

Food Safety in Organic Poultry

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http://www.extension.org/organic_production



Food Safety in Organic Poultry Production

USDA: Keeping Pathogens and Chemical
Residues Out of Poultry.

[Salmonella Outbreaks](#)
[Egg recall](#)



Food Safety Target

Each year in The United States:

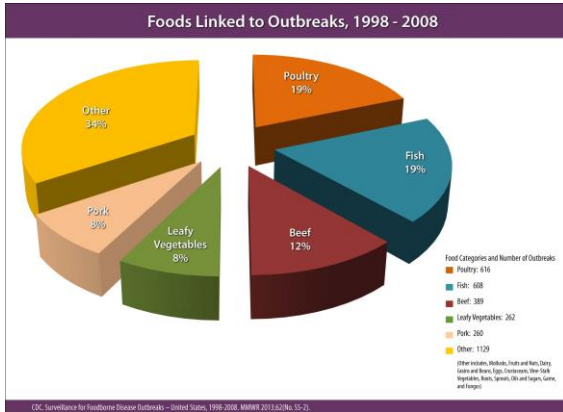
76 million cases of Foodborne illness

325,000 Hospitalizations

5,000 deaths

Economic impact: 152 billion dollars





Industry Impact

Food Recalls are very costly.

Bankrupt

Reputation

USDA Food Safety and Inspection Service ([FSIS](#)) provides updates on food **recalls**.



Food Safety Challenges

Population: 314 million eaters (3 meals/day).

Consumer demands fresh and natural, less processing

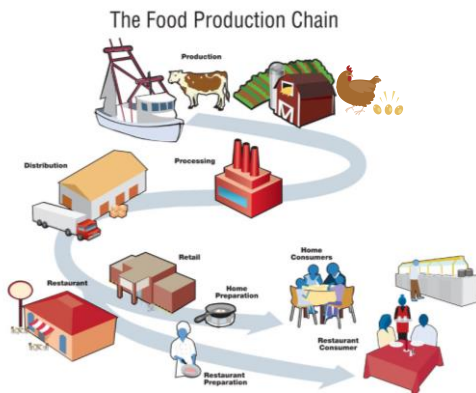
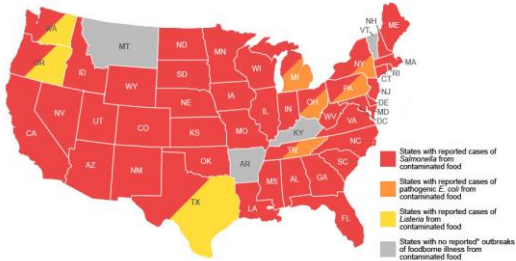
Eating outside the home. Restaurants



Wide distribution of food, short time.



Salmonella Typhimurium outbreak associated with eggs, 1,800 people sick



Pre-Harvest Food Safety

Pre-harvest

Activities before products are ready to be sold.

Processing

Transformation of raw products into food.

Post-harvest

Preparation of the product for storage or processed: cleaning, cooling, packaging.

Organisms of Concern

Bacteria

- *E. coli*
- *Salmonella* spp.
- *Campylobacter jejuni*
- *Listeria monocytogenes*
- *Clostridium* spp.

Viruses

- Hepatitis A
- Norovirus

Parasites

- *Trichinella spiralis*



Food Safety

Salmonella

- Economical impact: \$14.6 billion / year
- Poultry and poultry products



Lauren Rudolph - 1992

Campylobacter

- Economical impact: \$18.8 billion / year
- Poultry and poultry products

E. coli (O157:H7)

- Economical impact: \$3.3 billion / year
- Beef
- Jack-In-The-Box: >700 people infected



Pathogens

Campylobacter

Colonizes poultry as commensal.

Highly susceptible to stress

2nd cause of foodborne bacterial illness

Low infectious dose



Pathogens

Campylobacter

Causes a mild gastroenteritis

Long incubation period 3-5 days

Duration: 2-3 days

Mild self-limiting disease

- Diarrhea
- Vomiting
- Cramping
- Bloody stool

Antibiotic treatments are available



Pathogens

Salmonella

Colonizes poultry, cattle and swine.

Mainly found in poultry and poultry products

Leading cause of foodborne bacterial illness.

In 2008, FoodNet reported laboratory confirmed incidence to be **16.2** per 100,000 persons each year



Pathogens

Salmonella

Gastroenteritis

High infectious dose

Short incubation period: 1h - 2 days

Duration 2-3 days

Self-limiting disease

- Diarrhea
- Vomiting
- Cramping

Antibiotic therapy is available



Salmonellosis and poultry products

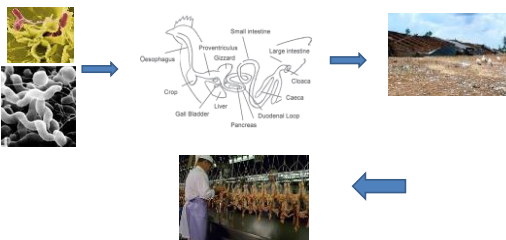
In the U.S.

- 145 outbreaks over 10 years sourced to poultry
- 77% to 82% of *S. Enteritidis* outbreaks have been associated with grade A shell eggs, or egg-containing foods
- CDC estimates that 75% of all *Salmonella* outbreaks are due to raw or inadequately cooked Grade A whole shell eggs



Pathogens

Colonization

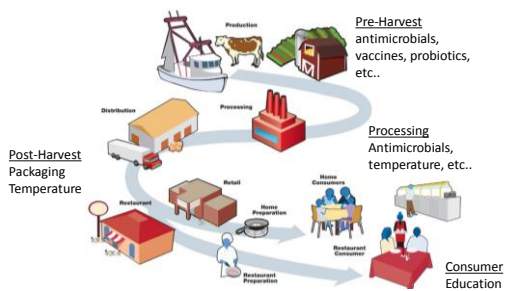


Pre-Harvest Food Safety

On the farm:



Campylobacter and *Salmonella* control efforts



Source of pathogens

On the farm

- Personnel
- Vectors
 - Rodents
 - Insects
 - Birds
- Feed
- Water



Pre-harvest Interventions

Clean feed

Pest management

Water treatments

Biosecurity

Personnel

Training

Education



Biosecurity Challenges

Rearing conditions

Indoor (Housing)

Outdoor (Pasture)

Heavily populated areas

Rotation versus all-in-all-out



Pre-harvest Interventions

Vector control



Rodent bait station



Light trap



Bird control

Pre-harvest control

- On farm control of *Salmonella* and *Campylobacter*
- For prevention and control of human illness
 - Antibiotics are retroactive
 - Prevention of initial infection can reduce risk of long term consequences
 - Prevention of chronic diseases

Strategies for on farm control

- Antibiotics
- Probiotics
- Prebiotics
- Vaccines
- DFM (direct fed antimicrobials)
- Botanicals



Pre-harvest control

Strategies for on farm control

- Antibiotics
- Vaccines
- Probiotics
 - Lactobacillus, Bifidobacterium, Bacillus
- Prebiotics
 - Fructo-oligosaccharides, alfalfa,
- DFM (direct fed antimicrobials)
 - Organic acids
- Botanicals
 - Plant extracts, grape seed extracts



Pre-harvest control

Strategies for on farm control

- Probiotics
 - Delivered in the water or feed
- Prebiotics
 - Delivered in feed
- DFM (direct fed antimicrobials)
 - Feed or water
- Botanicals
 - Feed



Pre-harvest control

Advantages and Disadvantages

- Probiotics
 - Improve weight gain, immune system, exclude pathogens
 - May produce inconsistent results
- Prebiotics
 - Stimulate growth of beneficial bacteria / synergism
 - Adjusting inclusion rate / flavor
- DFM (direct fed antimicrobials)
 - Exclude pathogens
 - Flavor
- Botanicals
 - Stimulate growth of beneficial bacteria / synergism
 - Adjusting inclusion rate / flavor



Processing



Processing Interventions

Carcass treatments

Temperatures

Scalding

Chilling

Chemicals

Trisodium phosphate

Lactic acid

Natural extracts

Citrus

Herbs



GAPs Good Agricultural Practices



Conditions and **practices** that are necessary for the manufacturing, processing, packing or storage of food to **ensure its safety** and wholesomeness.

GAP certification can be done with the USDA

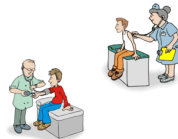
Good Agricultural Practices

Minimum standards to ensure safety

Disease control

Hygiene

Building and facility



HACCP

- Created in 1960
- Provide safe food for space expedition.
- Analysis and control of biological, chemical, and physical hazards.
- Tool to reduce, eliminate or control hazards to acceptable levels.
- Mandatory for meat and juice producers depending on volume of production

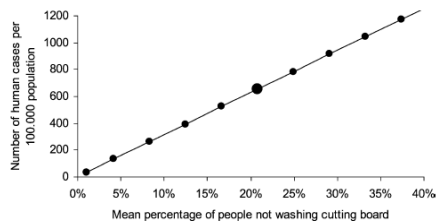


Regulations

- Broiler plant:
 - *Campylobacter*
 - 27 samples out of 51
 - *Salmonella*
 - 5 Samples out of 51
- Beef:
 - *E. coli*
 - No tolerance, adulterant.



Food Safety at Home



Consumer food safety

Proper preparation of food. Time and Temperature.

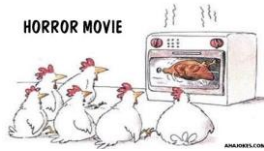
Raw ingredients may carry biological agents. Animal products.

Wash hands, equipment and products.

Cross-contamination: Separate animal products and vegetables.



Thank you!



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