Microbiological Evidence Base Plan 2015−2019

Introduction

In the food regulation system, FSANZ occupies a central role as an expert, science-based source of advice on a broad range of food-related issues and assessment of food-related risks. To fulfil this role, it's imperative to ensure the advice we provide is robust and up-to-date.

The overarching aim of FSANZ's *Microbiological Evidence Base Plan* is to provide a trusted, robust and contemporary microbiological evidence base to support food safety risk management measures in Australia and New Zealand. The plan links to the FSANZ Science Strategy, specifically on how to support Strategic Area 2 — improving scientific evidence.

The three key objectives of the plan are to:

- establish a consistent and systematic approach to building and sustaining FSANZ's microbiological evidence base

- ensure robust and contemporary microbiological evidence is available to support effective food risk management measures

- be recognised as a leader in, and trusted source of, advice for microbiological food safety issues.

The plan emphasises establishing appropriate internal systems and processes to better enable identification, collation and analysis of evidence for existing and emerging areas of microbiological food safety.

Three key focus areas are identified, each containing a number of supporting activities (Figure 1):

- facilitation
- interrogation
- anticipation.

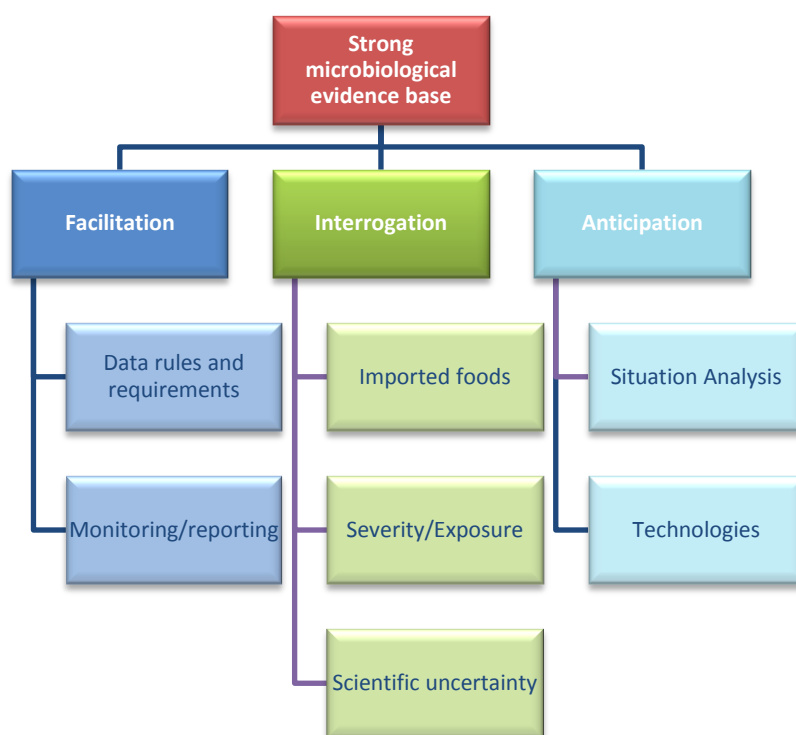An overview of components in each focus area is provided below.

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Figure 1:   Overview of FSANZ's Microbiological Evidence Base Plan 2015-2019

Facilitation

The facilitation focus area aims to establish consistent and systematic approaches to build and sustain the FSANZ microbiological evidence base.

Scientific information is often held in disparate locations and may not be collected or curated consistently. To improve our usability of these data we need to better understand and interpret changing data and be aware of the type of information collected and how it is collected, reported and utilised. Internal systems are required to ensure data obtained by FSANZ are in a consistent and usable format and accompanied by relevant metadata. Better links with data stakeholders will also ensure effective data generation, access and utilisation.

Two components have been identified as initial priorities in this area: data rules and requirements; and monitoring and reporting.

Data rules and requirements

This component will be progressed as part of the broader FSANZ *Data Management Strategy*. Data are often received by FSANZ in a variety of formats and without accompanying metadata which makes interpretation and use difficult. Standardised procedures and format requirements for microbiological data are used by a number of international food safety agencies setting minimum requirements for describing sample collection, analysis and reporting. FSANZ will draw on these examples to develop a similar set of standardised data rules and requirements for microbiological data.[1]

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[1] For example, EFSA's *Data Dictionaries for reporting 2014 zoonoses, antimicrobial resistance and food-borne outbreaks using the EFSA data models for the Data Collection Framework (DCF) to be used in 2015, for 2014 data.*

Monitoring/reporting

Data holdings are often dispersed throughout various research bodies, academia, government jurisdictions, as well as industry. This can limit our ability to analyse and report on food safety risks to inform the risk analysis process. FSANZ therefore intends to strengthen links to enable better identification and access to key relevant external data sources to better inform FSANZ's microbiological evidence base.

FSANZ has lacked a consistent and systematic approach to generating or collecting microbiological data. The Implementation Subcommittee for Food Regulation Surveillance and Monitoring Working Group (ISFR S&M WG) is an existing and effective mechanism which could be better used to establish ongoing and systematic generation and collection of microbiological data, similar to the approach that has been adopted for chemicals (e.g. the Australian Total Diet Study). A wealth of microbiological data already exists in the jurisdictions and enhanced collaboration with the ISFR S&M WG will enable better access and utilisation of these data.

Interrogation

The aim of this focus area is to ensure robust and contemporary microbiological evidence is available to support effective food safety risk management measures.

The type of data required to inform risk management is constantly evolving due to changes in how food is produced and the globalisation of supply chains. Increased large-scale food production, global distribution, changes in consumer behaviours and increases in ageing and vulnerable populations all contribute to these changes that require a more proactive and preventative approach to characterising and managing risk. This requires both finding and using existing data at various points in the food supply chain, some of which may not be immediately visible, but also accessing and generating additional data to fill identified gaps.

FSANZ microbiological risk assessments use the best scientific information available at the time. Scientific uncertainty relating to risk assessments is often identified due to gaps in evidence. Uncertainty arises due to a lack of information on contamination levels in specific products, reservoirs for pathogens, as well as the foods and pathogens responsible for the most foodborne disease. The severity of illness caused by less well characterised pathogens such as norovirus, *Toxoplasma gondii* and non-STEC pathogenic *E. coli*, as well as the frequency and type of high-risk foods consumed by vulnerable populations are also areas of significant uncertainty.

Interrogation forms the largest focus area under the plan and currently incorporates four components (described below).

Providing risk advice for imported foods

The Department of Agriculture and Water Resources enforces the Food Standards Code at the border. The department applies different control measures based on a risk-based assessment program. FSANZ works with the department and provides risk assessment advice in response to requests from the department. From time-to-time FSANZ may also provide advice in other circumstances e.g. in response to a national food safety incident.

FSANZ is working on a more transparent and systematic approach to risk characterisation that codifies the decision-making process for the risk statements it provides to the department. This approach will include considering risk ranking tools used internationally as well as determining gaps in the types of foods and/or hazards that may present emerging risks.

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Scientific uncertainty

If data gaps are identified that affect decision making, FSANZ seeks where possible, to generate the required data either alone or in partnership with others. Collaborating and sharing information and data including methodologies, can assist to fill some of the identified data gaps and add to the scientific evidence base. Activities proposed under the m*onitoring/reporting* component for the generation and collection of data and enhanced links with the ISFR Surveillance and Monitoring Working Group will also assist in reducing data gaps.

Attribution of foodborne illness to a particular food source, or environmental reservoir, is frequently an area of uncertainty. In the past, FSANZ has been a contributing partner in attribution research projects and recognises the importance of ongoing involvement in future source attribution work. FSANZ will support and partner academic institutes and other bodies to initiate source attribution research with a grant proposal for campylobacteriosis attribution planned for submission in 2016.

Severity/exposure

Information about the severity of an illness and the population at risk is essential for characterising the risk of foodborne illness from a particular pathogen. This type of information also provides valuable input to estimate the economic cost of the illness, which in turn informs risk management measures.

FSANZ currently estimates the economic costs associated with foodborne illness using a Cost of Illness (COI) model developed in-house. The chance of becoming ill and how ill a person becomes can be difficult to estimate. The proportions of illnesses that will be more severe or will develop sequelae are areas of even greater uncertainty. FSANZ will partner with other bodies to initiate research investigating severity outcomes of pathogens to inform the economic costs of foodborne illness.

For many microbiological hazards, a person's immune status is an important determinant of both the probability of infection and disease, as well as the severity of illness. There is an opportunity to better understand the food consumption patterns of vulnerable sub-populations with the availability of more up to date consumption (e.g. the 2011–2013 Australian Health Survey and other relevant data sets) and food supply information. Projects are planned around interrogating current health and consumption data to investigate changes in consumption patterns which may influence the risk factors for various diseases, like listeriosis.

This information will help us provide information about health outcomes to use as inputs to estimate the economic cost of illness and also inform other risk management activities.

Anticipation

The aim of this focus area is to be recognised as a leader in, and trusted source of, advice for microbiological food safety issues.

The food supply chain is a constantly evolving environment and therefore a more proactive approach is required to better understand emerging risks and ensure our advice remains contemporary. To that end, parts of this focus area include situational analyses across the food supply chain and keeping appraised of new and/or developing issues and technologies.

A current government priority is minimising the selection and development of antimicrobial resistant (AMR) organisms which could compromise the effectiveness of clinically important antibiotics, including through the food supply (e.g. the joint Department of Health and Department

of Agriculture *National Antimicrobial Resistance Strategy 2015-2019*). We will continue our involvement in the national and international conversation on the issue of AMR in the food supply and input into and influence, where possible, the national debate in this area.

There has also been technological advancement in the use of genomic sequencing and bioinformatics in routine diagnostics. We have already established links with expert groups in this research area domestically (e.g. Peter Doherty Institute, Melbourne University) and internationally (e.g. the Global Coalition on Regulatory Science Research). We will continue to strengthen these collaborations to facilitate a better understanding of these new technologies and their applications.

Situation analysis

Having a national and through-chain perspective on the current level of foodborne illness can be very informative, particularly in relation to foods associated with disease. The point at which illness originates in the food supply chain can provide a better understanding of the risk factors and associated intervention strategies for certain foodborne pathogens. A through chain analysis could potentially benefit the development of approaches to controlling important foodborne pathogens like *Salmonella*, *Campylobacter* and viruses. These pathogens have been identified as possible areas where situation analysis could occur if required.

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