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The Committee met on October 4, 2011 at the Adam's Mark Hotel in Buffalo, New York, from 8:00 a.m. to 12:00 p.m. There were 18 members and 28 guests present. After the Chair opened the meeting and welcomed the attendees he introduced himself and the Vice Chair, since both were new. He recognized the faithful service of Pat McDonough who served as Chair for the last 5 years. He reminded those present to sign the attendance sheets and if a member to check to see that their contact information was correct and if they were not members to indicate if they would like to become a member of the committee. The Chair briefly overviewed the requirements of becoming a member and that only members could propose resolutions and recommendations and vote. However, everyone was encouraged to participate in the discussion.

CDC Update on Salmonella Surveillance
Dana Cole, DVM, PhD, Division of Foodborne, Waterborne, and Environmental Diseases, U.S. Centers for Disease Control and Prevention

Dr. Cole gave the CDC update focusing on 4 areas: the estimated burden of Salmonella, isolate-based surveillance, outbreak-based surveillance, and foodborne disease attribution.

Each year there is an estimated 1.2 million illnesses in the United States due to Salmonella and of those there are 19,336 hospitalizations and 378 deaths. Within the surveillance systems the isolate-based systems is the most complex, comprising the laboratory-based enteric disease surveillance (LEDS), FOODNET, and NARMS. The LEDS system, also called the National Salmonella Surveillance System, was established in 1990 to collect data directly from state public health laboratories. These laboratories report isolation of nationally reportable pathogens. For example under this surveillance, the isolation rate of Salmonella for 2008 and 2009 were 15.4/100,000 and 13.2/100,000, respectively. The 10 most frequently reported human Salmonella serotypes for the year 2009 were: enteritidis (17%), typhimurium (15%), newport (9.3%), javiana (4.9%), heidelberg (3.5%), montevideo, O4,(5),12:1:-, oranienburg, saintpaul, and muenchen. Additional information from the LEDS system may be found at the following web site http://www.cdc.gov/ncezid/dfwed/edeb/publications.html

Another of the isolate-based surveillance systems is FOODNET. This system was established in 1996 to provide active surveillance for 11 pathogens commonly transmitted through food. It is comprised of CDC, USDA, FDA, and 10 participating state health departments. Overall it represents about 15% of the U.S. population pulling data from 650 clinical laboratories. FOODNET data shows an increase of laboratory confirmed Salmonella cases over 2006-2008. The incidence is highest in children (69.5 infections/100,000 children). The following Table shows the relationship between the number of Salmonella infections that are outbreak related or sporadic.

Year	Outbreak related	Total reported	% cases related to outbreak	Rate (cases/100,000)	
				All	Excluding outbreaks

2006	478	6,689	7.1	14.73	13.68
2007	416	6,828	6.1	14.86	13.96
2008	584	7,457	7.8	16.07	14.81
2009	376	7,023	5.4	14.99	14.18
2010	418	8,275	5.1	17.66	16.77

The data show that almost 95% of all *Salmonella* infections are not outbreak related. That means that the vast majority of *Salmonella* infections are outside our systems to track and investigate. The Top 10 *Salmonella* serotypes for 2010 within FOODNET includes: *enteritidis*, *newport*, *typhimurium*, *javiana*, O4(5),12:I:-, *heidelberg*, *saintpaul*, *muenchen*, *montevideo*, and *infantis*.

The third system within the LEDS is the National Antimicrobial Resistance Monitoring System (NARMS). NARMS receives *Salmonella* isolates from humans through CDC, *Salmonella* isolates from animals from USDA/FSIS, and *Salmonella* isolates from retail meats from FDA/CVM. The objectives of NARMS are to 1) monitor trends in antimicrobial resistance among foodborne bacteria from humans, animals and retail meats, 2) disseminate timely information on antimicrobial resistance to promote interventions that reduce resistance among foodborne bacteria, 3) conduct research to better understand the emergence, persistence, and spread of antimicrobial resistance, and 4) provide data that assist the FDA in making decisions related to the approval of safe and effective antimicrobial drugs for animals. There have been studies that have shown that multidrug resistant strains have increased morbidity and mortality and seem to have increased virulence.

In 2010, 85% of *Salmonella* isolates were pan-susceptible. For the past several years the percentage of isolates that are resistant to $\geq$3 or $\geq$5 antimicrobial classes have been declining. Of those serotypes that are resistant to $\geq$3 antimicrobial classes the top 3 serotypes are *typhimurium*, *heidelberg*, and *newport*, with *typhimurium* making up about 50% of the isolates. A closer look at the source of these resistant isolates show that isolates from humans are 10% resistant, while those from retail meats (chicken breasts, 48% and ground turkey, 26%) and food animals (chickens, 16%, turkeys, 33%, cattle, 26%, and swine, 32%) were higher. Also among the MDR isolates are the ones resistant to ampicillin, chloramphenicol, streptomycin, sulfonamide, and tetracycline commonly referred to as ACSSuT. The number of isolates with this MDR pattern, which primarily consists of *typhimurium* and *newport*, is also declining. Another common pattern is the ACSSuT plus resistance to amoxicillin-clavulanic acid and ceftriaxone. *Salmonella* with this pattern are also declining.

Further information can be obtained from www.cdc.gov/narms

The other surveillance system is CDC's Outbreak Surveillance System. This supports a national network of epidemiologists and other public health officials who investigate outbreaks of foodborne, waterborne, and other enteric illnesses. It represents collaboration between CDC and the U.S. state and local health departments, the USDA, and FDA. It also works closely with PulseNet (national molecular subtyping network for foodborne disease surveillance). Outbreak surveillance provides one of the best sources of information on foods that cause foodborne illness. Individual investigations can provide insight into the mechanisms of contamination, possible control measures to prevent future illnesses, and to identify gaps in our food safety system. From 1998-2008 about 25% of all foodborne outbreaks were caused by *Salmonella* and about 1/3 of those were due to *enteritidis*. *Salmonella* is second to Norovirus in number of outbreaks, but is responsible for more hospitalizations and death. Only a small proportion of the outbreaks can be identified by specific food source, but of the ones that have a known source 47% of the outbreaks are due to poultry and eggs.

A listing of the multistate outbreaks for 2011 may be found at www.cdc.gov/salmonella/outbreaks.html

The ones involving *Salmonella* include: ground turkey (*heidelberg*), imported papayas (*agona*), African dwarf frogs (*typhimurium*), sprouts (*enteritidis*), chicks and ducklings (*altona* and j*ohannesburg*), microbiology labs (*typhimurium*), turkey burgers (*hadar*), and cantaloupe (*panama*).

Lastly, foodborne disease attribution has high priority across federal agencies as there is a great need to understand what foods are contributing to the most illnesses. Attribution data help target interventions, help to measure progress toward goals, and assist in decision making.

FDA Egg Rule Inspections Update

Bruce Cooper, Consumer Safety Officer, FDA, New York District, Syracuse, NY is an instructor for the FDA Egg Safety Inspection Training Course and lead investigator on inspections in the Northeast district. To date there have been 2 assignments which are described in the websites below:

FY10: http://www.fda.gov/downloads/Food/FoodSafety/Product-SpecificInformation/EggSafety/UCM227645.pdf

FY11: http://www.fda.gov/downloads/Food/FoodSafety/Product-SpecificInformation/EggSafety/UCM242512.pdf

The FY10 assignment was from September 20, 2010 to December 31, 2010 and involved 35 locations representing 9 companies in 6 states. Farms were selected for inspections based on being implicated in past outbreaks, being a larger producer, or having a history of sanitation issues. All of these inspections were comprehensive meaning that environmental samples were collected for *Salmonella* isolation. The FY 11 assignment is ongoing and uses a risk assessment tool to categorize farms for inspection. The agency has a goal to inspect 600 farms by the end of the year. There are 2 types of inspections. Targeted inspections, which make up the majority of inspections, consist of a review of records and a walk through the houses. This inspection does not include environmental sampling. The objective of the inspection is to determine if the farm has implemented the controls necessary to comply with the FDA Egg Rule. Comprehensive inspections are targeted inspections plus environmental sampling. If during a targeted inspection there is evidence that the Egg Rule is not being substantially followed, the inspectors may collect samples for *Salmonella* testing.

The target inspections review the SE prevention plan to assure it includes the following components: 1) procurement of SE monitored pullets, 2) biosecurity measures, 3) rodent/pest control measures, 4) cleaning and disinfection measures, 5) adequate refrigeration of shell eggs, and 6) environmental and egg sampling program. Some of the significant deviations that have been found include: a) failure to include the above components into a SE prevention plan, b) failure to test the environmental at required time periods, c) failure to divert eggs or begin egg testing after a positive environmental sample, d) failure to implement the SE prevention plan, e) failure to maintain records documenting their SE plan implementation, and f) failure to monitor conditions required for implementation.

The possible outcomes of the inspection include a close out meeting to go over the observations, the issuance of a 483 listing the inspectional observations, an untitled letter, a warning letter, an injunction, or a seizure. Obviously the list is from least to most serious.

From the FY10 comprehensive inspections of 35 farms 11 farms received NAI (no action indicated), 12 farms received VAI (voluntary action indicated), and 12 farms are still pending. Only 4% of the environmental samples were positive for SE. The FY11 assignments are ongoing, however, to date there have been 213 targeted and 46 comprehensive inspections. Of the 147 samples (houses) sampled, 20 have been positive for SE. In addition there have been 25 state inspections conducted.

FDA Salmonella Surveillance in Animal Feed

Daniel McChesney, PhD, Director of the Office of Surveillance and Compliance, Center for Veterinary Medicine, FDA.

Dr. McChesney spoke on the surveillance programs for *Salmonella* in feed. The prevalence of *Salmonella* in feed for the last few years is shown in the table below.

Year	Samples tested	No. positive	% Positive
2002	187	34	18.2
2003	194	51	26.3
2004	150	22	14.7
2005	194	27	14.0
2006	144	23	16.0

2007*	284	28	9.9
2008*	321	25	7.8
2009*	584	47	8.0

The data for 2007-2009 contains the routine animal feed testing plus the testing results for direct animal feed samples, which reduced the overall prevalence. The prevalence of *Salmonella* in just animal feed was 11.9%, 10.3%, and 10.0% for the years 2007, 2008, and 2009, respectively. The data still shows a decrease in the prevalence of *Salmonella* in feed. A comparison of the prevalence of *Salmonella* in specific animal feeds from 2002-2006 versus 2007-2009 shows that for poultry feed it went from 12.3% to 9.1%, for cattle feed from 3.3% to 6.1%, swine feed from 13.3% to 0%, for horse feed from 0% to 0%, and for medicated feed from 11.9% to 13.3%.

There has been increasing concern with *Salmonella* in pet food as evidenced by 26 firms issuing recalls from October 2010 to August 2011. Ten of the recalls were initiated by FDA sampling and another 8 by state sampling. Therefore only 8 of the recalls were initiated by the firms in-house testing. This casts questions concerning the firm's internal testing programs.

FDA issued a Compliancy Policy Guide (Sec. 690.800) for *Salmonella* in Animal Feed, which gives the agency's current thinking and provides guidance for FDA staff. The Guide separates feed into direct-human-contact feeds (home environment) and animal feed (commercial environment). Examples of direct-human-contact feed are pet foods, pet treats, supplements for pets and feeds offered at petting zoos for people to use to feed the animals. FDA's policy for direct-human-contact feed is the presence of any *Salmonella* serotype deems it adulterated. The policy with animal feed is different in that there are specific serotypes that are of concern and would deem the feed adulterated. For example, for poultry feed the serotypes of concern are *pullorum*, *gallinarum*, and *enteritidis*, whereas with swine feed it is *choleraesuis*, sheep feed – *abortusovis*, horse feed – *abortusequi*, and dairy and beef feed – *newport* and *dublin*.

ARS Participation in the Salmonella in Feed Food and Feed Research Coalition and Current Research Efforts
Todd Callaway, USDA/ARS Food and Feed Safety Research Unit

Dr. Callaway shared several of the research efforts of ARS. Transporting animals, for example to market, is a stressful event, however, research suggests that there is more to this stress that just the transport. Some studies have shown that the prevalence or shedding of *Salmonella* increases with transport while others have found no increase. A broader view of the transport issue has been adopted, one that considers the stress on the animals. Stress may come from handling, social mixing of animals, and feed withdrawal in addition to transport. Data suggests that there is a cumulative effect of these different stressors resulting in increased *Salmonella*.

Other research areas are the use of bacteriophage that target *Salmonella*, the use of sodium chlorate to reduce *Salmonella* in the gut of animals, the use of essential oils, and competitive exclusion. Additionally, preharvest research efforts are aimed at investigating the "normal" population of the gastrointestinal tract, the role of birds and pests in *Salmonella* colonization, hormonal stress effects on pathogen shedding, and the effect of diet on the immune systems in poultry.

Current and future research is focused on determining the incidence and concentration of *Salmonella* in commercial feeds, what serotypes are found in feeds, and how these serotypes relate to those that cause human illness.

Update on Recent Compliance Guidelines: USDA-FSIS
Daniel Engeljohn, PhD, Assistant Administrator, Office of Policy and Program Development, USDA-FSIS.

Dr. Engeljohn provided an update on the status of the FSIS compliance guidelines relevant to *Salmonella* in animals. The baseline case rate for *Salmonella* in humans back in 1997 was 13.6/100,000. The industry missed the goal for 2010, with the case rate actually increasing to 17.6/100,000. Of the 4 primary bacteria causing foodborne disease, *Salmonella* was the only one that did not decrease. The U.S. Healthy People 2020 goal for human *Salmonella* cases is 11.4/100,000.

The FSIS Strategic Plan for 2011-2016 has 3 themes, 8 goals and 5 corporate performance measures. The themes are to prevent foodborne illness, understand and influence the farm-to-table continuum, and to empower people and strengthen infrastructure. The goals are:

1. Ensure that food safety inspections align with existing and emerging risks
2. Maximize domestic and international compliance with food safety practices
3. Enhance public education and outreach to improve food—handling practices
4. Strengthen collaboration among internal and external stakeholders to prevent foodborne illness
5. Effectively use science to understand foodborne illnesses and emerging trends
6. Implement effective policies to respond to existing and emerging risks
7. Empower employees with the training, resources, and tools to enable success in protecting public health
8. Based on defined agency business needs, develop, maintain, and use innovative methodologies, processes, and tools, including PHIS, to protect public health efficiently and effectively and to support defined public health needs and goals

And the corporate performance measures are the total number of all Illnesses from FSIS regulated products, percent of broiler plants passing the new *Salmonella* standard, the percent of all establishments with a functional food defense plan, the percent of slaughter plants identified through reviews with effective systematic approach to humane handling, and the average percent of consumers following four key safety "best practices" – cook, clean, chill, separate.

Compliance guidelines are designed to provide non-regulatory safe harbors for industry to use as validated methodology for the control of selected food safety hazards, or for other controls that meet FSIS expectations. The following are relatively recent compliance guidelines that or of particular concern to the *Salmonella* Committee

- "Controlling for *Salmonella* and *Campylobacter* in Poultry," 3rd edition (May 2010)
- "Video or Other Electronic Monitoring of Recording Equipment in Federally Inspected Establishments," April 2011
- "Validation of HACCP Food Safety Systems," soon to be re-issued; overview posted at NACMPI website
- "Time/Temperature Tables for Safe Cooking of Ready-To-Eat Poultry," June 2009)
- "Chemical Antimicrobials," June 2009

NVSL Salmonella Update
Beth Harris, PhD, Chief of Staff, National Veterinary Services Laboratory

Dr. Harris gave the NVSL *Salmonella* Update in place of Brenda Morningstar-Shaw who was unable to attend.

Recently NVSL has added the multiple-locus variable-number tandem repeat analysis (MLVA) technique to further discriminate between isolates of *Salmonella*, especially *Salmonella enteritidis*. The Sensititer antimicrobial susceptibility system was acquired to increase the capability of the lab. Customized panels of *Salmonella* serotypes are available for other laboratories to use for proficiency testing or serotyping controls. Also there is a plan to offer a *Salmonella* serotyping proficiency test.

A SE Rule Out test was initiated July 2010 to assist in the FDA Egg Rule to rapidly indentify or confirm group D isolates as SE or not SE. Referring labs can submit isolates using form 10-3 and can expect results in 1-2 business days.

The Salmonella Group D proficiency test is a valuable tool to assess the abilities of the authorized laboratories in the NPIP program. Over the last 3 years the number of labs that have participated in this test have gone from 40 to 70 labs. The mean scores have increased from 93% to 97% and none of the 70 labs failed the latest test.

The number of isolates submitted for serotyping was lower (14,164 isolates) in 2010 than the last 5 years. The number of clinical isolates serotyped were 4700, which was almost half of the number of non-clinical isolates (8473). There were 1574 group D isolates from chicken submitted for serotyping. Nine-five percent were SE, the remaining 5% were *berta*, *dublin*, *fresno*, *javiana*, *ouakam*, and 9,12:non-motile. *Salmonella pullorum* was not isolated in 2010, but there have been 2 cases in 2011.

NVSL has evaluated molecular typing methods because they are faster and less cumbersome that conventional serotyping, they have high throughput, less QC issues and have subjective interpretation. Molecular provides genotype analysis instead of phenotype and it is not affected by expression of antigens. The negative aspect of current molecular methods is they do not identify all serotypes. Evaluation of 48 SE

isolates and 119 non-SE isolates using the *sdf* gene determination of the Luminex assay showed 100% correlation with serotype analysis.

The NVSL serotype data for each animal species is provided in the Appendix.

NPIP Report for the USAHA Committee on *Salmonella* FY 2011
Steve Roney, National Poultry Improvement Plan, USDA-APHIS

Dr. Roney submitted the NPIP report for inclusion in the Committee report, as he was unable to attend in person.

The value of the US Poultry Industry is approximately $40 billion dollars in revenue in 2011. The success of this industry is largely due to the ability to control diseases such as *Salmonella pullorum* and *Salmonella typhoid*. USDA-APHIS-NPIP's Pullorum/Typhoid control program has contributed significantly to this success.

There were no isolations of *Salmonella pullorum* in commercial poultry and 2 isolations in backyard poultry in FY2011 There have been no isolations of *Salmonella gallinarum* in the US since 1988 in any type poultry. U.S. Pullorum-Typhoid Clean participating hatcheries include: 262 egg and meat-type chicken hatcheries, 37 turkey hatcheries, and 768 waterfowl, exhibition poultry and game bird hatcheries.

NPIP U.S.Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds include:

Egg-Type Chickens, 331 Flocks with 4,323,042 birds, **Meat-Type Chickens,** 6,471 Flocks with 86,324,569 birds, **Turkeys,**634 Flocks with 5,395,888 birds and **Waterfowl, Exhibition Poultry, and Game Birds with** 2667 Flocks with 978,579 birds.

Salmonella control programs administered by the NPIP are Pullorum/Typhoid Clean for all poultry breeders and the basis of the program, *Salmonella enteriditis* clean(SE Clean) for egg type breeders and egg and meat type primary breeders, Salmonella Monitored for primary meat type breeders and Sanitation Monitored for meat type breeders and turkey breeders.

There were no isolations of *Salmonella enteriditis* reported in egg type or egg type primary breeders in FY 2011.

The Full report is located following this report.

Committee Business

During the business session the Chair introduced and read through a resolution titled "Identification of Farm Environmental Parameters Hostile to Salmonella" that had been submitted by email from Dr. Ed Mallinson. After reminding the attendees that everyone may participate in the discussion, but only members could propose amendments and vote, the resolution was seconded and discussion ensued. After a few word changes the resolution was voted on and passed easily.

The Chair again thanked the speakers and the attendees for their presence. He reminded the members to review the mission statement and submit any suggested changes to him to be considered at the next meeting. Also he encouraged members to provide input as to the format of the meeting and suggested speakers.

Salmonella serotypes isolated from animals in the United States: January 1 – December 31, 2010

B.R. Morningstar-Shaw, D.A. Barker, T.A. Mackie, M.I. Munoz, E.A. Palmer, M.A. Kane, L.K. Cox, M.M. Erdman

Diagnostic Bacteriology Laboratory, National Veterinary Services Laboratories, USDA

The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotype *Salmonella* isolates submitted by private, state, and federal laboratories as well as veterinarians, researchers and other animal health officials. Most submissions were from diagnostic laboratories across the U.S., and although only counted as a single submitter, these labs typically submitted *Salmonella* isolates from a variety of sources, herds, or flocks. This report summarizes *Salmonella* serotyping submissions to NVSL from January 1 through December 31, 2010. The *Salmonella* isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (herd and flock monitoring programs, environmental sources, food). Serotyping data from isolates submitted for research purposes are not included in the source specific summaries. Based on information provided by the submitter the isolates were divided into animal source categories for analysis. The animal sources include Avian (avian of unknown origin, parrot, pheasant, pigeon, rhea, emu, ostrich, quail, duck, and owl), Cattle, Chicken, Dog/Cat, Horse (horse, donkey), Other Domestic (alpaca, ferret, goat, guinea pig, hamster, hedgehog, llama, mink), Pigs, Reptiles/Amphibians (iguana, lizard, reptile, snake, turtle, amphibian, frog, toad), Turkey, Wild/Zoo (antelope, bat, bear, beaver, bison, deer, elk, fish, fox, marine mammals, mongoose, opossum, rabbit, raccoon, rodent, otter, wolf, squirrel, reindeer, camel, elephant, kangaroo, monkey, primate, tapir, tiger, zebra, rhinoceros, wallaby), and Other (environment, water, feed, insects, unknown).

Salmonella serotyping at the NVSL is an ISO 17025 accredited test. Sera used for typing *Salmonella* isolates consists of polyvalent sera against the O serogroups and single factor sera against the individual O and H antigens. Approximately 50% of the sera used at the NVSL is produced in house as previously described (Ewing), and the rest is purchased from commercial vendors. All sera are subjected to quality control testing prior to use. *Salmonella* antigenic formulae are determined essentially as previously described (Ewing) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I. Those serotypes previously reported as “Arizona” are now listed with “III” (both monophasic and diphasic) followed by the antigenic formula. Those serotypes belonging to subspecies II or IV that had been previously named are now listed with their antigenic formula preceded by II or IV.

In 2010 there were 14,164 submissions for *Salmonella* serotyping originating from 47 different states and DC. Of these, 561 were identified as not *Salmonella*, contaminated, or mixed culture and were not further tested. The remaining 13,603 *Salmonella* isolates were divided into Salmonella rule out submissions (271), clinical isolates (4,700), non-clinical isolates (8,202) and research isolates (393). The sources of clinical and non-clinical *Salmonella* isolates are shown in Table 1. There were 335 different serotypes identified in 2010. Table 2 lists the 10 most common serotypes when all animal sources were combined. The most common isolates from chickens, turkeys, cattle, pigs, horses, and dog/cat are listed in Tables 3-8.

The NVSL provided a *Salmonella* proficiency test in order for laboratories to assess their ability to isolate *Salmonella* from environmental samples and determine the serogroup of any *Salmonella* isolated. The samples consisted of drag swabs spiked with *Salmonella* and/or common contaminants. The 2011 test included *Salmonella* serotypes Enteritidis, Kentucky, Berta, Heidelberg, 9,12: non-motile, *Escherichia coli*, *E. coli* (H_2S+), *Citrobacter freundii*, *Pseudomonas aeruginosa*, and *Proteus mirabilis*. The test consisted of 7 samples which were shipped to laboratories overnight on ice packs. Laboratories were instructed to use whatever protocol they choose and to report the results within 3 weeks. The NVSL randomly retained 10% of the test kits and tested them blindly for QA purposes. The results of the proficiency test are shown in Table 9.

Table 1: Sources of submissions to the NVSL for *Salmonella* serotyping in 2010

Source	No. Clinical Submissions	No. Non-Clinical Submissions	Total

Avian	145	35	180
Cattle	1396	790	2186
Chicken	244	4740	4984
Dog/Cat	77	18	95
Horse	602	48	650
Other	134	1235	1369
Other Domestic	62	0	62
Pig	1556	285	1841
Reptile/Amphibian	121	9	130
Turkey	245	981	1226
Wild/Zoo	118	61	179
Total	**4700**	**8202**	**12902**

Table 2: Most common serotypes in 2010: All sources

Clinical		**Non-Clinical**	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Typhimurium var 5-	542	Enteritidis	1449
Typhimurium	411	Kentucky	1116
Dublin	279	Senftenberg	680
Cerro	228	Typhimurium	334
Newport	211	Heidelberg	323
Agona	207	Montevideo	323
Derby	179	Cerro	216
Heidelberg	158	Mbandaka	209
Montevideo	155	Infantis	179
4,5,12:i:-	139	Newport	173
All others	2191	All others	3200
Total	**4700**	**Total**	**8202**

Table 3: Most common serotypes in 2010: Chickens

Clinical		**Non-Clinical**	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Enteriditis	105	Enteritidis	1395
Typhimurium	35	Kentucky	866
Kentucky	20	Senftenberg	374
Heidelberg	13	Heidelberg	261
Senftenberg	7	Typhimurium	150
All others	64	Mbandaka	132
		Tennessee	99
		Infantis	97
		Typhimurium var 5-	72
		Montevideo	55
		All others	1242
Total	**154**	**Total**	**4743**

Table 4: Most common serotypes in 2010: Turkeys

Clinical		Non-Clinical	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Senftenberg	45	Senftenberg	223
Heidelberg	23	Hadar	100
Typhimurium	17	Ouakam	60
Albany	17	Orion	55
Ouakam	17	Muenster	51
All others	126	Montevideo	50
		Kentucky	46
		Worthington	43
		Agona	34
		Saintpaul	34
		All others	285
Total	**245**	**Total**	**981**

Table 5: Most common serotypes in 2010: Cattle

Clinical		Non-Clinical	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Dublin	265	Kentucky	141
Cerro	207	Cerro	133
Montevideo	105	Dublin	74
Typhimurium	98	Anatum	38
Newport	90	Typhimurium	31
I 4,5,12:i:-	86	Newport	26
Kentucky	64	Typhimurium var 5-	24
Typhimurium var 5-	59	Agona	19
Anatum	46	Meleagridis	18
Agona	40	Bredeney	13
All others	336	All others	273
Total	**1396**	**Total**	**790**

Table 6: Most common serotypes in 2010: Pigs

Clinical		Non-Clinical	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Typhimurium var 5-	374	Derby	55
Derby	164	Typhimurium var 5-	27
Agona	136	Infantis	21
Typhimurium	123	Anatum	15
Heidelberg	96	Typhimurium	14
Worthington	58	Saintpaul	13
Infantis	53	Johannesburg	12
Cholerasuis	52	Heidelberg	10
Anatum	49	London	10
Senftenberg	49	Adelaide	9
All others	401	Agona	9
		All others	90
Total	**1555**	**Total**	**285**

Table 7: Most common serotypes in 2010: Horses

All Sources	
Serotype	**No. Isolates**
Javiana	125
Typhimurium	114
Newport	81
Braenderup	37
I 4,5,12:i:-	20
Anatum	19
Infantis	18
Muenchen	18
Orainienburg	18
Typhimurium var 5-	18
All others	182
Total	**650**

Table 8: Most common serotypes in 2010: Dogs and Cats

All Sources	
Serovar	**No. Isolates**
Mbandaka	10
Typhimurium	8
Newport	7
Agona	5
Typhimurium var 5-	5
All others	60
Total	**95**

Table 9: Summary of NVSL *Salmonella* proficiency test

	2009	**2010**	**2011**
Participants	40	55	70
Mean Score	93%	92%	97%
Score Range	100-44%	100-44%	100-85%
Below Passing	4	3	0

Ewing, WH. 1986. Edward and Ewing's Identification of Enterobacteriaceae. 4th edition. Elsevier Science Publishing Co., Inc., New York, U.S.

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NATIONAL POULTRY IMPROVEMENT PLAN

National Plan's Status Report
Steve Roney
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National Poultry Improvement Plan
USDA, APHIS, VS

Pullorum-Typhoid Status:

There were no isolations/outbreaks of *Salmonella pullorum* in 2009 nor in FY 2010. There were no isolations of S. pullorum in commercial poultry in FY 2011. There were 2 isolations of *Salmonella pullorum* in backyard birds in FY 2011.There have been no isolations of *Salmonella gallinarum* since 1987 in any type poultry.

Hatchery Participation in the National Poultry Improvement Plan Testing Year FY2010	
Egg and Meat-Type Chickens: Participating	262
Turkeys Participating	37
Waterfowl, Exhibition Poultry and Game Birds	768

Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2011	
U.S. Pullorum-Typhoid Clean: Participating- Number	331
Birds in Flocks-Number	4,323,042
Birds tested	31,866

Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2011	
U.S. Pullorum-Typhoid Clean: Participating- Number	6471
Birds in Flocks-Number	86,334,569
Birds tested	235,550

Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2011	
U.S. Pullorum-Typhoid Clean: Participating –Number	634
Birds in Flocks-Number	5,395,467
Birds tested	18,422

Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks In the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2011	
U. S. Pullorum-Typhoid Clean Participating	2667

Birds in Flocks	978,579
Birds tested	80,522

Mycoplasma gallisepticum* , *Mycoplasma synoviae, and ***Mycoplasma meleagridis*** positive breeding flocks
National Poultry Improvement Plan
FY2011

	WEGBY	Egg-Type	Meat-Type	Turkeys
Mycoplasma gallisepticum	16	5	8	3
M. synoviae	13	3	28	16
M. meleagridis	0	0	0	0

U.S. *Salmonella enteritidis* Clean- Egg-Type Chickens
No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2011

Arkansas	Environmental	Dead Germ	Bird
Flocks	1		15000
Birds in Flocks	6000		2
Georgia			
Flocks	3	2	
Birds in Flocks	30400	46000	
Illinois			
Flocks	3	2	1
Birds in Flocks	3900	3700	1200
Indiana	Environmental	Dead Germ	Bird
Flocks	15	2	1
Birds in Flocks	158345	27479	15092
Kentucky			
Flocks	1		
Birds in Flocks	6625		
Ohio			
Flocks	17		9
Birds in Flocks	192700		91600
Oregon			
Flocks	2		
Birds in Flocks	19516		
Pennsylvania			
Flocks	16		6
Birds in Flocks	166385		78450
Texas			
Flocks	1		
Birds in Flocks	10000		

Phage type13	Environmental	Dead Germ
Flocks	11	2
Birds in Flocks	152000	3700
Phage type 13A		
Flocks	5	2
Birds in Flocks	54321	27479
Phage type 2		
Flocks	2	
Birds in Flocks	28900	
Phage type 23		

Flocks	21	
Birds in Flocks	16,000	
Phage type 28		
Flocks	2	2
Birds in Flocks	15000	46000
Phage type 34		
Flocks	2	
Birds in Flocks	12500	
Phage type RNDC		
Flocks	1	
Birds in Flocks	7000	
Phage type Untypable		
Flocks	2	
Birds in Flocks	24000	
Phage type 8		
Flocks	21	
Birds in Flocks	237701	

Egg-type Chicken breeding flocks with isolates of *Salmonella enteritidis* by phage type and by year 1989-2011

Year	No. Flocks	Phage Type
1989	1	13A
1990	11	13A, 13, 8, 28
1991	12	13A, 13, 8
1992	10	Untypable,13A,8,28,34
1993	5	Untypable, 8, 2
1994	3	13A, 8
1995	2	13A, 28
1996	5	Untypable, RNDC, 13A,8,2
1997	2	8
1998	2	8
1999	1	13
2000	4	13, 8
2001	1	13
2002	0	
2003	0	
2004	0	
2005	1	13
2006	1	34

U.S. Salmonella enteritidis Clean - Egg-Type Chickens
No. of flocks and birds in the flocks with _Salmonella enteritidis_ isolates, 1990-2011

	Environmental	Dead Germ	Bird
Flocks	71	6	19
2007	4		13, 8
2008	3		8
2009	0		
2010	3		8(2), 13
2011	0		