Data Pack for High Level Food Chain Analysis

This slide pack summarises much of the data compiled from across the FSA for the High Level Food Chain Analysis

Operational Research Unit,
Analysis and Research Division

Contents

Foodborne disease is the highest priority hazard in terms of public health impacts accounting for 500 deaths per annum in the UK; it is also the food issue that is of greatest concern to consumers

Impacts of Food Safety Hazards	Estimated Deaths pa.	Estimated Total Illnesses pa.	Number of food incident reports (2007)	% Consumer concern (FSA tracker, Dec 2008)
Foodborne Disease (FBD)	500[1]	1,044,000[1]	270	53%
Allergens/ intolerance	~5-10	4,800[2]	90	22%
Chemical contamination	Not Known	Not Known	660	32%[3]
TSEs-vCJD	5[4]	0 new cases[4]	10	24%
Radiological contamination	less than 10[5]	less than 35[5]	40	15%[6]

Chemicals account for the majority of reported food incidents, which can have significant economic impact on industry and the public purse.

The known public health impacts of other food safety hazards after controls are applied are low compared to foodborne disease:

- Allergens deaths are low, hospitalisations at about 1,000 pa;
- vCJD cases now very low and deaths relate to historic contamination;
- cancers related to radiological discharge & fallout are also significantly lower

The health impacts associated with chemicals cannot be directly assessed as risks accumulates over a lifetime and it is difficult to link to health outcomes.

Evidence on intakes, exposure and monitoring of foods suggests that existing controls keep public health risks low for known chemicals hazards.

[1] Cases in England and Wales for 2007, Health Protection Agency, adjusted by population to estimate UK figures; [2] Estimated new cases with peanut allergy 2005 'Primary care epidemiology of allergic disorders' applied to UK population (http://www.qresearch.org/Public_Documents/HSCIC%20allergies%20report%20from%20QRESEARCH%20.pdf); [3] Consumer concern about pesticides; [4] 2007 'Incidence of variant Creutzfeldt-Jakob disease diagnoses and deaths in the UK January 1994 December 2007' (http://www.cjd.ed.ac.uk/cjdq56.pdf) ; [5] FSA estimates for UK population from exposure to radiological discharges into the environment ; [6] June 2006, consumer concern of irradiated food (no longer monitored)

Campylobacter, Listeria and Salmonella together they account for almost 70% of the burden of foodborne disease

Estimated Impact of Indigenous Foodborne Disease in England and Wales 2007 (1)	Deaths	Hospital-isations	New Cases	Total Cost of Illness (£'000) (3)
Campylobacter spp	80	15,729	333,652	591,052
Listeria monocytogenes	162	455	455	245,265
Salmonellas	92	1,170	32,115	224,373
Norovirus	29	111	175,250	137,312
Ecoli O157	21	349	920	58,008
Clostridum perfringens	20	78	18,540	56,748
Other bacteria/ virus/etc.	15	832	123,737	99,308
Unknown agents (2)	24	183	241,098	163,576
Total	**443**	**18,906**	**925,766**	**1,562,143**

- Campylobacter accounts for most cases, and a third of the cost burden
- Listeria deaths are high, and have more than doubled since 2000.
- Salmonella deaths and cases are high.
- There is some uncertainty over the proportion of Norovirus cases that are foodborne.
- VTEC O157 from food has a much lower impact compared to the other pathogens, but for individuals affected the impact can be severe.

(1) Estimated cases in England and Wales for 2007, Health Protection Agency ; (2) 'unknown agents' are the element of the estimate for total cases of foodborne disease not accounted for by estimates on individual known pathogens; (3) total cost of illness includes the direct costs to the NHS and individuals in loss of earnings etc. as well as the indirect associated with costs of pain, grief and suffering.

Information on sources and frequency of outbreaks also tells us about risks from specific food pathogen combinations

Number of foodborne outbreaks 2005-07 (1)	Fish & Shellfish	Poultry	Red Meat	Eggs	Salad, fruit & veg	Milk & dairy	Dessert	Rice
Total	35	17	13	16	5	0	8	3
Campylobacter	0	3	1	0	0	0	0	0
Listeria monocytogenes	0	0	0	0	0	0	0	0
Salmonella Enteritidus	0	7	0	15	1	0	7	0
Salmonella Typhimurium	1	3	0	1	1	0	0	1
Norovirous	8	0	0	0	1	0	0	0
Ecoli O157	0	0	3	0	0	0	1	0
Clostridum perfringens	0	3	9	0	0	0	0	0
Other	13	1	0	0	2	0	0	1
Unknown	13	0	0	0	0	0	0	1

There have been no outbreaks associated with milk or dairy products between 2005-2007. Earlier outbreaks were due to raw rather than pasteurised milk

In the UK we haven't experienced the same increase in outbreaks in produce that's been seen in recent years in the US

Although in decline, we continue to see frequent outbreaks of salmonella in eggs in raw or lightly cooked foods

Despite low levels of S. Enteritidus & S.Typhimurium being found in retail chicken in the UK, it's not unusual for poultry to be implicated in outbreaks of these pathogens

The majority of the Fish and Shellfish Norovirus outbreaks have been attributed to oysters

(1) Data supplied by HPA on Outbreaks identified as either Foodborne or Foodborne then person to person. Figures relate to outbreaks where food vehicle(s) has been identified only.

Main food sources seem to be chicken for Campylobacter, chicken and eggs for Salmonella, and ready to eat foods for Listeria.

Food	Risks across Food Chain					
	Pathogen	Imports	Primary Production	Manufacture / Distribution	Food Service	Retail Sales
Poultry: chicken	Campylobacter		Awaiting survey results for flocks	Reduction in slaughter houses		65% raw meat [1]
	Salmonella		Neg. in breeder flocks 8.2% broiler flocks [2]			6.6% raw meat [1]
Beef	Campylobacter		54.6% animals [3]	Reduction in slaughter houses		Awaiting survey results [4]
	VTEC		4.7% animals [3]			Awaiting survey results [4]
	Clostridium Perfringens					Awaiting survey results [4]
	Salmonella		1.4% animals [3]			Awaiting survey results [4]
	BSE		67 confirmed from 767,000 tested [5]			
Pork	Salmonella		21.2% lymph nodes [6]	13.5% carcasses [6]		Awaiting survey results [4]
Eggs	Salmonella	3.3% Box 6 [7]	11.9% lay flocks [8] (7.9% S.Ent/S.Typ)		0.38% Box 6 [9]	0.34% (UK) Box 6 [10]
Dairy	All bacteria		No structured surveillance			
Specific Ready to Eat	Listeria Monocytogenes					0.0 – 0.4% fail EU limit [11]
Shellfish	All pathogens					0-0.5% [12]
Fruit and veg	All pathogens	0% [13-15]				0.0-0.1% [13-15]

- Campylobacter contamination at retail is high in chicken and lower in other foodstuffs.
- Cattle is a main food source for VTEC.
- Salmonella is mainly found in chicken and eggs;
- Although contamination levels of S. Enteritidus & S. Typhimurium (the most common causes of salmonellosis in humans) in UK produced chicken are below targets set by the EU.
- Fruit and vegetables don't appear to pose the same risks as products of animal origin.

Figures compiled from nationwide, representative surveys and surveillance, see end of document for references

The level of Official Control varies through the food chain, but this isn't always aligned to risks

Official Controls 2007 (1)	Dairy Hygiene	Egg Hygiene	Primary Production	Slaughter houses	Cutting Plants	Manuf. & Processing	Distribution & Transport	Food Service	Retail	Manuf. selling by Retail
Ave. inspection frequency	16 mnths	3 yrs	20 yrs	5 mnthly audits plus ante mortem and post mortem inspection	5½ mnths	22 mnths	4 yrs	22 mnths	2 yrs & 10 mnths	19 mnths
% premises subject to informal enforcement	11%	U/K	U/K	27%		34%	12%	31%	20%	34%
% premises subject to formal enforcement	0.1%	U/K	U/K	10%		2%	1.0%	1.1%	0.7%	1.4%

- Controls are high on dairy farms compared to other primary production. Industry controls are also high, yet evidence suggests the current impact of risks are low.
- Controls on other primary production is extremely low, although membership of assurance schemes is generally high. Livestock farms are a key source of pathogens into the food chain, as well as contributing to environmental contamination.
- Controls are also high in slaughter houses, the audit fluctuation alone is greater than any other part of the food chain, yet meat & meat products continue to make a significant contribution to the Foodborne disease burden, suggesting controls are not aligned to these risks.

(1) Figures compiled by FSA from monitoring systems

References for 'risks across the food chain' table

1. FSA (2009) Report for the UK survey of Campylobacter and Salmonella contamination of fresh chicken at retail sale (B18025) http://www.foodbase.org.uk/results.php?f_report_id=351
2. EFSA (2007) Report of the Task Force on Zoonoses Data Collection on the Analysis of the baseline survey on the prevalence of Salmonella in broiler flocks of Gallus gallus, in the EU, 2005-2006. http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620761745.htm
3. Milnes AS, et al (2008) Intestinal carriage of verocytotoxigenic Escherichia coli O157, Salmonella, thermophilic Campylobacter and Yersinia enterocolitica, in cattle, sheep and pigs at slaughter in Great Britain during 2003, Epidemiol Infect, 136(6):739-51 http://www.ncbi.nlm.nih.gov/pubmed/17655782?ordinalpos=14&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum
4. FSA survey to be published Spring 2010 indicates that levels are low.
5. Great Britain and Northern Ireland TSE passive and active surveillance statistics http://www.defra.gov.uk/vla/science/sci_tse_stats_intro.htm
6. EFSA (2008) Report of the Task Force on Zoonoses Data Collection on the Analysis of the baseline survey on the prevalence of Salmonella in slaughter pigs, in the EU, 2006-2007 [1] - Part A: Salmonella prevalence estimates http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178713190037.htm
7. FSA (2006) Survey of *Salmonella* Contamination of Non-UK Produced Shell Eggs on Retail Sale in the North West of England and London. (B18012) http://www.food.gov.uk/news/newsarchive/2006/nov/eggs
8. EFSA (2007) Report of the Task Force on Zoonoses Data Collection on the Analysis of the baseline study on the prevalence of Salmonella in holdings of laying hen flocks of Gallus gallus http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620761896.htm
9. FSA (2007) UK Wide Survey of Salmonella in Raw Shell Eggs Used in Catering Premises (B18017) www.food.gov.uk/multimedia/pdfs/eggsurvey2007.pdf
10. FSA (2004). Survey of Salmonella contamination of UK-produced eggs on retail sale. http://www.food.gov.uk/multimedia/pdfs/fsis5005report.pdf
11. Little CL, et al (2008) LACORS/HPA Co-ordinated Food Liaison Group Studies: Assessment of the Microbiological Safety of Selected Retail Ready-to-Eat Foods with a focus on *Listeria monocytogenes.* http://www.lacors.gov.uk/lacors/ContentDetails.aspx?id=19849&authCode=
12. Sagoo SK, Little CL, Greenwood M(2007) Microbiological study of cooked crustaceans and molluscan shellfish from UK production and retail establishments *International Journal of Environmental Health Research,* 17 (3) pp. 219-230 http://www.ingentaconnect.com/search/article?title=Microbiological+study&title_type=title&author=sagoo&year_from=1998&year_to=2009&database=1&pageSize=20&index=1
13. Sagoo SK, et al (2001) LACORS/PHLS Co-ordinated Food Liaison Group Studies: The Microbiological Examination of Bagged Prepared Ready-to Eat Salad Vegetables from Retail Establishments http://www.lacors.gov.uk/lacors/ContentDetails.aspx?id=3526
14. Sagoo SK, Little CL, Mitchell RT(2002) LACORS/PHLS Co-ordinated Food Liaison Group Studies: The Microbiological Examination of Ready-to Eat Organic Vegetables from retail Establishments http://www.lacors.gov.uk/lacors/ContentDetails.aspx?id=3538
15. Little CT, Mitchell RT (2004) Microbiological quality of pre-cut fruit, sprouted seeds, and unpasteurised fruit and vegetable juices from retail and production premises in the UK, and application of HAACP *Commun Dis Public Health.* 2004 Sep;7(3):184-90. http://www.ncbi.nlm.nih.gov/pubmed/15481210