Food Safety Culture: When Food Safety Systems Are Not Enough

KEITH WARRINER
DEPARTMENT OF FOOD SCIENCE
UNIVERSITY OF GUELPH

Outline

- When food safety culture goes wrong
- The meaning of food safety culture
- Difference between training and behavior
- How to implement food safety culture
- Metrics to assess and maintain food safety culture
- The importance of leadership in establishing food safety culture
- Future trends

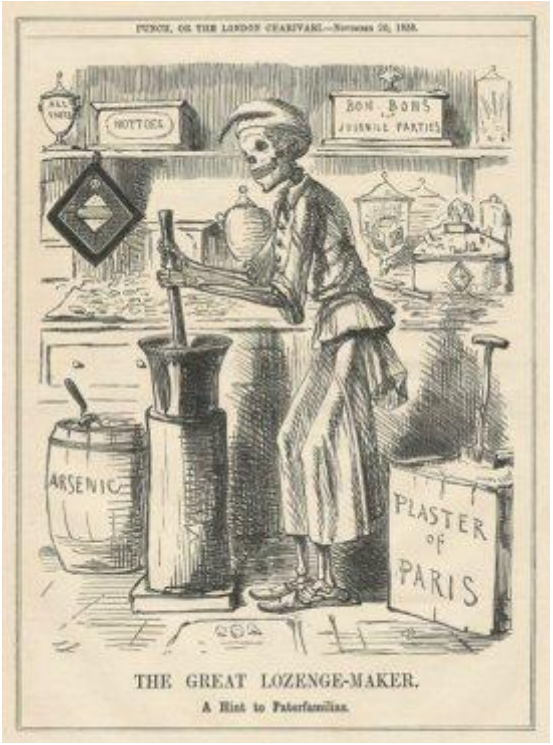
Industrial Revolution

- Shift from farm based economy to urban centers
- Mass manufacture of foods
- Open to abuse

Poison Squad

- Investigate incidence of food poisoning - Adulteration
- Subsequently developed into USDA

First Food Safety Regulations



- Focus on food adulteration
  - Profit
  - Extending foods
  - Perceived benefit
  - Acquired taste

Regulations significantly reduced incidence

Food Safety Systems

- 1950-1970 Intensive farming
- 1980's focus on food safety
- *Listeria*
- *Salmonella*
- Emergence of *E coli* O157:H7
- BSE: vCJD

A GOOD EGG

Sun readers back Edwina in the great salmonella controversy

Cut out cracked prices

Revenge

Snap

PUT A SAFE ICING ON YOUR CAKE–Page 10

1997 Food Safety Initiative

- *Salmonella* eradicated within 5 years
- Food Inspection
- Training
- Ownership
- Reduced red tape

- Mandatory implementation of HACCP in meat, seafood and juice sector
- HACCP based system
- GFSI benchmarking
- Shifting responsibility to industry

Food Safety Systems

- Good Manufacturing Practice
- Sanitation
- HACCP
- ISO22000
- GFSI

E. coli O157:H7: Jack-in-the Box 1993

- 732 confirmed cases
  - <10 year old
  - 4 deaths
  - 178 chronic illness
- 73 Jack in the Box outlets implicated
- Undercooked hamburgers
- Reduced cooking time: Efficiency
- 6 slaughter houses implicated

TO: MANAGER, OPERATIONS SERVICE AND MAINTENANCE, SAN DIEGO

FROM: Wendy Cochinella
TITLE/POSITION: Shift Leader
RESTAURANT# 8466
PHONE: (201) 435-3178
DATE: 6/18/92

IN THE SUGGESTION BOX

RECEIVED JUL 23 1992

Type of suggestion: (Check)

- ___ Restaurant Procedure (POS, Admin, Maintenance, etc.)
- ✓ Quality Improvement (Procedure, Equipment, System)
- ___ QSC&V Standards
- ___ New Product
- ___ Other

Describe change/New Product idea: I think regular pattie should cook longer. They don't get done and we have customer complaints

Describe benefit/New Product build: If we change this we will be making our burgers done and edible.

List any new ingredients or equipment: None just longer cook times

I clearly understand that all ideas and suggestions by me become the property of Foodmaker, Inc. dba JACK IN THE BOX Restaurants and that, whether or not Foodmaker, Inc. uses or benefits from such ideas/or suggestions, I will not receive and have not been promised any compensation whatsoever.

Wendy Cochinella — Signature
6/18/92 — Date

ORIGINAL COPY TO: MANAGER, OPERATIONS SERVICE AND MAINTENANCE, SAN DIEGO
SECOND COPY RETAINED BY INITIATOR

EXHIBIT 65

REV. [illegible]
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Getting Ready for Audit/Inspection Day

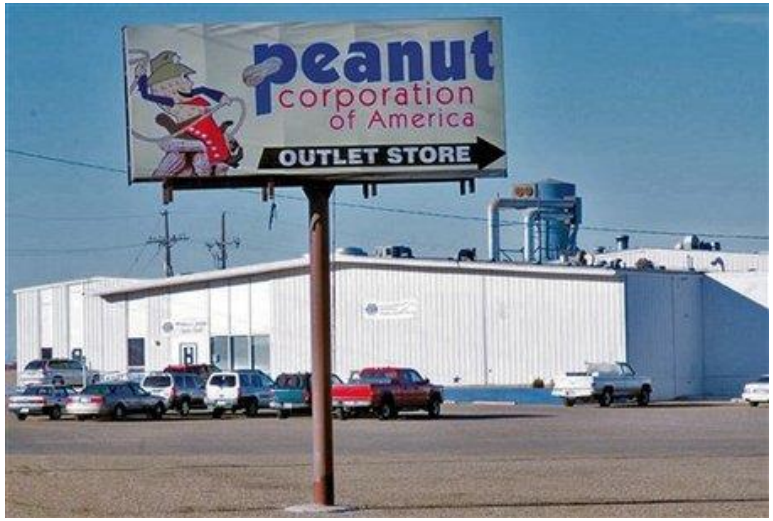
- Increase diligence in operations and documentations.
- Once completed drop down to standard operations
- Auditor potential for advising on how to improve food safety culture.

Peanut Corporation of America

- 2008: 691 cases

(9 deaths)

- 3923 different product recalls
- Poor sanitation
- Product known to be contaminated sent out



Employees Awareness

Front Page | **News** | Sports | Business | Lifestyles | Opinion | A&E

Home > Featured Articles > **Peanut-butter**

Inside 'nasty' peanut plant

TRIBUNE WATCHDOG: Ex-employees say rodents, roaches and mold were commonplace long before the salmonella outbreak

February 04, 2009 | By Dahleen Glanton, Tribune Correspondent and Tribune reporter Sam Roe contributed to this report.

BLAKELY, Ga. — David James recalled opening a tote of peanuts at the processing plant in this small Georgia town and seeing baby mice in it. "It was filthy and nasty all around the place," said James, who used to work in shipping at the plant.

Terry Jones, a janitor, remembered the peanut oil left to soak into the floor and the unrepaired roof that constantly leaked rain.

Audit Report

20926

TO VERIFY AUTHENTICITY OF THIS CERTIFICATE, CALL AIB INTERNATIONAL AT 1-800-633-5137

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Announced

Peanut Corporation of America - Plainview, TX

Plainview, Texas

was inspected by a qualified Food Safety Auditor on

August 20, 2008

and at that time was found to have fulfilled the requirements of the AIB Consolidated Standards for Food Safety

SUPERIOR

President

VP, Food Safety Education

Chairman of the Board

VP, Audit/Technical Services

Canadian Listeriosis Outbreak

- In 2008, a national outbreak of foodborne listeriosis resulted in 57 confirmed cases in 7 provinces, with a total of 23 deaths

Maple Leaf Foods

- Sanitation issues
- Testing but no trend analysis
- Lack of communication with upper management and Departments
- Workers did not make CFIA aware of *Listeria* results

THE GLOBE AND MAIL
CANADA'S NATIONAL NEWSPAPER

FOOD SAFETY » LISTERIA MONOCYTOGENES

Nationwide outbreak spurs massive meat recall

Maple Leaf plant shut after bacterial illness kills one and sickens at least 16 others

BY MATTHEW CAMPBELL TORONTO

One person is dead and at least 16 more have been sickened by a nationwide outbreak of listeria infection that may have originated in a Toronto meat-processing plant.

Maple Leaf Foods Inc. announced yesterday the recall of more than 20 meat products and temporarily shut down the Toronto factory where they were packaged. *Listeria monocytogenes*, a relatively common food-borne bacterium that can cause serious illness in pregnant women and the elderly, has been found in three tests of products in the past five days.

Products affected include sliced meats served by McDonald's and Mr. Sub restaurants, as well as lines supplied to gro-

The symptoms

Listeriosis causes fever, chills, nausea, diarrhea, headache and aches and pains. The onset of illness after infection from the bacteria can be from 13 hours to three months. The median incubation period is estimated to be three weeks.

came to the attention of public-health officials in Ontario, British Columbia, Saskatchewan and Quebec. They asked the Canadian Food Inspection Agency to "follow the food," said Garfield Balsom, an agency spokesman.

An investigation by agency inspectors, including one stationed permanently at the

TORONTO STAR

Tainted meat toll grows

Six deaths are blamed on bacterial outbreak and health officials investigate six others

JOANNA SMITH
STAFF REPORTER

A dozen deaths are now linked to the outbreak of a bacterial infection that prompted a nationwide recall of ready-to-eat meat, the Public Health Agency of Canada said yesterday.

Eleven deaths took place in Ontario, including four in Greater Toronto.

Listeria Outbreak linked to Cantaloupe

- 20 years old business
- Family run farm (4 generations)
- Tourist attraction
- Major producer within Colorado

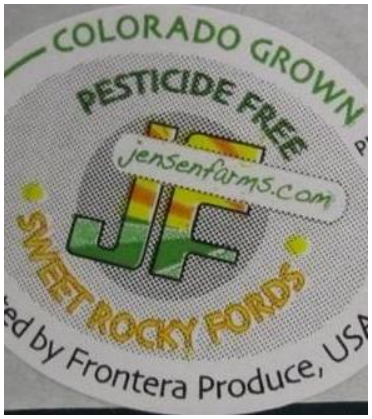
Listeria monocytogenes

- 160 cases
- 30 deaths (one miscarriage)

Jensen Farms

- Jensen bothers faced 6 federal charges
- 5 years Probation
- 6 Months home detention
- 100 Community service
- $150k fine
- 33 deaths 1 miscarriage

- Litigation
  - Walmart
  - Primus Labs



Jensen Brothers Take Responsibility But Blame PrimusLabs

BY **DAN FLYNN** | OCTOBER 21, 2013

After first pleading not guilty last month to all charges, Eric and Ryan Jensen reached an agreement with federal prosecutors that tomorrow will see them plead guilty and agree to cooperate with the government in exchange for lighter sentences.

The brothers will probably get an opportunity to provide testimony when they enter their pleas on federal misdemeanor charges where strict liability is the standard. Here's how that works: the cantaloupes they grew in 2011 were food, it was adulterated, and it entered into interstate commerce when the brothers were responsible for the business that allowed it to happen.

XL Foods 2012

- Second largest processor in Canada
- 27 cases of *E coli* O157:H7
- >2500 product recall
- Non-compliance and lack of inspection

AUDIT REPORT

Fresh Beef E. coli O157:H7 Addendum

for:

XL Lakeside Packers: Brooks, AB

Report Date
May 10, 2012

Audit by

A case of Ownership

- Workers on the floor note violations
- Inspectors see violations
- Managers know there is an issue

- Who is control?
- Is passing on concerns also passing on responsibility?
- Who has ownership for food safety?

Cannot Inspect or Test your Way to Food Safety

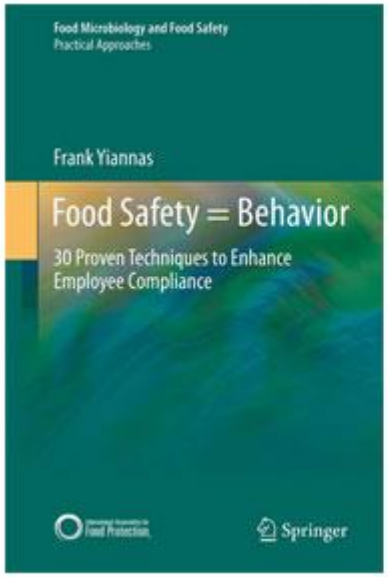
- Testing: Low prevalence of target makes testing almost irrelevant
- Number of inspectors: Increases detection but not prevention
- Preventative approach required

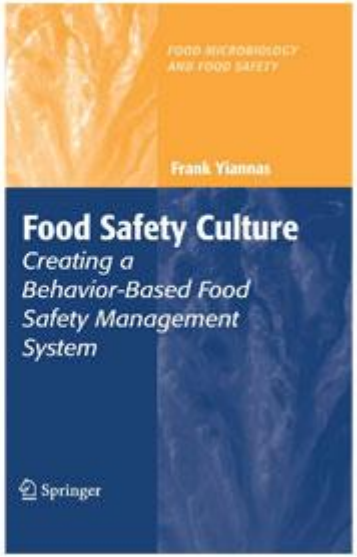
Humans are the weakest link

How to Measure Food Safety Culture?

- Easy to describe
- Subjective
- Wooly terms
- Good for sound bites

- How to implement?
- How to measure?
- How to change?





What is Culture?

- Complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society

Edward B. Tyler 1932-1917

Different Cultures

Challenges in Changing Culture

- Focus on throughput and efficiency
- Motivation (too motivated)
- Staff turnover
- Low pay
- Language and education
- Food safety knowledge

What Makes a Culture?

- Social Organization
- Customs and Traditions
- Language
- Arts and Literature
- Religion
- Government
- Shared values

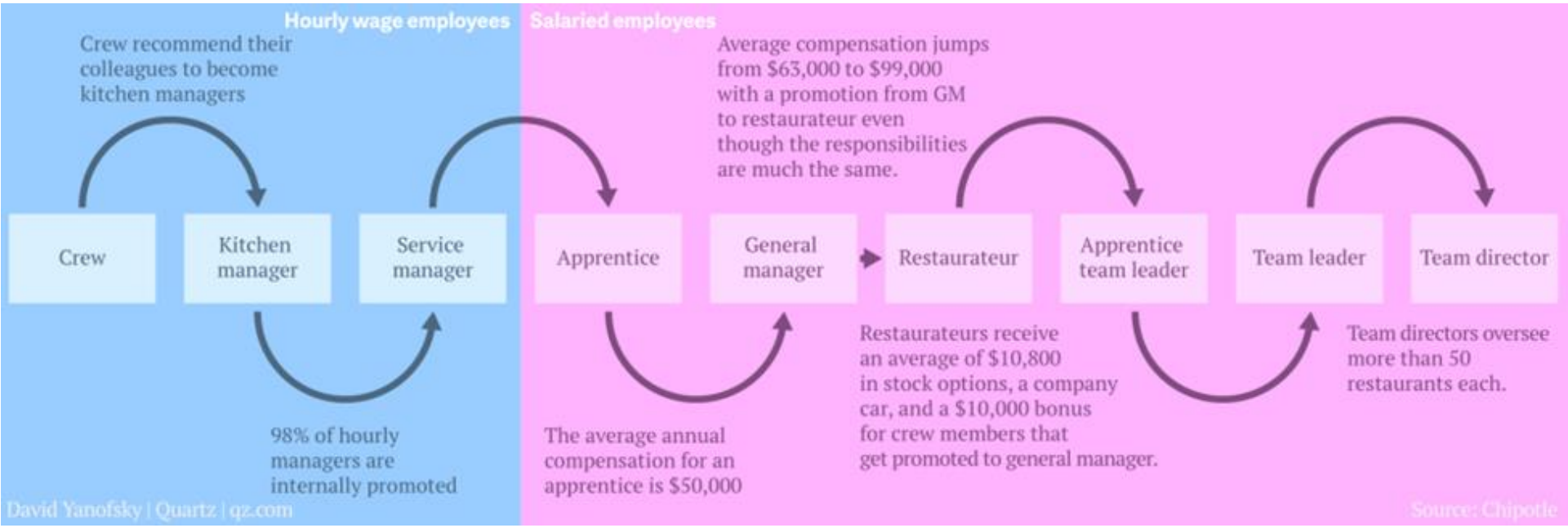
Quality Culture

- Emphasis on quality
- Reinforce quality message
- Employee ownership

Easy to measure

- Complaints
- Returns
- Loss of customer base

A Good Culture – 98% Managers Promoted Internally



98% of management came from internal promotions
Commitment to training
Empowerment to employees
Teaching good habits?

Good Culture but does this translate to food safety culture

Generating a Positive Culture

Chipotle Blames Outbreak on Its Own Sick Employees

Ria Misra

2/08/16 3:02pm · Filed to: FOOD SCIENCE

28.4K 141 5

What Makes Food Safety Culture?

- Social Organization ✔
- Customs and Traditions ✔
- Language ✔
- Arts and Literature ✖
- Religion ✖
- Government ?
- Shared values ✔

What is Food Safety Culture?

Chris Griffith

The aggregation of the prevailing, learned, shared attributes, values and beliefs contributing to the hygiene behaviors used in a particular food handling environment

Frank Yiannas

- Food safety culture is the way in which an organization or group approaches food safety, in thought and in behavior, and is a component of a larger organizational culture

All Companies have a Food Safety Culture

Food Safety Culture

Bad Culture

- Poor compliance with regulatory requirements
- Low perception of importance of food safety
- Little consideration of consequences of actions
- No enforcement by management

Good Culture

- Food safety is a high priority
- Compliance with regulations
- Compliance with documented system
- Committed management

It All Comes Down to Money

- Companies in business to make money
- People work to make money
- Food safety: Invisible benefits

Is Food Safety Training the Answer?

- Quality and Quantity
- Explains how but not why
- Need to provide context or delivered in an interesting way
- Knowledge does not equal behavior change
- Need to make connections with practice
- Training is only a element in food safety culture


The corrrelation between food safety knowledge and food safety action of food workers
% Food safety Action of Food Workers
% Food Safety Knowledge of Food Workers
R² = 0.3979
0
10
20
30
40
50
60
70
80
90
100

People are Complex Machines

Psychological Term	Constructs
Optimistic Bias	It will not happen to me
Illusion of control	I know how to do it
Cognitive Dissonance	I know I am doing wrong but there are reasons
Attitudinal Ambivalence	There are more important things.

How to Drive Change

- Direct link between actions and consequences
- Emphasize social, medical, financial cost
- Non-acceptance of inappropriate behavior
- Alter Cultural Norms
  - Management standards and expectations
  - Behavior

Role of Management

- Leadership
- Instill confidence
- Critical for management to set an example
- Little point in management having a food safety culture if it does not filter down to workers
- Examples, wash hands, ware protective clothing, take sanitation issues seriously, listen

Provide the Tools

- Facility
  - Well maintained
  - Sanitary design
- Provide wash stations
- Sanitation equipment
- Different colored utensils

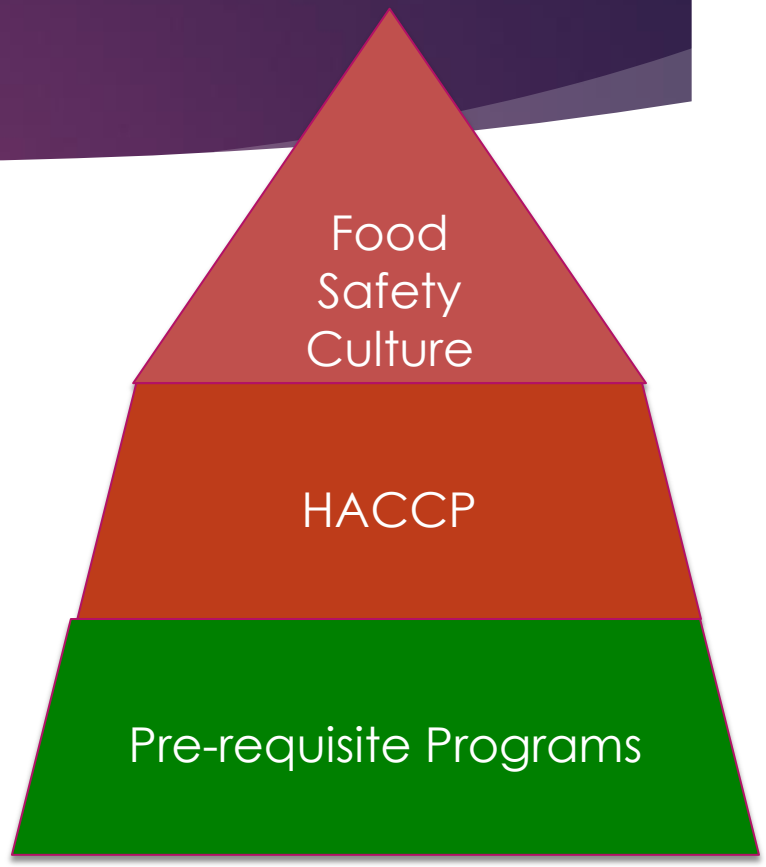
Implementing a Food Safety Culture

Staged Approach:

Assessing current Food Safety Culture

Step wise implementation

Review and improvement

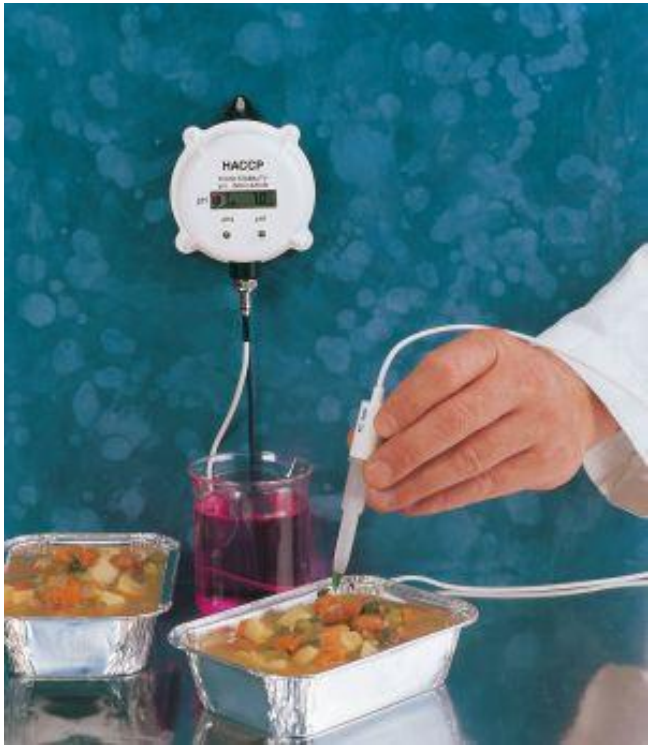


- Michael Wright, Paul Leach and Gill Palmer. A Tool to Diagnose Culture in Food Business Operators, Food Standards Agency research report, March 2013.
  http://www.food.gov.uk/science/research/choiceandstandardsresearch/enf-research/fs245020/#.UZCnx0qv94E

Assessing Safety of Foods

- Microbiology
  - Indicators
  - Pathogens
- pH
- Water activity
- Time/Temperature

No probe to measure food safety culture



Assessing Food Safety Culture

- No standard format; Primarily taken from health care and manufacturing industry

- Diagnostic tool should:-
  - No extensive employee questionnaire surveys: Qualitative
  - Be applied on all scales of operation: Small to Large (maybe)
  - Avoid culture based questions
  - Specific to food safety and concepts
  - Structured so recommendation can be made to improve food safety culture

Observations

- Facility: Sanitary status, color code utensils, wash stations, chemical storage
- Equipment: Thermometers, protective clothing, towels & soap
- Product flow and separation of different processes
- Management leadership style: Demonstrate positive food safety

Document Review

- HACCP plan
- Records and logs: Monitoring forms
- Food safety issues raised and follow-up
- Training records

Elements of Food Safety culture

1. Priorities and attitudes
2. Risk perception and knowledge
3. Confidence in food hygiene and safety requirements
4. Business ownership of food hygiene
5. Competence learning and training
6. Leadership on food hygiene
7. Employee engagement and review
8. Communication and trust to report food safety issues

Assessment Matrix

Category	Assessment
Amoral calculators	Intentionally breach regulations for the sake of financial gain, disputing or disregarding risk to people.
Dependent	Wait for advice. Not proactive, low knowledge. I will do what you want
Doubters	Cynical: Don't accept risk but will do the minimum to achieve compliance. We have never had problems.
Proactive compliers	Understand risk and importance. Encourage ownership and responsibility. Work in progress
Leaders	Food safety is critical. Visible leadership and continuous improvement

Category	Element							
	Priorities and attitudes	Food hygiene risk perceptions & knowledge	Confidence in food hygiene systems	Business ownership of food hygiene	Competence, learning, training, knowledge etc.	Leadership on food hygiene	Employee engagement in review & development of food hygiene practices	Communications & trust to engage in food hygiene & report issues
a) **Amoral calculators:** Intentionally breach regulations for the sake of financial gain, disputing or disregarding risk to people.	Consider food hygiene to be as a nuisance. Food safety requirements are rejected for reasons of self interest.	Disregard risk of harm to people or presume it is acceptable regardless of level of non-compliance e.g. encouraging personnel to re-use food that should be categorised as waste (e.g. food dropped on the floor or returned uneaten by consumers. No action taken to evident pest infestation.	Do not care whether food hygiene requirements are effective e.g. no action when food safety issues are reported & evident e.g. fridge breakdown.	Consciously do not comply unless enforcement obliges them to. e.g. lack of presence within the business with no delegation of responsibility for food safety.	Any knowledge is not applied and no wish to improve competence. e.g. lack of interest in guidance, negative attitude to suggestions that training is undertaken (self or staff).	Management advocates non-compliance except where risk of enforcement. e.g. no attempt to provide suitable equipment /facilities to enable staff to work correctly e.g. handwash facilities.	Minimal. e.g. Dictatorial approach to 'managing' staff or simply do not seek staff opinion.	Either no trust or actively discouraged from reporting concerns. e.g. evident poor awareness of food safety among staff/evident fear of reporting – 'more than my job's worth'.

Category	Element							
	Priorities and attitudes	Food hygiene risk perceptions & knowledge	Confidence in food hygiene systems	Business ownership of food hygiene	Competence, learning, training, knowledge etc.	Leadership on food hygiene	Employee engagement in review & development of food hygiene practices	Communications & trust to engage in food hygiene & report issues
e) **Leaders:** View food hygiene as a critical business issue that they must tightly manage and offers potential business benefits through achievement of a good reputation for food safety and hygiene. Provide visible leadership in continually improving food hygiene.	Considers food hygiene to be a top priority, a critical business success factor & something they must be seen as excellent at. e.g. frequent reference to food safety/hygiene, enthusiasm for prevention rather than cure i.e. using sampling and testing to verify safety rather than control issues.	Believe that food poisoning or other similar incident could cause major adverse impact on the business as well as harm to many persons. e.g. evidence that business recognises the need to avoid complacency.	Believe that systems such as HACCP when properly applied are essential for sake of the business and that they do effectively control risks. e.g. active use and update of HACCP/Safer Food Better Business – food safety controls very evident within business.	Actively check and improve food hygiene in absence of third party inspection or requirements. See food hygiene as a business risk that they must be excellent at. e.g. evidence of active management of food safety and completion of records, timely reaction to issues.	Very well informed about hazards, latest methods of risk control as well as highly trained and knowledgeable management. e.g. evident awareness of current food safety issues, legislative changes with regard to food safety, knowledge of 'best practice' i.e. over and above legislative requirements.	Frequently encourage staff to apply food hygiene procedures, explain why this is necessary and applaud good practice. e.g. evident active interest in food safety; leadership through good examples. Recognition of achievement i.e. 'scores' for compliance with standards.	Actively seek employee views on how to improve food hygiene. e.g. evident active interest in continual improvement in food safety – incentives/rewards for compliance and consistent achievement of internal standards; encouragement of suggestions for improvement.	Employees feel completely free to report issues and trust management to respond positively. e.g. evident communication of food safety matters e.g. staff 'noticeboard' - display of any complaints and actions taken. Management receptive to suggestions for improvement. Involvement of staff in resolving issues and providing support in taking agreed actions.

Category	Approach to Improve
Amoral Calculators	Highlight consequences, Set steps and milestones to achieve compliance
Dependent	Advice how to develop training and simplify how compliance can be achieved
Doubters	Explain how regulations control risks. Provide examples of good practice
Proactive compliers	Positive feedback. Encourage thoughts on how to improve practices and communication.
Leaders	Positive feedback. Encourage award nominations. Underline the need for continued learning and new developments.

Key is to take small steps rather than giant leaps

Limitations on Food Safety Culture Diagnostic Tool

- May not work for all scales of business (Medium – Large Processors)
- Person performing review must be reliable and objective
- Qualitative
- Subjective
- Challenging to identify specific areas of improvement

Food Safety Culture Tool- Food Service

- Based on FSA Tool

Approach

1) Identify participating food service outlets

2) Develop survey: knowledge and behavior

3) Interview manages: Closed and open ended questions

4) Perform inspection of facility

5) Food safety culture score

- Food Service outlets
- Small – medium size
- High staff turnover
- Different challenges to processing plants
- Managers are key players:-

Managers have intimate knowledge of the operation

Managers influence actions and behavior of workers

Workers actions are influenced by management and beleifs

Team

- Wellington-Dufferin-Guelph Public Health
  - Jessica Morris
  - Lise Trotz-Williams
  - Derick Dua
- Ryerson University
  - Richard Meldrum
- University of Guelph
  - Sukhman Grewal
  - Brita Ball
  - Keith Warriner

Step 1: Identify Participating Food Service Outlets

- Identify 127 food service outlets Guelph and Toronto
- Facilities store, prepare, cook and service high risk foods (meat, fresh produce and/or seafood)
- 7 Service outlets agreed to participate
  - Indicator that food safety culture is not a priority

Step 2: Develop Questioner

- Questions in different categories
  - Compliance (actions in-line with GMP; inspection report)
  - Leadership (encourage, direct, support)
  - Calculativness (deliberate breach of food safety procedures)
  - Belief (faith and confidence that are acting corrently)

- Scenario
- 3 point scale (0 Never, 1 Sometimes 2 Always)
- Weighting of score based on risk

Food Safety Practices: Survey

A collaborative project between
University of Guelph & Ryerson University
(REB #15JA032)

Step 3: Interview Managers

- Only managers and supervisors: not front line workers (ethics)
- 30-60 mins
- Questioner and open ended questions
  - 65.9% - males & 25% - females
  - 93.2% - formal food safety certification (Food Handler's Certificate)
  - 93.2% respondents acknowledged that they have received training at their current workplace

Premise	Location	No. of respondents
1	Toronto	11
2	Toronto	15
3	Toronto	13
4	Toronto	2
5	Guelph	1
6	Guelph	1
7	Guelph	1
	Total	**44**

Step 4: Facility Inspection

- Performed by Public Health Inspector
- Ontario Regulation 562/90: Food Premises
  - Facility
  - Handling
  - Storage
  - Sanitation

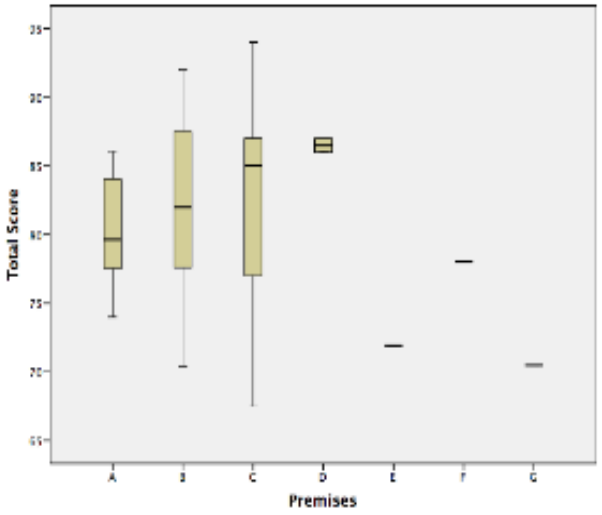
- Ranking to calculate compliance score
- Part of compliance score

Step 5: Calculating Food Safety Culture Scores

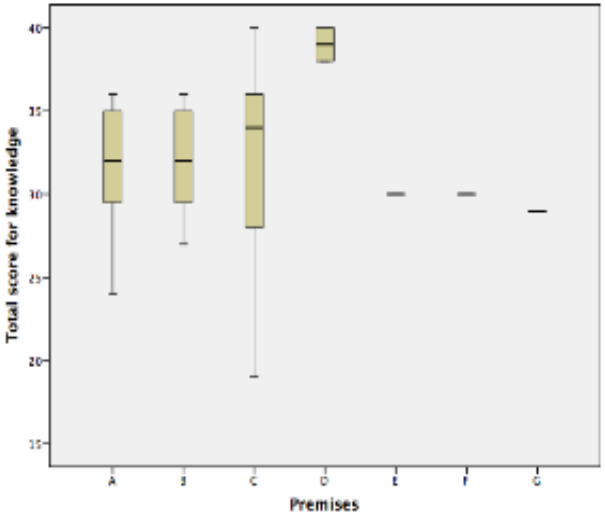
- Summation of scores in each category
- Correction factor for relative risk
- Calculate mid-point of each element/category (i.e half of total score for each element)

- Element score
- >midpoint : Assign 1 (Positive Food Safety Culture)
- <midpoint: Assign 0 (Negative Food Safety Culture)

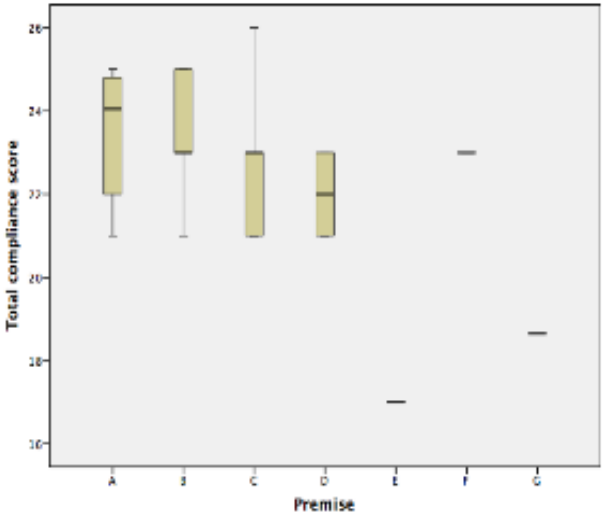
Results



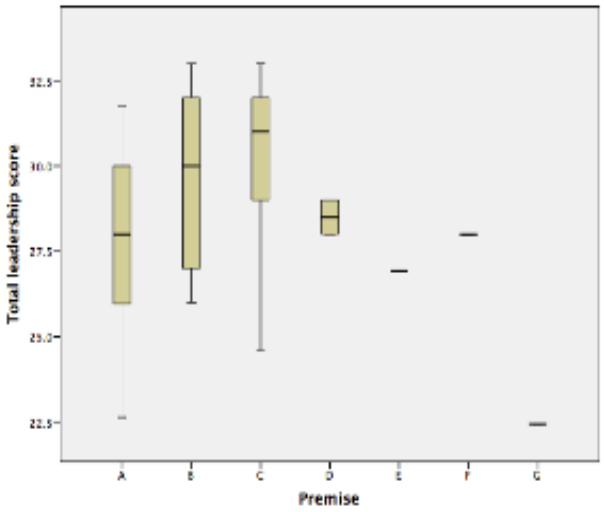
a: Total score for respondent/premise



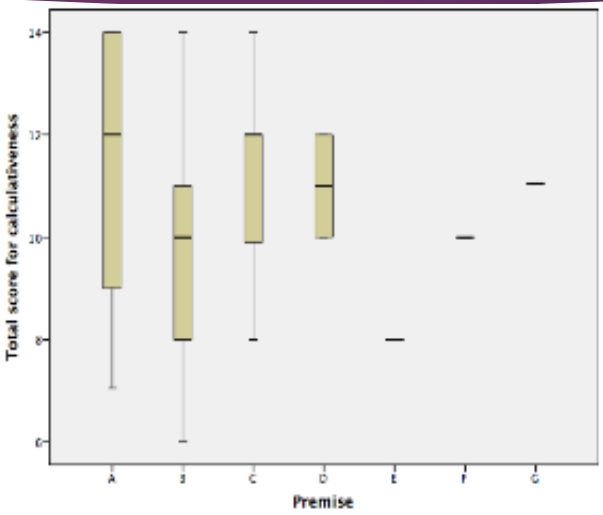
b: Total knowledge score



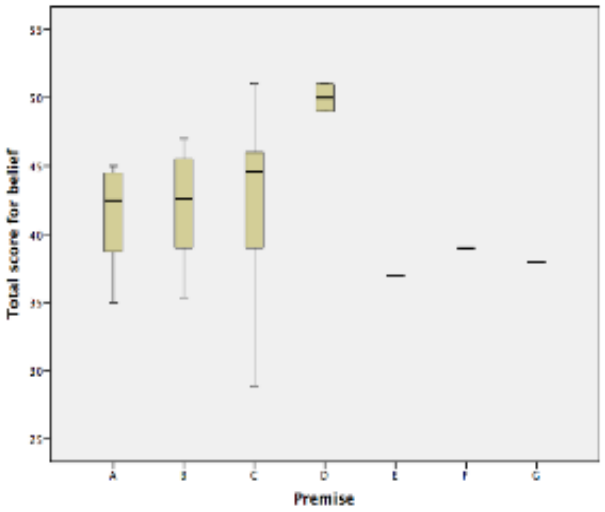
c: Total compliance score



d: Total leadership score



e: Total score for calculativeness



f: Total score for belief

Results

Premise A	Premise B	Premise D	Premise C & F

• **Proactive complier**
• ***Inspection***: *2 infractions*
  • Uncooked bacon stored over veggies in a fridge (CDI)
  • Uncovered Veggies in walk-in fridge (CDI)
• Lowest calculativeness
• Lower leadership
	• **Proactive complier**
	• ***Inspection:*** *1 critical and 3 non-critical infractions*
	  • Hand wash sink blocked by a garbage bin (CDI)
	  • Oil spill & burger bun on the floor
	  • Table surface cleaned, but not sanitized
	• Higher leadership
	• Average knowledge & belief
		• **Proactive complier**
		• ***Inspection:*** *1 critical infraction*
		  • Hand wash sink was obstructed with racks at two separate occasions (CDI)
		• Highest knowledge & belief
		• Average leadership & calculativeness
			• **Proactive compliers**
			• ***Inspection:*** *No infractions*
			• Relatively higher knowledge & compliance
			• Lower on calculativeness
			• C: Highest leadership score
			• F: Average leadership score

Results

Premise E

- **Calculative Non-Complier**
- ***Inspection****: 5 critical and 2 non-critical infractions*
  - Temperature abuse:
    - Meat in the cold holding unit at 11°C
    - Cooked rice and noodles were left uncovered in a pan at room temperature (23.5°C)
    - Soup in the hot holding unit at 56.7°C
  - The hand wash station in the food preparation area (kitchen) appeared to be dried out, even though food was being prepared
  - Floor in the vicinity of fryer and dishwasher was greasy

- Highest calculativeness score
- Average knowledge
- Lowest compliance & belief

Premise G

- **Non-Calculative Non-Complier**
- ***Inspection:*** *2 critical and 2 non-critical infractions*
  - One hand wash station was out of paper towels, while the other was out of soap(CDI)
  - Food product boxes were stored directly on the floor in the walk-in freezer
  - The walk-in fridge required cleaning
  - Ventilation fans were dirty and greasy

- Lower calculativeness & compliance
- Lowest knowledge & leadership score
- Lower belief

Results - Summary

Premise	FSA Toolkit Category	Areas for improvement
A, D & F	Proactive complier	Strengthen leadership
B & C	Proactive complier	Further increase knowledge & belief
E	Calculative Non-Complier	Improve knowledge, leadership & belief to improve compliance
G	Non-Calculative Non-Complier	Improve knowledge, leadership & belief to improve compliance

How to Develop Culture

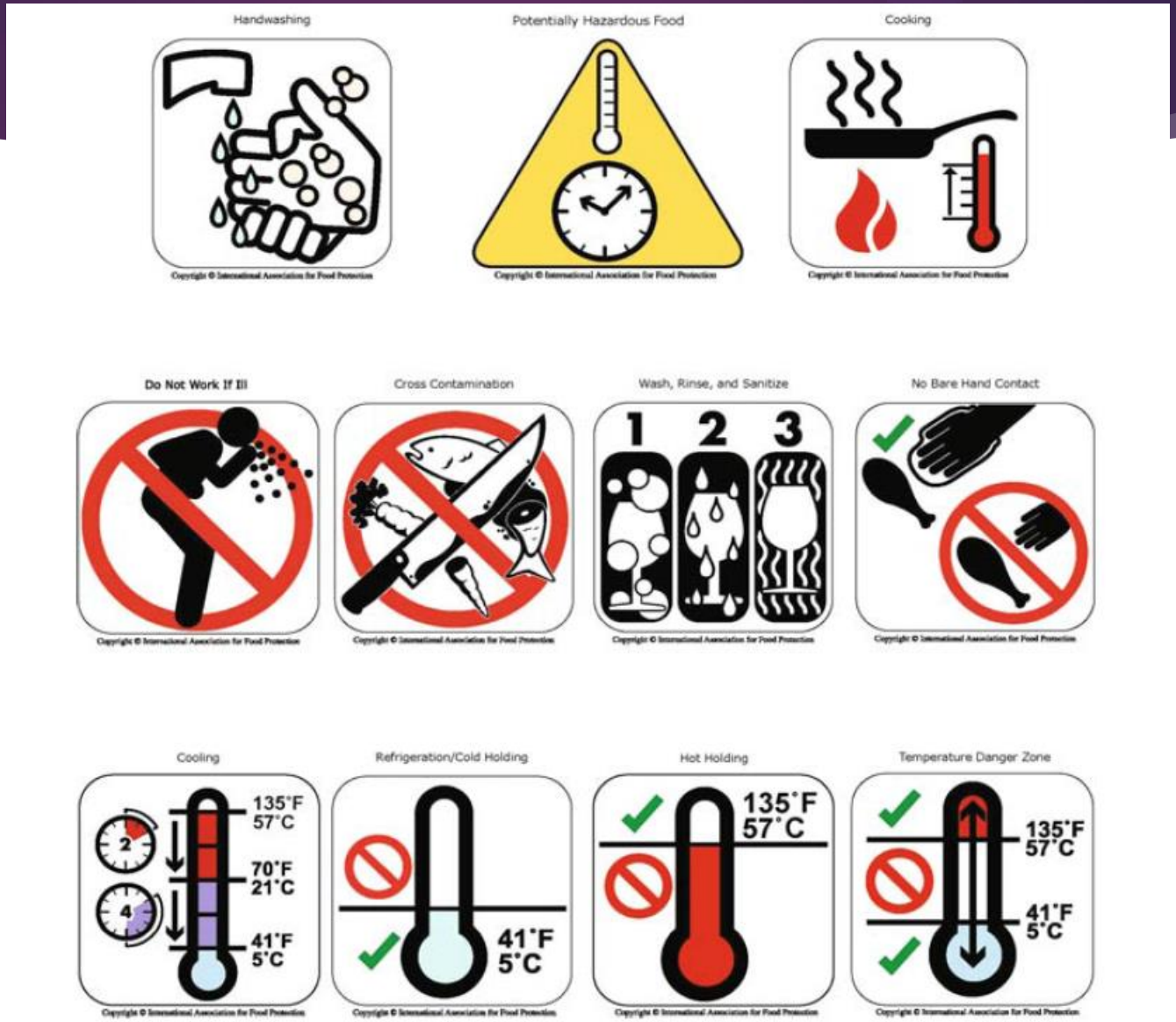
- Every trip starts with a step
- Step wise is key
- Know your staff
- Ensure managers have deep understanding of Food Safety Culture
- Be assertive and have limited flexibility
- Pull the line

- Empower workers: Monitoring, contributing views on how to improve culture
- Any worker (regardless of status) can remind another when not following food safety practice:
- Ensure all know responsibilities and expectations
- Maintain communication: Be positive and consider all ideas

Techniques

- Identify influential people within the workforce: Team leader, long term employee
  - Conform or move on
  - Make them aware of their central role to success of changes
- Get managers on the front line: Answering customer complaints
- Serve products to all employees
- Prioritize changes to be made: Micro-management can be counter productive

Reinforce Messages



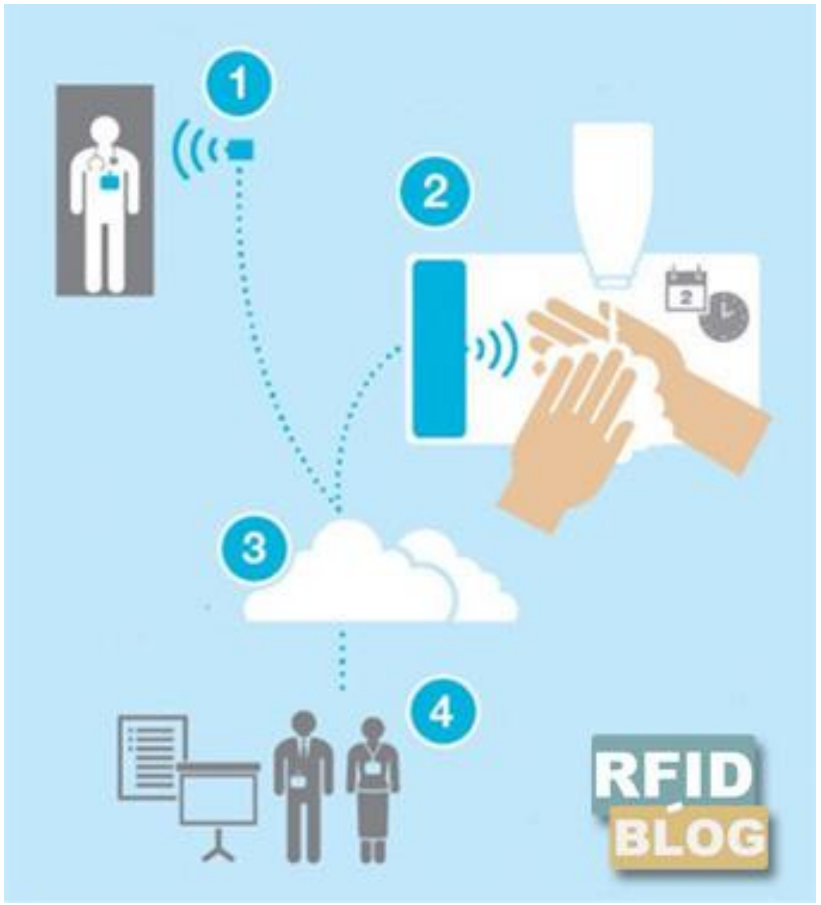
Food Safety Culture Tool

- Limitations of study and improvements
  - Volunteer places bias on results
  - Lack of variation in food service outlet
  - Variation amongst managers (lowest, average?)
  - Redefine score system (Grade of food safety culture not pass – fail)
  - More define questions for each element (questions over multiple elements)
  - Need to extend survey to include all workers
  - No opt in or out option for food service outlets

Alternative Approaches

- Radio Frequency Identification tags
- Continuous monitoring of hand washing activity

- Measure of food safety culture
- Predict high risk establishments



Conclusions

- Food Safety Systems have been effective at reducing incidence of foodborne illness
- Food Safety Culture is the next challenge
- Simple concept but hard to implement
- Standard method of assessment
- Identify areas of improvement
- Leadership is essential
- Alternative approaches from surveys
- Change is achievable but hard

Change Takes a Generation

1989 Inflight Smoking

2013 Smoking Ban Public Places