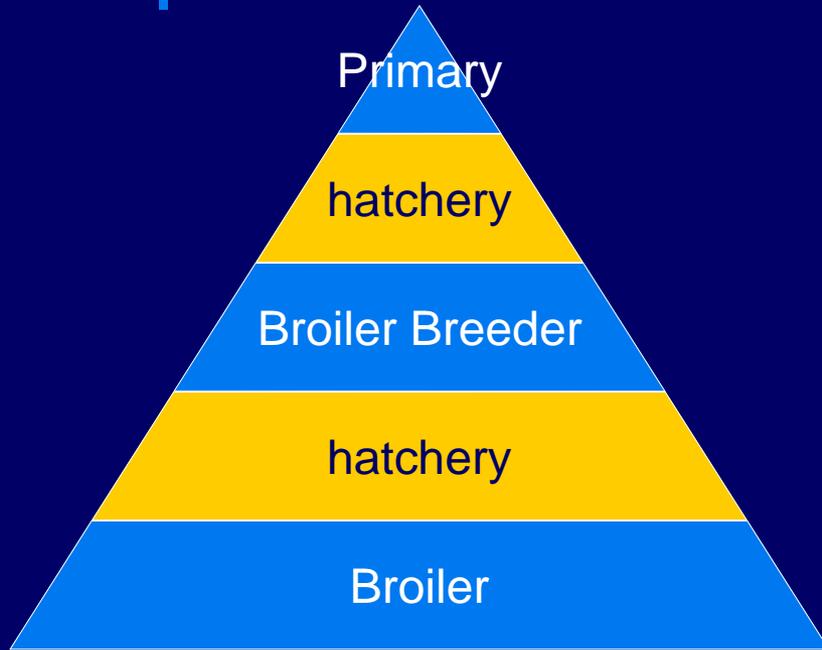


Detecting Trends in Salmonella throughout the Poultry Industry

**Canadian S. enteritidis Control
Symposium Dec 2010**

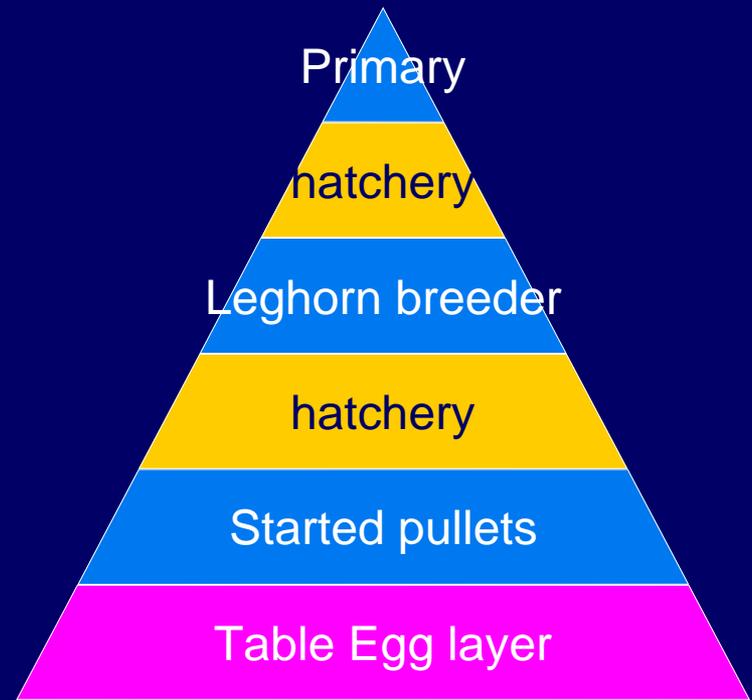
Dr. Rachel Ouckama

Poultry Production Chain



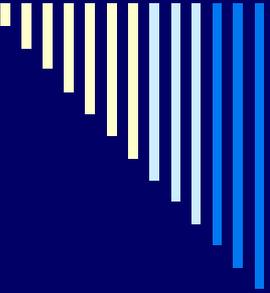
Processor

Meat → consumer



Grader/ egg processor

Eggs → consumer



Salmonella programs:

1. Surveillance
2. Control mechanisms
3. Outcome



Salmonella programs:

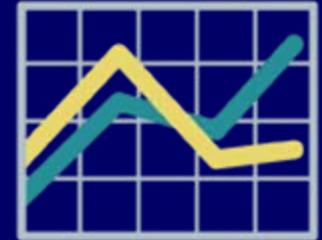
1. Surveillance

□ Monitoring

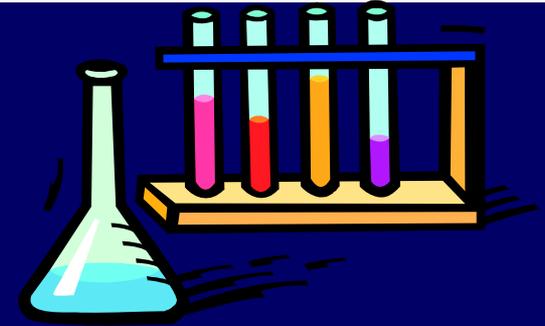
- Frequency of testing
- Sample type/ origin/ test method
- Sample number (portion of population)

□ Compilation of data

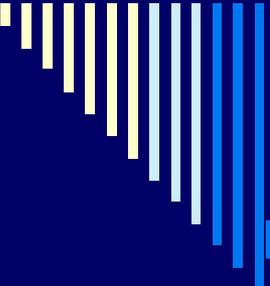
- Baseline (what is actual/ normal)
- Trending (changes with time)



Sample types



- **At flock level**
 - Blood/serology (D group)
 - individual bird: cecal contents, PM/diagnostic
 - Environment (litter, dust)
- **At hatchery level**
 - **Fluffs**
 - Shell membranes, DIS
 - Box pads/ meconium
 - Environment
- **At Plant level**
 - Individual bird: cecal/ **wash**
 - Environmental
 - Final product
- **Important considerations**
 - % of population represented
 - Specificity of test
 - Laboratory availability
 - Time lag for results
 - Interference (eg vaccination, sanitizers)
 - Ease of collection/shipment
 - Pre enrichment
 - Regulatory requirements
 - **Routine vs investigatory**
 - **Cost**



Compilation of Data

□ Important considerations for baseline

- % of population sample represents and frequency
- Domestic or import origin
- Confidentiality
- Standardized or comparable test
- Presence of interventions
- Routine vs investigatory

□ Important considerations for trending

- Provincial or national
 - Standardized interval (year)
 - Central depository for collection and analysis
 - Regular & timely communication of results
 - Champion/ accountability
-

Salmonella programs:

2. Control mechanisms



□ Response to positive finding

- Increased surveillance
- Reduce prevalence or transmission risk (treatment, containment, streaming)
- Eradication

□ Preventative

- Targeted (on farms previously positive)
- Generalized, routine
 - Exclusion, isolation (biosecurity, OFFS)
 - Vaccination

Salmonella programs:

3. Outcome

□ Program goal

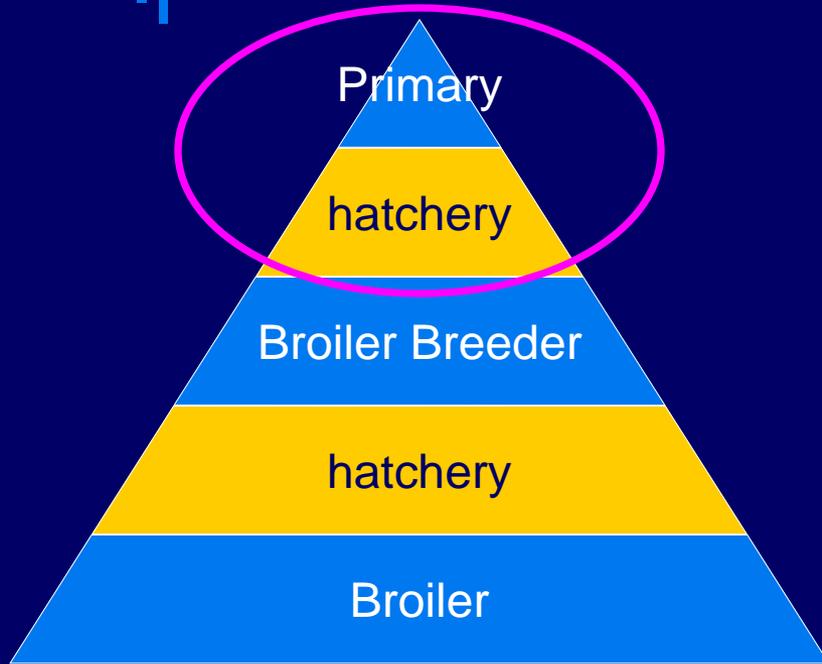
- Reduction in poultry?
- Reduction in human disease?
- By how much and how measured?

□ Communication plan

- Target audience: government, industry public
- Mode and frequency
- Definition of success

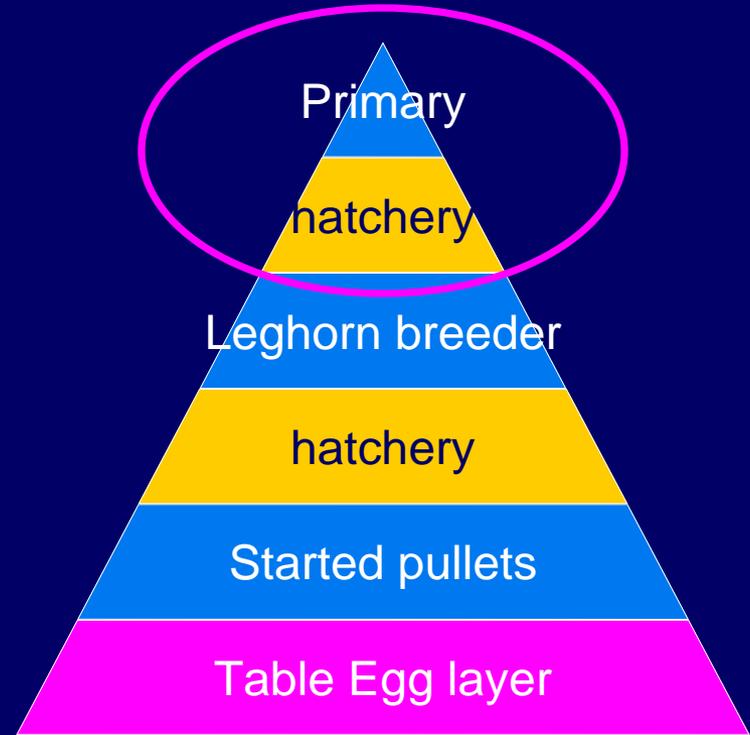


Salmonella programs in Poultry Production Chain



Processor

Meat → consumer



Grader/ egg processor

Eggs → consumer

Primary breeders

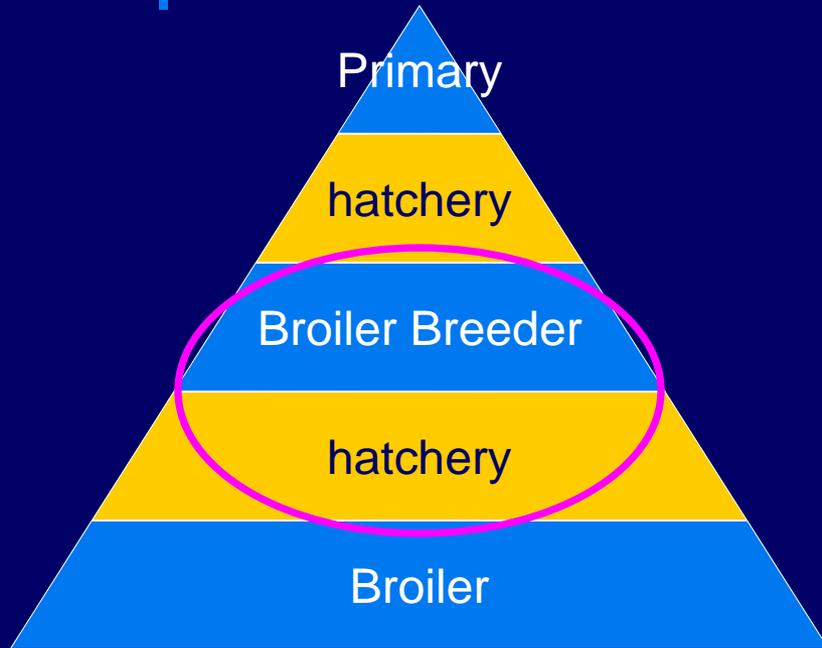
(a few Canadian, mainly US based)

- Aimed at export market, international scrutiny
- Intense testing, high frequency at flock level
 - Serology
 - Bacteriology
- **D group free GGP and GP**

- **Primary level hatchery**, intense testing & QA
 - All sources highly tested
 - Deliver by road or air, to PS breeder farms
 - Eastern Canada: BB PS Import chicks
 - Western Canada: import eggs BB PS
 - Hatched at commercial hatchery
 - Strive to keep separate, not all sources equally tested

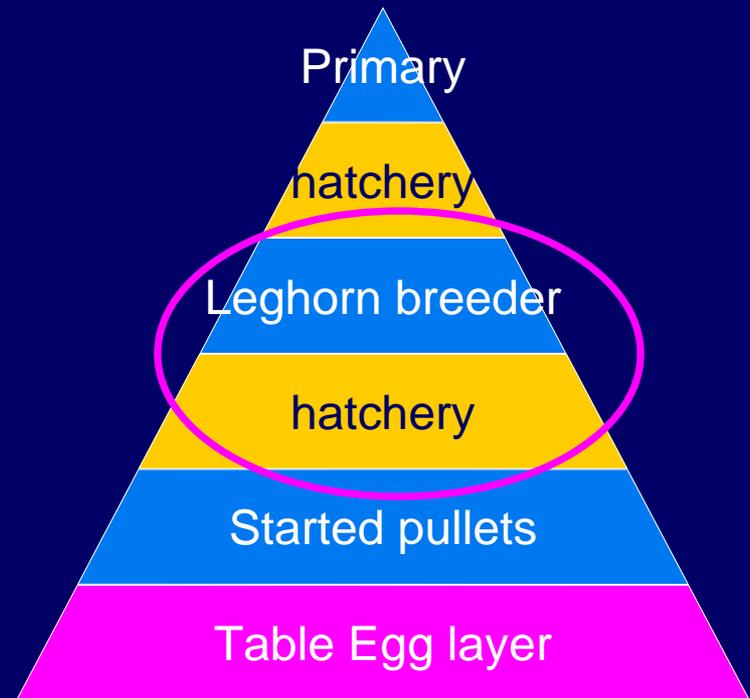


Salmonella programs in Poultry Production Chain



Processor

Meat → consumer



Grader/ egg processor

Eggs → consumer

Parent Stock, breeders for production of hatching eggs

- ❑ Surveillance varies by province
- ❑ Develop standard through AHSP

- ❑ **Leghorn breeder stock:**
 - Under control of hatcheries generally
 - High invested interest in maintaining Se negative
 - Multiple testing life of flock (environmental, serology)
 - Private monitoring & response
- ❑ **Dual purpose:** little information, not mainstream
- ❑ **Broiler breeder stock**
 - Large range of surveillance programs
 - More being done recently in all provinces
 - Little compilation of data

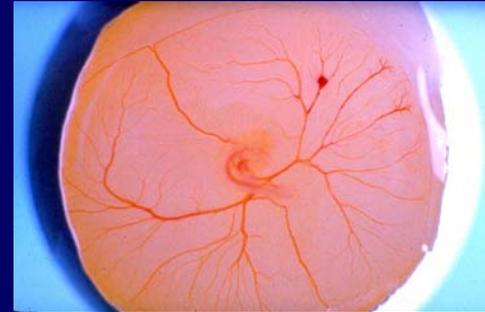


Leghorn breeders



- Outside quota system (except surplus eggs)
- No standard testing program but still:
 - Repeated, multiple testing, LOF, monthly
 - Use primarily environmental samples
 - Test large % of population in barn
 - Dust samples preferable/ most sensitive
 - Use serology also as appropriate
- High % vaccinated (combine live+killed)
- Positive Se rare.
- No compilation of data outside company

Leghorn Hatcheries



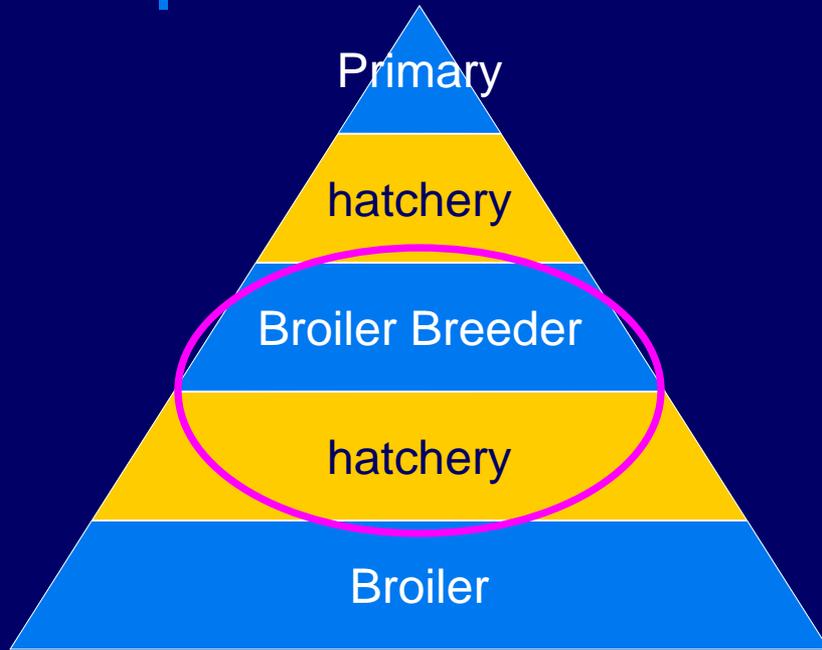
- **Vested interest in maintaining Se negative**
- Dedicated hatcheries, some dual with broilers
 - If so test both streams at higher level.
- **Fluff testing program**
 - Mandatory CFIA every 6 weeks
 - Additional multiple samplings privately
 - Se positive rare
- **Response to Se positive fluff:**
 - trace back, cease H egg
 - Trace forward , response depends on province.
- No monitory support for response breeder or hatchery (join PIE insurance program)

Leghorn Started pullets

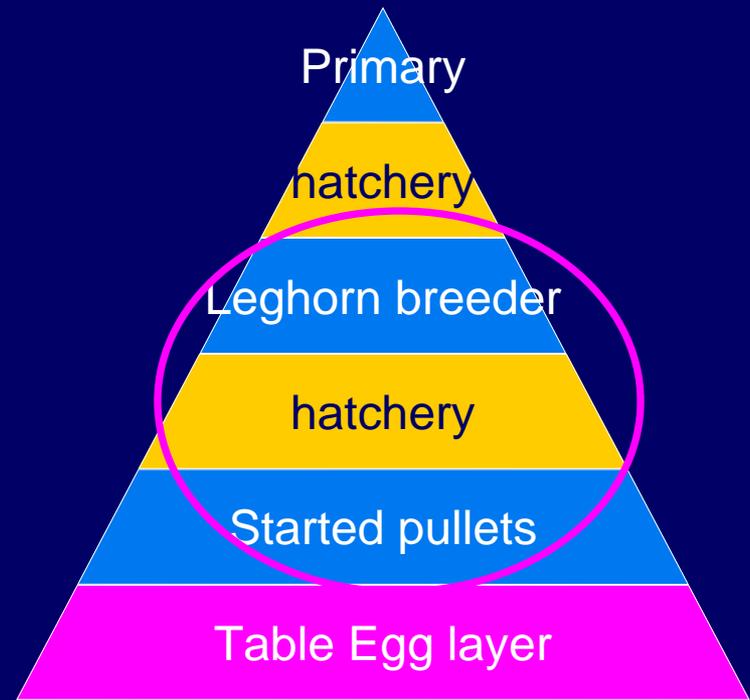


- Growing pullet flocks placed from these leghorn hatcheries
 - Increasing trend producers to grow own
 - Some may be under control of hatchery
 - outside of quota system
 - vaccination is common
 - May be tested prior to move to lay barn
 - Ont and Que require test, depop. if Se positive
 - Producer insurance program
 - Some started pullet flocks are available for purchase from US.
-

Salmonella programs in Poultry Production Chain



Processor
Meat → consumer



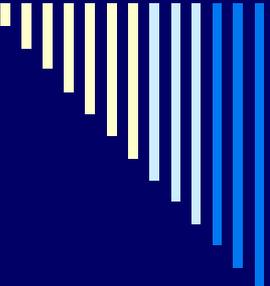
Grader/ egg processor
Eggs → consumer

B Breeder Salmonella program

Variety of programs by province

- No standard requirement
 - No barn level sampling at all, some.
 - Regular barn level sampling some
 - Routine vaccination some.
 - Little compilation of data
- Response also varies
 - None
 - Vaccinate next flock
 - Eradicate
- In past, risk to consumer in meat stream no different to any other salmonella. No push to guarantee negative Se status specifically.





Salmonella program OHSFP



“voluntary” but all mainstream comply.

All Ontario breeder flock environments

- Day old, box pads/meconium
- At least once at 16-20 weeks
- Most repeated at 25 and 45 weeks
- 1 pooled swab for each 1000 birds
- Fluffs every 6 weeks at hatchery level
- Report generated annually from AHL



Ontario Response positive Se at Broiler breeder level.

□ Day old

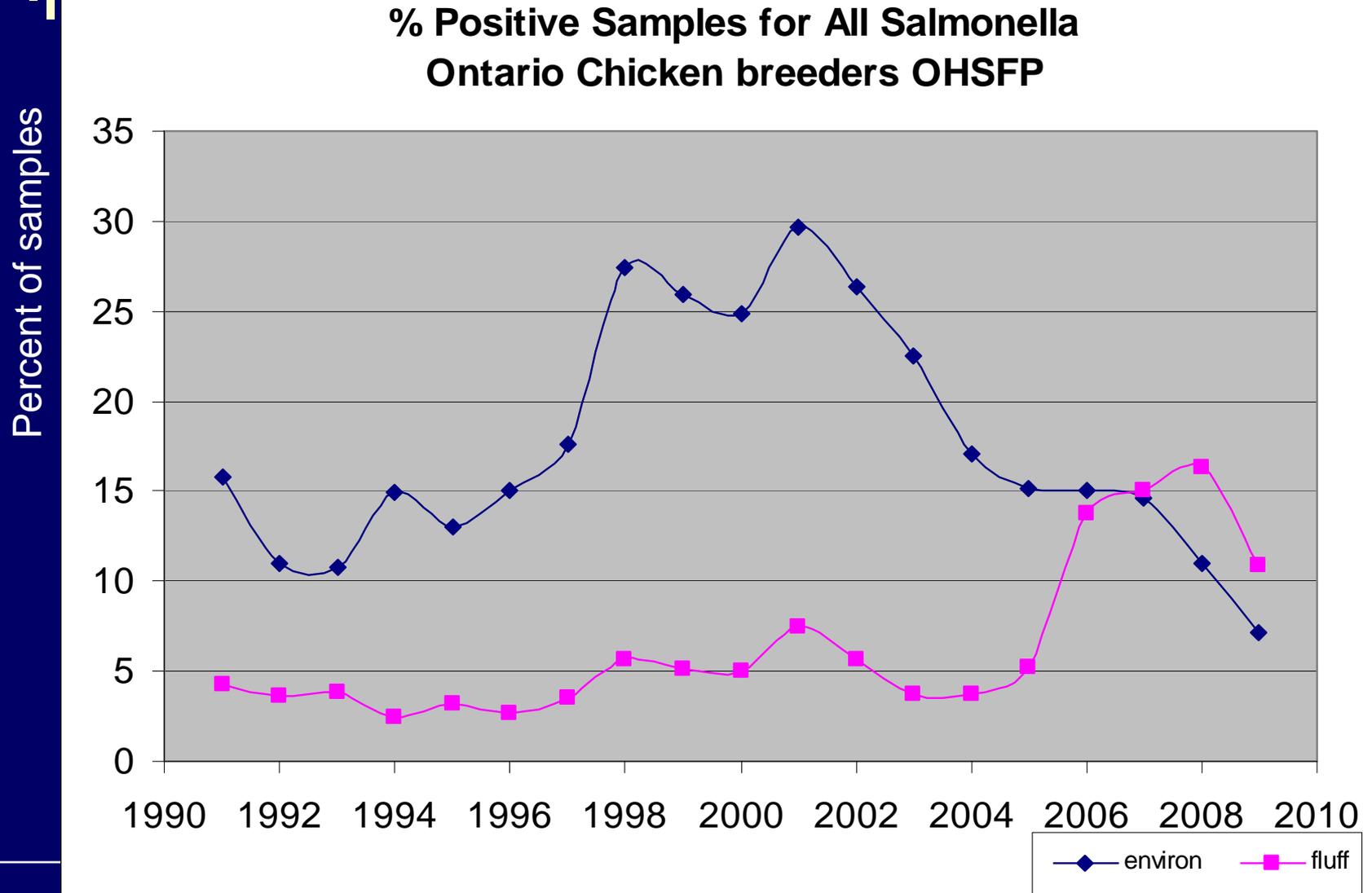
- On confirmation, destroyed, C & D
- Replaced by primary breeder
- Vaccination subsequent flock

□ Barn environment

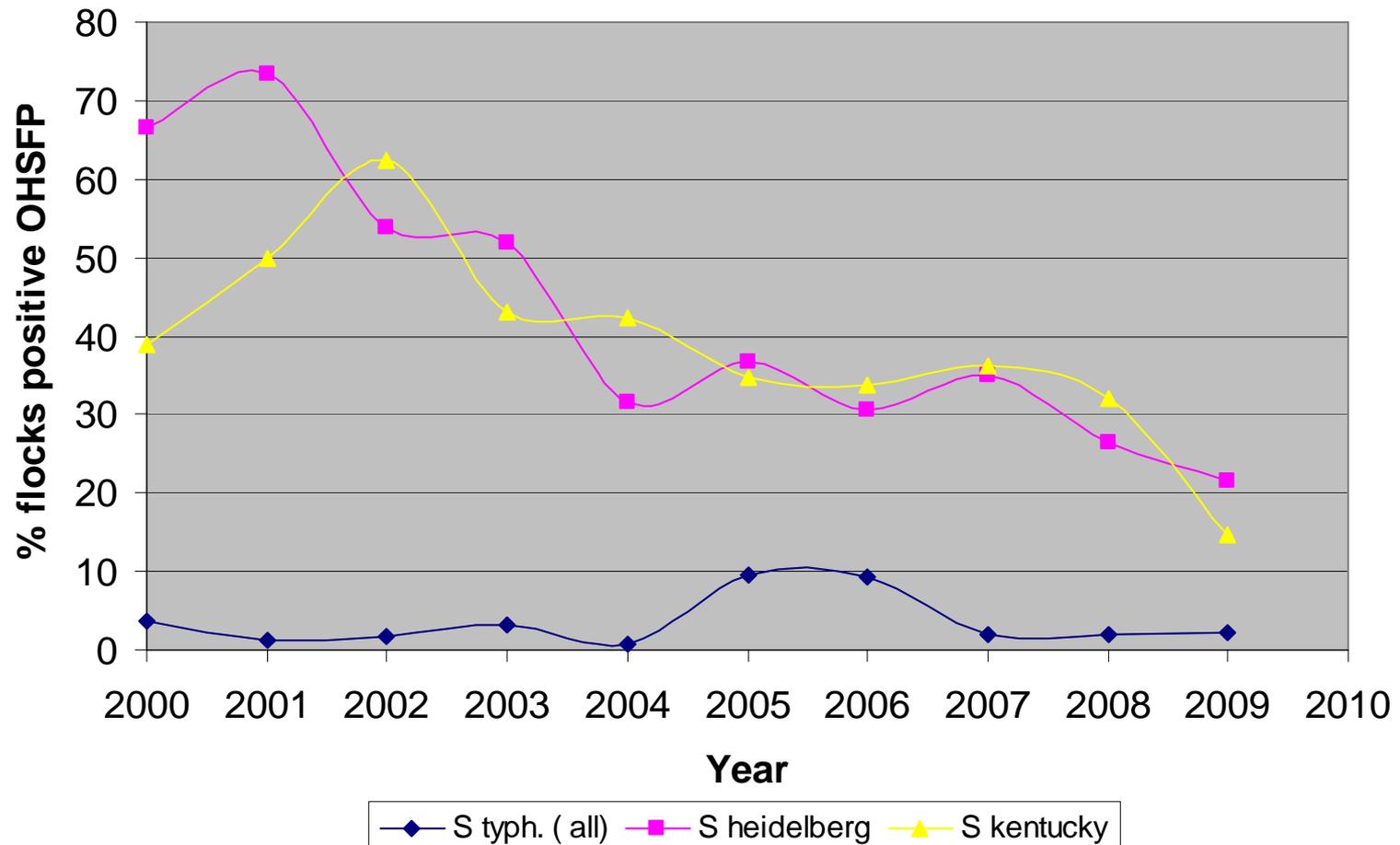
- No eggs to table market
- Hatching egg p/u suspended
- On confirmation, destroyed, C&D
- Producer paid by insurance program
- Vaccination subsequent flock.



Comparing barn isolations (Ont.) to fluff isolations all Salmonella



Prevalence of flocks testing positive environment named *Salmonella* sp. Chicken breeders OHSFP

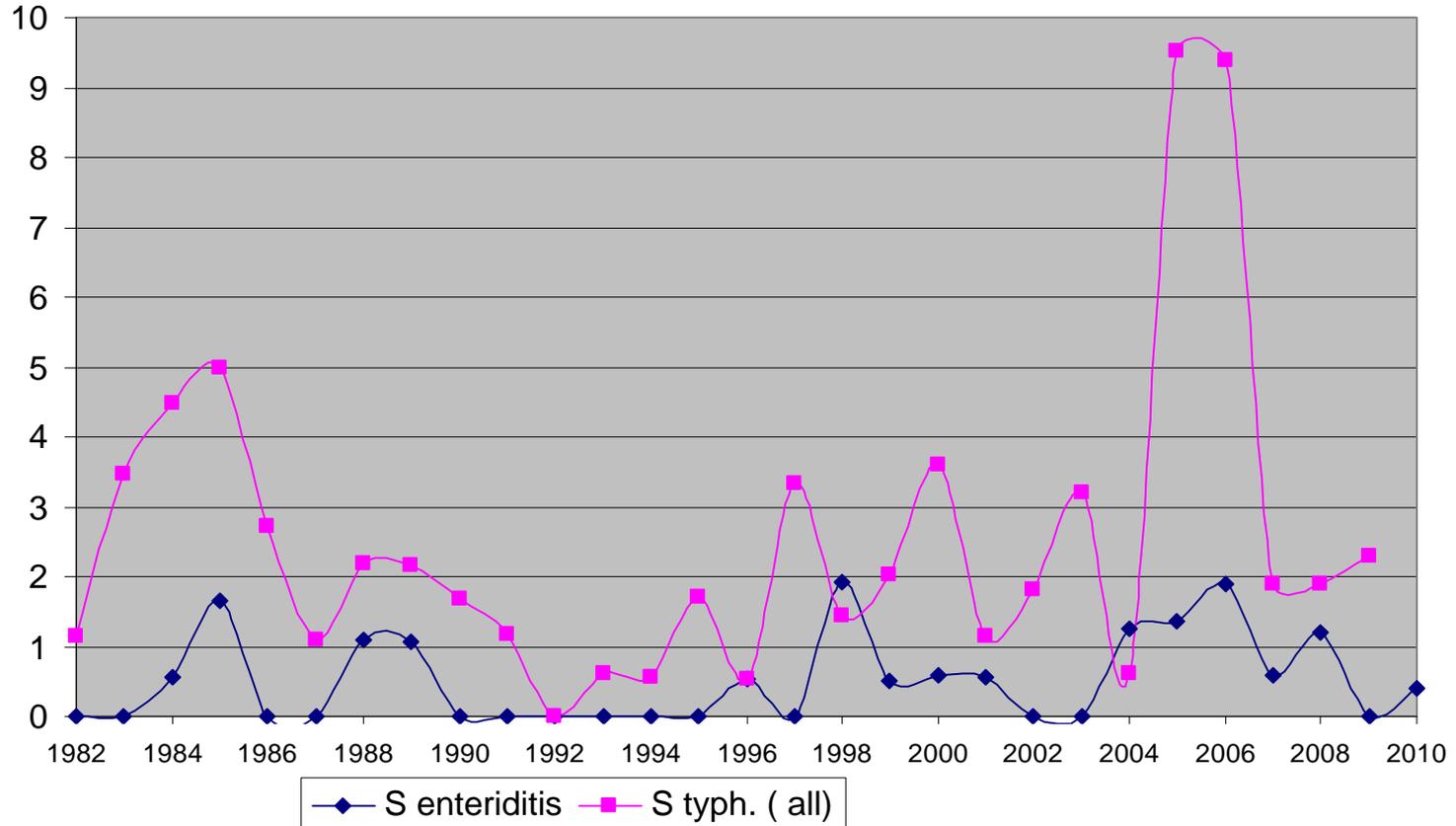


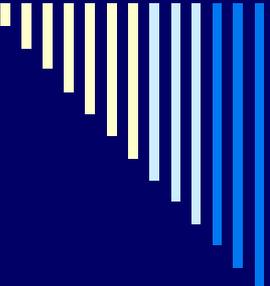
“Positive”: one environmental sample positive for that *Salm.* sp., LOF

Note scale y axis.

Percent of flocks

S.typh and S. e environmental positive flocks as % total flocks Chicken breeders in Ontario



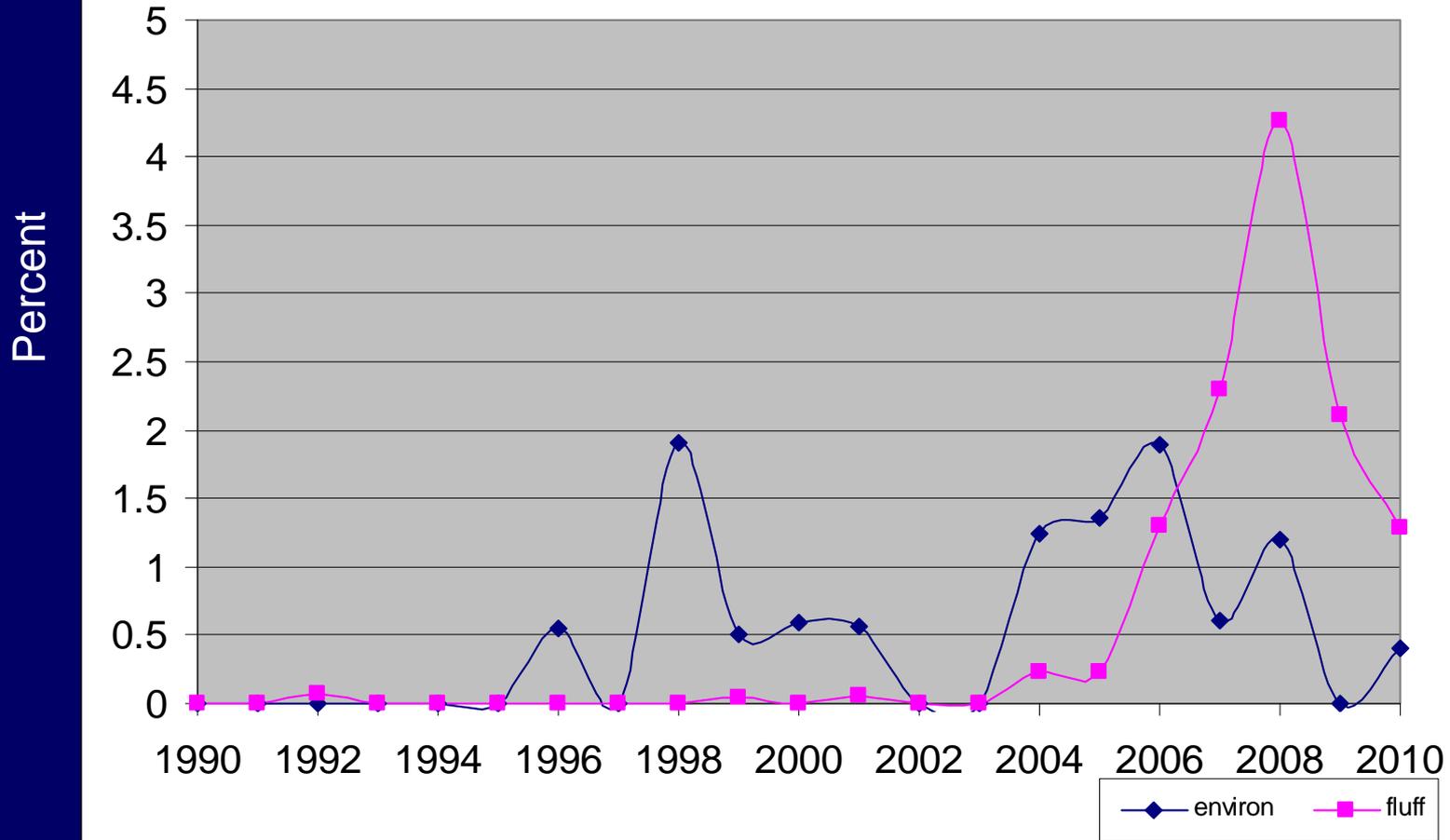


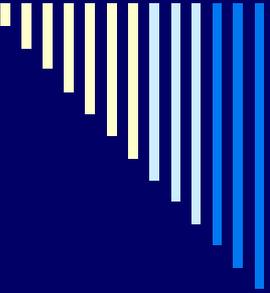
Actual # of Ontario BB flocks environmentally positive for Se

year	# flocks	year	# flocks
2000	1	2005	2
2001	1	2006	3
2002	0	2007	1
2003	0	2008	2
2004	2	2009	0
		2010 part	1 dual
			purpose

Comparing barn isolation (Ont.) to fluff isolations

% Positive Samples for S. enteritidis Ontario Chicken breeders OHSFP



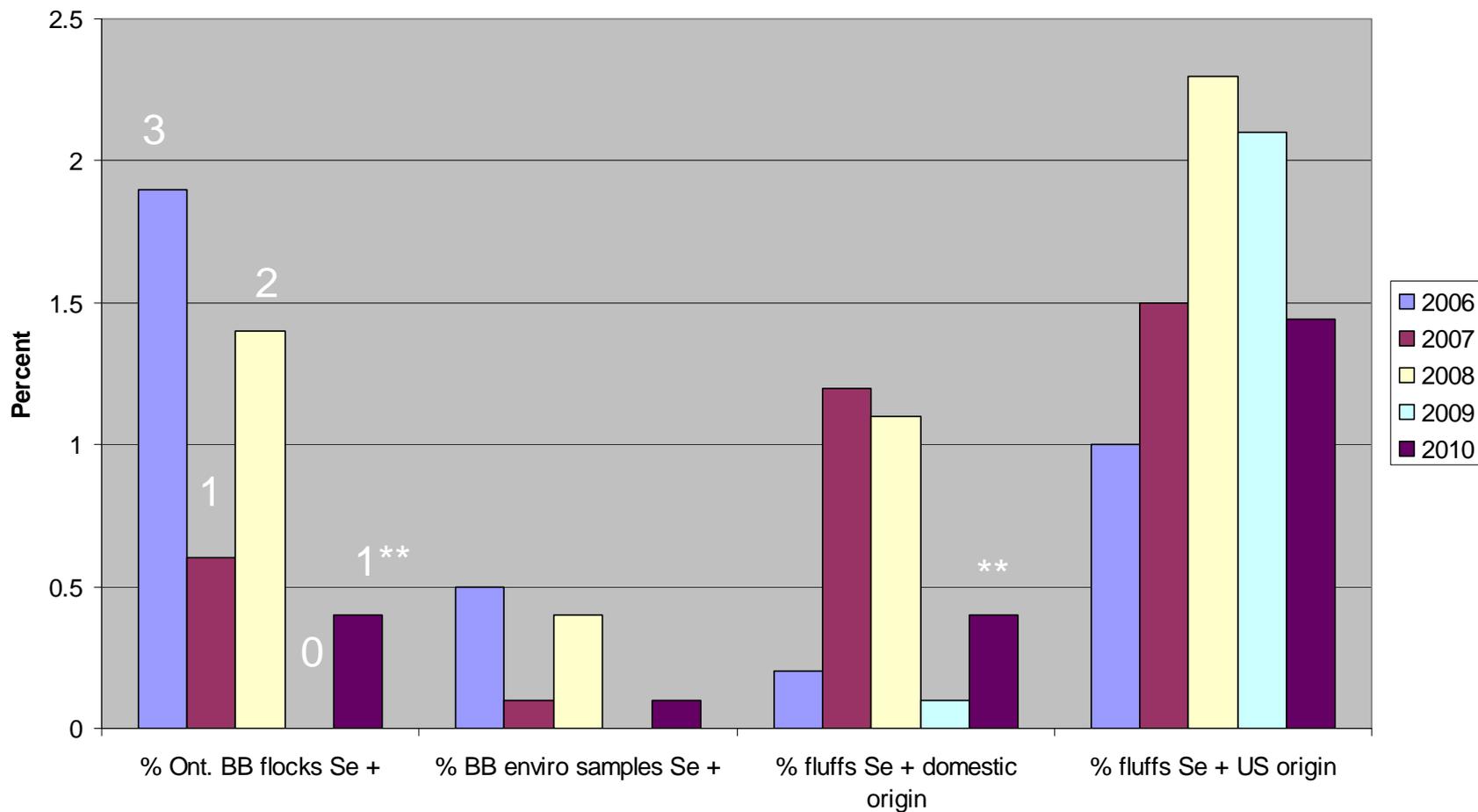


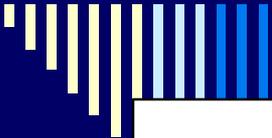
What changed after 2005?

- ❑ Decrease in overall antibiotic use hatchery level
 - ❑ Change in major US hatching egg supplier
(20% of eggs set in Canada)
 - ❑ Change to egg based system.
 - ❑ Increased sampling frequency and **investigatory sampling fluff**.
 - ❑ 2009 the US contracted supplier **vaccinated** all flocks
 - ❑ Second half 2010 shortage eggs in US, spot market purchases increased
-

Comparing fluff isolations from domestic and US egg source

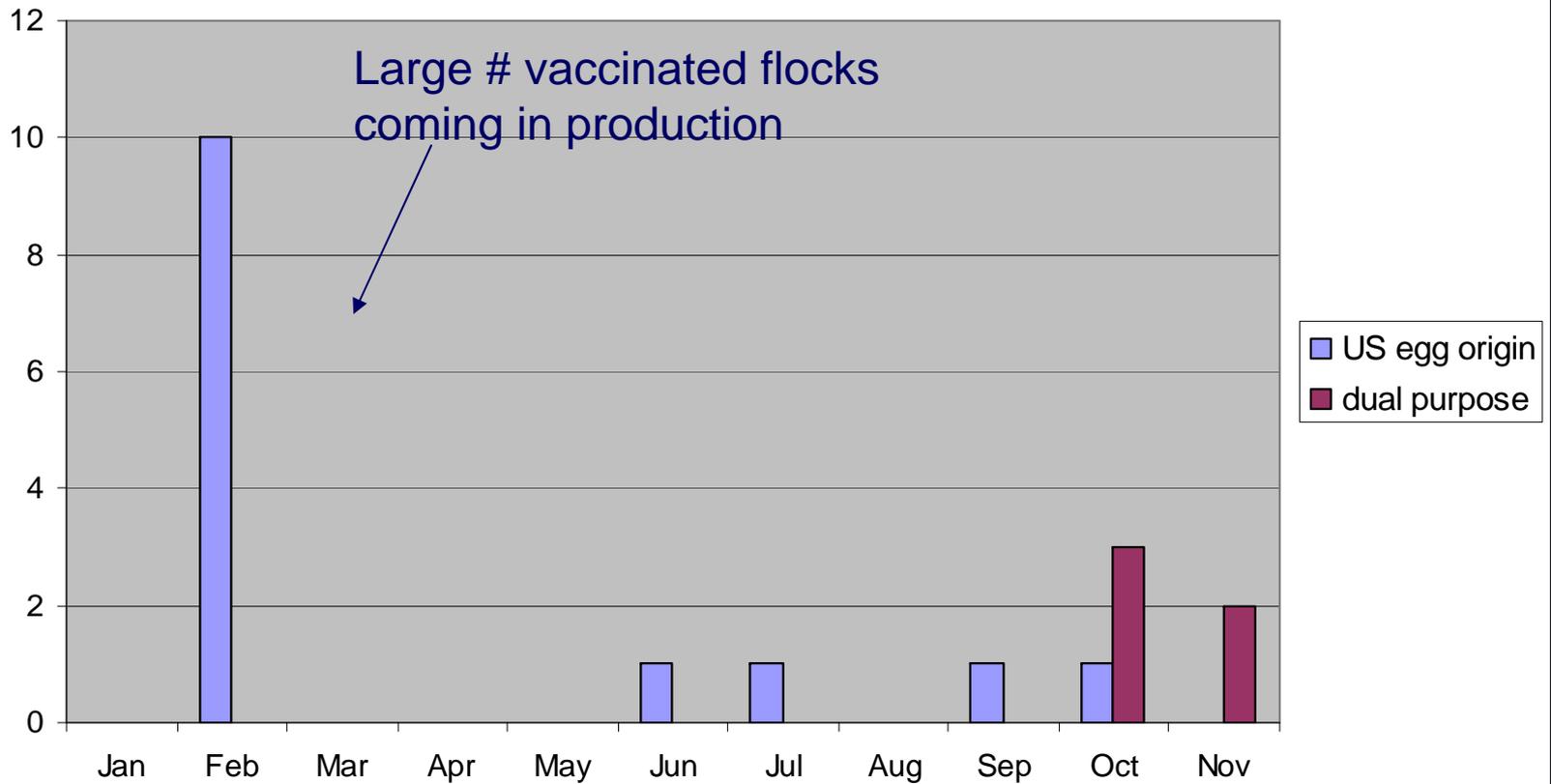
Ontario Broiler Breeders and Hatchery fluff prevalence Se

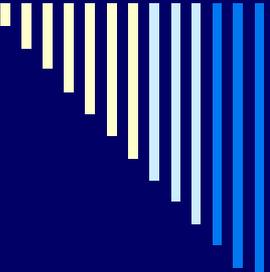




Number of Se + Fluff samples Ontario during 2010 (year not complete)

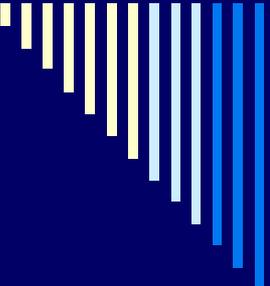
Number of samples positive





Summary response plans for Se in Ontario broiler chain.

- **Response to positive isolation in fluff**
 - Trace: suspend as egg source
 - Confirm: repeat fluff, 32 barn samples
 - Ont. BB confirmed in barn is destroyed
 - US source by fluff, not accepted for delivery
 - No requirement for eggs or chicks already in system (time lag for results)
 - **Se policy assoc. with food safety risks**
 - No table eggs from suspect BB life of flock
 - Poultry meat
 - no differentiation between Salmonella species
 - Salmonella sp. hazard for control in HACCP & cooking final product for meat.
-

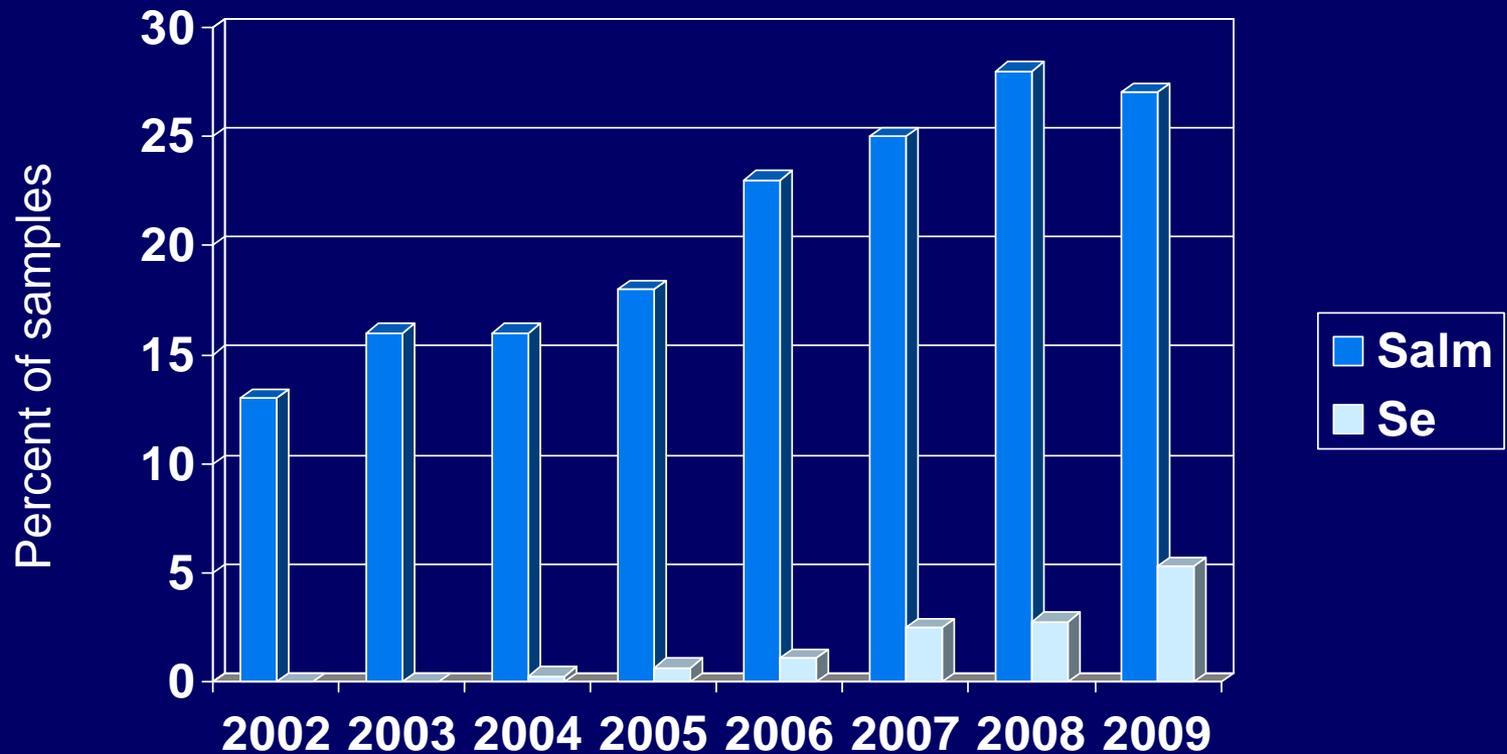


Broiler level



- No routine monitoring at farm level
 - Diagnostics (early mortality)
 - Severity depends on prevalence flock source, Ab usage, other stress factors, barn contamination, rodents
 - Clinically similar to colibacillosis
 - Research surveillance
 - Abattoir surveillance (CIPARS)
- Response
 - Attempt to segregate to end of kill day
 - OFFS program as preventative.

% recovery rate from cecal contents CIPARS abattoir



Plant level

□ Federal plants

- Routine sampling to qualify for export (US)
 - ‘bird in a bag’ one per shift.
 - Salmonella sp, no serotyping required.
 - CFIA compiles results
- Final product sampling, internal QA
- Mandatory FSEP

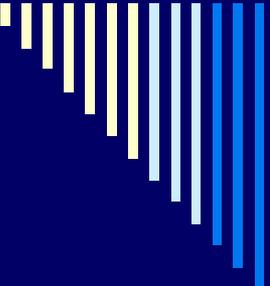
□ Provincial plants

- No routine sampling required
- Prov. HACCP, voluntary FSEP

□ CIPARS testing.

- Chosen abattoir level
- Random retail level





Summary



- **Salmonella programs do exist**
 - Where implemented, do work
 - For data we do have, overall prevalence in poultry of Se is low.
- **Surveillance**
 - Sporadic, not coordinated
 - Not standardized nationally
 - Coordination of laboratory system
 - Test methodology, reporting, serotyping availability
 - No system to compile and trend data

Summary

□ Control mechanisms Se

- **Response** not standardized
 - Prov. Boards do have ability to require minimums under FPMA for their commodity level
 - Expectations not clear
- **Preventative:** universal, most consistent, all levels
 - OFFS programs compatible with business payback

□ Outcome Se

- No defined goals
 - Human prevalence low already compared to EU
- Good communication system exists within industry
- Need cooperation /coordination between groups:
 - government agencies & industry sectors
 - ID lead/ champion

