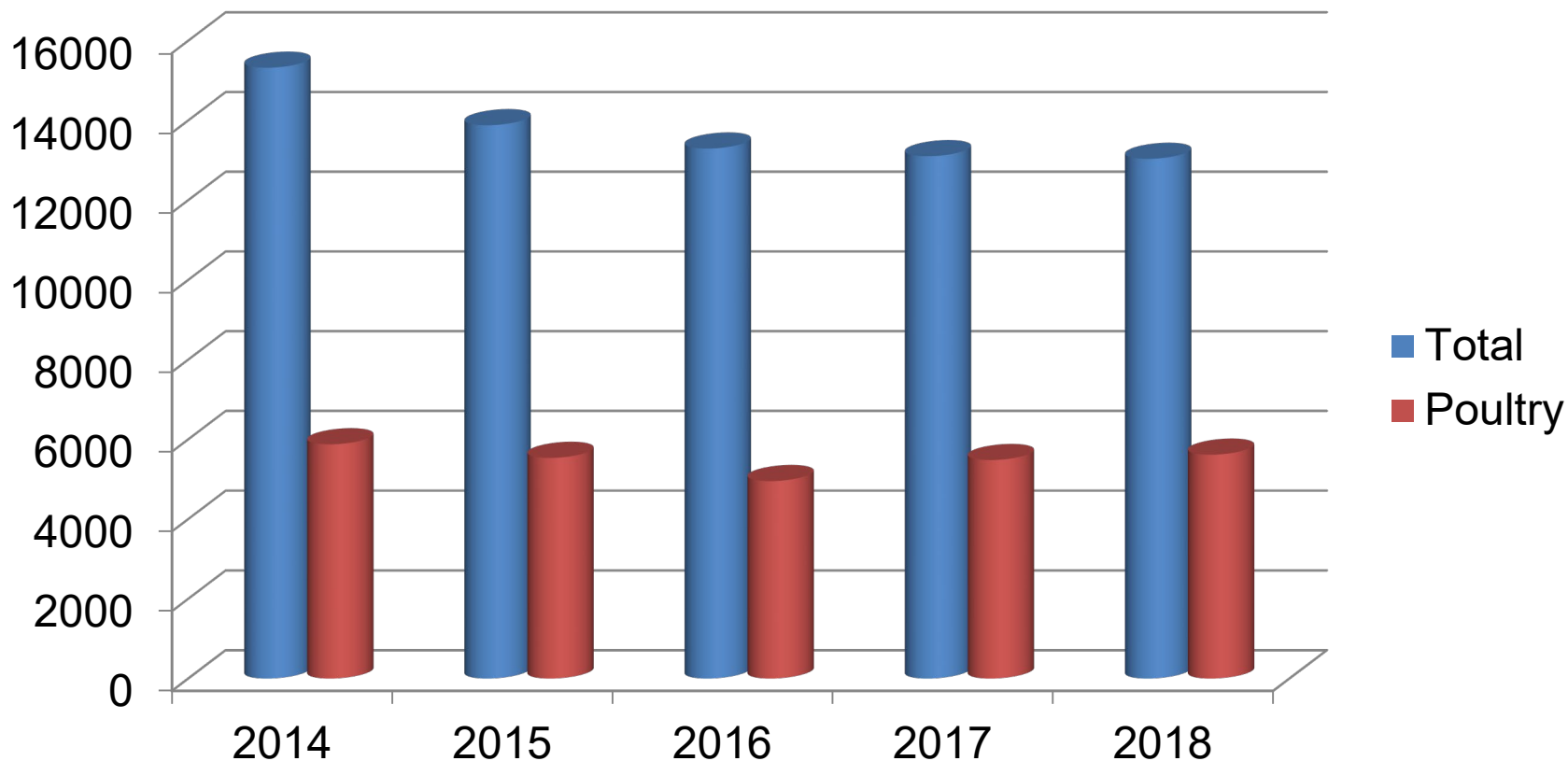
# *Salmonella* Serotyping

- 13,037 isolates submitted in 2017
  - 5,334 Clinical
  - 5,511 Non-Clinical
  - 2,192 Research and other
- 5,616 (43%) Chicken/Turkey

# 5 Year Serotyping Summary

Year	Total Isolates	Total Clinical Isolates	Total Poultry Clinical Isolates	Total Non-Clinical Isolates	Total Poultry Non-Clinical Isolates
2014	15,353	4,897	525	6,687	5,351
2015	13,880	4,976	498	6,396	5,038
2016	13,295	5,258	546	5,727	4,408
2017	13,103	5,479	679	5,489	4,802
2018	13,037	5,334	657	5,511	4,959

# Isolates Received 2014-2018





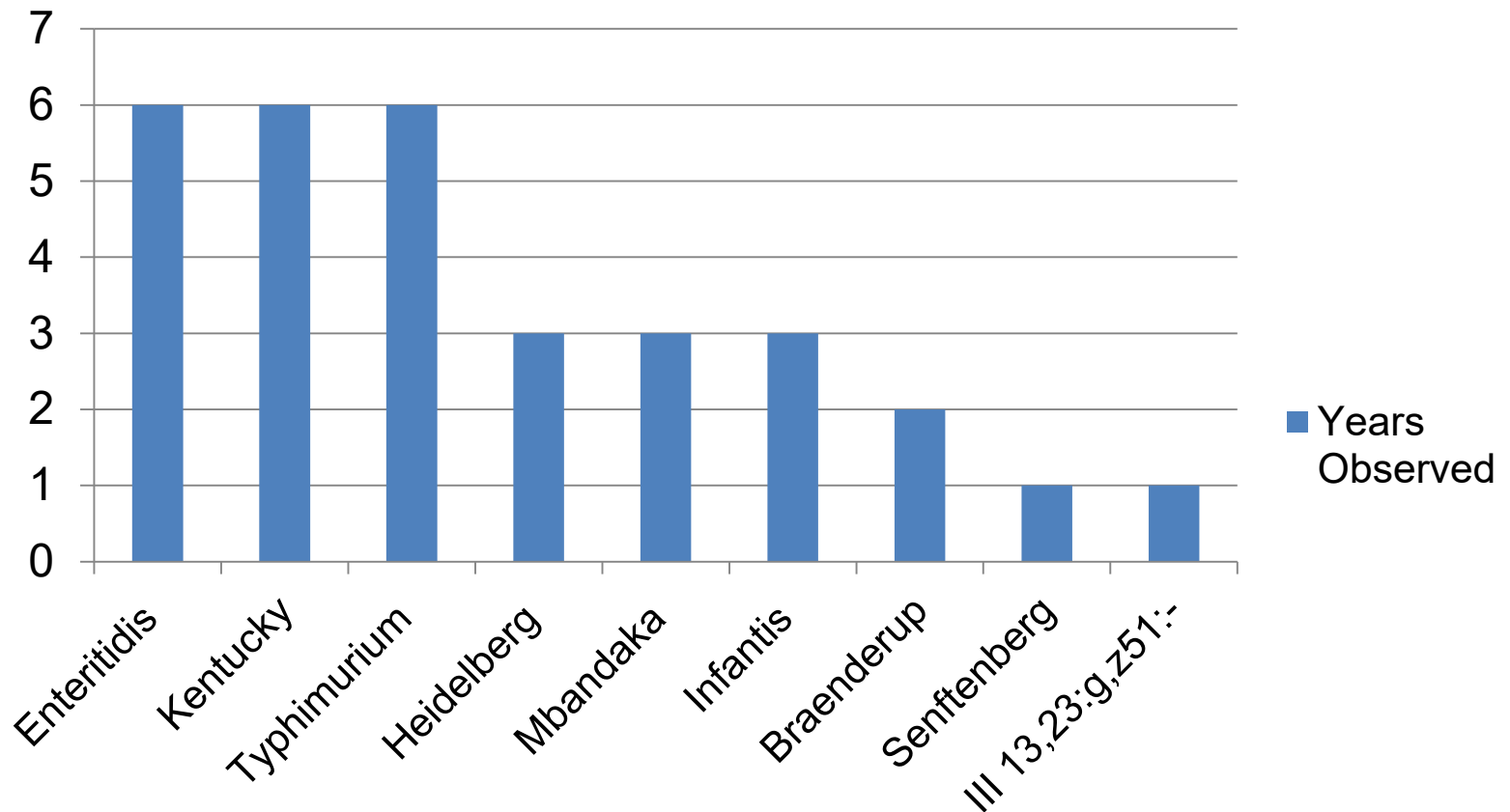
# Most Common Serotypes – Chickens 2018

<b>Rank</b>	<b>Clinical</b>	<b>Non-Clinical</b>
1	<b>Enteritidis</b>	<b>Kentucky</b>
2	<b>Typhimurium</b>	<b>Senftenberg</b>
3	<b>Kentucky</b>	<b>Montevideo</b>
4	<b>Infantis</b>	<b>Mbandaka</b>
5	<b>Braenderup</b>	<b>Enteritidis</b>

## ***Salmonella* Group D**

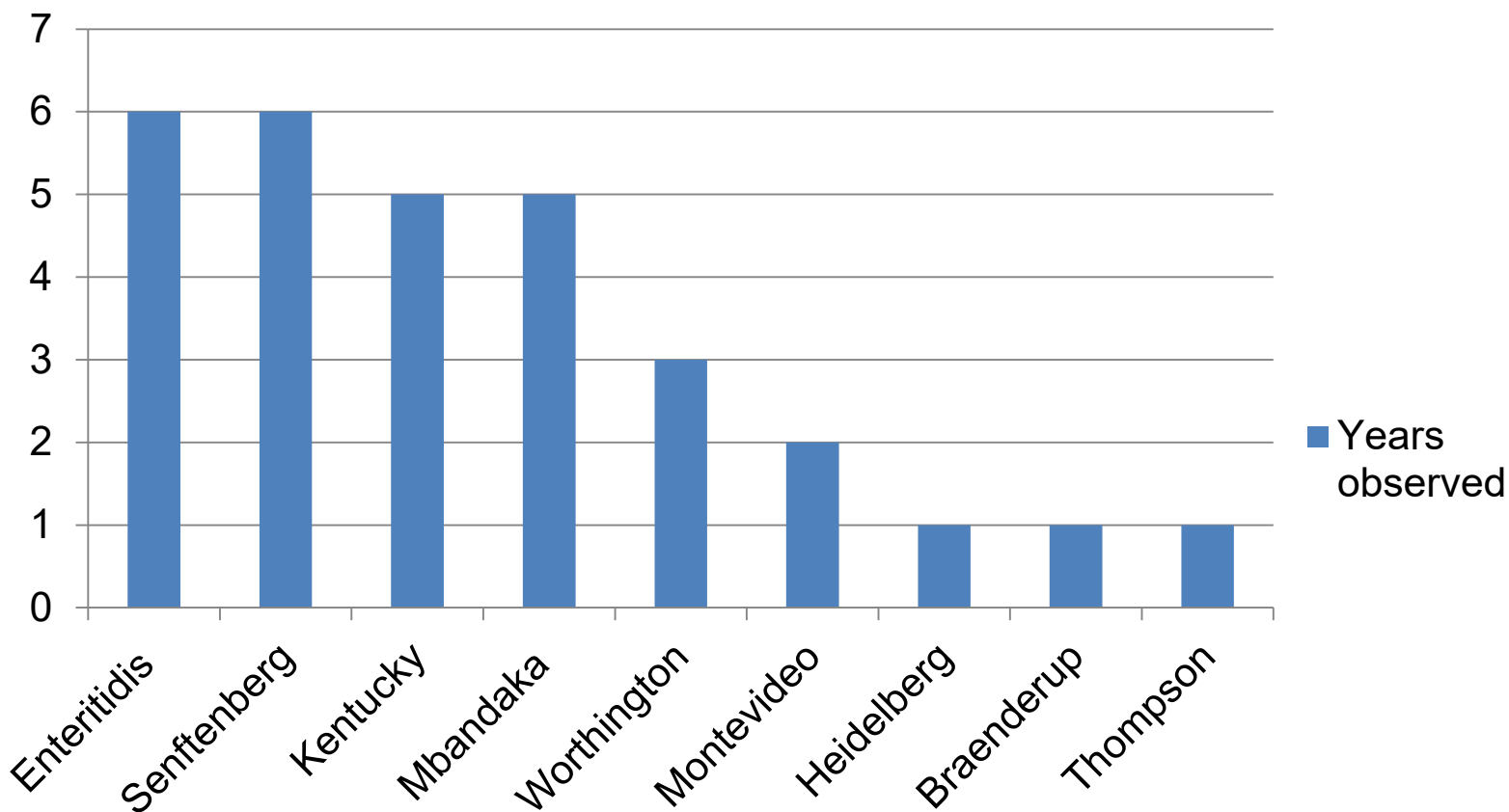
- Poultry submissions, clinical + non-clinical
- 493 Group D isolates
- 420 (85%) were SE
- Other 15%: Javiana, Berta, Ouakam

# Top 5 Serovars Clinical Isolates from Chickens 2013-2018





# Top 5 Serovars Non-Clinical Isolates from Chickens 2013-2018

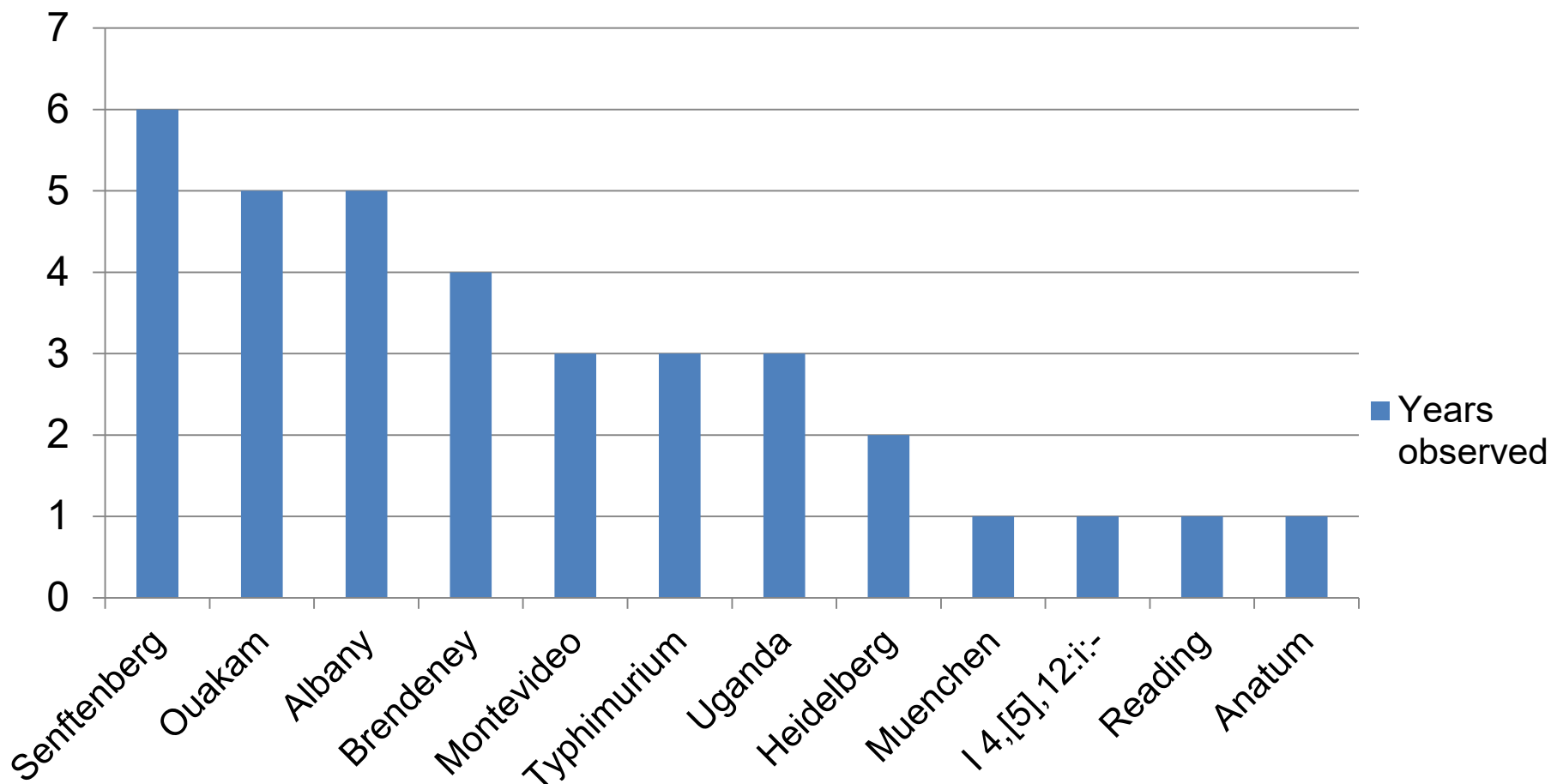




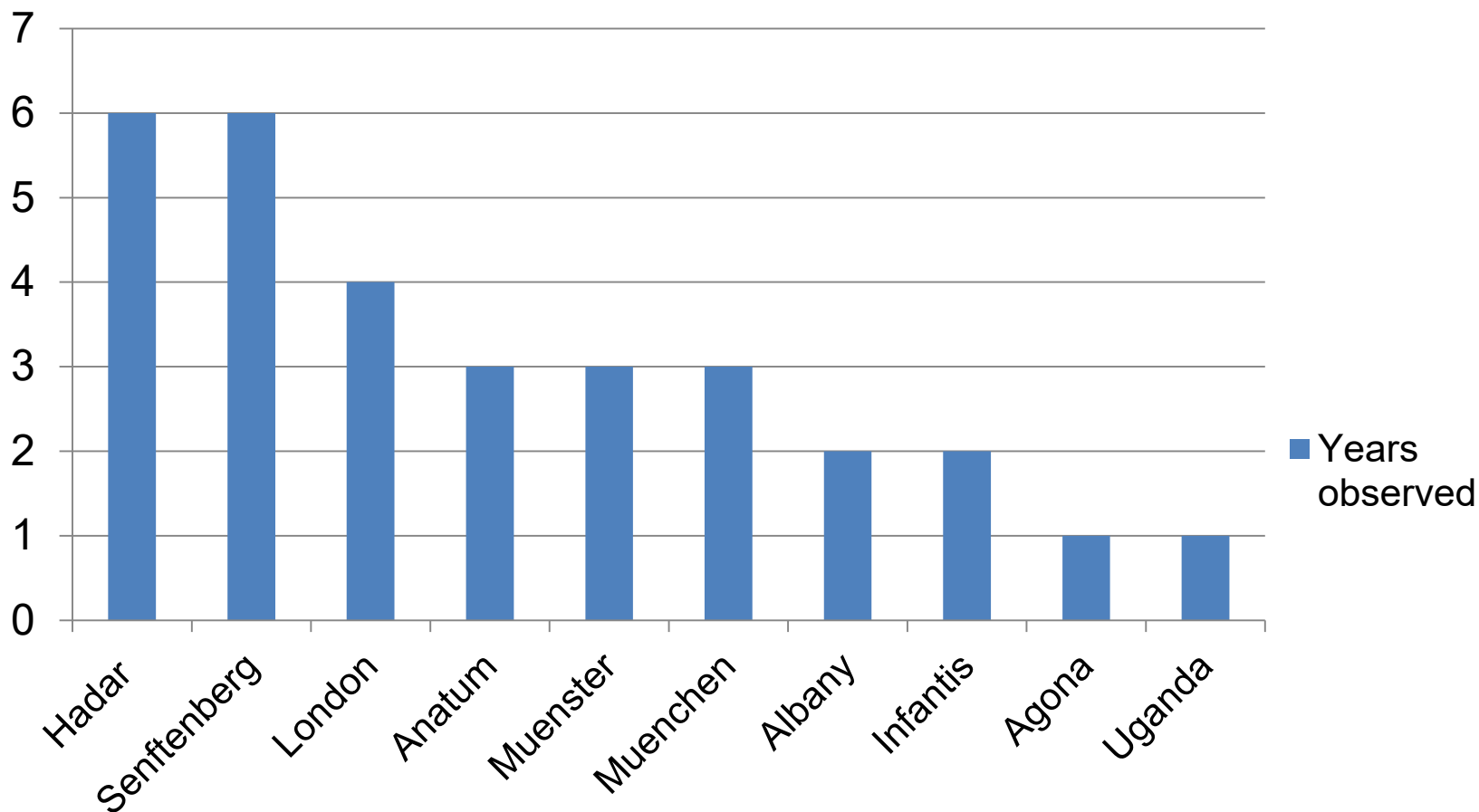
# Most Common Serotypes – Turkeys 2018

<b>Rank</b>	<b>Clinical</b>	<b>Non-Clinical</b>
1	<b>Albany</b>	<b>Senftenberg</b>
2	<b>Reading</b>	<b>London</b>
3	<b>Senftenberg</b>	<b>Bredeney</b>
4	<b>Uganda</b>	<b>Schwarzengrund</b>
5	<b>Anatum</b>	<b>Agona</b>

# Top 5 Serovars Clinical Isolates from Turkeys 2013-2018



# Top 5 Serovars Non-clinical Isolates from Turkeys 2013-2018



# Human Outbreaks Associated with Poultry 2013-2019

- Shell eggs
  - *Salmonella* ser. Braenderup
  - *Salmonella* ser. Oranienburg
- Various food products containing poultry meat
  - *Salmonella* ser. Typhimurium\*
  - *Salmonella* I 4,[5],12:i:-
  - *Salmonella* ser. Enteritidis
  - *Salmonella* ser. Heidelberg\*
  - *Salmonella* ser. Reading
  - *Salmonella* ser. Infantis



# Human Outbreaks Associated with Poultry

## 2013-2019

- Outbreaks associated with live poultry
  - *Salmonella* ser. Braenderup (x3)
  - *Salmonella* ser. Enteritidis (x4)
  - *Salmonella* ser. Indiana (x4)
  - *Salmonella* ser. Infantis (x5)
  - *Salmonella* ser. Hadar (x3)\*
  - *Salmonella* ser. Lille
  - *Salmonella* ser. Litchfield (x2)
  - *Salmonella* ser. Mbandaka (x3)
  - *Salmonella* ser. Montevideo (x2)
  - *Salmonella* ser. Muenchen (x2)
  - *Salmonella* ser. Muenster\*
  - *Salmonella* ser. Newport (x2)
  - *Salmonella* ser. Senftenberg
  - *Salmonella* ser. Typhimurium (x2)
  - *Salmonella* | 4,[5],12:i:-



# VS Electronic Submission Forms are Available

- NCAH Portal is used for electronic sample submissions
- Create an eAuthentication account prior to access
- Once submission has been made & samples received at the NVSL, future submitter information will auto populate
- Additional email & fax numbers are easily added
- Ability to clone past submissions with similar data
- Reports remain in the system for one year

[https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/lab-info-services/sa\\_forms\\_publications/ct\\_forms\\_publications](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/lab-info-services/sa_forms_publications/ct_forms_publications)

# Pullorum Disease/Fowl Typhoid

- Macroscopic tube agglutination test developed in 1913 for detection of carriers
- Modified whole-blood method developed in 1931 by Schaffer *et al.*
- USDA developed the NPIP to control and eradicate Pullorum in 1941



# Standard Tube Agglutination

- 1<sup>st</sup> test developed for detection of *S. Gallinarum* var. *Gallinarum* and *S. Gallinarum* var. *Pullorum* antibodies
- Serum incubated with standard antigen for 20-24 hours at 37 °C
- Serum cannot be tested in the field
- Additional time & expense

# Microtiter Test

- Serum serially diluted in microtiter plate
- Antigen added to each well
- Plate sealed and incubated 20-24 hours at 37 °C
- Serum cannot be tested in the field
- Additional time & expense



# SALMONELLA SEROTYPING

Brenda Morningstar-Shaw

Tonya Mackie

Dana Ludwick

Edward Palmer

Andrew Ludvig

Brenda Wyckoff

Brenda.R.Morningstar@usda.gov

515-337-7962