# final report

Project Code: P.PIP. 0381
Prepared by: Teys Australia Pty Ltd
Date published: November 2013

PUBLISHED BY
Meat and Livestock Australia
Limited Locked Bag 991
NORTH SYDNEY NSW 2059

# Food Safety Assessment of Interventions IEH

This is an MLA Donor Company funded project.

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government and contributions from the Australian Meat Processor Corporation to support the research and development detailed in this publication.

In May 2013, Dr Mohammad Koohmaraie, CEO of the meat division at IEH laboratories & Consulting Group Analytical Services in the United States of America, visited four (4) Teys Australia processing plants. The objective of the visit was to assess the performance of current food safety practices and identify potentially viable interventions that may be suitable for investigation and implementation across Teys Australia operations.

**• An evaluation as to why spray chilling cycles can cause shelf life problems and outline of potential solutions to this problem.**

It was determined that there were multiple factors that potentially lead to why spray chilling cycles may have negative effects on shelf life.
These consist of:

- high load of bacteria on carcasses going into the chillers;
- poor chilling caused by inadequate carcass spacing; and
- spraying with water greater than 5ºC.

One or a combination of the above is responsible for issues related to shelf life. Proper spray chilling of low microbial loads, will not have a negative on shelf-life.

**• The design of an accelerated shelf life trial.**

The evaluation of the issues related with shelf life and the potential causes of the shelf life issues have shown that a design of an accelerated shelf trial is not necessary at this stage.

**• Identification of what type of interventions are suitable on four types of slaughter floors and where to place these interventions to achieve an effective outcome.**

Dr Koohmaraie identified potential food safety interventions that may be suitable for trialling at Teys plants, and include:

- Trialling hot water wash cabinet after hot carcass scale
- Hygienic plant design and relocation of functions have potential to reduce contamination. This includes moving functions to either before or after interventions such as trimming and steam vacuum.
- Trial of chemical interventions – varying chemicals to achieve desired results depending on destination markets regulations. These chemicals include:
    - Lactic acid
    - Chlorine Dioxide,
    - Beefxide and
    - Twin Oxide.
- Trial post chilling interventions such as mist or sprays, chemical cabinet wash, including even after the trimmers.
- Spray chill with cold water (must be less than 5ºC)
- Trial modifications to to current chemical wash cabinets, with particular attention on

increasing nozzle numbers, pH variation trials.

- Minimise where possible the spraying of cattle with non potable water. If it is possible, treat recycled water (ozonate or other method such as Ultra Violate treatment) prior to cattle washing.
- Best dressing practices and all that it entails; hide on or pattern line intervention, employee training and education is key in this area.

**• Identifying where water can be used more efficiently on the cleaning shifts and suggest potential improvements to the cleaning process.**

An audit of the sanitation process has identified major opportunities for economising on the water usage. The current system relies primarily on water pressure and water temperature to wash down the meat/fat/blood, with minor contribution of chemicals in the process.
Based on the initial assessment, it is believed that there is a need to design and conduct a study to review, design and implement new SOP's for each step of the process, based on:

1. Identifying the nature of residues to be removed in each module of the process, and divide the modules accordingly.
2. To take into consideration the operational temperature of each module and the chemistry of the residues to be removed and microbiological issues.
3. To identify the proper chemicals to be used at each step of the process based on the temperature the chemistry of the residues, and biological hazards.
4. To review the SOP, and revise based on the proper sequencing of steps and replacing water pressure with the proper application of detergents/sanitation chemicals using automatic brushes, scrubbers and hand application when appropriate.
5. Use of water only for rinsing, at reduced pressure.
6. Comparison of the new protocols to the old based on water usage, microbiological quality of surfaces, and increased/decreased labor cost.

**• The food safety presentations that Dr Koohmaraie will be making.**

As attachment.

# Producing Safe Beef: Why and How – A Training Session for Teys/Cargill Managers and Supervisors

Mohammad Koohmaraie, Ph.D.

CEO – Meat Division

IEH Laboratories & Consulting Group


# Presentation (Training Outline)

- Basic information
  - Why focus on food safety
  - Consequences of *rare* failures
  - How do the regulatory agencies trace food to a supplier
  - Basic microbiology
- What are the pathogens of concerns?
- How do pathogens find their way into final product?
- How do we reduce/eliminate the pathogens in and on meat?

# We are in the Business of Producing Food

# Producing the Safest Food Possible

- Is our moral obligation
- Is our legal obligation
- By putting foods in commerce we have guaranteed the safety and wholesomeness of our products
- Under the law any product that enters commerce and is harmful to customers is adulterated
- Real people get hurt when the "*rare*" and certainly "*unintentional*" *failures* occur.

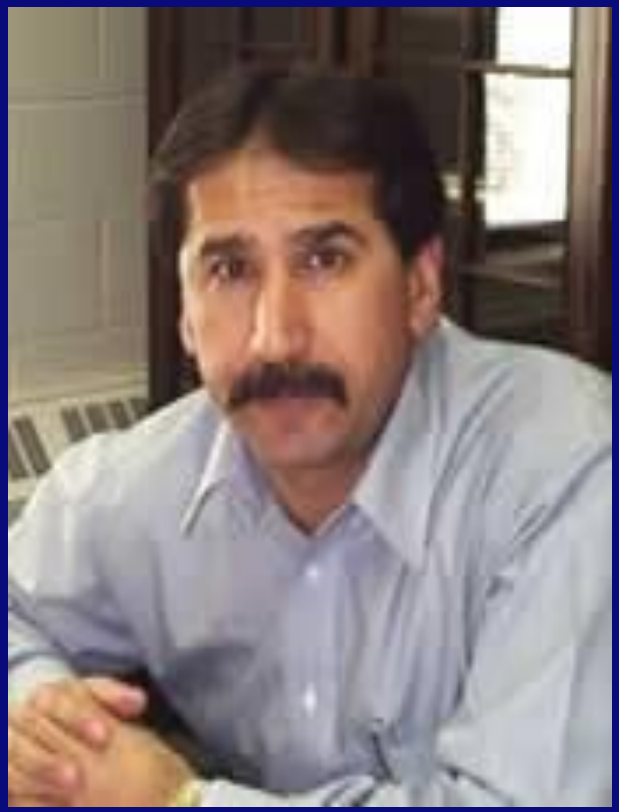
# Consequences of the "*rare*" and certainly "*unintentional*" *failures*

# Consequences of the "*rare*" and certainly "*unintentional*" *failures*

The young


The elderly

The immunocompromised



# The Consequence a *rare failure* - Abby's Video clip

# The Consequence a *rare failure* – of course unintentional

- Compromise public Health
- The brand is badly damaged or Destroyed
- Personal Affect
- Costs of the above?

# To Protect *the Brand*

- Though still operating, many companies have paid dearly.
- Several are no longer:
  - Hudson Foods
  - Beef America
  - XL Foods

# XL Foods In Canada

- Great company
- Excellent ownership
- Great plant manager, QA staff and all
- Two plants in Brooks, Canada and one in Omaha, NE
- Till August 2012

EDMONTON JOURNAL

ESTABLISHED 1903 | *Breaking news at edmontonjournal.com* | FRIDAY, OCTOBER 12, 2012

MEAT RECALL

SIMON HATTER/THE CANADIAN PRESS

# 'We absolutely take full responsibility and apologize to all those affected'

*XL Foods boss breaks silence as plant resumes operations*

SARAH SCHMIDT
*Postmedia News*

OTTAWA – The head of Alberta-based XL Foods Inc. apologized unequivocally Thursday to those who were sickened by eating tainted meat and vowed to "make sure this doesn't happen again."

In his only interview since his company became mired in the largest beef recall in Canadian history, a contrite Brian Nilsson, who along with his brother Lee serve as co-chief executive officers of Canada's largest beef processing company, told Postmedia News this means XL Foods will invest whatever is needed to make sure the food safety gaps at the plant never recur.

He spoke just as the Canadian Food Inspection Agency announced the company was able to resume limited operations at its Brooks facility. Nilsson called the development "a strong first step to moving back to a more normalized operation" after regulators suspended the plant's licence on Sept. 27.

"We absolutely take full responsibility and apologize to all those affected," Nilsson said. "We're totally committed to making sure that this doesn't happen again and investing and doing what is necessary to bring that forward."

Nilsson and his brother have stayed under the radar until now, nearly a month after CFIA announced the first recall of XL beef products on Sept. 16. It has since ballooned to more than 1,800 products, many sold under the store brand of some of Canada's largest retailers and grocers. Tainted meat from the XL Foods plant has also been linked definitively to 12 E. coli 0157: H7 cases in four provinces.

TODD KOROL/REUTERS

Cattle graze in a field near the XL Foods plant in Brooks. Twelve people have fallen sick from contaminated products from the plant.

Nilsson, who has weathered blistering attacks in the press for remaining mum for so long, said the sweeping recall and related E. coli cases came "very much" as a surprise to him because he thought the plant had rigorous safety protocols in place.

The 430,000-square-foot facility slaughters between 3,800 and 4,000 cattle daily. Nilsson defended the speed as "well within industry standards for a plant of that size," saying the plant has "always worked within CFIA guidelines as far as the amount of cattle that you can process in an hour."

Edmonton-based Nilsson Brothers Inc. purchased XL Foods Inc. in 1999 and bought the Brooks facility a decade later. Nilsson said the company has "spent tens of millions of dollars on the plant" to modernize the facility and put in food safety measures.

"We had an extensive testing program in the plant and it really was a surprise to us," Nilsson said.

*See RECALL page A4*

# Researcher's meteorite study shines light on the red planet

MARTY KLINKENBERG
*Edmonton Journal*

A University of Alberta researcher is unlocking some of the secrets of Mars by studying a meteorite that plummeted into the Moroccan desert 15 months ago after making a 225-million-kilometre journey from the red planet.

A science fiction buff and expert on Martian meteorites, Chris Herd says the volcanic rock was presumably launched about one million years ago when an asteroid crashed into that planet's surface. Shockwaves likely sent it into orbit, where it stayed until July 18, 2011, before thundering through the sky and smashing to the ground. Villagers in Tissint, 48 kilometres away, witnessed the fireball as it hurtled through the atmosphere and rained pieces down.

The first Martian meteorite to reach Earth since 1962, it was recovered after only a few months – before it could be scarred by the weather.

"It is interesting because it is fresh," says Herd, the co-author of a research paper that was released Thursday by the journal Science. "There is evidence of weathering, but it's not terrestrial, it's Martian.

"It is pretty consistent with other meteorites of this type: It's an igneous rock formed from lava from a volcano that erupted on the surface of Mars."

A university research team in Edmonton led by Herd matched traces of gases found inside the meteorite with samples from Mars that were collected in 1976 by NASA's Viking 1 lander.

*See METEORITE page A2*

SUPPLIED

Chris Herd, U of A associate professor of earth and atmospheric sciences, holds a sample of the Martian meteorite.

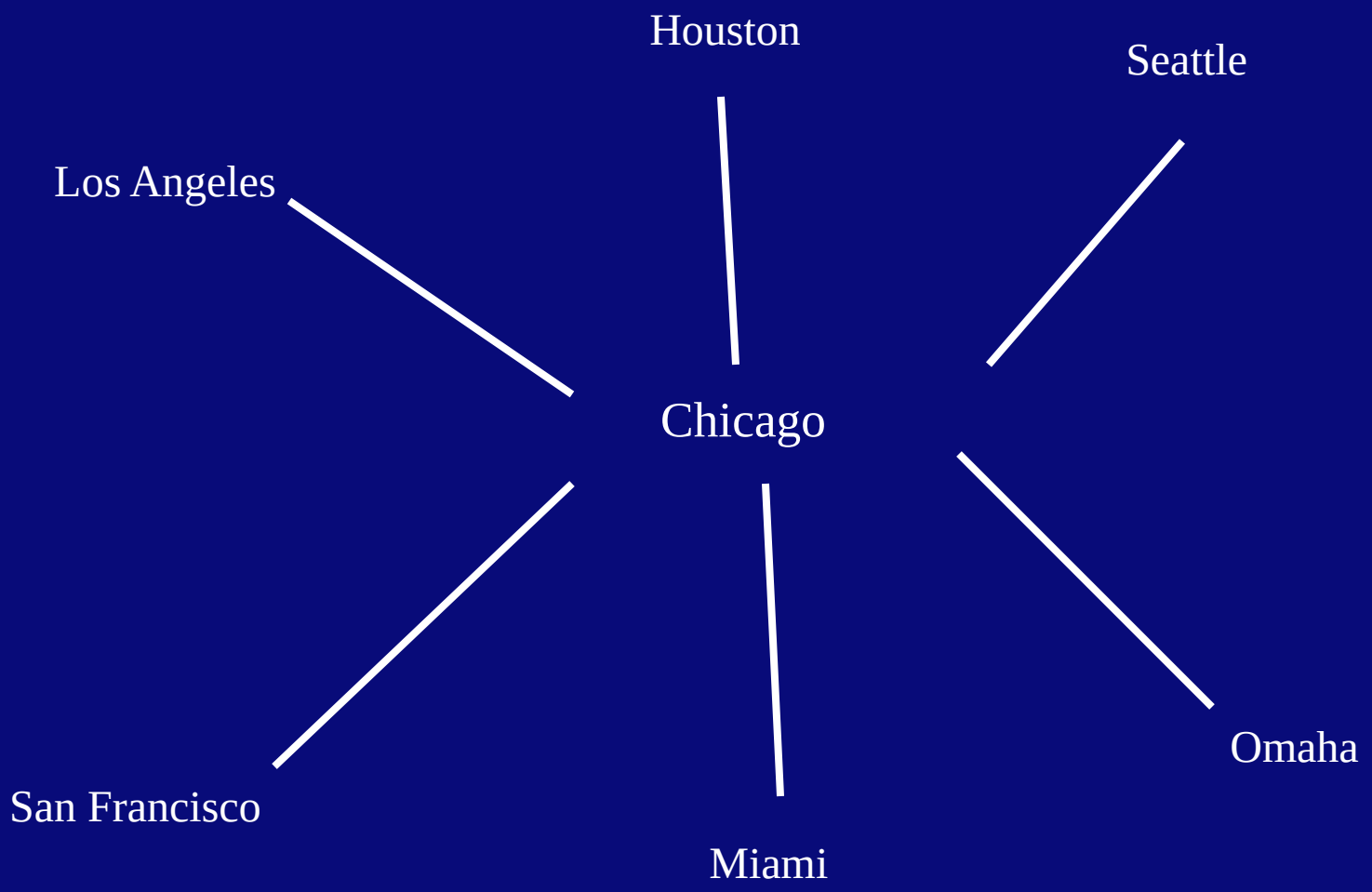
# Message: Do not get in the penalty box

# The Evolution of Foodborne Illness Tracking

# Why do they happen?

- We have done the same thing for 23, 50, 60, 84 years and never had a problem.

# Outbreak Detection



# The 1993 Jack-in-the Box Outbreak

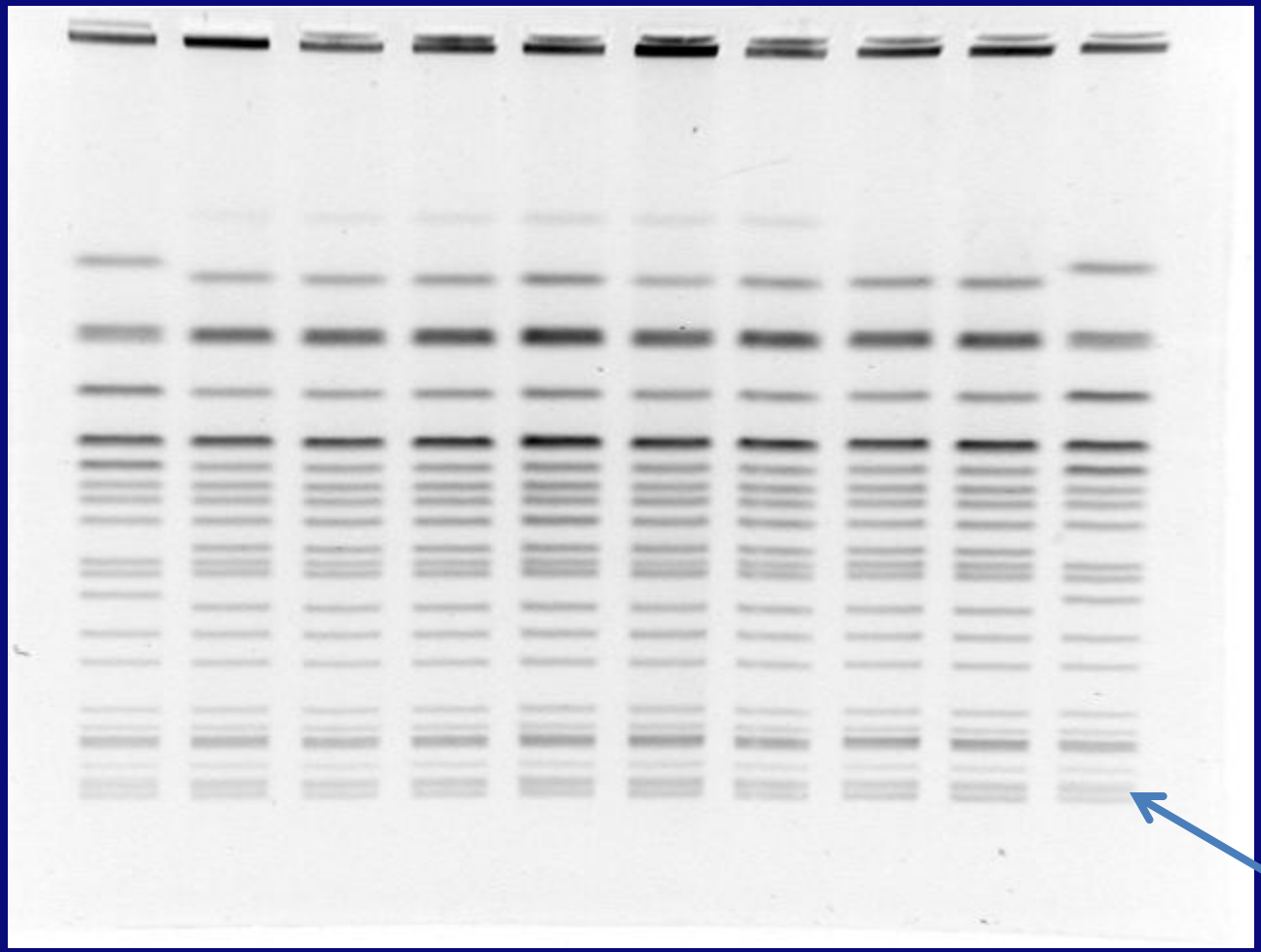

PulseNet
The National Molecular Subtyping Network
for Foodborne Disease Surveillance

# Pulse Field Gel Electrophoresis (PFGE)

# Epidemiology – tracking the source of an outbreak

- Interview patients
- What they have in common
- PFGE pathogen isolated from product consumed (if available)

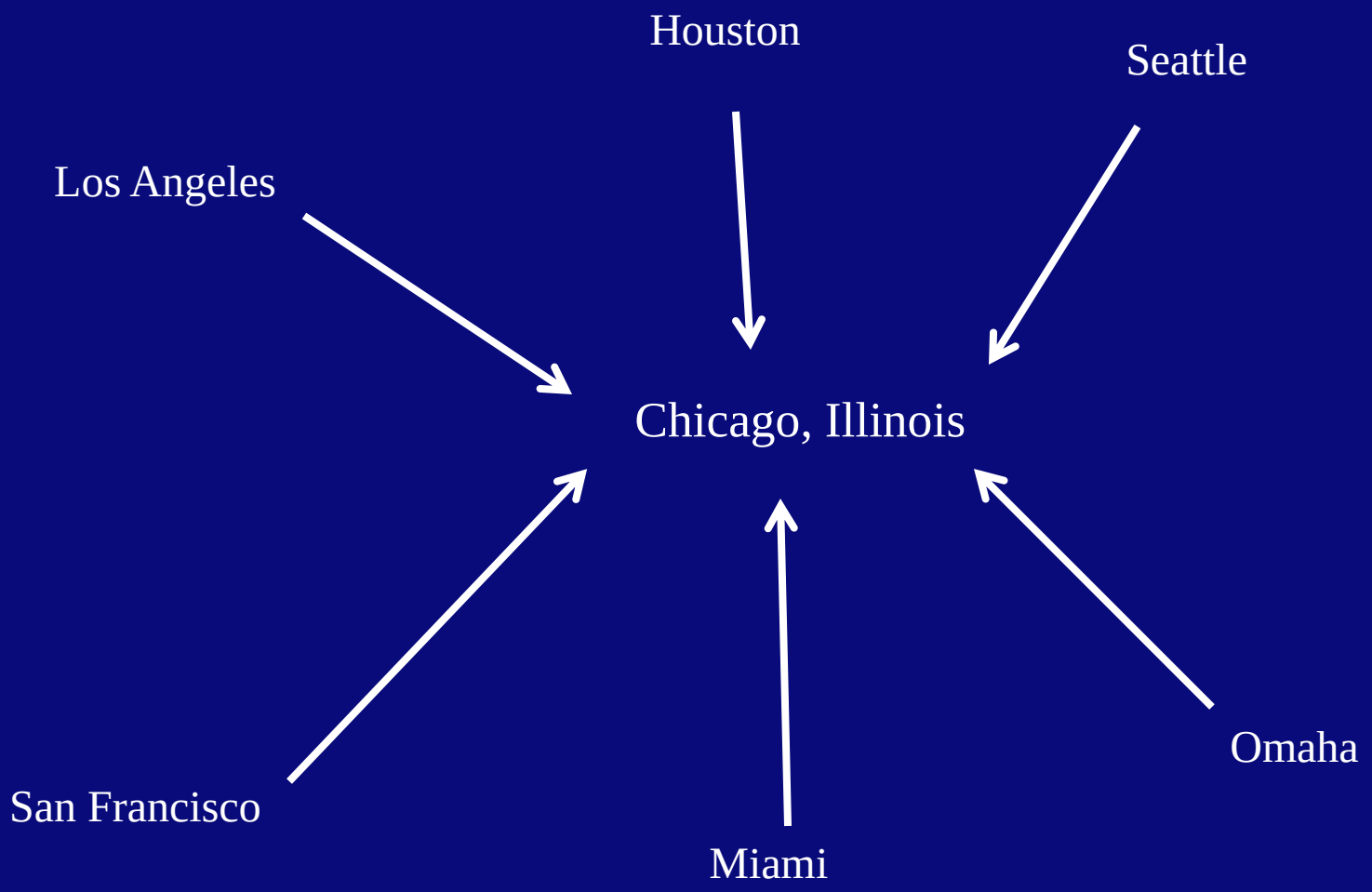
# Molecular Epidemiology



# Epidemiology

- Interview patients
- What they have in common
- PFGE of the product
- Determine the source of contamination, recall etc.
- Site visit by a team from the regulatory agency

# Outbreak Detection



# Basic Microbiology

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- Pathogenic bacteria
  - Pathogenic *E. coli*
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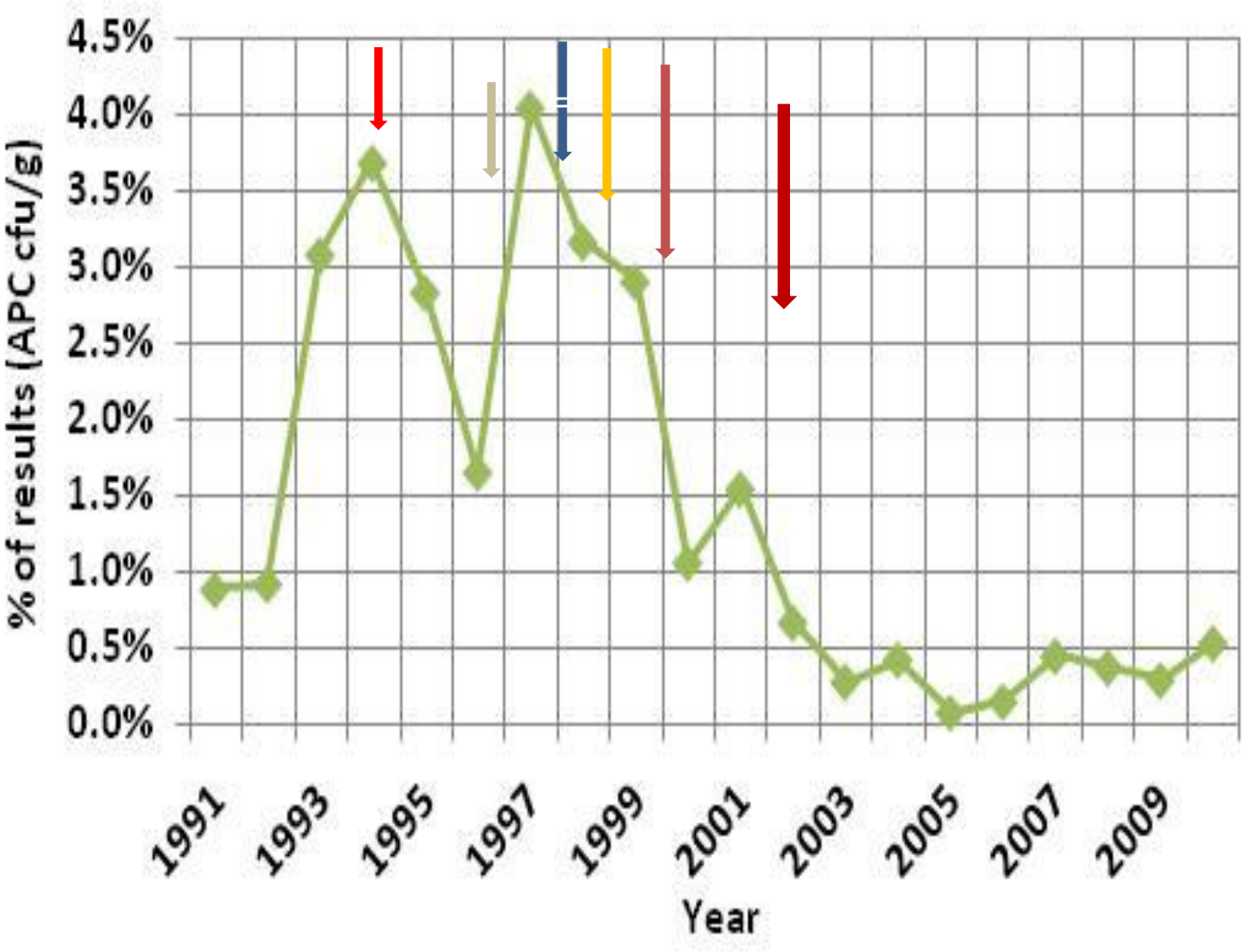
- Pathogenic bacteria
  - Pathogenic *E. coli*
    - *E. coli* O157:H7 non-O157 pathogenic *E. coli*
  - *Salmonella*, especially multi-drug resistant *Salmonella*
- Minimum Infectious Dose (MID)
  - Pathogenic *E. coli* - For *E. coli* O157:H7, as few as 10 cells. The infective dose of other EHEC serotypes is suspected to be slightly higher.
  - *Salmonella* – As few as 15-20 cells, depending on age and health of host and strain differences among members of the genus.

# Basic Microbiology

- Pathogenic bacteria
  - Pathogenic *E. coli*
  - *Salmonella*
- Non-pathogenic bacteria (spoilage)

# Will Focus on Pathogen Control, Extend the Product shelf-life?

# Beef Trimmings. Percent of APC Results




H7 an adulterant

HACCP, Ec, SSOPs

Large Plants

Medium Plants

>1,000,000

Small Plants

- Recall event,
- Rapid increase in testing with results used to verify program effectiveness
- Testing results and other factors used in product disposition.

# Best Practices to Produce Safe Beef

- Pathogen free
- Good microbial quality – Customer specification

# Purchase Specifications

| PARAMETER | TARGET LEVEL | ACTION LEVEL |
|---|---|---|
| 1. Total Plate Count | <10,000 cfu/g | 100,000 cfu/g |
| 2. Total Coliform Count | <10 cfu/g | 500 cfu/g |
| 3. *E. coli* Count | <10 cfu/g | 110 cfu/g |
| 4. *E. coli* O157:H7 | Negative ** | Presumptive** |
| 5. *Staph.*, Coag. Positive | <10 cfu/g | 110 cfu/g |
| 6. Pathogenic *Listeria* | Negative * | > 7 % Positive |
| 7. *Salmonella* | Negative * | > 4 % Positive |

# Role of Managers and Supervisors

- Line works are watching you
- “Do as I say” and not “do as I do” will not work
- If it is that important why are you not doing it?
- *Implementation* of a “good program”
- Good and supportable written program and most importantly following the written program.

# Best Practices to Produce Safe Beef

- Sanitation
  - Plant – Extremely critical
  - Personal Hygiene
- Slaughter
- Fabrication (Boning)

# Sanitation

- Fogging with maximum allowable Quaternary Ammonium when the cooler is empty.

# Good Personal Hygiene

keeping yourself clean

Why am I discussing it?

# Why?

- Overall, humans are the major source of food contamination
- Personal hygiene refers to the cleanliness of a person's body
- Health plays an important role
- Hands, hair, breath, perspiration

# Personal Hygiene

- Dirt under the fingernails carry bacteria
- Hand washing removes dirt from hands, but special emphasis should be on the fingernails
- Use a sanitizer as well and make sure it gets under fingernails

# Hand Washing

# Hand Washing

- *Hand washing with soap is an affordable "do-it-yourself" vaccine that effectively prevents disease. The U.S. Centers for Disease Control and Prevention has estimated that proper hand washing could eliminate half of all cases of food-borne diseases.*

# Best Practices to Produce Safe Beef

- Sanitation
  - Plant – Extremely critical
  - Personal Hygiene
- Slaughter
- Fabrication (Boning)

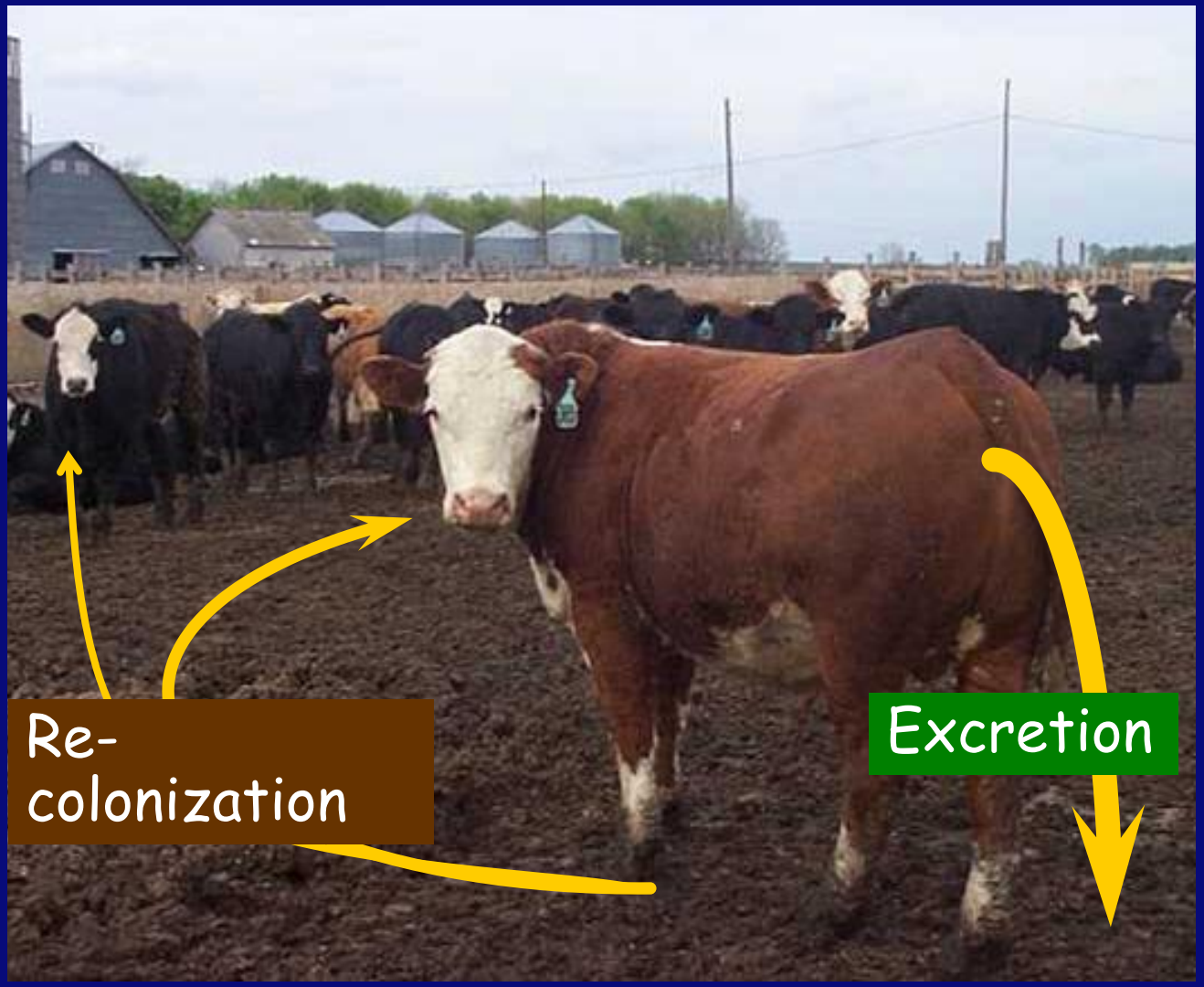
# Very important facts to know

- Cattle harbors many foodborne pathogens
- Pathogenic *E. coli (E. coli* O157:H7 + 6)
- *Salmonella*
- *Listeria*
- *Shigella*

# Very important facts to know

- These pathogens reside in the intestinal tracts of cattle (and other warm blooded animals).
- Shedding from a carrier cattle - spreads it when it defecates and subsequent contacts.
- One carrier can spread the contamination through the entire lot.
- Licking, and riding

# Colonization by *E. coli O157:H7*



# How Do Pathogens Find Their Way into Beef Supply?

- Hide is the principal sources of these pathogens.
- Inadequate dressing practices is responsible for transferring generic and pathogenic bacteria from hides onto the carcass.

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- Hide is the principal sources of these pathogens.
- Inadequate dressing practices is responsible for transferring generic and pathogenic bacteria from hides onto the carcass.
- Once on the carcass it is impossible to be 100% sure that you have eliminated them.
- Hide intervention - Antimicrobials

# Water and Curry Comb

| | Hides Before | Hides After | Log reduction |
|---|---|---|---|
| n | 52 | 52 | |
| APC | 8.02 | 7.29 | 0.73 |
| EBC | 6.93 | 6.06 | 0.87 |
| TCC | 6.14 | 6.08 | 0.06 |
| EC | 5.88 | 5.84 | 0.04 |

# The Ability to Detect Pathogens

Hides

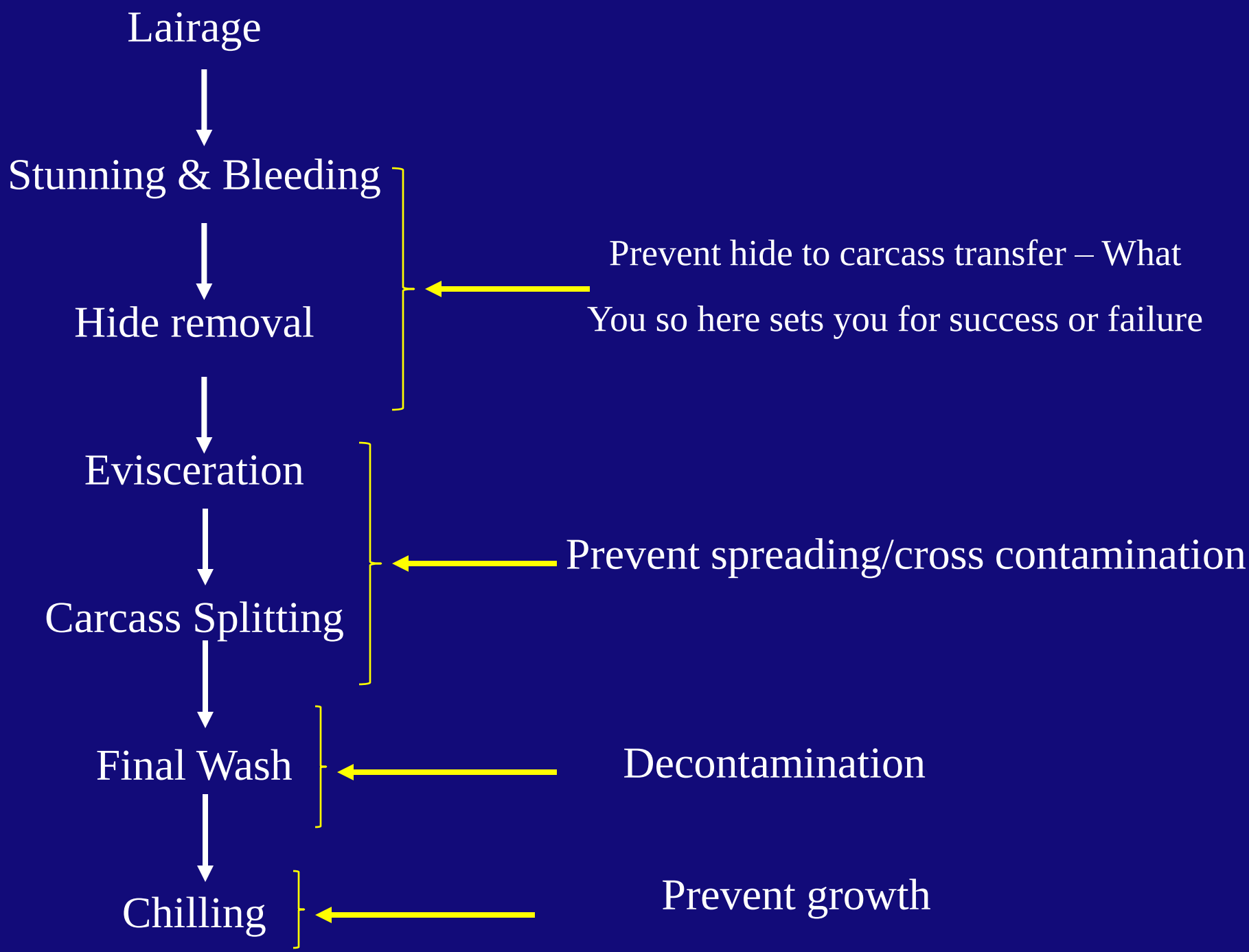
Carcass (right after hide is removed)

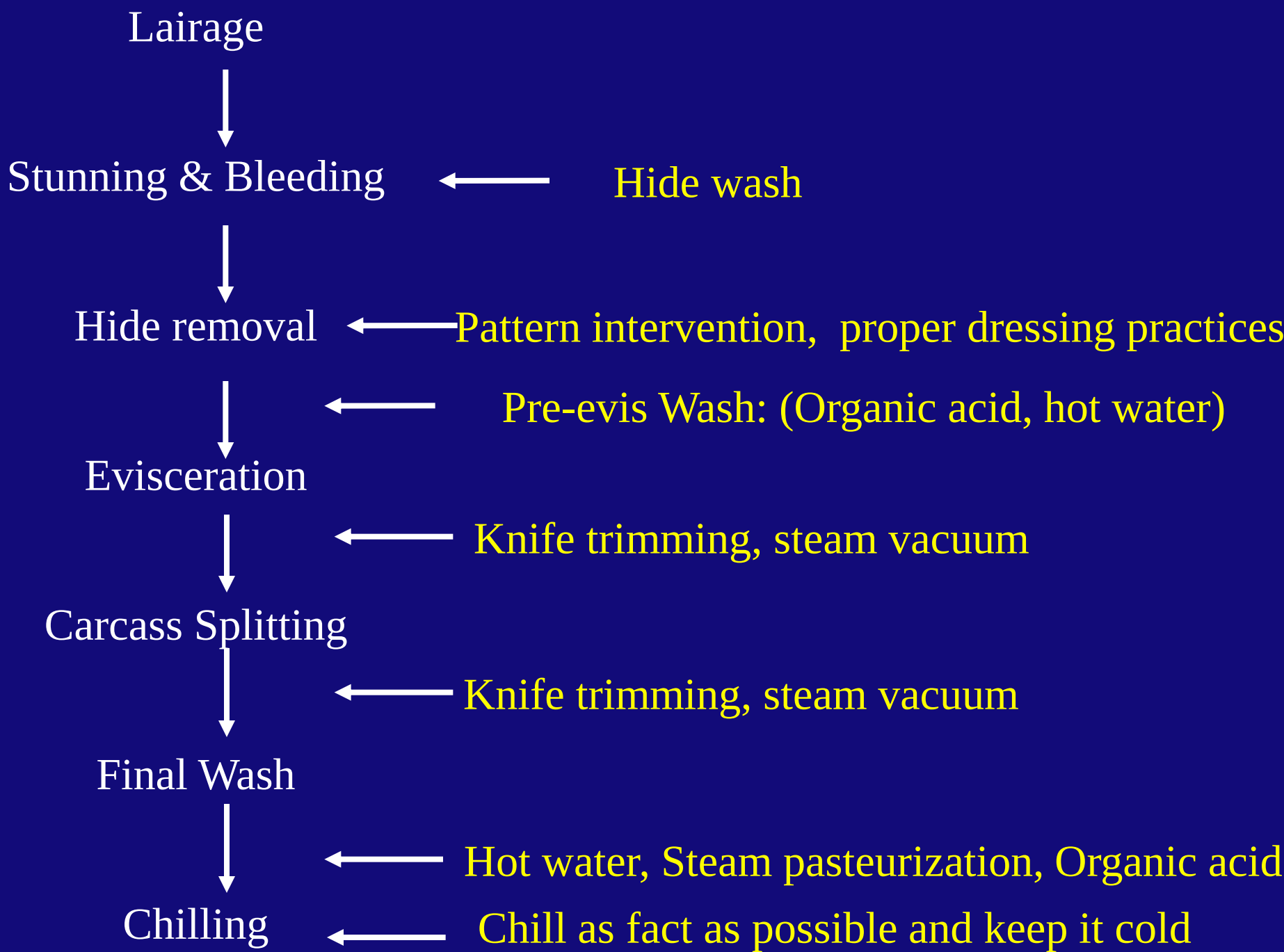
Carcass (after all interventions)

Trim

Ground Beef

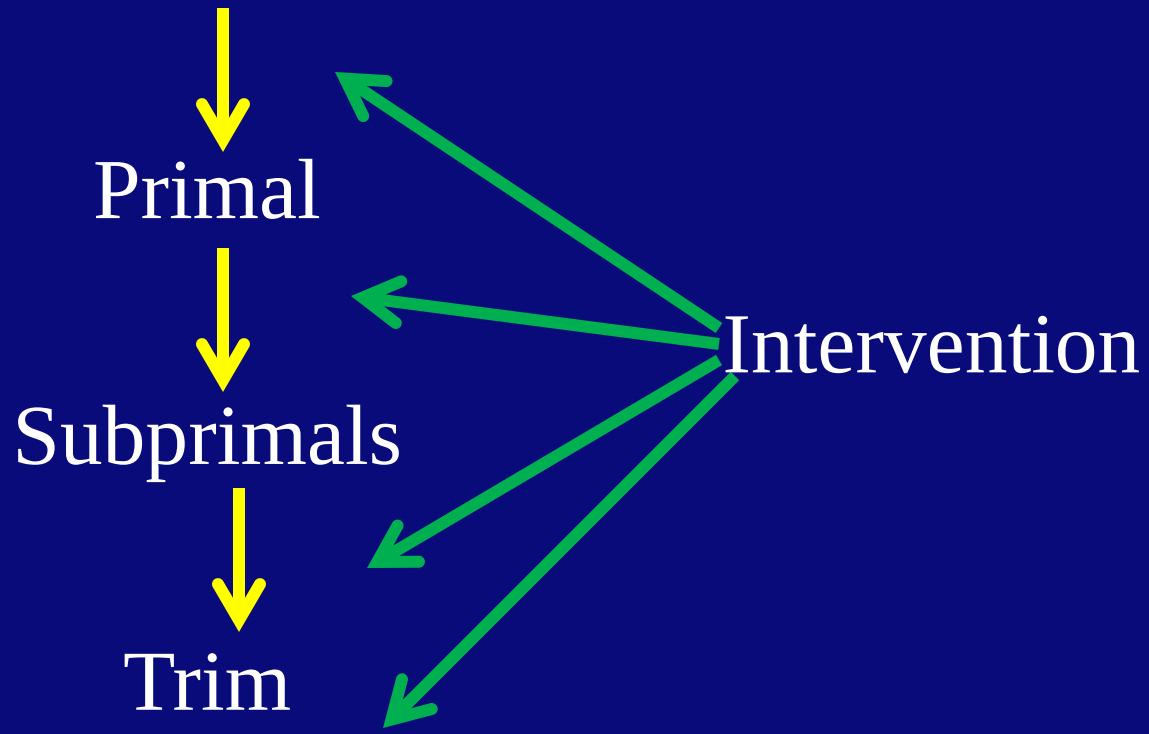
# Harvest Controls


Lairage
Stunning & Bleeding
Hide removal
Evisceration
Carcass Splitting
Final Wash
Chilling
Prevent hide to carcass transfer – What
You so here sets you for success or failure
Prevent spreading/cross contamination
Decontamination
Prevent growth


Lairage
Stunning & Bleeding
Hide wash
Hide removal
Pattern intervention, proper dressing practices
Pre-evis Wash: (Organic acid, hot water)
Evisceration
Knife trimming, steam vacuum
Carcass Splitting
Knife trimming, steam vacuum
Final Wash
Hot water, Steam pasteurization, Organic acid
Chilling
Chill as fact as possible and keep it cold

# Fabrication (Boning)

Carcass from cooler to boning room




(Source of ground beef )

# Over reliance on *Interventions* and not enough attention to *Prevention*

# Summary

- Do your part
- Know your programs
- Use your programs
- Use results to effect change and ensure food safety
- If you see something, say something
- Food Safety is everyone's responsibility
  - To prevent food safety issues hold people accountable and when necessary confront the issue to prevent reoccurrence

# Our mission

# Thank you

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