### Planning and designing an analytical food survey

**C. Mooney, Dr J. Abbey & J. Trudinger**  
Food Standards Australia New Zealand, Canberra, ACT

#### Introduction

Food Standards Australia New Zealand (FSANZ) monitors the food supply through a range of surveillance activities. Analytical surveys are an integral part of monitoring and provide important information about the safety of the food supply. The establishment of food standards and the development and maintenance of databases require data to support their review and development. In conducting an analytical survey, it is critical that the analytical data received from the laboratory is checked for errors and managed in such a way that potential errors are not propagated into the dietary exposure component of the risk assessment process. This will allow for a more accurate interpretation of the analytical data and representation of the current situation under investigation.

The planning and design of an analytical food survey is an integrated process (Figure 2) and there are a number of activities that need to be undertaken (Box 1). To conduct a robust analytical food survey, the design should accurately represent the current situation without bias. Accordingly, the development of a detailed and thorough sampling plan is critical for a sound risk assessment and to inform any risk management strategies that may be required. The effectiveness of existing food regulatory measures in ensuring the safety and adequacy of the Australian food supply can be evaluated with confidence and may also be used to compare with international data.

### The initial phases

1. **Clearly define the purpose of the survey**
2. **Define the scope of the survey** e.g., “total diet” versus “targeted”
3. **Determine the focus e.g., commodity such as coffee or substance such as melamine**
4. **Determine the urgency for acquiring the data** e.g., a potential risk to public health and safety
5. **Establish what resources are available for conducting the survey**

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#### BOX 1 - Initial activities to be undertaken

- Background research into the food analysis industry, including the representatives of the Food Standards Code, validated analytical methods and related health standards.
- Consultation with FSANZ internal discipline groups and external stakeholders to discuss plans and issues.
- Consideration of budget constraints.
- Ascertain the feasibility and potential cost of the overall survey.
- Consideration of any additional activities or phase changes.
- Identify sources of chemicals.
- Consider the possibility of additional food regulation issues.
- Review the plans for the contracted laboratory.
- Ensure there is a clear understanding of the planned food analysis.

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#### BOX 2 - Developing a sampling plan

- **What type of foods will be included?**
- **If it is a total diet study, are the foods representative of the diet?**
- **Is it necessary to include multiple samples to account for seasonal variation?**
- **Is it appropriate to sample in urban and rural settings?**
- **How many samples are required to provide the most accurate data? Should the samples be an equal number of samples?**
- **How many samples are needed to provide a valid overall diet?**
- **What should be included in the instructions for sample collection?**
- **What information needs to be recorded e.g., digital photos?**
- **What factors might influence the variability of the results?**
- **What analytical specifications do we want the laboratory to follow e.g., method type, limit of quantification/ detection/reporting?**

Data collection and interpretation

It is critical that the analytical data used in the estimation of dietary exposure to the food chemical and inform the risk assessment process. A dietary exposure estimate refers to estimating the potential exposure of a population or population sub-group to a food chemical from the diet and comparing this to a reference health standard. The steps involved in conducting a dietary exposure assessment and where this feeds into the risk assessment are summarised in Figures 4 and 5.

#### Figure 2: Steps involved in conducting an analytical food survey

1. **Planning**
2. **Design**
3. **Sampling**
4. **Sample analysis**
5. **Data compilation and checking**
6. **Dietary exposure estimate**
7. **Risk assessment**

#### Figure 3: Example of single vs. composite sample analysis

- Single sample
- Composite sample

#### Figure 4: The process of conducting a dietary exposure assessment

1. **Food consumption data**
2. **Data compilation**
3. **Dietary exposure estimate**
4. **Risk assessment**

#### Figure 5: The risk assessment process

1. **Hazard identification**
2. **Hazard characterization**
3. **Exposure assessment**
4. **Risk characterization**

#### Conclusion

Through planning and design of analytical food surveys are fundamental to ensure that high quality, reliable and representative data are produced. The data derived from analytical food surveys are critical for a sound risk assessment and to inform any risk management strategies that may be required. The effectiveness of existing food regulatory measures in ensuring the safety and adequacy of the Australian food supply can be evaluated with confidence and may also be used to compare with international data.