FOOD SAFETY RISKS IN RESTAURANTS AND SCHOOL FOODSERVICE ESTABLISHMENTS: AN INVESTIGATION OF HEALTH INSPECTION REPORTS

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Introduction

The Centers for Disease Control and Prevention reported 1,034 foodborne illness outbreaks in 2008 resulting in 23,152 illnesses, 1,276 hospitalizations, and 22 deaths (CDC, 2011).

More than 190 million meals served in restaurants and over 31 million students in school cafeterias daily.

Three most likely setting for foodborne illness outbreaks are (Lynch et al., 2006):

- Restaurants and delis (50.2%)
- Private residence (19.5%)
- School foodservice (4.3%)

The average number of cases per outbreak is greater in schools (M=48.1) than restaurants or delis (M=14.1) (http://wwwn.cdc.gov/foodborneoutbreaks/Default.aspx).

The 2004 Child Nutrition and WIC Reauthorization Act mandated that all school foodservice operations have two health inspections annually. Most restaurants receive at least one inspection annually.

Purpose

To identify food safety risks and needs for behavior changes in restaurant and school foodservice operations utilizing health inspection reports.

Methodology

Food safety inspection reports from all school foodservice facilities (n=2,511) and randomly selected restaurants (n=2,624) in OK, PA and RI were collected.

All food code violations were:
- Recorded on the original state inspection form.
- Categorized as behavioral, non-behavioral, critical, and non-critical violations.
- Consolidated into 30 pre-determined food code categories.

Statistical analyses included descriptive statistics, independent sample t-tests, \( \chi^2 \) analyses, and odds ratios.

Statistical significance was determined at \( p < 0.01 \).

Behavioral Violation Categories (26 categories)
- Restaurants had significantly more violations in 20 categories than restaurants.
- No differences were found in 4 categories:
  - Approved Food Sources
  - Cooling
  - Use of Thermometers & Test Kits
  - Display of Valid Permit & Consumer Advisories

School foodservice had more violations in 2 categories:
- Waste Washing
- Garbage & Recycling Facilities Outside

Cross-tabulation and Odds Ratios of Code Violations

Results

Mean Number of Behavioral, Non-behavioral, Critical, and Non-critical violations in Restaurants and Schools

<table>
<thead>
<tr>
<th>Violation Classifications</th>
<th>Restaurants (n=2,624) Mean ± SD</th>
<th>Schools (n=2,511) Mean ± SD</th>
<th>t</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral</td>
<td>2.94 ± 3.23</td>
<td>0.94 ± 1.21</td>
<td>29.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Non-behavioral</td>
<td>1.68 ± 1.89</td>
<td>0.90 ± 1.24</td>
<td>17.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Critical</td>
<td>1.68 ± 1.89</td>
<td>0.90 ± 1.24</td>
<td>17.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Non-critical</td>
<td>1.68 ± 1.89</td>
<td>0.90 ± 1.24</td>
<td>17.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total</td>
<td>4.75 ± 4.51</td>
<td>1.99 ± 1.98</td>
<td>28.61</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

* Based on independent t-tests.

Non-behavioral Violation Categories (11 categories)
- Restaurants had more violations in 7 categories.
- No differences were found in 3 categories
  - Premises & Equipment Maintenance
  - Pest & Animal Controls
  - Waste Water & Sewage
- Schools had more violations in 1 category
  - Adequate Equipment for Cold/Hot Holding

Conclusions

School foodservice had fewer overall, behavioral, non-behavioral, and high risk food code violations than restaurants.

School foodservice had the greatest number of citations in Premises and Equipment Maintenance followed by Plumbing and Adequate Toilet Facilities.

Restaurants are more likely to be cited for food code violations than schools.

Further investigation is needed related to food sources.

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