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Metta.
From *The Jungle* to HACCP:
A first-hand view of the United States meat inspection process

Ryan Bradburn
*MPH Final Examination*
*Kansas State University Graduate School*
A mile in *my* shoes

- A veritable smorgasbord of careers
  - 2002 - 2003: A return to college
  - 2004 - 2007: A shot at veterinary medicine
  - 2008: Salvage

- *Frontier*
  - “An interdisciplinary program for the historical studies of border security, food security, and trade policy.”
A Frontier take on FSIS (1)

- 1862 - Lincoln creates Dept. of Ag
- 1884 - Bureau of Animal Industry
  - 20 employees and $150,000
- 1906 - Upton Sinclair’s The Jungle
- 1906 - FMIA
- 1957 - PPIA
A Frontier take on FSIS (2)

- 1958 - *Food Additive Amendment* (residues)
- 1967 - *Wholesome Meat Act* (state inspection)
- 1968 - 1972 - Merged with APHIS
- 1978 - *Humane Slaughter Act*
- 1981 - Food Safety and Inspection Service
- 1996 - Shift from organoleptic approach to more science-based HACCP system

**Current FSIS:**
- 9,500 employees (7,800 inspection)
- 6,200 inspected establishments
- $930 million budget
A *Frontier* take on HACCP (1)

- 1959 - Work begins to create safe food for NASA
  - In conjunction with Pillsbury Co. and US Army Natick Labs
- Dr. Howard Bauman, project head at Pillsbury Co.:
  - “If we had to do a great deal of destructive testing to come to a reasonable conclusion that the product was safe to eat, how much were we missing in the way of safety issues by principally testing only the end product and raw materials?"
  - “We concluded after extensive evaluation that the only way we could succeed would be to establish control over the entire process, the raw materials, the processing environment and the people involved.” (Stevenson 2)
A Frontier take on HACCP (2)

• “Modes of Failure” adapted from Natick Labs
  – Gather knowledge and experience concerning the food product and process
  – Predict potential hazards, and how and when in the process they are liable to occur
  – If the process is uncontrolled at this point, there is an increased probability of a food safety problem

Stevenson 2
A Frontier take on HACCP (3)

• Hype over 1971 presentation of HACCP faded
• Return in 1985 with endorsement by Subcommittee of the Food Protection Committee of the National Academy of Sciences
• 1989 - Seven principles from three
  – Revisions in 1992 and 1997
• 1996 - Announced as FSIS rule
• 1998 - 2000 - phased into meat and poultry establishments (not egg product yet)
Hazard Analysis and Critical Control Points (1)

- Responsibility on the establishment to deliver a wholesome and safe product
- Regulatory HACCP:
  - Sanitation Performance Standards
  - Sanitation Standard Operating Procedures
  - HACCP
Hazard Analysis and Critical Control Points (2)

• Seven principles of HACCP
  – Conduct a hazard analysis
  – Determine the Critical Control Points (CCPs)
  – Establish critical limits for the CCPs
  – Establish monitoring procedures for the CCPs
  – Establish corrective actions, in case critical limits are not met
  – Establish verification procedures to ensure process is working
  – Establish record-keeping and documentation, allowing a third party (i.e.: FSIS) to verify the process
Sample flowchart (hotdogs)

Receiving and Storage: Packaging materials
Receiving and Storage: Non-meat ingredients
Receiving and Storage: Meat

Storage, Shipping, Distribution
Packaging, Labeling
Weighing, Metering
Grinding
Blending
Emulsifying
Stuffing, Linking

Peeling
Rework
Showering
Smoking, Cooking

Cooling

CCP

CCP
Sound HACCP decisions

- “Responsibility on establishment…”
- Show decision-making process
- Support decisions scientifically
- Other supporting documents:
  - Prerequisite programs
  - Good Manufacturing Practices
Current US food inspection

- DOC
  - NOAA
- HHS
  - FDA
- USDA
  - APHIS
  - AMS
  - FSIS
My FSIS chain of command

- Sec. of Ag: Ed Schafer
- Under sec. of Food Safety: Dr. Richard Raymond
- FSIS Administrator: Al Almanza
- OFO: Dr. Kenneth Peterson
- LDO: (currently no DM)
- FLS: Dr. Larry Darr
- PHV: Dr. Rob Clarkson
Other key players

- CSIs
  - William
  - George
  - Kenny
  - Bill
  - Paul
- EIAO
  - Lisa
- And many others!
Where rubber meets road

- Congressional acts
- Regulations
  - Code of Federal Regulations
- Directives
- Notices
- Memoranda, etc
“Let the system work”

- On-line inspection
  - Every animal, every carcass
- Off-line inspection
  - The implementation of HACCP
- Checks and balances
  - FLS - agency consistency (fingers crossed)
  - EIAO - HACCP plan adequacy
  - Compliance - commerce
On-line inspection

• Food Inspectors (FI)
  – Pork
  – Chicken
  – Beef
Off-line inspection

• Consumer Safety Inspectors (CSI)
  – Large vs. small/very small plants
• Public Health Veterinarians (PHV)
  – Mini-circuits
  – Dispositions
Checks and balances

- Frontline Supervisors (FLS)
  - Circuits
    - KS: 3
    - MO: 5
- Enforcement, Investigation and Analysis Officers (EIAO)
  - Food Safety Assessments (FSA)
- Compliance
21st century FSIS

- Food safety
- Economic integrity (consumer protection)
- Humane handling
- Food defense
Food safety

• Biological

• Chemical

• Physical
Food safety: Biological (1)

- **Raw**
  - *E. coli* O157:H7
  - *Salmonella* spp.
- **Heat-treated but not fully cooked**
  - *E. coli* O157:H7
  - *Salmonella* spp.
  - *Clostridium* spp.
- **Ready to eat**
  - *Listeria monocytogenes*
  - *Clostridium* spp.
    - Also
      - *Campylobacter* spp.
      - *Yersinia* spp.

**Bacteria**
- *Listeria monocytogenes*
- *Escherichia coli*
- *Salmonella typhimurium*
- *Listeria monocytogenes* (on beads)
- *Clostridium difficile*
Food safety: Biological (2)

- Generic *E. coli* testing
- *E. coli* O157:H7 testing
- Routine *L. monocytogenes* testing
Food safety: Biological (3)

• Bovine spongiform encephalopathy
  – Disease of central nervous system
• UK outbreak began in 1988
  – Followed by rise in vCJD cases

[Map of geographical distribution of BSE cases]
Comparison of bovine spongiform encephalopathy and human vCJD cases in Great Britain from 1988 to present

(sources: “Number of Cases”, “CJD Statistics”)
Food safety: Biological (4)

- As of 2003, all downer cattle are condemned
- Aging
  - Paperwork
  - Eruption of second set of incisors
- Other concerns:
  - Market heads
  - AMR

- Specified Risk Materials
  - All cattle
    - Distal ileum
    - Tonsils
  - Cattle $\geq 30$ months old
    - Brain
    - Skull
    - Eyes
    - Trigeminal ganglia
    - Spinal cords
    - Vertebral column
    - Dorsal root ganglia
Food safety

• Biological

• Chemical

• Physical
Food safety: Chemical

- Cleaning agents and lubricants
- Allergens
- Residues
  - FAST/STOP testing
Food safety

• Biological
• Chemical
• Physical
Food safety: physical

- Pre-slaughter sources
- Post-slaughter and processing sources
21st century FSIS

- Food safety
- Economic integrity (consumer protection)
- Humane handling
- Food defense
Economic integrity

- Labeling
- Wholesomeness
  - Spoilage bacteria vs. foodborne pathogens
21st century FSIS

- Food safety
- Economic integrity (consumer protection)
- Humane handling
- Food defense
Humane handling

- Food and water
- Use of electric prods
- Slipping and falling
- Slaughter event
  - Slaughter effectiveness
  - Consciousness on rail
  - Religious slaughter
- Other issues
  - Porcine Stress Syndrome/Paylean
21st century FSIS

- Food safety
- Economic integrity (consumer protection)
- Humane handling
- Food defense
Food defense

• Meat processing
  – 08S procedures
    • Water systems
    • Processing/manufacturing
    • Storage areas
    • Shipping and receiving

• Food animal industry
To recap…

• The task
  – Protect the US meat, poultry, and egg product supply

• The agency
  – USDA FSIS: one of several components of US food inspection

• The system
  – HACCP facilitated the transition from organoleptic inspection to scientifically-based safe food production
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