



# FOOD SAFETY –THE OHIO MODEL

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Ohio Department of Agriculture  
THE CONSUMER ANALYTICAL  
LABORATORY

Dr. Maya Achen



# Consumer Analytical Laboratory





# Consumer Analytical Laboratory (CAL)

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- Ohio's Food Regulatory Laboratory
- Four sections
  - Microbiology
  - General Chemistry
  - Pesticide, Residue and Formulation
  - Analytical Toxicology
  
- ODA also has Animal Disease Diag. Lab; Plant Pathology lab

# General Microbiology Laboratory



# *Listeria* Laboratory





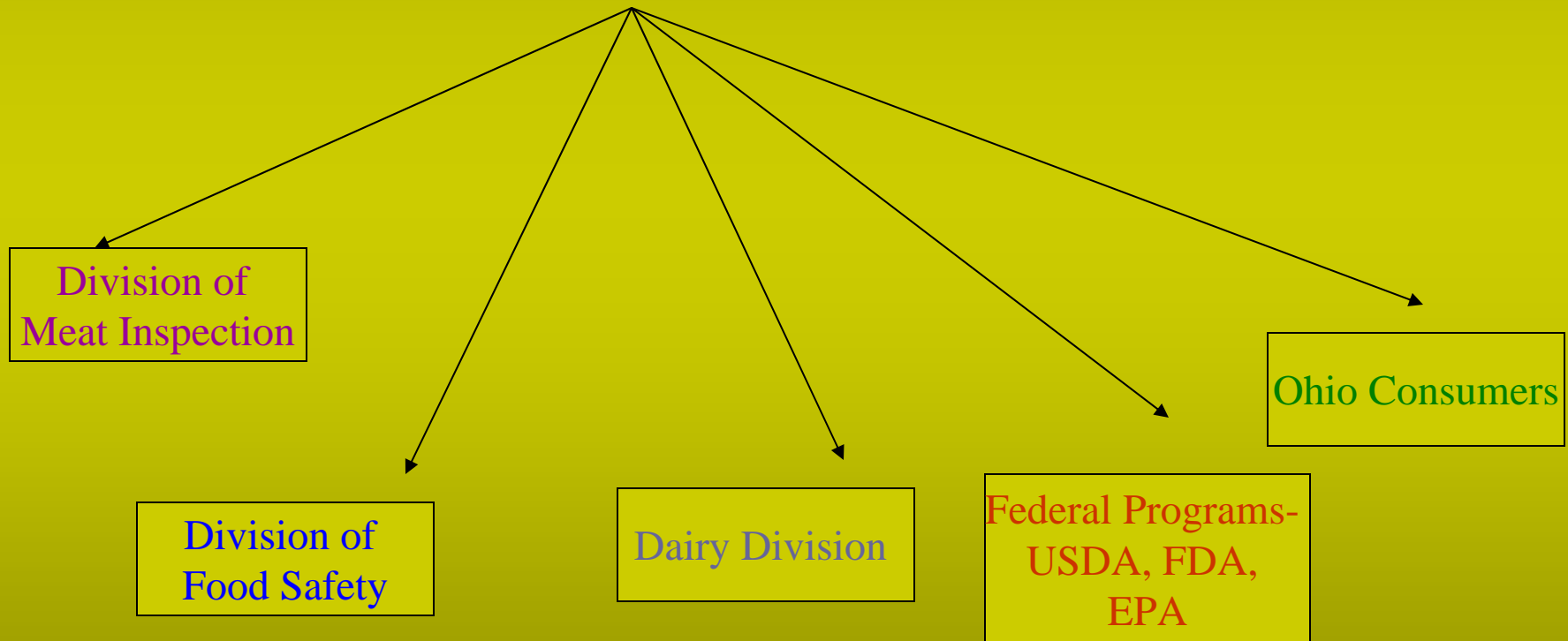
# Pesticide/Residue Laboratory

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# Microbiology Laboratory

- ODA's Regulatory lab working for



CAL Microbiology lab analyzed ~16,000 samples in 2007



# Division of Meat Inspection

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- ❑ Meat Inspectors inspect slaughter houses and Meat Processing facilities in Ohio.
- ❑ These facilities do not ship across state lines
- ❑ 218 establishments in Ohio.
- ❑ Samples collected and tested.
- ❑ Repeat inspections of “Positive” establishments





# Division of Meat Inspection

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- ❑ Processed meat samples- *Salmonella* sp., *E.coli* O157: H7; *L.monocytogenes*, generic *E.coli*, *S.aureus*, *B.cereus*, *C.perfringenes*
- ❑ Raw meat samples: Baseline *Salmonella*, *E.coli* O157: H7
- ❑ Carcass Sponges: *Salmonella* sp., *E.coli* O157: H7
- ❑ Environmental sponges: *Listeria* sp.
- ❑ Other testing: *Bacillus cereus*, Staph. Enterotoxin, STEC, EHEC, ETEC, *Campylobacter* sp. , Yeast and Mold, pH, Water Activity
- ❑ USDA methods



# Division of Food Safety

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- ❑ Food Safety Inspectors inspect 2559 businesses in Ohio.
- ❑ Includes Food warehouses and distribution companies
- ❑ FDA products inspected (non-meat)
- ❑ Samples sent to CAL for testing as part of surveillance program.



# Division of Food Safety

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- Testing of surveillance samples for: *Salmonella sp*;  
*L.monocytogenes*; *E.coli* O157: H7, Generic *E.coli*, *S.aureus*,
    - Deli salads
    - Fruits, vegetables
    - RTE sandwiches
    - Bottled water
    - Canned products- Commercial Sterility
    - FDA methodology
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- Outbreak related samples
  - Consumer complaints

# Sample set up



# Rapid Detection Methods



# BAX Q7

*Salmonella* sp. and *E.coli* O157: H7





**VIDAS**- *Salmonella* sp.,  
*Listeria* sp.; Staph. enterotoxin

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# TEMPO- Generic *E.coli*



# Promega Maxwell 16- DNA extraction



# DYNAL Bead Retriever- IMS for *E.coli* O157:H7



# VITEK 2- Biochemical confirmation





# Dairy Division

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- ❑ Inspects 3,329 Ohio Dairy farms and 78 milk- processing companies.
- ❑ Dairy Inspectors collect samples from each plant once every month.





# Dairy Division

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- All dairy produced in Ohio- Raw milk, Manufactured milk, Grade A milk
  - Aerobic Plate Count (APC), Coliform count, Antibiotics, Phosphatase, DMSCC
  - Laboratory Evaluation Officer (LEO)- conducts audits of Dairy processing plant laboratories
  - All analysts have to be FDA certified.

# Dairy Testing

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# Dairy Testing

- ❑ Grade A Products: Fluid Milk/Milk Products & Containers
- ❑ Manufactured Grade: Cheese/Frozen Desserts
- ❑ Dairy Farm Waters

## Analysis:

Aerobic bacteria, coliforms, phosphatase, antibiotics.





# Federal Inspections

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- ❑ USDA and FDA inspect establishments in Ohio that ship foods across state lines.
- ❑ USDA inspects 177 Ohio slaughter houses and meat-processing companies on a daily basis.
- ❑ FDA inspects about 1600 establishments that manufacture and ship foods (no meat) across state lines.



# Federal Programs in CAL

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- ❑ Microbiological Data Program (MDP)
- ❑ Food Emergency Response Network (FERN)
- ❑ Antimicrobial Pesticide Program (APP)

# MDP- USDA



- Produce such as Bagged Lettuce, Bagged Spinach, Sprouts, Cantaloupe, Tomatoes, Peppers, Green Onions
- Samples from Ohio, Maryland, California
- Data Collection Program
- *Salmonella* sp.; *E.coli* O157: H7; Pathogenic *E.coli* (STEC, ETEC), *Shigella* sp; Generic *E.coli*, Coliform, Total Viable Count.





# FERN (FSIS/FDA)

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- ❑ Cooperative Agreement Program
- ❑ Conduct validation studies/Emergency Response
- ❑ Surge capacity for Ohio Dept. of Health
- ❑ Training on BSL 3
- ❑ Select agent status- *C.botulinum*, *Yersinia pestis*, *B.anthraxis*



# FERN CAP 2005-2008

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- *Shigella* sp. Nested and RT-PCR- single lab validation
- *E.coli* O157: H7- platform extension and RT-PCR- single lab validation
- *C.botulinum* NT – assay on M1M and RT-PCR
- 2008-2009 CAP- non O157: H7 STEC



# USEPA Programs

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- Antimicrobial Pesticides Program(APP)
  - Evaluation of Hospital/Institution Grade Disinfectants According to Product Claims
  - Efficacy Against *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Mycobacterium bovis* BCG



# APP (EPA): Carrier Based Test



Glass Slide Carriers vs.  
Stainless Steel / Porcelain  
Carriers



Carriers Inoculated with Organism  
and Exposed to Disinfectant for  
Timed Interval



# Outbreak Response

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Ohio Dept. of Agriculture (ODA)  
and Ohio Dept. of Health (ODH)



# ODA and ODH in collaboration

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- ❑ Labs located on same campus
- ❑ ODA and ODH share a BSL 3 suite
- ❑ ODA Food Safety division regularly communicates with ODH Epidemiologists.
- ❑ All outbreak related food samples currently tested at CAL
- ❑ PFGE and serotyping of food isolates currently done at ODH (PulseNet lab)



# ODA and ODH response to a Food borne outbreak

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- ❑ ODH epi contacts Food Safety Div. at ODA
- ❑ Epi contacts Local Health Dept.
- ❑ LHD sends food sample from patients home (opened/unopened) to CAL
- ❑ CAL tests food for presence of pathogens
- ❑ CAL relays cultural results to Food Safety Division and discusses follow up actions

# ODA and ODH response to a Food borne outbreak



- ❑ If a recall is appropriate, ODA contacts manufacturer or distributor. Governor's office is notified and expects voluntary vendor issued recall within 3 hrs of vendor notification.
- ❑ CAL sends isolate to ODH for PFGE and serotyping
- ❑ ODH submits PFGE results to CAL/Food Safety Div.
- ❑ In case of PFGE match -Food Safety, CAL and ODH communicate with regards to next course of action.
- ❑ PFGE is uploaded onto Pulse Net



## 2007-2008

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- ❑ ConAgra Pot pies- *Salmonella* sp.
- ❑ Totino's Pizza- *E.coli* O157: H7
- ❑ *E.coli* O157: H7 in ground beef (2)- First Gr. Beef isolate to match on PulseNet
- ❑ *Salmonella* sp. in sprouts- MDP sample from CA- multistate recall
- ❑ *Salmonella* sp. in Cilantro- MDP sample
- ❑ *Salmonella* sp. in Hot Pepper- MDP sample

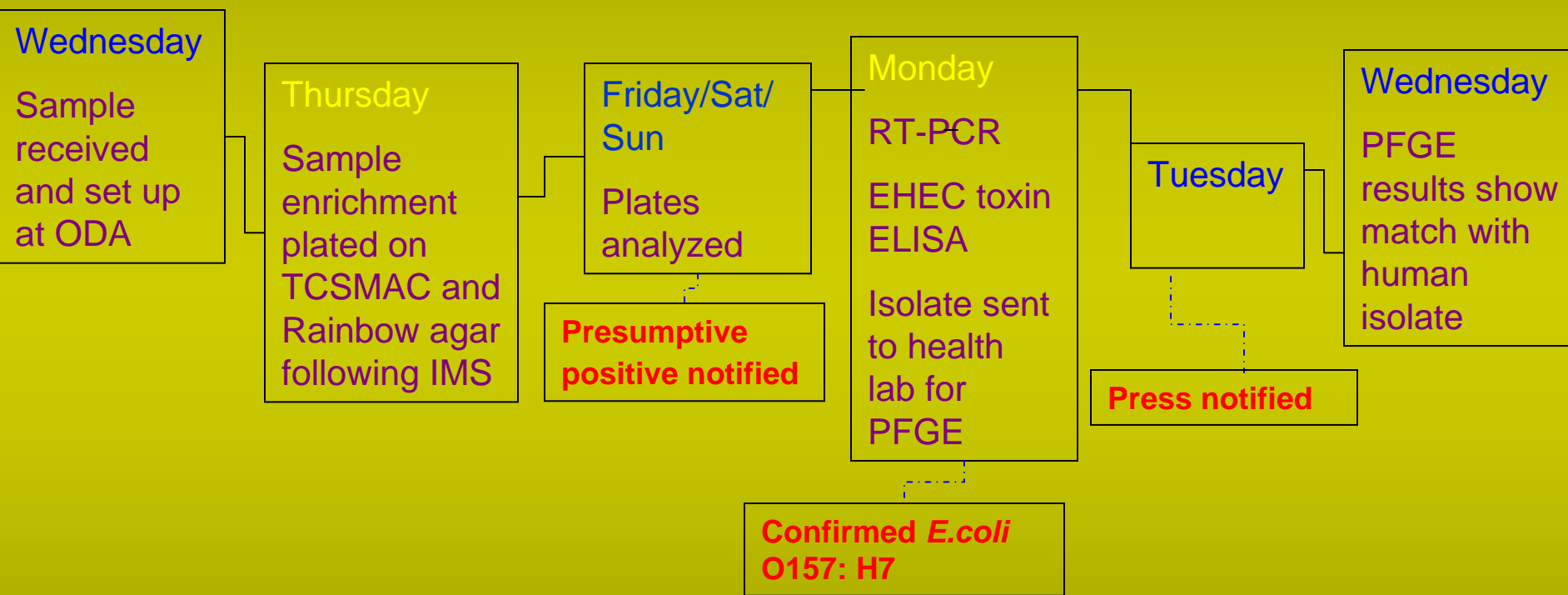


## Nebraska Beef recall- An example

- *E.coli* O157: H7 outbreak (June 2008)
  - OH and MI- PFGE match on human isolates
  - Ground beef??
  - Ground beef samples collected by local HD
    - Samples set up immediately at CAL
    - RT-PCR- isolate positive for Stx 2 gene
    - Positive ELISA test for Toxin
    - Isolate sent to ODH for PFGE
    - PFGE match to human isolate



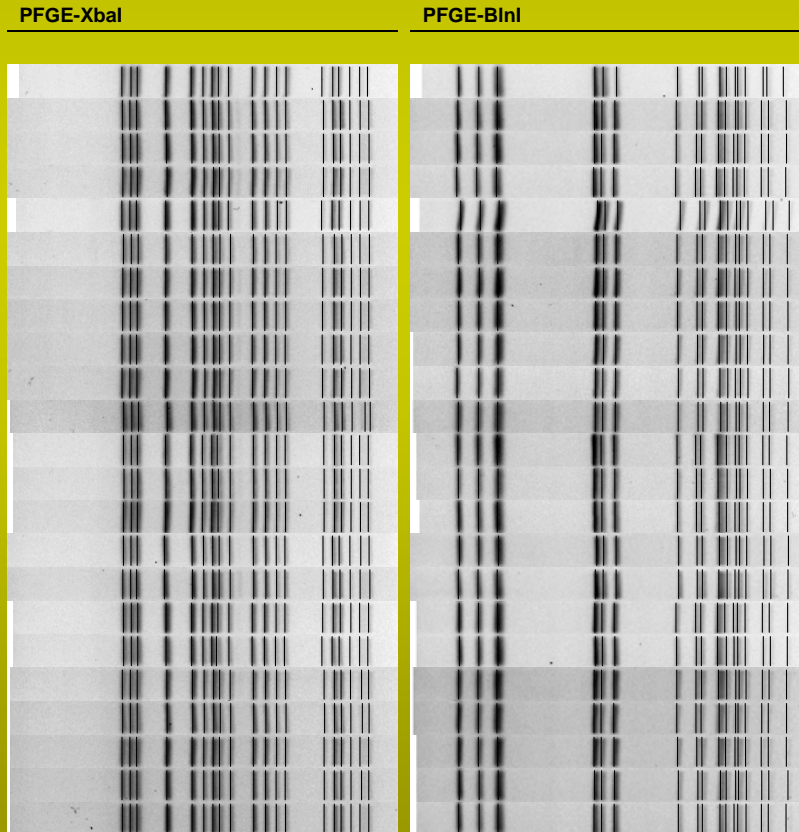
# *E.coli* O157: H7 Detection timeline – June 2008



# Nebraska Beef recall-Beef vs Human isolates



June 25, 2008, E. coli O157:H7  
Central Ohio, 0806OHEXH-1mlc



Location	County	Sample ID	Sample ID	Source
		EXHX01.0047	EXHA26.0332	Stool
Columbus	Franklin	EXHX01.0047	EXHA26.0332	Stool
Dublin	Franklin	EXHX01.0047	EXHA26.0332	Stool
Columbus	Franklin	EXHX01.0047	EXHA26.0332	Stool
New Albany	Franklin	EXHX01.0047	EXHA26.0332	Stool
	Fairfield	EXHX01.0047	EXHA26.0332	Stool
	Delaware	EXHX01.0047	EXHA26.0332	Stool
New Riegel	Seneca	EXHX01.0047	EXHA26.0332	Stool
Pickerington	Fairfield	EXHX01.0047	EXHA26.0332	Stool
Pickerington	Fairfield	EXHX01.0047	EXHA26.0332	Stool
Sylvania	Lucas	EXHX01.0047	EXHA26.0332	Stool
Columbus	Franklin	EXHX01.0047	EXHA26.0332	Stool
Worthington	Franklin	EXHX01.0047	EXHA26.0332	Stool
Columbus	Franklin	EXHX01.0047	EXHA26.0332	Stool
Dublin	Franklin	EXHX01.0047	EXHA26.0332	Stool
Pickerington	Fairfield	EXHX01.0047	EXHA26.0332	Stool
Gahanna	Franklin			Stool
Westerville	Franklin			Stool
				Ground Beef
				Ground Beef
				Ground Beef
				Ground Beef
				Ground Beef





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Thank You



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# Acknowledgements

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