Food Handling Practices in Schools

Produce Safety Workshop
October 28, 2009
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Food Safety Specialist, USDA FNS
Food Safety in Schools

- Schools have a good food safety record
- Foodborne Outbreaks 1998-2006
  - About 4% of outbreaks
  - N=472, 63% associated with food prepared in schools
<table>
<thead>
<tr>
<th>Commodity</th>
<th># Outbreaks</th>
<th>Illnesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and Poultry</td>
<td>33</td>
<td>1444</td>
</tr>
<tr>
<td>Dairy</td>
<td>3</td>
<td>367</td>
</tr>
<tr>
<td>Eggs</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Produce (all)</td>
<td>17</td>
<td>1178</td>
</tr>
<tr>
<td>Vegetables (all)</td>
<td>9</td>
<td>887</td>
</tr>
<tr>
<td>Leafy</td>
<td>6</td>
<td>267</td>
</tr>
<tr>
<td>Vine</td>
<td>2</td>
<td>545</td>
</tr>
<tr>
<td>Sprouts</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>Fruits/Nuts</td>
<td>8</td>
<td>291</td>
</tr>
<tr>
<td>Complex Foods</td>
<td>92</td>
<td>5901</td>
</tr>
<tr>
<td>Unknown</td>
<td>146</td>
<td>9328</td>
</tr>
</tbody>
</table>
## Contributing Factors

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th># Outbreaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sick food handler</td>
<td>50</td>
</tr>
<tr>
<td>Food kept at room temperature several hours</td>
<td>27</td>
</tr>
<tr>
<td>Bare-handed food contact</td>
<td>16</td>
</tr>
<tr>
<td>Other source of contamination</td>
<td>14</td>
</tr>
<tr>
<td>Preparation half day or more before serving</td>
<td>14</td>
</tr>
<tr>
<td>Inadequate cold holding</td>
<td>13</td>
</tr>
</tbody>
</table>
School Studies funded by Cooperative States Research, Education, and Extension Service

1. Mentoring Model for HACCP Implementation in School Foodservice Operations
2. Mitigating Cross Contamination in Retail Foodservice Operations
Study Summary

- **Mentoring Model 2002-2005**
  - 40 school districts
  - 3-year study
  - Year 1 and Year 2 site visits

- **Cross Contamination 2005-2008**
  - 20 operations, schools, restaurants, child care, assisted living
  - 2 site visits Year 1, 1 site visit Year 3
Common Food Handling Problems Observed in Iowa Schools

- Not taking and recording temperatures of food
- No calibration of thermometers
- Cold foods not being 41°F or lower
- Inadequate handwashing
  - Not frequent enough
  - Poor technique
  - Using hand dips in dishrooms
Common Food Handling Problems Observed in Iowa Schools, cont.

- Improper sanitizing
  - No fill lines on sinks
  - Incorrect chemical concentrations and not checking concentrations
  - Mixing detergent with sanitizers
  - Not sanitizing surfaces such as handles

- Improper thawing techniques

- Improper cooling techniques
Common Food Handling Problems Observed in Iowa Schools, cont.

- Poor dishroom techniques
  - Towel drying of dishes
  - Use of hand dips between dirty and clean end of dish machine
  - Use of fans blowing on dishes
Issues Related to Produce

- Handwashing
- Cold Chain Management
- Cross Contamination
Issue 1. Handwashing
Handwashing

- Research Findings
  - Inadequate frequency
  - Inadequate procedures
  - Inadequate steps to prevent hand contamination
Handwashing Observations

- 60 hours observation; 1-2 employees observed
- Observations
  - Should wash
  - Did wash
  - Procedure
Results

- 23% compliance rate
- Highest compliance—entering work area
- Low compliance
  - After eating and drinking
  - Before donning gloves
  - Changing tasks
Handwashing Benchmarks
(no. times per employee hour)

- Production: 11
- Service: 12
- Cleaning: 8
- Overall: 11
Issue 2. Cold Chain Management
Cold Chain Management Considerations

- Refrigeration Space Limitations
  - Old buildings/small refrigeration units
  - Limited number of deliveries each week
  - Competition for space

- Cold Holding Limitations

- Perceptions about what is a potentially hazardous food
Some Supporting Data

- Cold food held at 41 °F or below in 21 of 39 schools 1st visit; 23 of 35 schools 2nd visit
- Hot food held at 140 °F or higher in 34 of 40 schools 1st visit; 34 of 35 schools 2nd visit

As educators, we seem to have gotten the word out about hot food!
Knowledge Problem Areas

Schools

- 40-50% missed
  - Temperature Danger Zone
  - Appropriate cooling procedures
  - Chlorine sanitizing procedures
Issue 3. Cross Contamination
Sources of Cross Contamination

- **Receiving/Storing**
  - Delivery person placed products in storage
  - Food stored on floor
  - Broken ceiling tiles
  - Raw/prepared foods in close proximity
  - Inadequate coverings
Sources of Cross Contamination, cont.

- Preparing
  - Packages on food contact surfaces
  - Touching other surfaces (such as refrigerator handles)
  - Multiple items on same cutting board
  - No sanitizing of food contact surfaces
  - F&V not washed in preparation
  - Sinks used for multiple purposes
  - Towels used for wiping/drying multiple surfaces
Sources of Cross Contamination, cont.

- Transporting
  - Uncovered
- Serving
  - Self service
  - Inadequate sanitizing of surfaces
  - RTE foods served with bare hands
Sources of Cross Contamination, cont.

- Standard Operating Procedures
  - Inadequate Cleaning and sanitizing of FCS
  - No handwashing between handling dirty and clean dishes
  - Sanitizer concentration not checked
  - Sanitizing concentrations too low
  - Hot water not hot enough
  - Limited corrective actions taken
## Total Plate Count

Acceptable:  \( <1-20 \)

<table>
<thead>
<tr>
<th>Sample</th>
<th>Schools Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Contact Surface</td>
<td>(&lt;1-38,800)</td>
</tr>
<tr>
<td>Equipment</td>
<td>(5-435,000)</td>
</tr>
<tr>
<td>Hand sink handle</td>
<td>(&lt;10-675,000)</td>
</tr>
<tr>
<td>Refrigerator Handle</td>
<td>(5-715,000)</td>
</tr>
<tr>
<td>Tray</td>
<td>(&lt;1-820)</td>
</tr>
</tbody>
</table>
### Staphylococcus aureus

**Acceptable:** <10

<table>
<thead>
<tr>
<th>Sample</th>
<th>Schools Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Contact Surface</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Equipment</td>
<td>&lt;10-10</td>
</tr>
<tr>
<td>Hand sink handle</td>
<td>5-6,850</td>
</tr>
<tr>
<td>Refrigerator Handle</td>
<td>5-2,750</td>
</tr>
<tr>
<td>Tray</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>
## Coliform Count

**Acceptable: <10**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Schools Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Contact Surface</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Equipment</td>
<td>&lt;10-260</td>
</tr>
<tr>
<td>Hand sink handle</td>
<td>&lt;10-25</td>
</tr>
<tr>
<td>Refrigerator Handle</td>
<td>&lt;10-15</td>
</tr>
<tr>
<td>Tray</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>
Microbiological Study in Iowa Schools (No. meeting standard)
This research project was funded by the USDA Cooperative States Research, Education, and Extension Service, Project No. 2005-51110-03282. The mention of trade or company names does not mean endorsement. The contents are solely the responsibility of the authors and do not necessarily represent the views of USDA.

Microorganisms from the refrigerator door handle

Microorganisms from gloved hand that touched the handle
Microorganisms found on the bottom of the lettuce box

Microorganisms from fingers that have touched the lettuce box
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Microorganisms found on the celery bag

Microorganisms from fingers after touching the celery bag

Microorganisms found on the counter after the celery bag sat on it
Sample of microorganisms found on a food film box in a production kitchen.

Growth of microorganisms from fingers that have touched a well used food film box.

IOWA STATE UNIVERSITY
University Extension

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The glove box isn’t that clean

Microorganisms from the glove box in the cooks area

Microorganisms from the glove box on the service line

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A clean and sanitized cutting board shows no sign of microorganisms.
Conclusions

- There are food handling issues that could increase likelihood of produce contamination
- Employee education is needed
- Policies and procedures need to be strengthened
- Supervision is key