ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

Horizon scanning

1. The ACMSF recognises the benefits that flow from horizon scanning activities.

2. From time to time, the Committee has reviewed new developments and considered what implications they may have for food safety. Several ACMSF reports have resulted from ideas put forward by Members of the Committee as a result of developments in agricultural practice, food technology and microbiology.

3. Having previously identified topics which might merit attention in the future, in 2003 the Committee set up three *ad hoc* Groups to look into imported foods, changing social habits in relation to food, and newly emerging pathogens. These Groups were charged with assembling information on the current situation on these topics in order to decide whether there was a potential problem in relation to the microbiological safety of food; and recommending to the ACMSF whether the Committee needed to undertake further work. The Group on Changing Social Habits reported its outputs to the Committee in March 2004 (paper ACM/ 679 refers). In 2004 the Committee also set up a virtual Emerging Pathogens Group to provide immediate and ongoing advice on any emerging developments via discussion using an electronic message board. In December 2005 the Imported Foods Group presented paper ACM/764 which reported the conclusions of its findings to the Committee.

The Agency's horizon scanning programme

4. The aim of the Agency's horizon scanning programme is to ensure that the Agency has access to relevant information to take into account in decision making and shaping future strategy. The programme will develop the Agency's horizon scanning capability and also bring together current activities within a coherent framework.

5. The programme draws together 3 strands of work: i) horizon scanning by the expert advisory committees ii) information gathering and sharing in the Agency iii) networking and joint activities with other organisations.

6. Currently, the horizon scanning outputs from advisory committees are not systematically brought together and cross-referenced with wider horizon scanning activities in the Agency and/or government foresight initiatives. The work of the advisory committees will help to develop the Agency's foresight in science and technology, for instance by identifying new areas for research to address gaps in knowledge or identifying issues for early public engagement.

The work will feed in to the Agency's information gathering activities to identify trends and key drivers of change to inform future strategic planning.

7. With action now taken on previously identified priorities, and with several new members on the Committee, it is now timely to take stock and invite members to identify and discuss new topics for consideration. By taking forward the Committee's work on horizon scanning, these outputs will be used to inform the Agency's own horizon scanning activities.

8. In 2002 the Committee identified topics for possible future consideration in the attached paper ACM/581. At the time, Members agreed to revisit these topics at a future date when the ACMSF embarked on a future round of horizon scanning.

9. One area which was not covered in the previous list is the **"implications of climate change on the microbiological safety of food".** There are a wide range of issues here from the potential for spread of diseases not found in the UK, whether increased temperatures, droughts or flooding and storm damage can/will lead to more food poisoning.

Action needed

10. Members are therefore invited to consider the attached Annex and, in view of the fact that some of these areas have now been tackled, to:

- Consider whether any of the previous topics in ACM/581 not previously short-listed by the Committee, should now be considered;

- Consider any reports that need to be revisited for example, the report on foodborne viral infections, as a couple of areas in the horizon scanning list relate to this.

- Suggest new or emerging topics or microbiological risks which might merit detailed attention by the Committee in the short to medium term, and to decide whether such topics are likely to pose future problems.

Secretariat
June 2006

ACM/581

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

ACMSF HORIZON SCANNING

1. The ACMSF held a preliminary discussion on horizon scanning at its 43rd meeting on 21 March 2002 on the basis of ACM/559. The aim was to identify emerging issues which might merit detailed attention by the Committee in the short to medium-term.

2. During the course of the discussion on 21 March, Members put forward suggestions of what potential new or unusual microbiological risks might emerge. The Chairman asked Members to prioritise their suggestions and submit them so as to inform the Committee's further consideration of this issue on 27 June. Suggestions received are at Annex A.

3. Members' views are invited on the topics identified and any other candidates for attention by the ACMSF.

Secretariat
May 2002

ANNEX A

TOPICS IDENTIFIED BY ACMSF MEMBERS AS POSSIBLE CANDIDATES FOR PRIORITY ATTENTION

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Imported foods	The global food supply market has led (and will continue to lead) to increased volumes of imports from third countries. These include primary agricultural products, products of animal origin, and a wide variety of processed foods. Foodborne pathogens prevalent in exporting countries may find access to the UK via these trade routes. There is additional concern about the increased chance of antibiotic-resistant bacteria being present. For example, a survey of chicken from Taiwan found that 98% of *Campylobacter* isolates were fluoroquinolone-resistant.	• Review trend of imports (particularly of primary agricultural products) over past 5 years. • Review public health concerns in those exporting countries from which UK imports are increasing. • Assess risks. • Advise FSA on monitoring developments. • WHO may have data on antibiotic-resistant bacteria present in foods and food animals.

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Labelling for food safety	A variety of different food safety messages are given by manufacturers and retailers on-pack regarding cooking, storing cooling etc of foods and there may be a need to review this from a microbiological perspective to assess whether such advice is sound.	• Gather labelling information from high risk food groups. • Assess current industry guidance documents. • Determine safety of guidance and on-pack labelling with regard to control of food pathogens.
Role of opportunistic pathogens in disease	A range of bacteria are listed as being capable of causing opportunistic foodborne disease, including *Aeromonas*, various Enterobacteriaceae (*Citrobacter*, *Serratia*, etc), *Pseudomonas* spp., *Yersinia*, etc. These bacteria can occur in a variety of foods including RTE salads, ready meals, milk, infant foods, etc. There is a need to review the significance of these types of bacteria and provide guidance in relation to their significance in RTE foods for different consumer groups, including healthy adults and vulnerable groups.	• List foodborne organisms classed as potential pathogens. • Determine evidence to assess the capacity to cause illness, the infectious dose and foods. • Provide advice to FSA regarding likelihood of such organisms causing disease in different consumer groups.

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Decontamination processes for produce	There is a widespread debate about the use of chlorine for decontamination of produce and pressure from some countries to ban its use for foods. As a consequence, alternatives to chlorine for disinfection have been developed which have differing efficacy. In addition, there is some concern that the internalisation of pathogens in plant tissue could render conventional decontamination processes ineffective. Possible need to review contamination systems to assess the microbiological safety of such processes.	• Collect data on current available decontamination systems and efficacy trials. • Review data and determine the validity of such trials. • Review available options for decontamination in the event of internalisation becoming significant. • Advise FSA on current decontamination processes and potential new processes
Bivalve molluscs : current and future risks	There appears to be an increase in the number of fisheries closed due to detection of algal toxins and there is also considerable debate regarding the classification of harvesting/growing waters for shellfish using the current *E. coli*/faecal coliform monitoring. It may be useful to review shellfish safety controls given these issues.	• Review trends in data on shellfish associated illness, fisheries closures due to algal toxin detection, and shellfish classification. • Determine any trends tending towards increased microbiological concerns. • Review current controls and recommend any improvements for future microbial control to FSA.

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Changes in agriculture in general, and food animal production in particular	• Rearing, transport, slaughter, further processing, animal feed. • Chain information – data going both forward and back. Traceability at all stages in the chain. • Organic and new farming practices and Impact on disease and sub clinical disease. • Waste and agriculture – both farm generated and contaminants (sludge, etc). • New approach to meat inspection (changes to meat inspection legislation and possible option to use alternative meat inspection in some species and categories of stock in an integrated production system). • Use of terminal decontaminants, both traditional and novel (eg. bacteriophages). • Parasites (particularly in view of changing market shares and imported foods); • Opportunist pathogens (*Yersinia*, *Aeromonas*, *Pseudomonas*, *Cryptosporidium*, *Giardia*, *Trichinella*, etc).	

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Changes in agriculture in general, and food animal production in particular (continued)	• Epidemiological intelligence in terms of animal disease and relationships to human disease incidence.	
Risk assessment	Greater use of qualitative (rather than quantitative) approach to risk assessment and, in particular, with reference to monitoring and surveillance on-farm.	
Temperature control	Temperature control at various stages of the chain (eg. depot, in-store, etc). Any risk, eg, of loading meat at >7°C and expecting remaining fall to take place on lorry ?	
Markets	Wholesale and farmers' markets and other outlets, including farm gate sales	

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Imported foods	• Massive increase in foods from non-traditional overseas countries. Pressure to accept food from less developed countries, including enlarged EU. • Influence of cultural changes in a multi-cultural/multi-ethnic society • Retailer/media promotion of foods not part of traditional diet. • All imported foods to be traceable to source. • Hygiene controls. • Minimum packaging standards.	Better testing and inspection in international trade.
Overseas travel	• Health risks from hepatitis, typhoid, TB. • Importing foods for personal consumption on return from overseas trips. Better detection methods for meat and other illegal imports at sea and air ports.	
Agricultural practices	• Mixed farming. • Environmental changes. • Expansion of organic production.	

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Changing consumption habits	• Dietary changes. • Trend to eating out. • Al fresco eating patterns. • Influence of foreign travel on dietary habits. • Trends in fast food consumption. • Better food labelling.	
Progression towards extensive food production systems	The move towards organic and free-range animal production systems may increase food safety risks, as biosecurity is more difficult to maintain.	Review available data on pathogen contamination levels on meat/poultry produced under intensive and extensive systems.

TOPIC	ISSUE	**MEMBERS' IDEAS FOR POSSIBLE ACTION**
Bacterial stress responses and food safety	The Government has funded a lot of work on bacterial responses to exposures to food-related stresses. Much of this has been rather fundamental in nature and there may be a need to review this and to determine how relevant this work has been to food production. For example, when people become infected with foodborne pathogens, they will almost always eat bacteria that are attached to food matrices. Given previous work on the acid resistance of attached bacteria, it would be reasonable to assume that attached cells would have a lower infective dose but nothing has been done to examine this. In addition, there is very little information on the factors responsible for the persistence of bacteria in the environment, or on their ability to survive in air. This has animal health, cross-contamination and bio-terrorism relevance.	**Review current data**

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Transfer of genetic material between bacteria and quorum sensing	Certain foodborne pathogens, like *Salmonella typhimurium*, have an enhanced ability to receive and retain genetic material from other bacteria. For example, the antibiotic resistance integron in DT104 is believed to have come from a fish pathogen in the Far East. Bacteria can also communicate via compounds such as Homo-serine lactones.	Assess current state of knowledge and what work is in progress to try to determine whether the information being obtained permits food safety risks to be properly assessed.
Kitchen cleaning products containing biocides	There is a need to critically examine the need for kitchen cleaning products containing biocides. Whilst there is much information about how well pathogens like *Salmonella* and *Campylobacter* spread during, and persist after, food preparation, the circle has not yet been completed. Thus, does the presence of a few cells of *Salmonella* or *Campylobacter* on a work surface or in a dish cloth pose a measurable risk to health ?	Possible review of available data on pathogen spread and the claims made by the manufacturers of kitchen products. It would be interesting to ascertain from PHLS whether it is possible to breakdown data on cross-contamination in outbreaks to better-define categories.

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
How well prepared is the UK for the next foodborne disease pandemic ?	There could be major events in the future similar to *Salmonella* in eggs or BSE, particularly in view of the increasing trend in imports (legal or other).	
Loss of culinary skills	• A generation is growing up with little or no culinary skills. Domestic hygiene could be compromised, leading to increased domestic food poisoning. • Recruits into food service have less background knowledge of kitchen hygiene practice.	• Track knowledge of culinary skills. Use public awareness campaigns to address key risk areas. • Strengthen hygiene training requirements for food service.
Adaptation of food pathogens across species.	More severe food poisoning organisms adapt to most common food poisoning exposure pathways.	PHLS monitoring.
Link between common food poisoning organisms and chronic disease.	Possible role of *Campylobacter* and other foodborne pathogens in longer-term aetiology of other diseases.	Monitoring of medical science.

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Changes in production practice	Are there new microbial antibiotic resistance threats which have arisen since ACMSF Report ?	PHLS monitoring.
Norwalk-like virus (NLV) shown to be major food poisoning organism.	Technological advances help detect NLV in the food chain. NLV shown to be more significant than thought.	Technology watch. Risk assessment.
Diversification of farms to more niche food manufacturing	Potential for poor practice in small scale food processing, resulting in under-processing or contamination of finished products.	PHLS monitoring. Licensing of food manufacturing premises. Strong enforcement by EHOs. Legal requirement for documented HACCP.
Water as a potential source of pathogens.	Mains water used in food preparation. Bottled water sold through retail outlets.	Science watch. PHLS monitoring.
Plants and animals as vehicle for bioterrorism.	Feasibility. Economic impact. Preparedness. Lessons learned.	

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Traceability, including of organic and exotic foods	Growing consumption and import trends. Internet commerce and purchases through small importers. Sales through major retail multiples.	
Probiotics	The continued rise in foodborne and other pathogens demands that alternative strategies be adopted for the control of infection in food animals. One potentially attractive option, which could be used on a large scale, is the use of preparations of non-pathogenic microorganisms either to exclude or to remove pathogens. A good example of this is the competitive flora used to protect chickens against *Salmonella*. Work is in progress to try to develop a protective flora which would be effective against *Campylobacter*.	Certain key issues associated with the use of probiotics remain to be fully resolved, including :- • for how long do the protective effects last ? • can probiotics work against established intestinal infections ? • what are the actions of these preparations ? Are inhibitory compounds produced, is there competition for binding sites, or both ? • given that bacteria like *Salmonella* and *E. coli* can become more acid resistant in the presence of low concentrations of certain organic acids, is there a possible food safety risk in the use of lactic acid bacteria ?

TOPIC	ISSUE	MEMBERS' IDEAS FOR POSSIBLE ACTION
Probiotics (continued).	In addition to the administration of microbial cultures, it may also be possible to protect animals against infection through the use of feed which has been fermented by lactic acid bacteria. The organic acids produced by such fermentations are highly active against Gram-negative pathogens in particular.	• does the presence of probiotic bacteria affect gene and protein expression in foodborne pathogens in a way which might compromise food safety ? • are there animal production gains which might accrue from the increased use of probiotics ? • are all currently available preparations equally effective ? • has enough work been done to identify the bacterial strains most suitable for large-scale use in animal production ? Possible further work :- • trials to compare probiotics with antibiotics as animal treatment agents. • assemble information on work in progress and identify gaps/research needs (a number of UK research groups are looking at probiotic use and should be able to provide information).