Food-borne Diseases

Food Quality and Standards Service, FAO

FAO / OIE / WHO Tripartite Meeting
Rome, 31 January - 2 February 2007
Food-borne diseases - causes

- Pathogenic bacteria
- Viruses
- Parasites
- Chemicals

Many of animal origin
Foodborne illness – a major public health problem

- 4 billion cases of diarrhoea annually
- Worldwide, an estimated 2.2 million children < 5 years die annually of diarrhoeal diseases (WHO)
- A large proportion of these diseases originate from contaminated food and drinking water
- Everyone is at risk from food-borne illness
Global burden of food-borne disease

- Foodborne disease – relates to both acute and chronic diseases commonly transmitted through food and considers morbidity, disability, long term consequences, mortality
- WHO have statistics on mortality - potentially caused by foodborne diseases intestinal infections, zoonoses etc
- But not enough data to give the big picture yet – many studies but limited to particular settings, e.g. hospitals, outbreaks, industrialised countries, children only differences in surveillance and reporting systems
**Foodborne Disease Burden Initiative – led by WHO**

- Sept 2006 – international consultation
  - Launched this initiative
  - Developed
    - strategic framework for global foodborne BOD estimates
    - a action plan and time frame for BOD work
    - elements of standard protocol/manual for conducting BOD studies in countries to obtain estimates
  - Recommended establishment of Foodborne Disease Burden Epidemiology Reference Group (FERG) to execute strategy - meeting in March 2007
Trends in foodborne disease

- Reflects reported cases of illness – often just a fraction of actual cases

- Data depends on national reporting, surveillance and recording systems – often very varied or may not exist

- Poor linkages between surveillance systems (human, animal) and food control systems
### EHEC infections per 100000 people

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate (Year)</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Australia</td>
<td>0.2 (2001)</td>
<td>OzFoodNet, 2001</td>
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<tr>
<td>Argentina</td>
<td>22 (in children aged 6 – 48 months)</td>
<td>Lopez et al., 1997</td>
</tr>
<tr>
<td>USA</td>
<td>0.9 (2004)</td>
<td>Vugia et al., 2005</td>
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Recent trends in foodborne disease

- Some industrialized countries starting to indicate declines in the incidence of some types of foodborne disease compared to baseline data

- E.g. United States, European countries

* Shiga toxin–producing *Escherichia coli*. 
Figure SA2
Salmonella in table eggs in MS reporting from 2001-2005
Fig. 6A
Salmonella in broiler parent-breeding flocks in MS conducting surveillance programmes, 2001-2005
Good news or?

- *Salmonella* and *Campylobacter* still account for about most of the reported cases of foodborne diseases worldwide – implication for food production as well as consumer protection.
- For many countries disease surveillance systems do not exist or are only being established – so not data yet!
- However, reports of outbreaks of foodborne disease are becoming more common.
Behind the overall trends (1)

- Vehicles of transmission of foodborne disease
  - Changing
  - Increase in foodborne illness related to fresh produce where causative agent was traditionally linked to foods of animal origin
  - e.g. more cases of EHEC illness now linked to fresh produce than meat
  - Also other pathogens e.g. *Salmonella* – more frequently associated with fresh produce
Behind the overall trends (2)

- Bacterial strains and serotypes of importance
  - Changing
  - e.g. S. Enteriditis decreasing while other serotypes becoming more prevalent
  - e.g. *C. jejuni* vs *C. coli* and other *Campylobacter* strains

- Characteristics of organisms changing
  - e.g. antimicrobial resistance
Behind the overall trends (3)

- Non-bacterial causes of food-borne disease
  - In many countries viruses are now considered to be the most important causes of foodborne
  - But only overcoming limitations relating to their isolation and detection
  - Parasites continue to be linked to incidents of foodborne disease
Reducing the risk of foodborne diseases

- Considerations
  - Fighting a moving target
  - Reducing a hazard in one food/vehicle of transmission does not always lead to a reduction in disease e.g. EHEC
  - Control measures against one hazard do not necessarily impact other hazards
  - At what point do we start considering something to be a food product?
Reducing the risk of food-borne diseases

- Experience has thought us that practices throughout the food chain have an impact on the level of foodborne disease

- Reducing food-borne disease - requires an integrated food chain approach
Potential routes of Transmission of EHEC

Animal Reservoir
- Cattle
- Other animals e.g. sheep, pigs, pets etc

Human Reservoir

Environmental Reservoir

Milk and Dairy products
- Non-animal products e.g. fresh produce, juices

Beef and Beef Products
- Pre-Harvest (on farm activities)
- Harvest (transport, lairage, slaughter, dressing)
- Post-Harvest (boning, processing, distribution, retail, preparation, consumption)
- Primal cuts e.g. Beef joints
- Ready to eat processed beef products e.g. Fermented beef products
- Raw processed beef products e.g. Ground beef, mechanically tenderised beef
Current approaches from the food safety perspective (AGNS)

- Whole food chain taken into consideration
- Partnership and shared responsibility
  - Both at international level (AGNS (FAO), other FAO divisions, FOS (WHO)) and regional and national levels
  - Greater linkage between stakeholders at different parts of the food chain
- Application of risk-based approaches
  - Focus on result orientated measures - requires a strong linkage between food control systems and foodborne disease surveillance
Tools

- Risk Assessment (e.g. JEMRA)
  - Unique insight into food chain
  - Link actions at different parts of food chain to outcome in terms of foodborne disease

- Linked to cost-benefit analysis
  - Economic consequences
  - QALYs/DALYs
Integrated approaches to food safety

- How integrated are these approaches?
  - often work in parallel lines even though hazards are cross-cutting
  - tend to focus on single hazard: product combinations or segments of the food chain

- Making progress but more to do
- Next steps.....