Interactive Training of Retail Deli Employees on the Cleaning, Sanitizing and a Lethal Kill-Step for the Deli Slicer

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Background Information

- USDA/FSIS sliced RTE deli meat “elevated risk” for immuno-compromised
- 2,493 cases of Listeriosis
- 499 deaths each year
- 2002 outbreak in Northeast, sliced turkey deli meat 46 persons infected; 10 deaths (7 individuals and 3 miscarriages).
Retail Deli Operators and RTE Deli Meat Suppliers

- National Alliance for Food Safety >13,000 samples
- **Found 8 times more likely** to detect LM from deli than commercial prepackaged
- Most LM positives -- poultry
Risk Factors

• Significant advances have been made by the meat and poultry industries to minimize their environmental contamination of ready to eat (RTE) sliced deli meats with improved sanitation and antimicrobials that suppress the outgrowth of low levels of *Listeria monocytogenes* (Lm).
Occurrence of Foodborne Illness Risk Factors in Deli Operations

- Poor personal hygiene, # 1
- Inadequate cooking
- Improper holding/time & temperature
- Contaminated equipment
- Food from unsafe source
Food Safety Culture as an Emerging Risk Factor?

Every food business has a food safety culture which lies on a continuum from strongly positive to one where food safety priorities are overridden by other factors eg. finances (Griffith et al., 2010).

Despite increased food safety training for retail managers, the number of foodborne illness outbreaks has not decreased.
Food Safety for Non-English Speakers

• More than translating material into a different language
  – Education level
  – Cultural differences
  – Customs
Empathy for Non English Speaking Individuals (NESI)

• Immigrants are a substantial and growing segment of the U.S. labor force.

• In 2004, more than 21 million workers (1 in 7) in the U.S. were foreign born (Congressional Budget Office, 2005).

• In 2000, 25 million of the 31 million foreign-born people residing in the U.S. indicated that they spoke a language other than English at home.
  – About 9 million who indicated that they did not speak English very well or at all (U.S. Bureau of the Census, 2000).
Empathy for Non English Speaking Individuals (NESI)

- The foodservice industry is the currently largest employer of Non-English Speaking Individuals in the United States.
  - Managers in this industry struggle to communicate with these employees (Lee & Chon 2000).
  - Anger? Frustration?
Research Question

• This study offers a training tool for service industries and educational settings to utilize in teaching empathy in diverse work environments.

• Behavioral manipulation (versus cognitive).

• “Do attitudes towards Non-English speaking individuals change as a result of empathy training?”
Methods

Participants: 96 college students enrolled in a Food Service Production and Operations course. There were 30 men and 58 women; 45 Caucasian, 18 Asian, 12 Hispanic, 3 African-Americans, and 12 identified as “other.”

Procedure

- Measured attitudes
- 1 month
- Empathy training
- Immediate measure of attitudes
Empathy training:
1. Participants were assigned to groups.
2. Task was to complete a recipe (e.g., cook a dish).
3. One (the manager) was provided a recipe in English and the others (employees) were provided with the recipe in a non-English language (symbol).
4. Task was completed in silence.
Results

Main Effect of Empathy Training:
\( F(1, 65) = 26.9, p < .05, \eta^2 = .29 \)

The effect of the empathy-diversity training on attitudes was not qualified by the participants’ race, \( F(3, 50) = .79, p > .05 \), nor by the participants’ gender, \( F(1, 50) = .24, p > .05 \).
Discussion

• The managers found that demonstrating the desired behavior was the most effective method of training.

• The participants stated that they now realized how frustrating, lonely, and stressful it is to work in an environment where you cannot communicate.

• Given the vast amount of Non-English speaking individuals employed by the hospitality industry, this study offers important practical implications.
  – Our results suggest that empathy training can positively effect individuals attitudes towards Non-English speakers and may reduce turnover rates.
Food Safety Training for NESI

- Non-verbal communication styles
- Use of Picture recipes with Food Safety Icons
Fried Chicken with Cream Gravy

INGREDIENTS:
- Chicken, Breast, Bnls, Sknls, Raw
- Salt and Pepper to taste

AMOUNT:
- Oil, peanut

METHOD:
I.1. Collect all ingredients and equipment.
II.3. Set up breading station: seasoned flour, egg wash, and bread or panko crumbs
4. Pass the chicken through the standard breading procedure.
5. Heat the fat in the deep fryer to 325-350°F.
6. Shake off excess breading and place the pieces skin side down in the hot oil. Let the pieces fall away from you to avoid splashing hot oil on yourself.
7. Fry the chicken until golden brown on the bottom. Turn the pieces with tongs and brown the other side.
8. Check the chicken for doneness and color.
9. Remove the chicken from the pan and drain well. Keep chicken warm in the oven, uncovered.

III. Note: Use enough oil to partially chicken
- IV.10. Using ___ oz. of peanut fry oil and whisk in flour to make a roux
11. Over medium low heat add stock and cream in stages, whisking as it comes to a boil (thickest point). Adjust consistency and flavor.
Applying NESI Research to Deli Operations
Meat Slicers

• Meat slicers must be clean before they can be sanitized.

• The use of a novel visual indicator will help eliminate major contamination.
Meat Slicers

• **Slicer example** to determine dry and moist thermal inactivation of *Listeria monocytogenes* on slicer components
• Improved cleaning methods: sanitizers and cleaning cloths
• Improved cleaning + sanitation decrease Lm
Biofilm Formation in Metal Pits

http://www.bact.wisc.edu/themicrobialworld/biofilm_formation.gif
Equipment for Thermal Inactivation

- Bread Proofer, Win-Holt--those used in retail Deli, better than convection oven
- HOBO® data logger, temperature and Relative Humidity, RH
Preparation of Slicer Components

- 2 X 2 cm grids drawn stainless steel & cast aluminum deli tray, guard, blade; also cut 2 X 2 cm coupond
Inoculation of Deli Slicer Components

100 uL of *Listeria monocytogenes* inoculum (8-9 log) pipetted and allowed to dry for 2 h
Biofilms

- Biofilms grown on intact deli slicer components and on 2 X 2 cm coupons cut from deli slicer components
Preliminary Sanitizer + Thermal Inactivation

Three or more tests groups:
(3 replications for each sanitizer)
From these results, Barrier® was chosen to be the sanitizer used for the continuing studies. Y axis = log CFU.
Inoculated coupons with 100 uL and allowed to dry for 4 h. Each cloth was soaked to 170% weight of cloth in sanitizing solution and wiped across area 5 times, dry for 60 seconds, put coupons in 50 mL centrifuge tubes with 30 mL PBS, sonicate for 1 min. Serial dilutions of solutions were plated on MOX.
After cleaning thermal sanitization using bread proofer

• Three conditions were used:
  1. Thermal inactivation dry heat for 4 h (82 °C) without sanitation procedures (chemical inactivation) prior
  2. Cleaning, rinsing, and sanitizing prior to thermal inactivation dry heat for 4 h (82 °C).
  3. Cleaning, rinsing, and sanitizing the component areas prior to thermal inactivation using moist heat for 1 h at 77 °C, then dry heat for 3 h at 82 °C.
Cleaning, Rinsing, Sanitizing, Then Moist Heat at 77 °C for 1 h, Dry Heat at 82 °C for 3 h

CS = control cell suspension; CSP = control cell suspension + protein; (both initial inocula levels). C-CS = area inoculated with CS that was air-dried for 2 h; CSP = area inoculated with CSP that was air-dried for 2 h; Area CS = area inoculated, air-dried and thermally treated; area inoculated with CSP, air-dried and thermally treated; REC/CS = area with cell suspension that was re-sampled for verification; REC/CSP = area with cell suspension + protein that was re-sampled for verification.
Conclusion

• Empathy studies have indicated that food safety is the most difficult issue to communicate non-verbally
• Current studies indicate that the use of food safety icons along with gestures improves food safety behaviors
• Application of non-verbal training to deli operations is the logical next step.
Questions?