

***Food hygiene:
still a relevant nosocomial
issue***

Dr. Michael A. Borg
 Consultant (Hospital Infection Control)
 St. Luke's Hospital, Malta

Hosted by **Paul Webber**
paul@webbertraining.com

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Aims 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

***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

BBC NEWS
 You are in: UK: Scotland
 Thursday, 17 January, 2002, 20:40 GMT

Salmonella kills three in hospital

WELCOME TO THE VICTORIA INFIRMARY NHS TRUST
 Accident & Emergency
 Grange Road Entrance
 In-patients Admissions

Five men were struck by the outbreak.

WATCH/LESTER ON THIS STORY
 Alken Clark reports
 "The health minister said he was very concerned and called for an urgent report"
 The BBC's John Huxton
 "The most likely cause is that the infection was brought in by a patient"
 Professor Hugh Pennington
 "This is something we have to track"

See also:
 • 10 Feb 01 | Health: Salmonella infection cases drop
 • 28 Nov 00 | Scotland: Salmonella hits two more
 • 26 Aug 00 | Health: Salmonella cases 'rise'
 • 13 Jan 98 | Features: Salmonella poisoning

Internet links:
 • South Glasgow University Hospitals NHS Trust

SERVICES
 Daily E-mail
 News Ticker
 Mobiles/PDAs
 Feedback
 Help
 Low Graphics

Two other men were also struck by the outbreak at the Victoria Infirmary on the city's south side.
 Rudolfo Ionta, 74, from Glasgow, who had multiple sclerosis, died

- "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

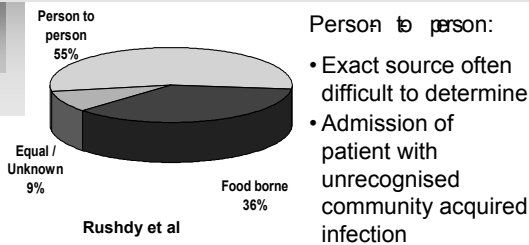
- | | |
|---|---|
| <ul style="list-style-type: none"> ■ Death and/or serious illness ■ Major implications for public health ■ Exceptional / unusual infection episode ■ Major public anxiety and concern | Major
Outbreak
Plan |
| <ul style="list-style-type: none"> ■ Minimal infection ■ Minimal impact on public health ■ Minimal disruption of health and/or public services ■ Minimal public anxiety & concern | Infection
Control
Team
Investig. |

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

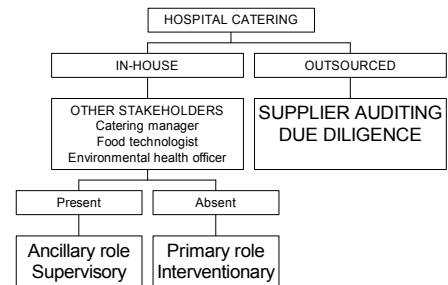
Jarosch et al

Epidemiology



Foodborne outbreaks carry 3.22 greater mortality risk
 Meakins et al

Role of ICT's in food hygiene



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



Hygiene Training

- Risk foods
- Bacterial growth & temperature danger zone
- Cross-contamination
- Personal & environmental hygiene

Causes of food poisoning

- Preparing food too long in advance
- Storing food at ambient temperatures
- Cooling food too slowly before refrigeration
- Not reheating food to sufficient temperatures
- Using contaminated food
- Undercooking meat, meat products and poultry
- Ineffective thawing frozen poultry and meat
- Cross contamination between raw & cooked food
- Keeping hot food below 63°C
- Infected food handlers

HACCP

Hazard Analysis Critical Control Points

- Analysis of potential hazards in the current process & possible preventive measures
- Identification of Critical Control Points in the Process
- Establish critical limits
- Introduce monitoring requirements and procedures
- Determine corrective actions
- Record keeping procedures
- Verification procedures

The Principles of HACCP

- Derived from Engineering System- "Failure Mode & Effect Analysis".
- Pillsbury / NASA- American Space Program- 1960's.
- 1971- Presented at 1st American National Food Protection Conference
- HACCP Principles now incorporated into Food Safety Legislation in US & EU.

Pre-requisites

- | | |
|--|--|
| <ul style="list-style-type: none"> ■ Statement of intent ■ Skills base ■ Training <ul style="list-style-type: none"> * in HACCP * in Food Hygiene ■ Approved Suppliers <ul style="list-style-type: none"> * supplier auditing schemes | <ul style="list-style-type: none"> ■ Good hygiene practices <ul style="list-style-type: none"> * premises & layout * equipment * Staff hygiene * Cleaning & disinfection * Pest control |
|--|--|

Good hygiene practices

- Equipment cleaning S.O.P.'s & logs
- Hand hygiene facilities
- Insect control
- Pest activity sighting
- Food hygiene training
- Equipment maintenance
- Cleaning check
- Employee health questionnaire
- Staff sickness reports

Hazards in Food

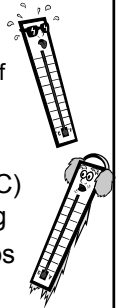
- Biological: bacteria, viruses, parasites
- Chemical: sanitizers, pesticides, antibiotics
- Physical: bone, rocks, metal



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°-4°C quickly helps prevent microbes from growing

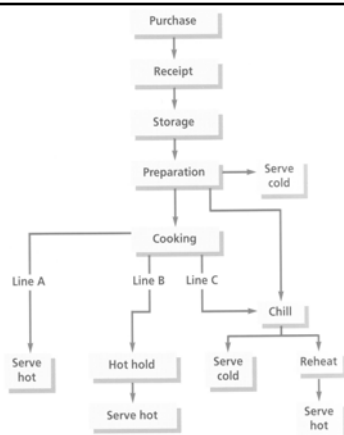


Control of chemical hazards

- 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



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.
Preparation	Contamination of high risk (ready to eat) foods. Growth of pathogenic bacteria	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.
Cooking	Survival of pathogenic bacteria.	Cook food to at least 75°C in the thickest part.

Procedure	Hazard	Control
Cooling	Growth of any surviving spores or pathogens. Toxin production. Contamination with pathogenic bacteria	Cool foods as quickly as possible. Do not leave out at room temperatures to cool unless cooling period is short
Hot holding	Growth of pathogenic bacteria. Toxin production	Keep food hot e.g. above 63°C
Reheating	Survival of pathogenic bacteria.	Reheat to above 75°C
Chilled storage	Growth of pathogenic bacteria.	Temperature control. Date code high risk (ready to eat) foods. Use in rotation & within shelf life.
Service	Growth of pathogens. Toxin production. Contamination	<i>Cold service</i> - serve high risk foods as soon as possible after removing from refrigerated storage. <i>Hot foods</i> - serve high risk foods quickly.

HACCP in hospital catering

Shanaghy et al	Total count < 10 ³ cfu/gr	Total count > 10 ³ cfu/gr	E. coli > 10/gr
Pre-HACCP	61%	3%	1.5%
Post-HACCP	90%	0.06%	0.17%

- 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!

Angelillo et al


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

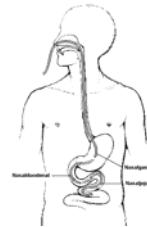
Wards have kitchens too!



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 pre-filled 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

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