



**Lessons Learned in the Meat Industry:
*Control of Listeria in RTE Meat and Poultry Products***

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Managing Food Safety Practices from Farm to Table

The Food Forum

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Lessons Learned

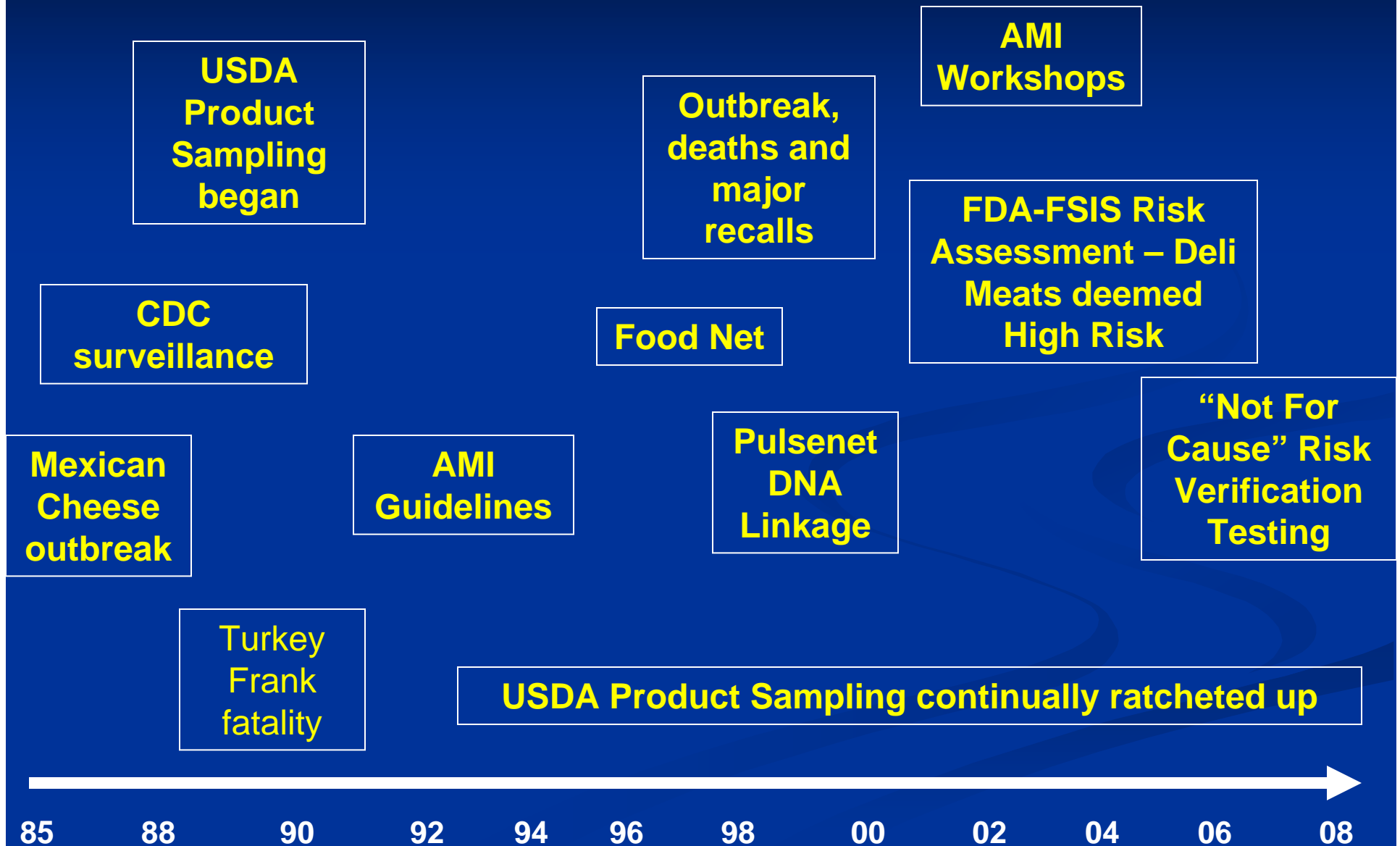
“The battle with this organism (Listeria) has caused more change for producers of RTE deli meat products than any one single factor or event in the last 30 years. Our scars are numerous and deep.”

Dr. John Butts
V.P. Research
Land O’ Frost

***“Selling Safe Food is the
Right Thing to Do -- It is
Good for Business and
Good for Consumers”***

Timeline of Major Events

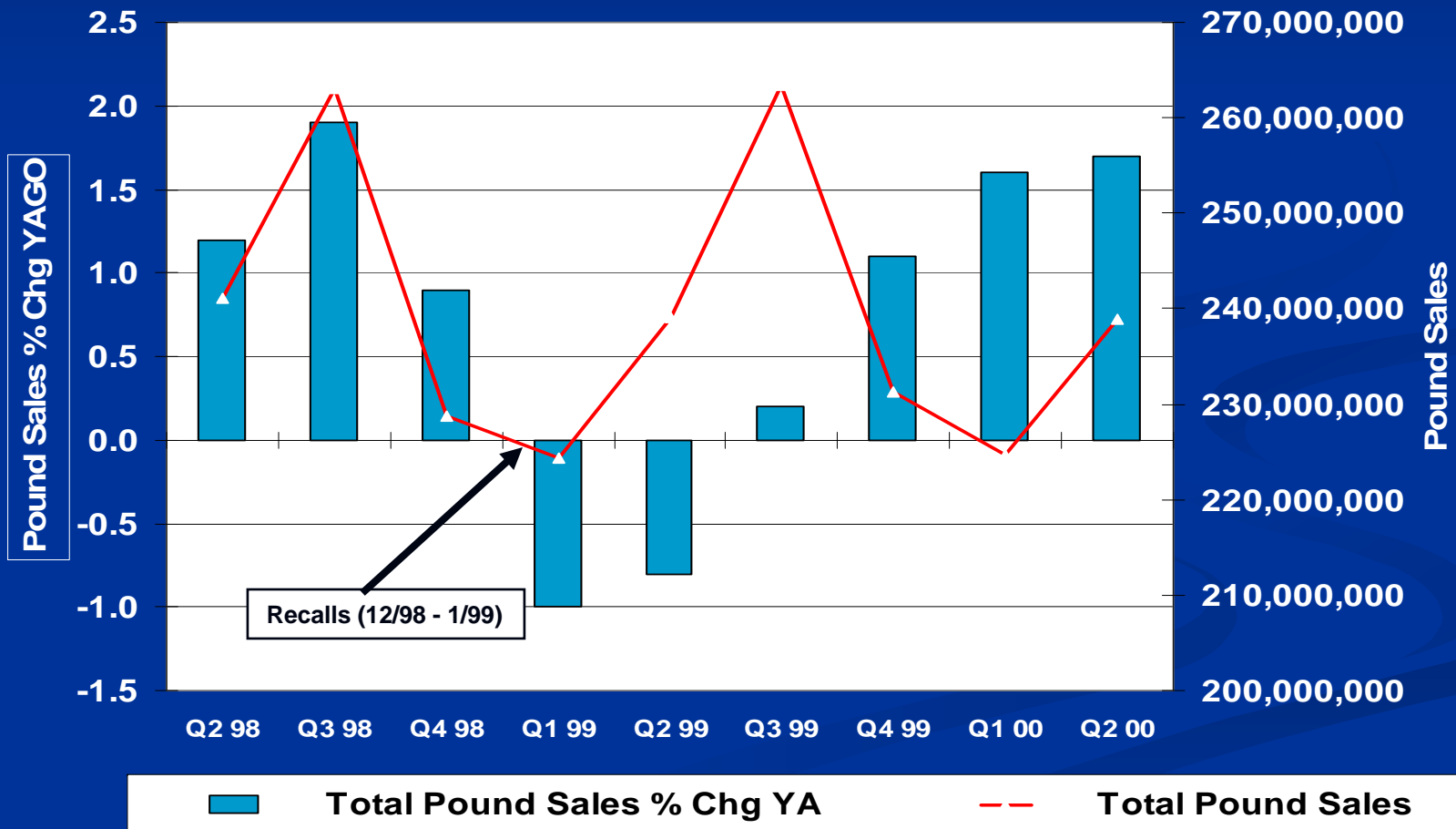
Listeria monocytogenes



The Business Case:

Negative events affect everyone

Total Cold Cut Category



Source: AC Nielsen Category Data, 1/14/99

Cycle of Control

Awareness:
Detect Problem

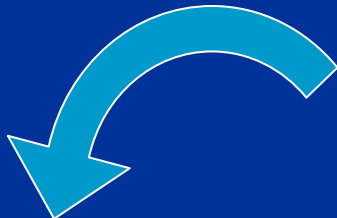
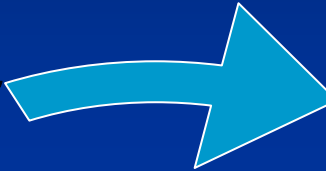
Predictive:
Measure
impact of
interventions

Enlightenment:
Collect data to
understand the
problem

Preventative:
Implement
Interventions and
Best Practices

Preventative:
ID appropriate
points of control

Share Best Practices
across industry



The Evolution of Environmental Listeria Control

Stage	Control Methods
Awareness	Sample product. Recognition of environmental nature of Listeria.
Enlightenment	Recognized existence of growth niches. Sample contact surfaces and some floor and environmental areas. Starting the redesign phase.
Preventative	Potential Growth niches mapped. Some scheduled intervention practices in place. Managing “Critical Factors” of the Sanitation process. Engaged in Equipment and Facility redesign.
Predictive	Aggressive early warning sampling in place. Intervention practices in place with all RTE equipment. Focus on zone 4 and facilities. Advanced phases of both Equipment and Facility redesign.

Evolution of Control

Awareness phase

Early '90s

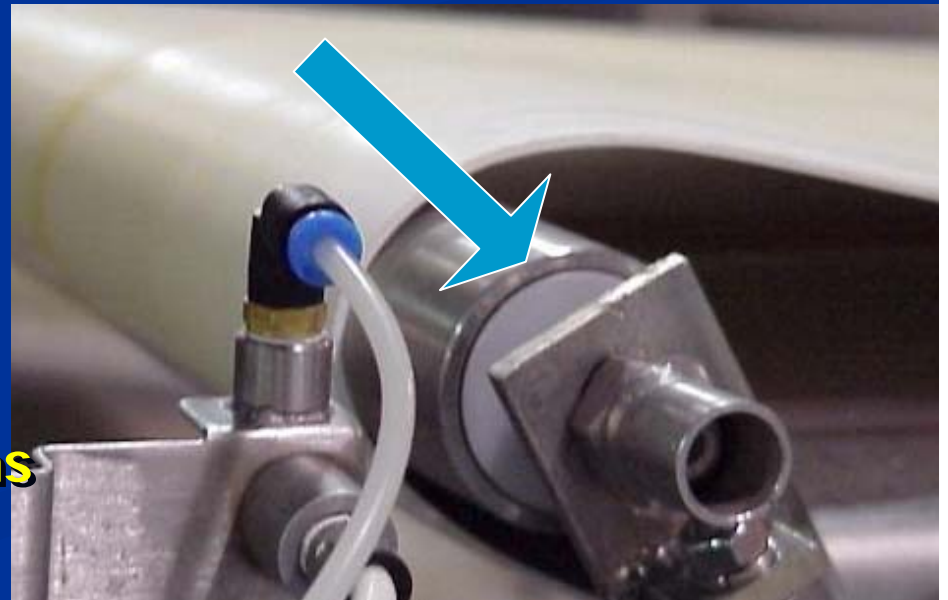
- **Product and contact surface sampling dominated**
- **Growth niches discovered in hollow rollers**
- **Industry recognized benefits and needs of separation**
 - **painted lines on floor**

GROWTH NICHES

Locations harboring the organism after the routine sanitation process for that area has been completed.

Examples

- **Hollow roller on conveyor transporting food product**
 - **Hollow rollers not disassembled cleaned and sanitized or heat treated in a manner to eliminate any contaminating organisms can become growth niches.**



Evolution of Control

Enlightenment Phase

Mid '90s

- **Equipment teardown became common**
 - Seek & Destroy concept developed
- **Internal equipment redesign became commonplace**
- **Suppliers were informed of design problems**
 - Conflicting design expectation evolved
 - Equipment manufacturers given a moving target
- **Floor problems persisted**
 - Floors/drains were recognized as harborage and chronic problem areas
 - Methods to clean floors continuously failed
 - Drains were not expected to be Ls free

Evolution of Control

Enlightenment Phase (con't)

Mid '90s

- Persistent deep equipment growth niches were discovered and recognized as root cause problem areas
- Facility areas were recognized as sources of *Listeria* harborage
 - walls, freezer walls, absorbent materials in doors, wet floors and cracks in floors
- Mid-shift cleanups were recognized as problem causing sources of recontamination

Evolution of Control

Preventative Phase

Late '90s

- Benefits of dry floors were realized
- Cooking/pasteurization of equipment became commonplace
- Large area sampling became commonplace
- DNA linkage evolves
- Methods for “construction process control” evolves
- Spread of organisms from growth niches became more understood
- Physical separation of RTE areas became common place

Evolution of Control

Predictive Phase

2000

- **First AMI Workshop – June, 2000**
 - Consensus in methods and Best Practices was attained
 - Six “Strategies for Control” developed
 - Over 15 workshops held reaching over 1000 industry employees

October 2001

- **AMI Board declared “Food Safety Not Competitive”**

2001 to today

- **Many lines and processes brought under control**
- **Elimination of single growth niches produced new levels of control**
- **More aggressive sampling was deployed**

Strategies for Control of *Lm*

(adapted from AMI *Listeria* control workshop)

1. Prevent *Listeria* growth in a niche or other site that can lead to RTE product contamination.
2. Implement appropriate post-lethality technology to eliminate, reduce or prevent the growth of *Listeria*.
3. Implement a *Listeria* sampling plan to assess in a timely manner whether the processing area is “under control.”
4. Respond to each positive product contact sample as rapidly and effectively as possible.
5. Verify the problem has been corrected.
6. Review and analyze data to ensure the *Listeria* control program is working.

Evolution of Control

Predictive Phase

2001 to today

- Pasteurization of large chubs and roasts became common place
- The use of DNA analysis (ribotyping, PFGE, Rep PCR) to ID sources of growth niches and degree of the diversity of RTE contamination
- AMI Equipment Design Task Force - 2003
- Some plants had achieved new levels of control
 - One year without drain positive
- Lactate –diacetate recognized to control growth
- AMI Facility Design Task Force - 2004
- Most (>90%) of the Lm recalls are due to plant not holding product being tested

GROWTH NICHES

Delrin bolted to stainless steel

- If product and microorganisms penetrate mating surfaces a growth niche develops.
- Level of disassembly is a Sanitation Process Control "critical factor".



GROWTH NICHE CONTROL

Sanitation Critical Factors

- Degree of disassembly
- Chemical sanitizer treatment
 - Effective coverage (Flood sanitation)
 - Time
 - Chemical concentration
- Hand scrub Contact Surface
- Heat treatment
 - Small parts (COP tank)
 - Localized steam
- Non Daily scheduled sanitation
 - Rotational deep cleaning
 - Equipment pasteurization
- Effective GMP's after flood sanitization

High risk situations

- Drain backup
- Use of high pressure water or air on floor or in a drain
- A packaging line is moved or modified significantly
- An equipment breakdown
- Personnel used interchangeably between raw and cooked products (CPA)
- Construction in or adjacent to CPA
- Warm room
- Wet area or process
- Crack in floor that retains water
- Rinsing or cleaning equipment on the floor
- Others.....

Myth Busting in Critical

Use data and logic to focus resources

Common misconceptions about root cause

- “The organism is airborne”
- “Raw meat is (20-40% Lm +) highly contaminated with the organism”
- “It cannot be removed from the processing environment”
- “Drains will always be positive”

Summary of “Lessons Learned”

- **Data, Data, Data**
- **Let data guide the “Cycle of Control”**
- **Sampling and testing used strategically**
- **Vigilant re-evaluation of systems is critical**
- **Industry sharing of Best Practices**
- **Avoid misconceptions – use the data**
- **Flexible regulatory approach**

Protecting Public Health

“Selling Safe Food is the Right Thing to Do -- It is Good for Business and Good for Consumers”

The Industry is Making Progress

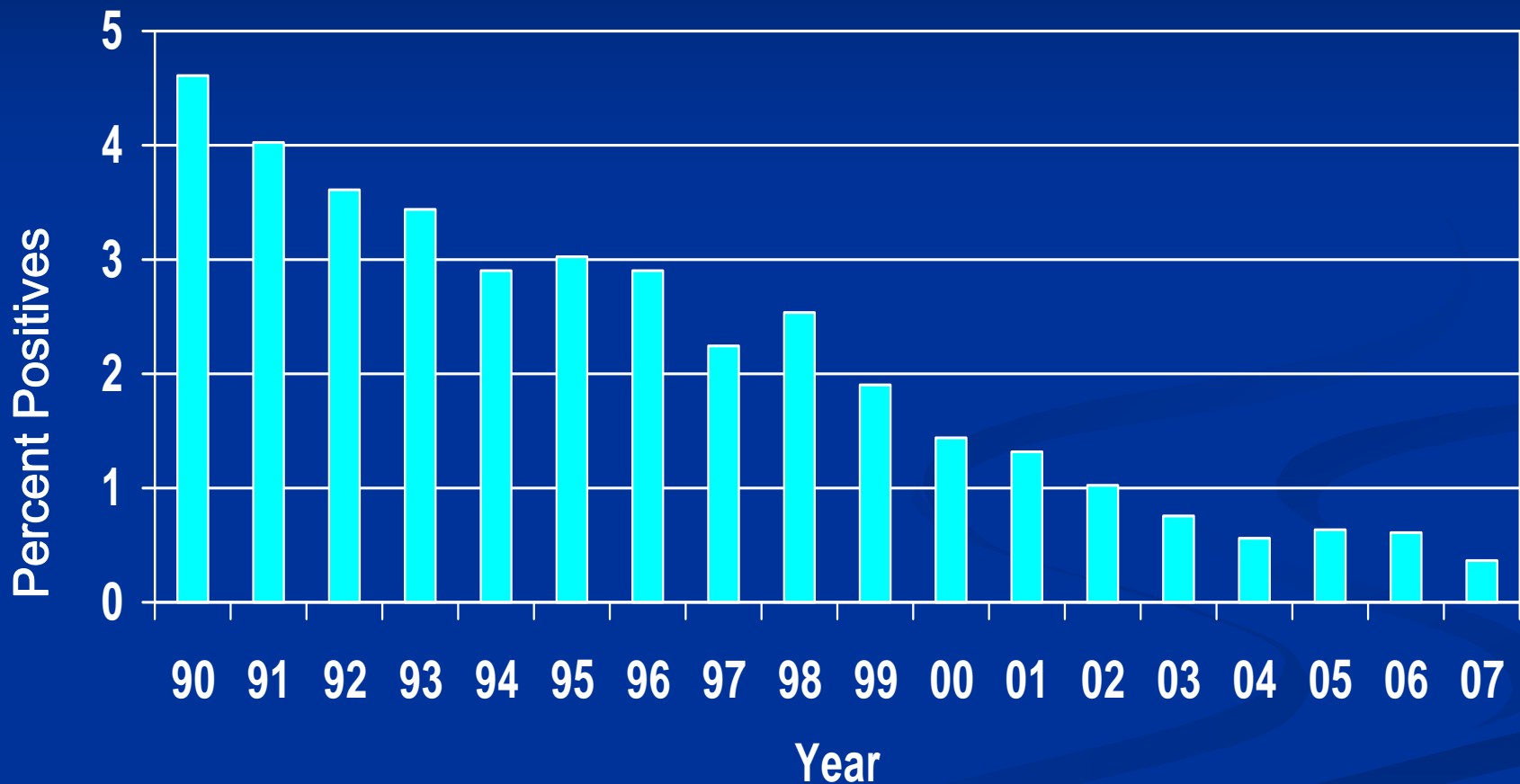
Listeria monocytogenes Recalls

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008**</u>	<u>Total</u>
No. of Recalls	14	13	26	5	9	6	73
No. of Recalls due to Illness Investigation (%)	0	0	0	0	0	0	0
No. of Recalls due to FSIS/Company Sample (%)	13* (93%)	12* (92%)	25* (96%)	5 (100%)	9 (100%)	5* (83%)	69 (94%)

* In these years there were recalls due to state health agency testing

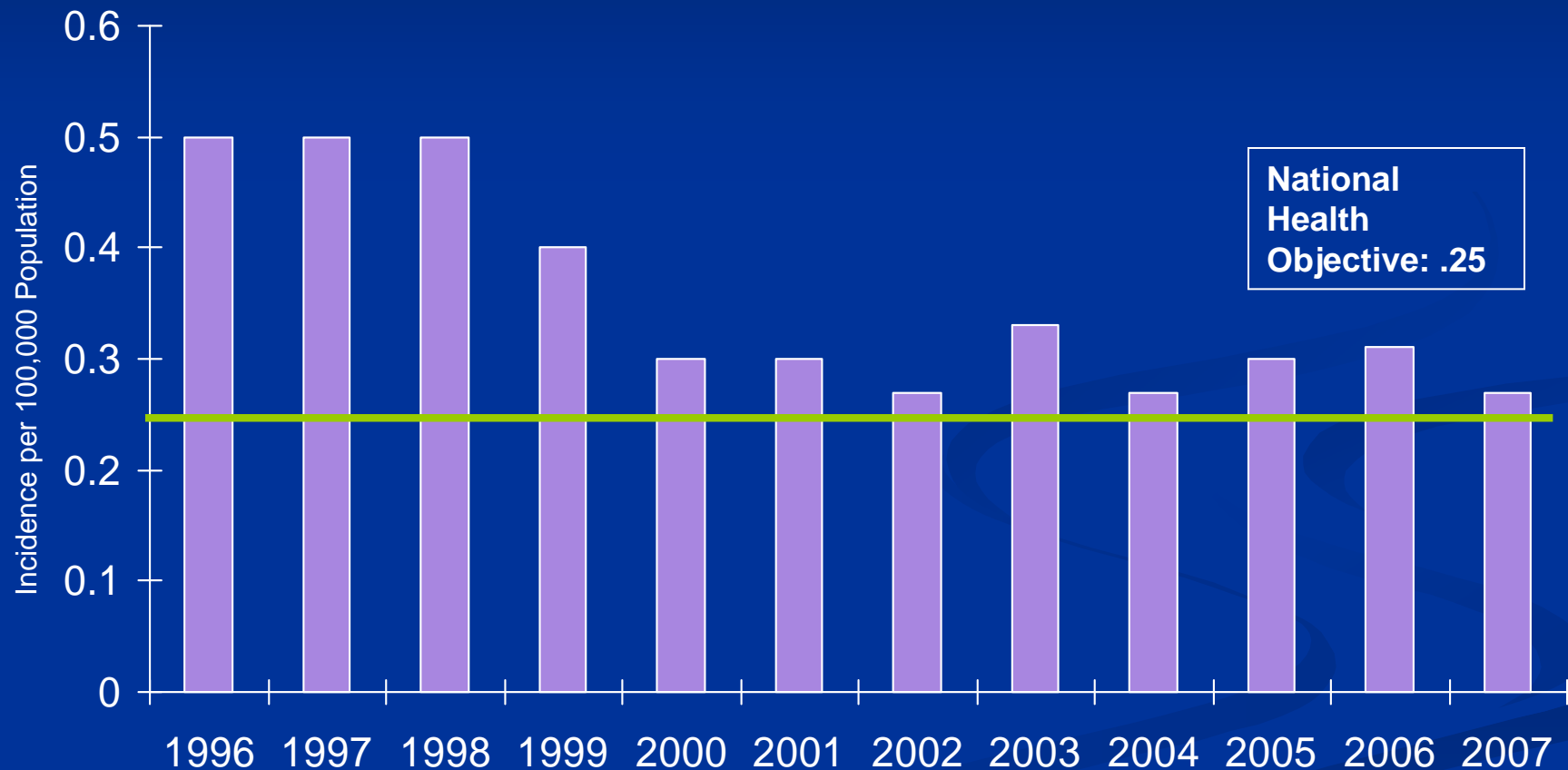
** 2008 data as of 9/08/2008

Prevalence of *Listeria monocytogenes* in RTE Meat and Poultry Products *



*FSIS results of routine regulatory testing of ready-to-eat meat and poultry products analyzed for *Listeria monocytogenes*

Incidence of Foodborne Illness 1996-2007: *Listeria**



*Preliminary FoodNet Data on the Incidence of Infection with Pathogens Transmitted Commonly Through Food --- 10 states, 2007



Thank you.

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