Introduction to the Centers for Disease Control and Prevention’s Environmental Health Specialists Network (EHS-Net)

Vince Radke
Environmental Health Services Branch
Since 2000, CDC has funded state and local health departments to conduct research that contributes to our understanding of environmental causes of outbreaks.

Focused on retail food service.

EHS-Net is a collaborative program of federal, state, and local environmental health/food safety specialists and epidemiologists.
**EHS-Net: Priorities**

1. Improve understanding of environmental causes of foodborne illness outbreaks
2. Strengthen federal, state, local, and industry food safety policies and practices
3. Reduction in foodborne illness
EHS-Net: Environmental causes of foodborne illness outbreaks

Contributing factors

• Factors that caused the outbreak

• *How* the outbreak occurred

Environmental antecedents

• Factors that led to the contributing factors

• *Why* the outbreak occurred
Outbreak

- *E. coli*
- Outbreak caused by salads eaten at Restaurant A

Contributing factor

- Cross contamination
- Worker used same utensils on raw ground beef and salads

Environmental antecedents

- Worker in a hurry
- Worker had not been trained on avoiding cross contamination
EHS-Net retail food safety studies
EHS-Net retail food safety studies: Why retail?

Two-thirds of foodborne illness outbreaks are linked with retail establishments.

Contributing factors to outbreaks include inadequate food safety practices:

- Inadequate cooking
- Inadequate holding time/temperature
- Cross contamination
- Poor personal hygiene

Restaurants/Delis: 68%

Other settings: 32%
EHS-Net retail food safety studies: Focus

**Describing**
- Food safety policies and practices
  - In 12% of restaurants, hamburger temperatures were too low

**Finding links**
- Between establishment and worker traits and food safety policies and practices
  - Restaurants with a certified kitchen manager were less likely to serve undercooked hamburgers
EHS-Net retail food safety studies: Topics

- Beef
- Chicken
- Eggs
- Food cooling
- Hand hygiene
- Ill workers
- Kitchen manager certification
- Leafy greens
- Outbreak
- Tomatoes
- Retail deli food safety practices
EHS-Net retail food safety studies: Process

Data collection

- Involves
  - Interviews with managers and workers
  - Observations of
    - food prep/safety practices
    - kitchen environment

- Is conducted by EHS-Net site environmental health specialists

- Occurs in ~300 randomly selected establishments in selected jurisdictions in EHS-Net sites
EHS-Net retail food safety studies: Limitations

- Only collect data in establishments with an English-speaking manager/worker
  - Data may not represent establishments without English speakers

- Biases
  - Interview data: subject to social desirability bias
  - Observation data: subject to reactivity bias
  - These biases may lead to overestimates of safe food prep practices
EHS-Net retail food safety studies: Findings and use

Outbreak Study

Restaurants with certified managers less likely to have outbreaks

Used to influence FDA policy about kitchen manager certification

Ill Worker Study

Workers in restaurants with on-call workers less likely to say they had worked while sick

Used to inform CDC recommendations on norovirus prevention
EHS-Net food safety studies: Resources

EHS-Net web page: http://www.cdc.gov/nceh/ehs/EHSNet/

- Publications
- Study protocols
- Plain language summaries of study findings
EHS-Net food safety studies: Retail deli practices
Thank you

Vince Radke

ver2@cdc.gov

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
EHS-Net’s Retail Deli Practices Study Findings

Taylor Radke, MPH
Environmental Health Services Branch
Background

- *L. monocytogenes* (*Listeria*) causes the third highest number of deaths from foodborne illness\(^1\)
- Of 23 ready-to-eat foods linked to *Listeria*, deli meats pose the greatest *Listeria* risk per year and per serving\(^2\)
- Cross-contamination is likely an important contributor to contamination of food with *L. monocytogenes* and other foodborne pathogens in retail delis\(^3\)
Purpose/objectives

- Describe deli, manager, and worker cross-contamination prevention practices and policies

- Determine which characteristics, practices, and policies are associated with cross-contamination risks
Data collection

Conducted by environmental health specialists in 6 CDC-funded EHS-Net sites:

- California
- Minnesota
- New York State
- New York City
- Rhode Island
- Tennessee

**Manager interview (N=300)**
- Deli and manager characteristics
- Food safety policies and practices
- Food safety knowledge test

**Food worker interview (N=296)**
- Worker characteristics
- Food safety practices
- Food safety knowledge test

**Observation (N=300)**
- Deli’s environment
- Food safety practices
**Analysis**

- Descriptive data on deli, manager, and worker characteristics
- Descriptive data on cross contamination prevention practices and policies
- Regressions analyses

<table>
<thead>
<tr>
<th>Hand washing sinks</th>
<th>Separation of raw and ready-to-eat food</th>
<th>Sanitizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand washing sinks also used for other activities (opening chubs; rinsing raw vegetables; washing dishes, equipment)</td>
<td>Raw animal products and deli products stored together in coolers</td>
<td>Sanitizing solution is at improper concentration</td>
</tr>
</tbody>
</table>
# Descriptive data: Delis, managers, and food workers

## Deli Characteristics

<table>
<thead>
<tr>
<th>Ownership type (N=300)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chain</td>
<td>165</td>
<td>55.0</td>
</tr>
<tr>
<td>Independent</td>
<td>135</td>
<td>45.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of customers served on busiest day (N=264)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>85</td>
<td>32.2</td>
</tr>
<tr>
<td>100-299</td>
<td>93</td>
<td>35.2</td>
</tr>
<tr>
<td>&gt; 300</td>
<td>86</td>
<td>32.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of work shifts per day (N=300)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2</td>
<td>151</td>
<td>50.3</td>
</tr>
<tr>
<td>&gt; 3</td>
<td>149</td>
<td>49.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Average # of employees per shift (N=299)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2</td>
<td>150</td>
<td>50.2</td>
</tr>
<tr>
<td>&gt; 3</td>
<td>149</td>
<td>49.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manager food safety training required (N=297)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>221</td>
<td>74.4</td>
</tr>
<tr>
<td>No</td>
<td>76</td>
<td>25.6</td>
</tr>
</tbody>
</table>

## Manager Characteristics

<table>
<thead>
<tr>
<th>Food safety certified (N=299)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>204</td>
<td>68.2</td>
</tr>
<tr>
<td>No</td>
<td>95</td>
<td>31.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience in the retail food industry (N=300)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 years</td>
<td>78</td>
<td>26.0</td>
</tr>
<tr>
<td>&gt; 10 – 20 years</td>
<td>94</td>
<td>31.3</td>
</tr>
<tr>
<td>&gt; 20 years</td>
<td>128</td>
<td>42.7</td>
</tr>
</tbody>
</table>

## Worker Characteristics

<table>
<thead>
<tr>
<th>Received food safety training (N=295)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>222</td>
<td>75.3</td>
</tr>
<tr>
<td>No</td>
<td>73</td>
<td>24.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience in the retail food industry (N=295)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 years</td>
<td>144</td>
<td>48.8</td>
</tr>
<tr>
<td>≥ 10 years</td>
<td>151</td>
<td>51.2</td>
</tr>
</tbody>
</table>
Descriptive data: Hand washing sinks

Hand washing sinks also used for other activities (opening chubs; rinsing raw vegetables; washing dishes, equipment)

As observed by data collectors
N = 299

Yes 22%
No 78%
Regression findings: Hand washing sinks

2 or fewer work shifts in the deli per day (vs. more shifts) (OR = 7.18)

2 or fewer employees, on average, per shift (vs. more employees) (OR = 4.03)

Deli manager is not food safety certified (vs. is certified) (OR = 1.95)

Hand washing sinks also used for other activities
Descriptive data: Separation of raw and ready-to-eat foods

Raw animal products and deli products stored together in the cooler

As observed by data collectors
N = 180

Yes 24%

No 76%
Regression findings: Separation of raw and ready-to-eat foods

- Worker is not food safety trained (vs. is trained) (OR=2.74)
- Worker has less than 10 years of retail experience (vs. more than 10 years) (OR=1.88)

Raw animal and deli products stored together inside coolers
Descriptive data: Sanitizing

Sanitizing solution is at improper concentration

As observed by data collectors
N = 239

Yes 23%

No 77%
Sanitizing solution is at improper concentration.

Regression findings: Sanitizing

- **Independent deli** (vs. chain) (OR = 5.01)
- **Deli manager is not food safety certified** (vs. is certified) (OR = 2.35)
- **Manager food safety training is required by deli** (vs. is required) (OR = 4.00)
Conclusion and recommendations

Many delis are engaging in practices that could lead to cross-contamination

- Manager and worker training and certification should be encouraged
- Interventions should focus on independent and smaller delis
References


Thank you

Taylor Radke

tradke@cdc.gov

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