Food Hygiene, Still a Relevant Nosocomial Issue
Dr. Michael Borg, Malta
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Aim of presentation:
- Relevance and impact of food borne illness in hospitals
- Role of Infection Control Teams in hospital food hygiene interventions
- Overview of food hygiene fundamentals esp. HACCP
- Food hygiene in wards including enteral feeding

Food hygiene: still a relevant nosocomial issue

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Aims of presentation

Food hygiene in wards including enteral feeding

Nosocomial food poisoning in developing countries

- Surveillance generally lacking
- Infectious intestinal diseases prevalent in the community
- HIV-infected patients at a greater risk
- Kenya: prevalence of nosocomial Salmonella: 3.0%; Shigella: 2.5%
  Paton et al
- India: 20% of hospitalised children run the risk of an enteric infection
  Kamalaratnam et al

Nosocomial food poisoning in developed countries

- 248 outbreaks of Salmonella in U.K. over a 10 year period
  Joseph et al
- Nosocomial infectious intestinal diseases account for 15% of all national outbreaks of food poisoning
  Wall et al
- Direct costs of nosocomial Salmonella outbreak = AU$ 120,000
  Spearing et al

“...a lack of clarity about the circumstances in which details of an outbreak should be communicated.
Confusion about which individuals should take the lead for such communication.
No clear internal communications policies within the organisations concerned.
Reluctance to communicate with the public until forced to do so by external media enquiries, so that media pressures drove events.”
Determining the response

- Death and/or serious illness
- Major implications for public health
- Exceptional / unusual infection episode
- Major public anxiety and concern

ICT input in food poisoning outbreaks

- Cohort isolation
- Supervision of patient placement
- Surveillance
  * workload increased by 800% during outbreak
- Education
- Employee health
- Public & media relations

Epidemiology

<table>
<thead>
<tr>
<th>Person to person</th>
<th>Equal / Unknown</th>
<th>Food borne</th>
</tr>
</thead>
<tbody>
<tr>
<td>55%</td>
<td>9%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Person to person:
- Exact source often difficult to determine
- Admission of patient with unrecognised community acquired infection

Foodborne outbreaks carry 3.22 greater mortality risk

Role of ICT’s in food hygiene

HOSPITAL CATERING

IN-HOUSE

OUTSOURCED

OTHER STAKEHOLDERS
  Catering manager
  Food technologist
  Environmental health officer

SUPPLIER AUDITING

DUE DILIGENCE

Present

Absent

Ancillary role

Supervisory

Primary role

Interventionary

Infection Control Teams & food hygiene

- Intervention in suspect / confirm food borne gastroenteritis
- Supplier auditing of food contractors
- Collaboration with in-house kitchen managers / environmental health officers
- Monitoring of hospital kitchen
- Extensive involvement in hospital food hygiene policy

The Food Hygiene Pyramid

FOOD & ENVIRONMENTAL TESTING

KITCHEN AUDITING

HACCP

TRAINING
Food Hygiene, Still a Relevant Nosocomial Issue  
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<table>
<thead>
<tr>
<th>Hygiene Training</th>
<th>Causes of food poisoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Risk foods</td>
<td>• Preparing food too long in advance</td>
</tr>
<tr>
<td>• Bacterial growth &amp; temperature danger zone</td>
<td>• Storing food at ambient temperatures</td>
</tr>
<tr>
<td>• Cross-contamination</td>
<td>• Cooling food too slowly before refrigeration</td>
</tr>
<tr>
<td>• Personal &amp; environmental hygiene</td>
<td>• Not reheating food to sufficient temperatures</td>
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</table>

<table>
<thead>
<tr>
<th>HACCP</th>
<th>The Principles of HACCP</th>
</tr>
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<tbody>
<tr>
<td>Hazard Analysis</td>
<td>• Derived from Engineering System- “Failure Mode &amp; Effect Analysis”.</td>
</tr>
<tr>
<td>Critical Control Points</td>
<td>• Pillsbury / NASA- American Space Program- 1960’s.</td>
</tr>
<tr>
<td></td>
<td>• 1971- Presented at 1st American National Food Protection Conference</td>
</tr>
<tr>
<td></td>
<td>• HACCP Principles now incorporated into Food Safety Legislation in US &amp; EU.</td>
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<table>
<thead>
<tr>
<th>Pre-requisites</th>
<th>Good hygiene practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Statement of intent</td>
<td>• Equipment cleaning S.O.P.’s &amp; logs</td>
</tr>
<tr>
<td>• Skills base</td>
<td>• Hand hygiene facilities</td>
</tr>
<tr>
<td>• Training</td>
<td>• Insect control</td>
</tr>
<tr>
<td>* in HACCP</td>
<td>• Pest activity sighting</td>
</tr>
<tr>
<td>* in Food Hygiene</td>
<td>• Food hygiene training</td>
</tr>
<tr>
<td>• Approved Suppliers</td>
<td>• Equipment maintenance</td>
</tr>
<tr>
<td>* supplier auditing schemes</td>
<td>• Cleaning check</td>
</tr>
<tr>
<td></td>
<td>• Food hygiene training</td>
</tr>
<tr>
<td></td>
<td>• Equipment maintenance</td>
</tr>
<tr>
<td></td>
<td>• Cleaning check</td>
</tr>
<tr>
<td></td>
<td>• Employee health questionnaire</td>
</tr>
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<td></td>
<td>• Staff sickness reports</td>
</tr>
</tbody>
</table>
### Hazards in Food

- **Biological:** bacteria, viruses, parasites
- **Chemical:** sanitizers, pesticides, antibiotics
- **Physical:** bone, rocks, metal

### Control of biological hazards

Cooking helps to kill microbes
- >75°C for poultry, eggs, ground beef
- >70°C for pork
- >65°F for fish

Holding at low temperatures (<4°C) prevents microbes from growing

Cooling from 60°F-4°F quickly helps prevent microbes from growing

### Control of chemical hazards

- Approved and legal chemicals (cleaners, sanitizers, hormones, pesticides)
- Vendor certification
- Proper procedures and rinsing (cleaners and sanitizers)
- Storage and labeling for ingredients and raw materials

### Control of physical hazards

- Separate and remove physical objects
  - Filter or sieve (meat grinder)
  - Water bath (vegetables)
  - Metal detector (all foods)
- Good employee practices (jewelry)
- Good sanitation and quality control programs

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**Procedure** | **Hazard** | **Control**
--- | --- | ---
**Purchase** | Contamination with food poisoning bacteria or toxins | Buy from reputable supplier only. Specify temperature at delivery. 
**Receipt of food** | Contamination with food poisoning bacteria or toxins | Visual/sensory checks. Temperature checks
**Storage** | Growth of food poisoning bacteria; toxins on high risk (ready to eat) foods. Further contamination. | High risk foods stored at safe temperatures. Store wrapped. Date label high risk foods. Rotate stock; use by recommended date. Limit exposure to ambient temperatures during preparation. Prepare with clean equipment used for high risk (ready to eat) foods only. Separate cooked and raw foods. Wash hands before handling food.
**Preparation** | Contamination of high risk (ready to eat) foods. Growth of pathogenic bacteria | Cook food to at least 75°C in the thickest part.
**Cooking** | Survival of pathogenic bacteria. |
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A Webber Training Teleclass
Hosted by Paul Webber paul@webbertraining.com
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<th>Procedure</th>
<th>Hazard</th>
<th>Control</th>
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<tbody>
<tr>
<td>Cooling</td>
<td>Growth of any surviving spores or pathogens, Toxin production, Contamination with pathogenic bacteria</td>
<td>Cool foods as quickly as possible. Do not leave out at room temperatures to cool unless cooling period is short.</td>
</tr>
<tr>
<td>Hot holding</td>
<td>Growth of pathogenic bacteria, Toxin production</td>
<td>Keep food hot e.g. above 63°C</td>
</tr>
<tr>
<td>Reheating</td>
<td>Survival of pathogenic bacteria. Temperature control. Date code high risk (ready to eat) foods. Use in rotation &amp; within shelf life. Reheat to above 75°C</td>
<td></td>
</tr>
<tr>
<td>Chilled storage</td>
<td>Growth of pathogenic bacteria.</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>Growth of pathogens, Toxin production, Contamination</td>
<td>Cold service - serve high risk foods as soon as possible after removing from refrigerated storage. Hot foods - serve high risk foods quickly.</td>
</tr>
</tbody>
</table>

HACCP in hospital catering

<table>
<thead>
<tr>
<th>Shanaghy et al</th>
<th>Total count &lt; 10^3 cfu/g</th>
<th>Total count &gt; 10^3 cfu/g</th>
<th>E. coli &gt; 10^6 cfu/g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-HACCP</td>
<td>61%</td>
<td>3%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Post-HACCP</td>
<td>90%</td>
<td>0.06%</td>
<td>0.17%</td>
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- Only 54% of the 27 responding hospitals in Italy using HACCP system
- Food handlers had better knowledge of food borne pathogens than educationally superior healthcare workers!

Food & environmental testing

- Expensive & labour intensive
- Routine pathogen testing is useless
- Limit to total count & indicator organisms
- Look for trends not single results
- Semi-quantitative swabbing of surfaces and hands probably more useful
- Don’t neglect the psychological spin-offs of results

Understanding the jargon

- **Total Bacterial count**
  - * not an indication of hygiene
  - * more useful as quality indicator
- **E. coli count**
  - * normally present intestines
  - * indicator organism of poor hygienic state.
- **Staphylococcus aureus count**
  - * Contamination from a human food handler
- **Salmonella & Campylobacter**
  - * Most common food poisoning organisms

Environmental swabbing

- May be more cost effective than food testing
- Semi-quantitative methods simple to perform
- Useful tool to monitor hygiene of production areas, equipment & hands
- More likely to detect anomalies

Routine testing of food handlers

Screening for pathogens in faeces specimens from food handlers:
- is not cost-beneficial
- identification of a carrier is not likely to make a significant contribution
- infection may also occur after testing
- may lead to a false sense of safety
- can cause negligence with regard to general & personal hygienic practices
**Kitchen auditing**

1. Preparation too far in advance
2. Storage at room temperature
3. Cooling too slowly before refrigeration
4. Insufficient reheating of cook-chill meals
5. Meat and meat products undercooked
6. Frozen poultry insufficiently thawed
7. Xs-contamination from raw to cooked
8. Hot food stored below 63°C
9. Food handlers with gastroenteritis

**Wards have kitchens too!**

**Ward kitchens & refrigerators**

- Clean
- Sited out of direct heat or sunlight
- Temperature monitored regularly
- Unlabelled or outdated items discarded
- No items exposed or unwrapped
- Cooked items separate & above raw

**Enteral feeding**

- “Feed contamination is common in hospital and at home” Patchell et al
- 100% of feeds tested in Costa Rica Arias et al
- 77% of feeds tested in Brazil exceeded permissible bacterial levels Rocha Carvalho et al

Correct enteral feeding

- Commercially prepared feeds in prefilled administration reservoirs where possible.
- Scrupulous attention to food hygiene if feeds are mixed on the ward
- Blenders must be dismantled, washed with detergent and dried after each use.
- Hands washed before handling enteral feeding systems

Correct enteral feeding 2

- Administer feed over as short a time as possible
- Avoid direct contact between the administration set connections and any non sterile object
- Store opened feeds in the refrigerator and discard after 24h
- Replace administration sets and reservoirs every 24h. Do not wash out and reuse
- Flush tubing with plenty of water after administering intermittent feeds.
“An ounce of prevention is worth a pound of cure”

“Measures to aid the prevention of costly outbreaks of nosocomial salmonellosis, require an investment …. 

“…. dedication of limited resources toward such preventive strategies, as education, is a practical and cost-effective option for health care facilities.”

Spearing et al: AJIC 2000