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.

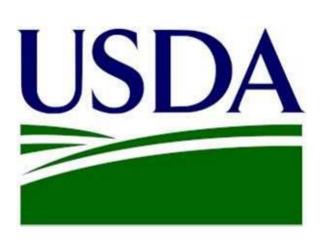● Three most likely setting for foodborne illness outbreaks are (Lynch et al., 2006):
  • Restaurants and delis (50.2%)
  • Private residence (19.5%)
  • School foodservice (4.3%)

● 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

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http://cnsafefood.ksu.edu/
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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:
  o Recorded on the original state inspection form.
  o Categorized as behavioral, non-behavioral, critical, and non-critical violations.
  o Consolidated into 30 pre-determined food code categories.

● Statistical analyses included descriptive statistics, independent sample t-tests, χ^2 analyses, and odds ratios.

● Statistical significance was determined at p< 0.01.

Results

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

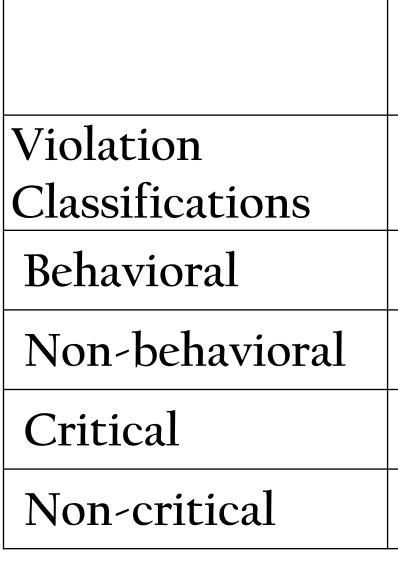| Violation Classifications	Restaurants (n=2,624)	Schools (n=2,511)	t	P^a
	Mean ± SD			
Behavioral	2.94 ± 3.23	0.94 ± 1.21	29.17	<0.001
Non-behavioral	1.68 ± 1.89	0.90 ± 1.24	17.56	<0.001
Critical	1.68 ± 1.89	0.90 ± 1.24	17.56	<0.001
Non-critical	1.68 ± 1.89	0.90 ± 1.24	17.56	<0.001
Total	4.75 ± 4.51	1.99 ± 1.98	28.61	<0.001

[a] 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
  o *Premises & Equipment Maintenance*
  o *Pest & Animal Controls*
  o *Waste Water & Sewage*

• Schools had more violations in 1 category
  o *Adequate Equipment for Cold/Hot Holding*

Results (Continued)

Behavioral Violation Categories (26 categories)

• Restaurants had significantly more violations in 20 categories than restaurants.

• No differences were found in 4 categories:
  o *Approved Food Sources*
  o *Cooling*
  o *Use of Thermometers & Test Kits*
  o *Display of Valid Permit & Consumer Advisories*

• Schools had more violations in 2 categories:
  o *Ware Washing*
  o *Garbage & Recycling Facilities Outside*

Cross-tabulation and Odds Ratios of Code Violations

Violation Classifications	Restaurants (n=2,624)	Schools (n=2,511)	Odds Ratio
	No. of Facilities with Violations (%)		
Behavioral	2,123 (80.9%)	1,364 (54.3%)	3.6
Non-behavioral	1,793 (68.3%)	1,268 (50.5%)	2.1
Critical	806 (32.1%)	1,542 (58.8%)	3.0
Non-critical	2,194 (83.6%)	1,726 (68.7%)	2.3

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.