

# Use of Microbiological Testing and Microbiological Criteria in Regulatory Programs for Meat, Poultry, and Processed Egg Products

**Daniel Engeljohn**

Deputy Assistant Administrator

Office of Policy, Program and Employee Development



## Responsibility

- FSIS is the public health regulatory agency within USDA
- FSIS ensures that the nation's commercial supply of **meat, poultry** and processed **egg** food products is not adulterated or misbranded
- FSIS authorizing authorities (FMIA, PPIA, EPIA) do not bind the Agency to in-plant activity



## FSIS Structure

- Approximately 7,600 full-time inspectors (meat, poultry, eggs)
- Approximately 6,000 establishments
  - 52.8 billion pounds of poultry in FY04
  - 43.6 billion pounds of meat in FY04
  - 4 billion pounds of egg products
- Approximately 75 import inspectors
  - 135 establishments; 4.2 billion pounds of meat and poultry and 12.1 billion pounds of egg products



## Microbiological Testing

- **FSIS regulatory testing**
  - Verification of PR/HACCP systems to ascertain compliance (routine and intensified) and to encourage industry action
  - Baseline studies to ascertain prevalence
  - Threat agents (separate from food safety scheme)
- **Industry testing**
  - Validation to support HACCP system
  - Verification of HACCP system to ascertain compliance



## Level of Testing

### 2003 FSIS Regulatory Testing

	# annually	# Est.	Average #/Est/Yr	Shifts*	Rate/Sift
<b>Raw Ground Beef for <i>E. Coli</i> O157:H7</b>					
	5,000	1,800	2.8	500,000	1/100
<b>RTE for <i>Listeria monocytogenes</i> and <i>Salmonella</i></b>					
	6,600	2,400	2.8	600,000	1/90
<b>Salmonella In Raw Products</b>					
	50,000	1,100**	1/Yr	-	-
<b>Salmonella in Egg products</b>					
	1,600	80	20/Yr	20,000	1/12

\* Production shifts assumed as an average of 250 per plant (range - >600 to < 100 per year)

\*\* Sampling only substantial producers (ground beef - 26 per year; cattle and hog slaughter - 500 per year)



## Policy Considerations

### Salmonella trends in Raw Products

	National Baseline	CY2003
Broilers	20.0	12.8
Market hogs	8.7	2.5
Cows/Bulls	2.7	1.5
Steers/Heifers	1.0	0.4
Ground beef	7.5	1.7
Ground chicken	44.6	35.5
Ground turkey	49.9	25.4

Overall FSIS regulatory testing (Set "A"):

CY1998 – 10.65 %; CY1999 – 7.26 %; CY2000 – 5.31 %; CY2001 – 5.03 %;  
CY2002 – 4.29 %; CY2003 – 3.80 %; upward trend in 3 classes of poultry



## Policy Considerations

### *Escherichia coli* O157:H7 -- % positives in raw ground beef (CY 2003-2004)

Source	CY 2003		CY 2004	
	Analyzed	%Positive	Analyzed	%Positive
Federal Plants	5,735	0.349	7,683	0.182
Retail Stores	779	0	311	0
State Plants	39	0	0	-
Imports	31	0	16	0
Totals	6,584	0.304	8,010	0.175



## Policy Considerations

### *Salmonella* -- % positives in RTE

Summary by HACCP process type for meat and poultry*	A	B	C	D	Overall
	0.34	0.15	0.15	0.28	0.16
Summary for processed eggs*	E	F	G	H	Overall
	0.73	0.33	0.34	0.95	0.54

\* CY 2001-2002 combined for meat and poultry; CY 1995-2003 combined for egg

A = Not Heat Treated Shelf Stable

B = Heat Treated Shelf Stable

C = Fully Cooked Not Shelf Stable

D = Product with Secondary  
Inhibitors, Not Shelf Stable

E = Egg Whites

F = Whole Eggs or Yolks

G = Whole Eggs with Added Yolks  
or Whole Egg Blends

H = Dried Yellow Egg Products



## Policy Considerations

### L. monocytogenes -- % positives in RTE (CY 2001-2002)

Summary by HACCP process type*	A	B	C	D	Overall
	2.03	.023	1.33	1.68	1.16 **

\* A = Not Heat Treated Shelf Stable

B = Heat Treated Shelf Stable

C = Fully Cooked Not Shelf Stable

D = Product with Secondary Inhibitors, Not Shelf Stable

\*\* Healthy People 2010 goal for human infections from Lm expected to be halved by 2010 adjusted in order to be met 2005 by President Clinton



## Informing Risk

### Conducting baseline studies for risk assessment use:

- On-going
- Of sufficient duration to address regional and seasonal effects
- Looking at more than one point in the process
- Looking at use of indicator organisms for process control as well as pathogen impact



## FSIS Risk-Based Testing

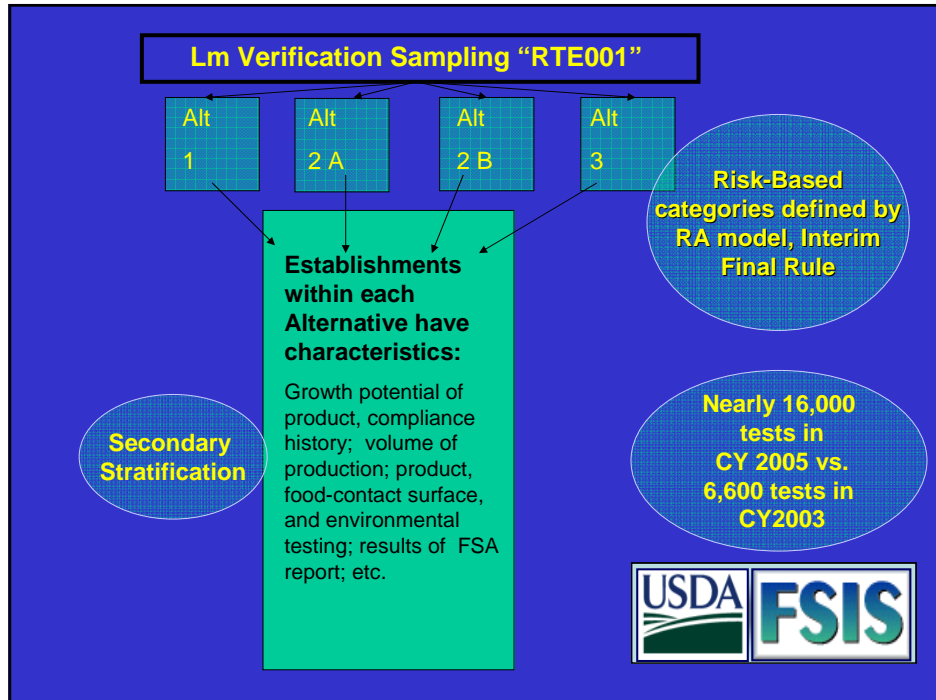
- Historically, sampling was randomly scheduled
- Now, drive for more effective use of resources; impact on public health
  - Targeted to those products most likely to result in illness; amplifies impact; focuses follow-up verification activity
  - Data-driven mechanistic model (risk factors are weighted)



## Risk Management

### For *L. monocytogenes* in RTE:

- Interim final rule for post-lethality exposed RTE (October 2003)
  - Effective control measures through HACCP plan, Sanitation SOP, or other prerequisite program:
    - Alternative 1 – post-lethality treatment **and** antimicrobial growth inhibitor
    - Alternative 2 – post-lethality treatment **or** antimicrobial growth inhibitor
    - Alternative 3 – Sanitation



## Risk Management

### For *Salmonella* in Raw Product:

- Addressing sustained, upward trend in classes of raw poultry, especially broilers
  - Targeting poorer performers
  - Targeting serotypes of epidemiological importance
  - Getting results back to establishments immediately



## Risk Management

### For *E. coli* O157:H7 in Raw Product:

- Addressing all producers; no exemption
- Targeting high volume
- Targeting high prevalence season
- Sampling ground beef and manufacturing trimmings

\* CY2000-2004 - % positives decreased by >80% with 43.3% decline in 2004 – CDC reported decline in human infections by 42% from baseline years of 1996-1998



## Industry Testing

### Performance standards/criteria:

- **RTE**
  - 5.0- $\log_{10}$  reduction for *E. coli* O157:H7 in beef
  - 6.5- $\log_{10}$  reduction for *Salmonella* in meat
  - 7- $\log_{10}$  reduction for *Salmonella* in poultry
  - 8.75- $\log_{10}$  reduction for *Salmonella* for processed eggs
  - No multiplication of *C. botulinum*
  - No more than 1- $\log_{10}$  growth for *C. perfringens*
  - Non-detectable *L. monocytogenes* in all product and food-contact surfaces
- **Raw**
  - Generic *E. coli* at slaughter specific to fecal contamination control
  - *E. coli* O157:H7 – Notably, testing conducted to provide high confidence of absence of low level contamination (e.g., “N-60”)