



**Australian Government**

**Australian Institute of  
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# **Mandatory folic acid and iodine fortification in Australia and New Zealand**

## **Baseline report for monitoring**

**May 2011**

Australian Institute of Health and Welfare  
Canberra

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# Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ANS	New Zealand Adult Nutrition Survey
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
BEACH	Bettering the Evaluation and Care of Health
CDAH	Child Determinants of Adult Health
DFE	Dietary folate equivalent
EAR	Estimated average requirement
FFQ	Food frequency questionnaire
FSANZ	Food Standards Australia New Zealand
ICCIDD	International Council for the Control of Iodine Deficiency Disorders
ICD	International Classification of Disease
ICD-O-3	International Classification of Diseases for Oncology, 3rd edition
MRI	Magnetic resonance imaging
MUIC	Median urinary iodine concentration
NNS	National Nutrition Survey
NRV	Nutrient reference value
NTD	Neural tube defect
NZFSA	New Zealand Food Safety Authority
SE	Standard error
RDI	Recommended dietary intake
UL	Upper level of intake
UNICEF	United Nations Children's Fund
WHO	World Health Organization

# Symbols

..	not applicable
>	more than
<	less than
≥	more than or equal to
≤	less than or equal to
μg	micrograms
L	litre
mL	millilitres
n.a.	not available
nmol	nanomoles
n.y.a.	not yet available
mg	milligrams
g	grams

# Summary

The Australia and New Zealand Food Regulation Ministerial Council (the Ministerial Council) requested that Food Standards Australia New Zealand (FSANZ) consider mandatory folic acid fortification to help reduce the incidence of neural tube defects (NTDs) (serious birth defects), and mandatory iodine fortification to tackle the re-emergence of iodine deficiency in the population. In response, FSANZ developed two mandatory standards, effective from October 2009, which require the addition of folic acid to bread-making flour in Australia, and iodine (via iodised salt) to bread in Australia and New Zealand.

In developing the mandatory standards, the Ministerial Council agreed that these need to be monitored to assess the effectiveness of these public health interventions. As a consequence, monitoring frameworks for mandatory folic acid and iodine fortification were developed by expert groups of the Food Regulation Standing Committee. The frameworks were then agreed by the Australian Population Health Development Principal Committee and the Australian Health Ministers' Advisory Council.

These monitoring frameworks are based on five main components:

1. food composition and food industry compliance
2. nutrient intake
3. nutrient status
4. health benefits
5. adverse health effects.

This report presents baseline data for each component of the monitoring framework, and makes observations for future monitoring. Recommendations are provided on how to manage the various data available, and to consider data not yet available for publication as part of the monitoring process. A summary of the monitoring questions and quality of the baseline data questions for each component of the framework for folic acid and iodine fortification is at Table S.1 and Table S.2 (see Section 2.6 for details on baseline quality data). The success of the monitoring program will be dependent on ongoing data collection.

Key baseline data, outlined below, will form the basis of future monitoring to determine the effectiveness of the two mandatory fortification standards. Before mandatory folic acid fortification was introduced:

- the mean dietary folic acid intakes for women aged 16–44 years (the target population) in Australia was 108 micrograms ( $\mu\text{g}$ ) of folic acid per day and in New Zealand was 62  $\mu\text{g}$  of folic acid per day, well below the recommended 400  $\mu\text{g}$  per day.
- there were 149 pregnancies affected by NTDs in 2005 in Australia (rate of 13.3 per 10,000 births) in the three states that provide the most accurate baseline of NTD incidence (South Australia, Western Australia and Victoria), and 63 pregnancies affected by NTDs in 2003 in New Zealand (rate of 11.2 per 10,000 births).

Before mandatory iodine fortification was introduced:

- large proportions of the Australian and New Zealand population had inadequate iodine intakes.

- national surveys measuring median urinary iodine concentration (MUIC) in schoolchildren, an indicator of overall population status, confirmed mild iodine deficiency in both countries. The concentration was 96 µg per litre in Australia, and 66 µg per litre in New Zealand, less than the 100–200 µg per litre considered optimal.

**Table S.1: Folic acid fortification monitoring questions and quality of baseline data**

Framework component	Monitoring question	Baseline data quality	
		Australia	New Zealand
Food composition and industry compliance	Has the level of folic acid in our food supply increased?	High	Moderate
	Is the food industry adequately complying with the mandatory fortification standards?	..	..
Nutrient intake	Have folic acid intakes in women of child-bearing age increased?	Moderate–high <sup>(a)</sup>	High <sup>(a)</sup>
Nutrient status	Has the folate status of women of child-bearing age improved?	Low–moderate <sup>(a)</sup>	High <sup>(a)</sup>
Health benefits	Has the incidence of NTDs decreased?	High <sup>(a)</sup>	High <sup>(a)</sup>
Adverse health effects	Does mandatory folic acid fortification result in adverse health effects for the population?	Moderate–high <sup>(a)</sup>	High <sup>(a)</sup>

(a) Pending the release of some data not yet available for publication.

**Table S.2: Iodine fortification monitoring questions and quality of baseline data**

Framework component	Monitoring question	Baseline data quality	
		Australia	New Zealand
Food composition and industry compliance	Has the level of iodine in our food supply increased?	High	High
	Is the food industry adequately complying with the mandatory fortification standards?	..	..
Nutrient intake	Have iodine intakes in the population increased?	Moderate–high <sup>(a)</sup>	High <sup>(a)</sup>
Nutrient status	Has the iodine status of the population improved, in particular in women of child-bearing age?	High	High <sup>(a)</sup>
Health benefits	Has iodine deficiency been tackled?	High	High <sup>(a)</sup>
Adverse health effects	Does mandatory iodine fortification result in adverse health effects for the population?	Moderate–high <sup>(a)</sup>	High <sup>(a)</sup>

(a) Pending the release of some data not yet available for publication.

# Recommendations for additional baseline data

Baseline data from various sources are documented throughout this report. However, some data are not yet available for publication in this report because they have not been analysed or published. It is anticipated the additional data be available in 2011 and then published as a supplement to this report. These data are listed below.

## Australia

The following additional data sources should be included as baseline data:

- the Food Standards Australia New Zealand (FSANZ) analysis of the 2007 Australian National Children's Nutrition and Physical Activity Survey (2007 Children's Survey) for folic acid and iodine intake, to complement data from the 1995 National Nutrition Survey (NNS)
- data on folic acid and iodine intake, including supplements, and folate and iodine status from the 2009–10 Victorian Health Monitor (see Section 3.3 for details), to complement other data sources
- data on folic acid intake and folate status from the Western Australian Folate Study (see Section 3.3 for details), to complement other data sources.
- the most recent data on supplement use from the jurisdictional population health surveys, to complement data from the Population Survey Monitor
- data on folate status from the Child Determinants of Adult Health and Aboriginal Birth Cohort studies
- the consumer behaviour and food intake data from FSANZ on fortified products
- the most recent data on NTD incidence
- the most recent data on cancer incidence and mortality, and from the bowel cancer screening program (for folic acid fortification).

## New Zealand

The following additional data sources should be included as baseline data:

- the FSANZ analysis of the 2002 Children's National Nutrition Survey (2002 Children's Survey) and results of the 2008–09 New Zealand Adult Nutrition Survey for folic acid and iodine intake, to complement data from the 1997 National Nutrition Survey
- data from the 2008–09 New Zealand Adult Nutrition Survey on folic acid and iodine supplement use and folate and iodine status, complemented by data from the Folate Status of Representative Populations in Dunedin Study (folic acid only)
- the most recent data on NTD incidence
- the most recent data on cancer incidence and mortality (for folic acid fortification).

# Observations for future monitoring

A consideration for the selection of baseline data was the availability of follow-up data to monitor change over time. The AIHW has made various observations throughout this report on data requirements for future monitoring. These are summarised below.

In principle, the Australian Population Health Development Principal Committee prefers that, where feasible, all jurisdictions are included in monitoring.

## Australia

- FSANZ food composition data recommended to be used as the basis for monitoring the folic acid and iodine content of foods.
- Information collected by jurisdictional enforcement agencies on the level of industry compliance – for example, as part of the Implementation Sub Committee Coordinated Survey – be used for future monitoring.
- The Australian Health Survey Program should be used for future monitoring (folic acid and iodine intake, including supplements, and folate and iodine status).
- A repeat of the 2009–10 Victorian Health Monitor (see Section 3.4 for details) would make a valuable contribution to future monitoring (folic acid and iodine intake, including supplements, and folate and iodine status).
- A repeat of the Western Australian Folate Study (see Section 3.4 for details) post-implementation would provide an indication of the effect of mandatory folic acid fortification (folic acid intake and folate status).
- Continued collation of consumer behaviour and food intake data by FSANZ on fortified products would be beneficial to the monitoring process.
- Consideration should be given to collecting data, as part of the jurisdictional population health surveys, on the amount of folic acid consumed from various supplements.
- Data from the repeat of the Aboriginal Birth Cohort Study will be beneficial to monitoring folate and iodine status.
- Data on NTDs from states in addition to South Australia, Western Australia and Victoria, where possible, should be included in the monitoring with the inclusion of pregnancy terminations before 20 weeks gestation.
- A central agency for reporting NTD occurrences, drawing on the Australian Congenital Anomalies Monitoring System, should be continued.
- All possible causes for changes in cancer incidence and mortality rates should be carefully considered when monitoring change over time (for folic acid fortification).
- It will be important to determine if the implementation of the National Bowel Screening Program has an effect on cancer detection rates before interpreting any change in cancer incidence in the years following fortification.

## **New Zealand**

- The Manufactured Food Database should be used to estimate the extent of folic acid food fortification.
- The New Zealand Food Composition Database should be used as the basis for monitoring the folic acid and iodine content of foods through analysed values.
- Compliance information collected by the New Zealand Food Safety Authority should be sent to a coordinating agency.
- Future National Nutrition Surveys should be used as a means for monitoring (folic acid and iodine intake, including supplements, and folate and iodine status).
- The planned repeat of the Folate Status of Representative Populations in Dunedin Study will help monitor folic acid supplement use and folate status.
- All possible causes for changes in cancer incidence and mortality rates should be carefully considered when monitoring change over time.



# 1 Introduction

## 1.1 Purpose of this report

In 2004, the Australia and New Zealand Food Regulation Ministerial Council (the Ministerial Council) requested that Food Standards Australia New Zealand (FSANZ) develop mandatory folic acid and iodine fortification standards to help reduce the incidence of neural tube defects (serious birth defects), and to tackle the re-emergence of iodine deficiency in the population. In response, FSANZ developed two mandatory standards requiring the addition of folic acid to bread-making flour in Australia, and iodine (via iodised salt) to bread in Australia and New Zealand. These standards became effective from October 2009.

The Ministerial Council's Policy Guideline on Fortification of Food with Vitamins and Minerals (ANZFRMC 2004) indicates that mandatory fortification of a nutrient should not result in detrimental dietary excesses or imbalances of vitamins and minerals, and should deliver effective amounts of added vitamins or minerals to the target group to meet the health objective. The guideline also requires that mandatory fortification be monitored and reviewed to assess the effectiveness of, and continuing need for, this public health intervention. As a result, there is a need for management of a monitoring program, which begins with the identification and analysis of baseline data.

The purpose of this report is to:

- find and analyse the most suitable baseline data for monitoring mandatory fortification
- make observations about future monitoring
- document the data sources relevant to monitoring the mandatory fortification of the food supply with folic acid and iodine in Australia and New Zealand.

Data presented in this report have been drawn from a review of the available data sources, and are listed in the Appendix.

## 1.2 Background

### Folic acid

Folate is a B group vitamin needed for healthy growth and development, including the nervous system. Naturally-occurring folate is found in a wide variety of foods, such as green leafy vegetables, cereals, fruits and grains. Folic acid is the synthetic form of folate used in supplements or added to food (FSANZ 2006).

Since the 1960s, there has been mounting evidence that increasing folic acid intake during the peri-conceptual period is associated with a decreased prevalence of NTDs (Lumley et al. 2001). NTDs are major congenital anomalies that result from very early disruption in the development of the brain and spinal cord (central nervous system) in utero (AIHW: Abeywardana & Sullivan 2008). The neural tube, which forms the central nervous system, usually closes and fuses 18–26 days after conception. Failure to do so may lead to a neural tube defect such as spina bifida, anencephaly or encephalocele (Verity et al. 2003).

The recommendations for folic acid to prevent NTDs are expressed as micrograms ( $\mu\text{g}$ ) of folic acid:

Women capable of, or planning, pregnancies should consume additional folic acid as a supplement or in the form of fortified foods at a level of 400  $\mu\text{g}$  per day folic acid for at least one month before and three months after conception, in addition to consuming food folate from a varied diet (NHMRC & NZMoH 2006).

Evidence that the risk of NTDs can be reduced by increased consumption of naturally-occurring folate alone is lacking. Thus, recommendations to reduce the risk of NTDs focus on 400  $\mu\text{g}$  of folic acid per day either in supplements or from fortified foods, in addition to the naturally-occurring folate in foods (FSANZ 2006).

While the recommended level of folic acid intake for a health benefit relates solely to women capable of, or planning, pregnancies, the *Nutrient Reference Values for Australia and New Zealand* (NRVs) specify upper levels of intake (ULs) for children, adolescents and adults (NHMRC & NZMoH 2006) (Table 1.1).

**Table 1.1: Upper level of folic acid intake, by age group**

Age group (years)	Upper levels of intake ( $\mu\text{g}/\text{day}$ )
1–3	300
4–8	400
9–13	600
14–18	800
19+	1,000

Source: NHMRC & NZMoH 2006.

## Iodine

Iodine is required for the synthesis of thyroid hormones, and these play a key role in regulating metabolism. Thyroid hormones are also important in the early growth and development of most organs, especially the brain during fetal and postnatal life (Delange 2000). So the iodine status of pregnant and breastfeeding women is of particular importance (FSANZ 2008b). Iodine deficiency causes more than goitres – it also causes stillbirths, neonatal and other types of hypothyroidism, fetal brain damage and reduced intelligence quotient (IQ)(depending on the level of deficiency) (WHO et al. 2001).

The recommendations for iodine intakes are listed in Table 1.2 (NHMRC & NZMoH 2006). Adequate intake (AI) levels are provided for infants and recommended dietary intakes (RDI), estimated average requirements (EAR) and upper levels of intake (UL) for children, adolescents and adults. Requirements during pregnancy and lactation are higher than the general adult population.

**Table 1.2: Nutrient Reference Values for Australian and New Zealand for iodine ( $\mu\text{g}/\text{day}$ )**

Life stage	Age group	Adequate intake	Estimated average requirement	Recommended dietary intake	Upper level of intake
Infants	0–6 months	90	..	..	..
	7–12 months	110	..	..	..
Children and adolescents	1–3 years	..	65	90	200
	4–8 years	..	65	90	300
	9–13 years	..	75	120	600
	14–18 years	..	95	150	900
Adults	19+ years	..	100	150	1100
Pregnancy	14–18 years	..	160	220	900
	19–50 years	..	160	220	1100
Lactation	14–18 years	..	190	270	900
	19–50 years	..	190	270	1100

Source: NHMRC & NZMoH 2006.

## Mandatory folic acid fortification

The Ministerial Council asked FSANZ to consider mandatory fortification of food with folic acid as a means of reducing the incidence of NTDs. In response, FSANZ raised Proposal P295 – Consideration of mandatory fortification with folic acid.

After extensive consultation, the mandatory standard was accepted by the Ministerial Council in June 2007 and gazetted on 13 September 2007. Standard 2.1.1 – Cereal and cereal products of the Australia New Zealand Food Standards Code (the Code) requires the addition of folic acid to all wheat flour for making bread in Australia. New Zealand issued a separate food standard under the *New Zealand Food Act 1981*, which requires the addition of folic acid to bread, rather than to wheat flour for making bread. In both countries all flour and bread represented as ‘organic’ are exempt from mandatory fortification.

The level of fortification required in Australia is no less than 2 milligrams (mg) and no more than 3 mg of folic acid per kilogram of wheat flour for making bread. In New Zealand the level is no less than 0.8 mg and no more than 1.8 mg of folic acid per kilogram of bread. Fortification at these levels is expected to result in an average value of 120 micrograms ( $\mu\text{g}$ ) of folic acid per 100 grams of bread in Australia (about three slices) and 135  $\mu\text{g}$  in New Zealand (FSANZ 2007b). The amount of folic acid present in bread differs slightly between Australia and New Zealand due to the difference in food vehicle – wheat flour for making bread as opposed to bread. Existing voluntary folic acid fortification permissions in products other than flour/bread remain.

The mandatory standards allowed the food industry a 2-year transition period to implement the provisions. The Australian standard became enforceable from 13 September 2009 and the New Zealand standard from 27 September 2009. However, the New Zealand Government decided to defer implementation of its mandatory folic acid fortification standard until May 2012, and to encourage increased voluntary fortification, particularly of bread.

The baseline data for New Zealand in this report may be used for monitoring should mandatory fortification be introduced. Any increase in voluntary fortification will need to be captured in the baseline data, and a full assessment will need to be done closer to that time.

## **Mandatory iodine fortification**

Also in 2004, the Ministerial Council asked FSANZ to consider mandatory fortification of food with iodine as a means of tackling the re-emergence of iodine deficiency in Australia and New Zealand. In response, FSANZ raised Proposal P230 – Iodine fortification, and later Proposal P1003 – Mandatory iodine fortification for Australia.

Again after extensive consultation, the Ministerial Council accepted a joint standard for Australia and New Zealand in 2008. The standard requires non-iodised salt to be replaced with iodised salt in bread. However, bread represented as ‘organic’ is exempt, consistent with the mandatory folic acid fortification standard.

The level of salt iodisation required is between 25–65 mg of iodine per kg of salt, the same level as the current voluntary permission for iodised salt. Given the current salt levels in bread, bread will contain an average of 46 µg iodine per 100 g of bread (from iodised salt and other ingredients) (FSANZ 2008b).

The standard became enforceable from 27 September 2009 in New Zealand and 9 October 2009 in Australia. A 1-year transition period was provided so that both the folic acid and iodine fortification standards could be implemented together.

## **1.3 Structure of this report**

Following an introduction and overview of the monitoring framework, this report contains four main chapters covering mandatory folic acid and iodine fortification for both Australia and New Zealand. Details of the specific chapters are:

- Chapter 1 – Introduction.
- Chapter 2 – Overview of the folic acid and iodine fortification monitoring frameworks.
- Chapter 3 – Australian baseline data for monitoring mandatory folic acid fortification, and observations on data requirements for future monitoring.
- Chapter 4 – Australian baseline data for monitoring mandatory iodine fortification, and observations on data requirements for future monitoring.
- Chapter 5 – New Zealand baseline data for monitoring mandatory folic acid fortification, and observations on data requirements for future monitoring.
- Chapter 6 – New Zealand baseline data for monitoring mandatory iodine fortification, and observations on data requirements for future monitoring.

At the end of Chapters 3–6, summaries of all relevant baseline data sources are included.

## 2 Monitoring frameworks and measures

### 2.1 Introduction

Monitoring frameworks for mandatory folic acid and iodine fortification have been developed by Food Regulation Standing Committee expert groups. These frameworks cover the appropriate areas that need to be monitored to assess the effects and effectiveness of the mandatory fortification standards. They were agreed by the Australian Population Health Development Principal Committee in August 2007, and accepted by the Australian Health Ministers' Advisory Council in October 2007.

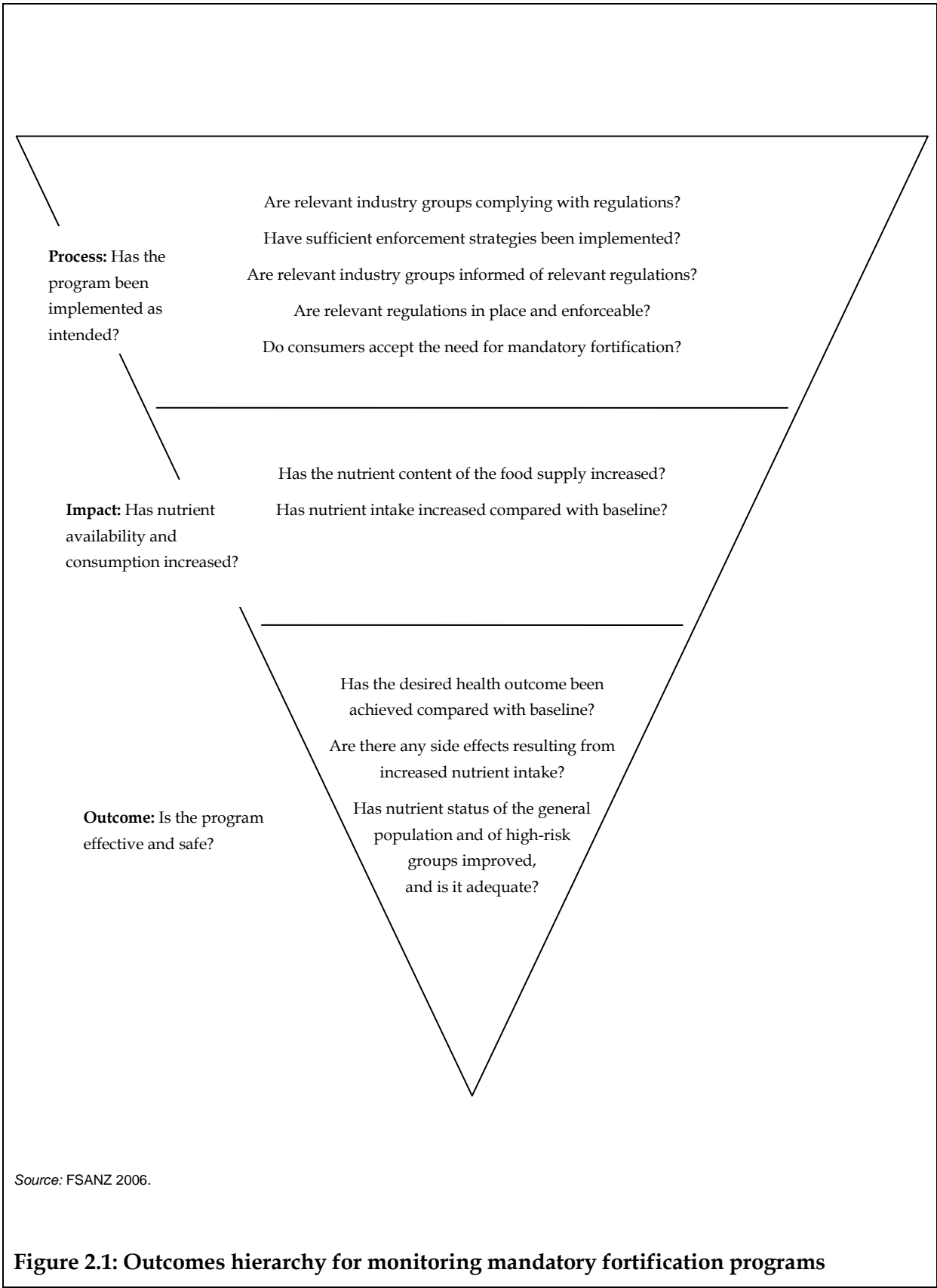
When monitoring the standards, it is essential to assess the impact on the target populations, and to ensure there are no unintended consequences for the population as a whole. The monitoring frameworks are based on an 'outcomes hierarchy' outlining the process, impact and outcome questions to be considered. This has been outlined by FSANZ (2006) and is based on a model by Abraham & Webb (2001) (Figure 2.1).

This outcomes hierarchy approach is based on a stepwise progression from the first action (the policy change) to the policy objective (that is, a reduction in NTDs and iodine deficiency). Each step represents a measurable achievement necessary to achieve the next step and the ultimate outcome (Abraham & Webb 2001).

The monitoring frameworks for folic acid and iodine fortification are divided into five key components:

1. food composition and food industry compliance
2. nutrient intake
3. nutrient status
4. health benefits
5. adverse health effects.

With respect to the outcomes hierarchy, each step of the monitoring framework must be achieved before moving on to the next. For example, an increase in the concentration of folic acid and iodine in the food supply should lead to an increase in nutrient intake, then status and ultimately a reduction in NTDs and iodine deficiency. Along with monitoring health benefits it is essential that possible adverse health effects are assessed.



**Figure 2.1: Outcomes hierarchy for monitoring mandatory fortification programs**

## **2.2 Folic acid fortification monitoring framework**

### **Expected outcome of fortification**

It is expected that mandatory folic acid fortification will lead to a reduction in the incidence of NTDs. This is underpinned by a dose-response relationship between folic acid intakes and risk of pregnancies affected by NTDs according to serum folate concentrations (FSANZ 2006).

### **Target population**

The target population for mandatory folic acid fortification is women of child-bearing age (about 16–44 years).

### **Monitoring elements**

The following monitoring questions require answers:

1. Food composition and food industry compliance  
Has the level of folic acid in our food supply increased?  
Is the food industry adequately complying with the mandatory fortification standard?
2. Nutrient intake  
Have folic acid intakes in women of child-bearing age increased?
3. Nutrient status  
Has the folate status of women of child-bearing age improved?
4. Health benefits  
Has the incidence of neural tube defects decreased?
5. Adverse health effects  
Does mandatory folic acid fortification result in adverse health effects for the population?

## **2.3 Folic acid fortification monitoring measures**

This section describes the measures that will be monitored for each component of the monitoring framework.

### **Food composition and food industry compliance**

Various voluntary fortification permissions exist under Standard 1.3.2 – Vitamins and minerals of the Australia New Zealand Food Standards Code. Monitoring the level of folic acid in the food supply via both voluntary and mandatory fortification is required to help monitor folic acid intakes. This incorporates assessing industry compliance with the mandatory standard.

While folic acid was required to be added to flour in Australia by 13 September 2009, the actual start date by the majority of mills was in August 2009. This should be considered when monitoring the effects of mandatory fortification.

## **Nutrient intake**

The target population for mandatory folic acid fortification is women of child-bearing age. So this group is the focus for the assessment of changes in folic acid intake against the required 400 µg/day. It is important that the use of folic acid supplements is considered in assessing folic acid intakes.

The type of food consumption data available and the associated analysis have an impact on the conclusions that can be drawn about the prevalence of high or low intakes within the population. For population surveys, food consumption data can be collected via a food frequency questionnaire or a 24-hour recall. The questionnaire assesses habitual intake and includes questions about frequency, quantity and types of foods usually consumed over a period of time. A 24-hour recall obtains information on food and fluid intake for the previous 24 hours and provides detailed information about total food consumption.

It is important to correct 24-hour data for within-person variation because the distribution of 1-day intakes for a group is invariably wider than the distribution of usual intakes for the same group. So using raw data will provide an incorrect estimate of the proportion of the population above or below a given cut-off, such as the EAR and UL (Mackerras & Rutishauser 2005). Data should be adjusted for 2 days if possible.

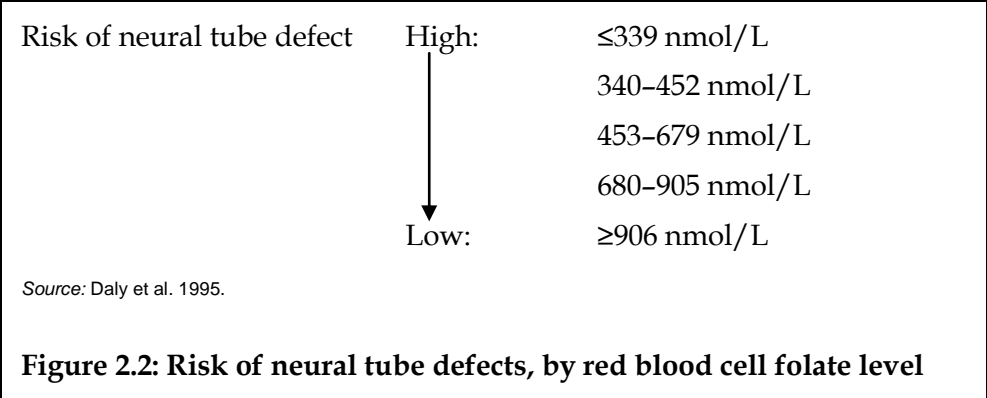
## **Nutrient status**

Measures of folate status include the assessment of folate in serum and red blood cells. Serum folate concentrations are a sensitive index of folate intake (Metz et al. 2002), and can fluctuate due to recent changes in dietary intake or temporary changes in folate metabolism (Gibson 2005). Red blood cell folate concentrations are less sensitive than serum folate levels to short-term fluctuations in folate status, and reflect folate stores (Gibson 2005). Both of these measures can be used to assess the impact of mandatory folic acid fortification on folate status, but it is important to acknowledge their different aspects when interpreting results.

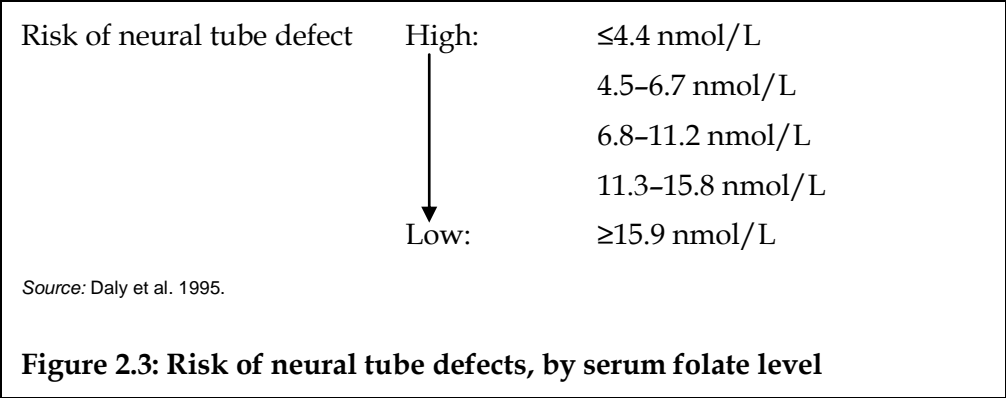
The monitoring question relates to whether the folate status of women of child-bearing age has improved following mandatory fortification; so the mean or median value of serum and red blood cell folate can be used to assess changes over time. However, for an additional assessment, values can be compared with cut-points for folate inadequacy or deficiency.

There is no accepted standard for folate deficiency or inadequacy based on red blood cell concentrations (Choumenkovitch et al. 2001). Various cut-points are used in studies, and Gibson (2005) cites red blood cell folate cut-off values from the National Health and Nutrition Examination Survey II in which two points were defined: levels of 317–363 nmol/L were designated as 'low' and suggestive of an individual at risk; levels below 317 nmol/L were taken to indicate deficiency.

Gibson (2005) explains that cut-off values to interpret red blood cell folate concentrations during pregnancy are still ill-defined, and it is similarly difficult to define the criteria for red blood cell folate associated with increased risk of neural tube defects. But Daly et al. (1995) in their case-control study found that neural tube defect risk is associated with red blood cell folate levels in a continuous dose-response relationship (Figure 2.2). There is a more than eightfold difference in the risk between those with red blood cell folate levels less than 340 nmol/L compared with those with levels of 906 nmol/L or higher. While they were unable to determine an optimum level of red blood cell folate for neural tube defect prevention, they assume no additional protective effect beyond 1,292 nmol/L.



Similarly, there is also no universal cut-off value for serum folate. Gibson (2005) highlights that a cut-off value of less than 6.8 nmol/L for low serum folate concentrations was used in the National Health and Nutrition Examination Survey II, and this value is also used during pregnancy. Daly et al. (1995) also report that a clear dose-response effect is seen with plasma folate levels and neural tube defect risk (Figure 2.3).



### Health benefits

The desired health benefit from mandatory folic acid fortification is a reduction in the incidence of NTDs in Australia and New Zealand. Incidence of NTDs following mandatory fortification will be assessed and compared with baseline rates.

Collection of data on pregnancy terminations is critical in reporting accurate rates of NTDs, because failure to report on these would result in an underestimation of actual rates. In this report, pregnancy terminations are categorised into those less than 20 weeks gestation (early termination) and at least 20 weeks gestation (late termination). Late pregnancy terminations and stillbirths are included as fetal deaths.

Neural tube defect incidence is presented as the number of pregnancies (live births, fetal deaths and early pregnancy terminations) affected by a NTD expressed as a rate per 10,000 total births (live births and fetal deaths).

$$\text{Neural tube defect incidence} = \frac{\text{number of pregnancies with neural tube defect}}{\text{number of total births}}$$

## Adverse health effects

### Upper level of intake

The UL for folic acid has been set on the basis of high supplemental intakes being related to adverse neurological effects in people with vitamin B<sub>12</sub> deficiency (NHMRC & NZMoH 2006). The UL set for adults has been applied to younger age groups on a relative body weight basis (Table 1.1).

- FSANZ (2007a) highlights that vitamin B<sub>12</sub> deficiency is rare in children, so the relative risk of this endpoint is unclear. If staple foods are fortified, children are more likely to exceed the UL for folic acid due to their lower body weight and consumption of more food per kilogram of body weight compared with adults. FSANZ took this into consideration when selecting the food vehicle and the level of fortification to achieve maximum intake in the target population yet ensuring safe levels for other population groups.

The assessment of folic acid intakes against UL can be used to assess whether the level of addition of folic acid to bread might be a concern to public health and safety. The NHMRC and NZMoH (2006) indicate that the UL can be used to estimate the proportion of the population at potential risk of adverse effects from excessive nutrient intake.

Because the assessment of folic acid intake against the UL is based on folic acid intake data, it is reported in sections 3.3 and 5.3 'Folic acid intake'.

### Cancer

Folate (folic acid) plays an important role in DNA synthesis and replication. So it could affect the development of cancer. Kim (2004) speculates that folic acid may increase the progression of pre-cancerous lesions, but may lower the risk of cancer if no lesion exists.

As part of the standards development process, FSANZ reviewed the epidemiological literature looking at folic acid intakes and health outcomes, including the three cancers most often mentioned in relation to folic acid fortification – colorectal (bowel), prostate, and breast. They concluded that there was no increase in cancer risk from the likely increase in folic acid intakes from mandatory fortification (FSANZ 2006). An updated review confirmed these findings (FSANZ 2007b).

However, due to the increasing focus placed on folic acid intake and cancer in the literature and media, particularly bowel and prostate cancers, the incidence and mortality of these cancers are reported here to enable monitoring change over time. It will be essential to consider all possible causes for any increase or decrease in cancer incidence and/or mortality following the introduction of mandatory fortification, and any change not directly attributed to folic acid intake. The introduction of the National Bowel Screening program in Australia in 2005 will improve the monitoring of bowel cancer.

### **Literature review**

As part of the monitoring process, FSANZ will do a meta-analysis of the literature on potential adverse health effects for several indicators. This is being done in parallel with activities in the monitoring framework.

## **2.4 Iodine fortification monitoring framework**

### **Expected outcome of fortification**

It is expected that mandatory iodine fortification will tackle iodine deficiency across much of the Australian and New Zealand population.

### **Target population**

As iodine deficiency is widespread across the population, all Australians and New Zealanders are the target for mandatory iodine fortification (FSANZ 2008b). Because iodine is important in the early growth and development of most organs, especially the brain, which occurs in humans during fetal and postnatal life (Delange 2000), the groups of particular interest are women of child-bearing age (about 16–44 years) and young children.

### **Monitoring elements**

The following monitoring questions require answers:

1. Food composition and food industry compliance
  - Has the level of iodine in our food supply increased?
  - Is the food industry adequately complying with the mandatory fortification standard?
2. Nutrient intake
  - Have iodine intakes in the population increased?
3. Nutrient status
  - Has the iodine status of the population improved, in particular in women of child-bearing age?
4. Health benefits
  - Has iodine deficiency been tackled?
5. Adverse health effects
  - Does mandatory iodine fortification result in adverse health effects for the population?

## **2.5 Iodine fortification monitoring measures**

This section describes the measures that will be monitored for each component of the monitoring framework.

### **Food composition and food industry compliance**

Monitoring the level of iodine in the food supply via both voluntary and mandatory fortification is required to help monitor iodine intakes. This incorporates assessing industry compliance with the mandatory standard.

### **Nutrient intake**

Mandatory iodine fortification is being implemented to tackle iodine deficiency in all population groups; so iodine intakes will be compared with the EAR for each population subgroup. Women of child-bearing age will be assessed as a separate group due to their specific requirements during pregnancy and lactation. It is important that iodine supplement use is considered in assessing iodine intakes.

The EAR is used to estimate the prevalence of inadequate intakes within a group. FSANZ (2008a) indicate that a small proportion of the population (that is 3% or less) with intakes below the EAR may be a reflection of the inaccuracies that are inherent in population nutrient intake data sets. When assessing population intakes, two or more subgroups with greater than 3% of intakes below the EAR spread across a broad range of ages is indicative of an inadequate population-wide intake of a nutrient.

The type of food consumption data available and the associated analysis have an impact on the conclusions that can be drawn about the prevalence of high or low intakes within the population. For population surveys, food consumption data can be collected via a FFQ or a 24-hour recall. The questionnaire assesses habitual intake, and includes questions about frequency, quantity and types of foods usually consumed over a period of time. A 24-hour recall obtains information on food and fluid intake for the previous 24 hours and provides detailed information about total food consumption.

It is important to correct 24-hour data for within-person variation, because the distribution of 1-day intakes for a group is invariably wider than the distribution of usual intakes for the same group. So using raw data will provide an incorrect estimate of the proportion of the population above or below a given cut-off such as the EAR and UL (Mackerras & Rutishauser 2005). Data should be adjusted for 2 days if possible.

## Nutrient status

Urinary iodine excretion provides an indication of recent iodine intake. While 24-hour urine specimens are preferred, they are not always practical in field surveys. As an alternative, fasting early morning or casual urine samples are often obtained for population-based estimates (Gibson 2005) This is the preferred method of the International Council for the Control of Iodine Deficiency Disorders (ICCIDD), World Health Organization (WHO) and United Nations Children's Fund (UNICEF) (WHO et al. 2001). The measure is therefore iodine *concentration* as opposed to *excretion*, as it is based on a single spot sample.

Urinary iodine values from populations are usually not normally distributed, so the median rather than the mean should be used as a measure of central tendency. This measure is termed the 'median urinary iodine concentration' (MUIC) (WHO et al. 2001).

WHO et al. (2001) recommend three target groups for surveillance of mandatory iodine fortification:

- **school-age children** are a useful target group because of their combined high vulnerability, easy access, and applicability to various surveillance activities
- **women of child-bearing age** provide an opportunity to establish the iodine status of a group that is particularly crucial because of the susceptibility of the developing fetus to iodine deficiency
- **newborns** may also be a useful target, as screening to find congenital defects is well established in many countries.

WHO et al. (2001) have developed cut-off points for classifying iodine nutrition into different degrees of public health significance (Table 2.1). These are based on MUICs in school-aged children. Mackerras et al. (2008) highlight that these values are based on the assumption of a daily urinary volume of about one litre, which therefore reflects iodine intake. For adults, because of their higher urinary volume, the concentration reflects less than total intake.

A MUIC of 100 µg per litre and above define a population that has no deficiency – that is, at least 50% of the sample should have a urinary iodine concentration above 100 µg per litre. In addition not more than 20% of samples should be below 50 µg/L. A MUIC less than 50 µg/L indicates an overall moderate iodine deficiency in a population (WHO et al. 2001).

The latest guidelines from the International Council for the Control of Iodine Deficiency Disorders state that in populations of children aged less than 2 years and breastfeeding women, a MUIC below 100 µg/L indicates an insufficient iodine intake. In pregnant women, a population MUIC below 150 µg/L indicates an insufficient iodine intake (ICCIDD 2007).

Urinary iodine concentration is currently the most practical marker for iodine nutrition, but it only assesses levels at the time of measurement. Even though populations may have attained iodine sufficiency by MUIC, goitre may persist, even in children. Thyroid size reflects iodine nutrition over months or years, but measuring this indicator is harder than urinary iodine concentration (WHO et al. 2001).

Based on the recommendations of the ICCIDD, WHO and UNICEF (2001), the particular population groups to be monitored for MUIC will be school-aged children and women of child-bearing age.

**Table 2.1: Criteria for assessment of population iodine status based on median urinary iodine concentration in school-aged children**

Median urinary iodine concentration ( $\mu\text{g/L}$ )	Iodine intake	Population iodine status
<20	Insufficient	Severe iodine deficiency
20–49	Insufficient	Moderate iodine deficiency
50–99	Insufficient	Mild iodine deficiency
100–199	Adequate	Optimal
200–299	More than adequate	Risk of iodine-induced hyperthyroidism in susceptible groups
>300	Excessive	Risk of adverse health consequences

Source: WHO et al. 2001.

## Health benefits

The desired health benefit from mandatory iodine fortification is a reduction in iodine deficiency across much of the Australian and New Zealand population. Nutrient status, measured by MUIC, following mandatory fortification will be assessed and compared with baseline levels.

## Adverse health effects

The term ‘adverse health effects’ is used in the monitoring framework. However, the two measures under this component can be classified as ‘indicators of possible increasing risk’ of an adverse health effect, rather than direct adverse health effects.

## Upper level of intake

The UL for iodine is based on the critical adverse effect of elevated thyroid stimulating hormone concentrations (NHMRC & NZMoH 2006). Upper levels of intake for children and adolescents were extrapolated from the adult recommendation on a body weight basis (Table 1.2) (FSANZ 2008b; Institute of Medicine 2001).

The assessment of iodine intakes against the UL can be used to determine whether the level of addition of iodine to bread might be a concern to public health and safety. The National Health and Medical Research Council and New Zealand Ministry of Health (2006) indicate that the UL can be used to estimate the proportion of the population at potential risk of adverse effects from excessive nutrient intake.

Because the assessment of iodine intake against the UL is based on iodine intake data, this aspect is reported in sections 4.3 and 6.3 ‘Iodine intake’.

## Median urinary iodine concentration

A MUIC of more than 300 µg/L represents excessive iodine intake, and could pose a risk of adverse health consequences (WHO et al. 2001). The latest guidelines from ICCIDD (2007) state that in populations of pregnant women a MUIC of more than or equal to 500 µg/L indicates excessive iodine intake. A qualification is provided that the term 'excessive' means in excess of the amount required to prevent and control iodine deficiency. There are no recommendations provided for young children or lactating women.

An assessment of MUIC against the criteria for excessive intake (WHO et al. 2001) can be used to determine whether the level of addition to bread could potentially be a concern to public health and safety.

Because the assessment of MUIC is based on data relating to nutrient status, it is reported in sections 4.5 and 6.5 'Median urinary iodine concentration'.

## 2.6 Baseline data quality

Various data are available for each measure of the monitoring frameworks. A classification system has been developed to guide the selection and presentation of data for population studies in this baseline report, according to their strength in achieving the goals of the monitoring program. Category 1 data are ideal, as they are representative of the population. Category 2a and 2b data can be used where no Category 1 data exist or to complement Category 1 data. Category 3 data have limitations with their use or interpretability, but they may be of some benefit to monitoring.

Another consideration in the presentation of baseline data is the prospect for a repeat or follow-up study to be done after the start of mandatory fortification to help monitor the effect.

**Category 1:** Good quality national data

**Category 2a:** Good quality regional/sentinel data that can be used as a substitute for national data

**Category 2b:** Good quality regional/sentinel data

**Category 3:** Other—low-quality data, or good quality data that have limited application/interpretation in the monitoring framework.

In the Summary, 'high-quality baseline data' include predominantly Category 1 data, whereas 'moderate quality baseline data' include mostly Category 2a and 2b data, and 'low' mostly Category 3 data.

## 3 Australian baseline data for mandatory folic acid fortification

This section reports the Australian baseline data for monitoring mandatory folic acid fortification, observations on data requirements for future monitoring, and a summary of the baseline data sources. Data are presented for each of the five key components of the monitoring framework.

### 3.1 Food composition

#### FSANZ Food Composition Database

The FSANZ Food Composition Database, AUSNUT 2007, is the point of reference for the concentration of folic acid in the Australian food supply for baseline monitoring. This database, containing 37 nutrient values for 4,225 foods, beverages and dietary supplements consumed during the 2007 Australian National Children's Nutrition and Physical Activity Survey, is available from:

<[www.foodstandards.gov.au/monitoringandsurveillance/foodcompositionprogram/ausnut2007/index.cfm](http://www.foodstandards.gov.au/monitoringandsurveillance/foodcompositionprogram/ausnut2007/index.cfm)>

Various foods are currently fortified with folic acid, including fruit juices, bread, breakfast cereals and bars, milk and yoghurt, and yeast extract. Concentrations of folic acid in these foods are presented in Table 3.1.

**Table 3.1: Concentration of folic acid in Australian foods**

Food category	Typical value in fortified foods only (µg/100 g)
Yeast extract	2,000–3,250
Puffed rice breakfast cereals	175–333
Wheat biscuit breakfast cereals	170–333
Other breakfast cereals	160–333
Bran based breakfast cereals	104–333
White and wholemeal bread	120
Breakfast/muesli bars	58–413
Reduced fat milk & yoghurt	40
Soy milk	35
Fruit juices	30

Source: Provided by FSANZ from AUSNUT 2007.

AUSNUT 2007 presents data for total folates (naturally occurring folates plus added folic acid) and total folates, expressed as dietary folate equivalents (DFEs) (naturally occurring folates plus 1.67 x added folic acid). Although data for folic acid alone are not presented in AUSNUT 2007, they are available from FSANZ and can be estimated from the data presented.

A limited set of analytical values for folic acid form the basis for the folic acid values used in AUSNUT 2007 to derive DFEs. These levels were determined in major folic acid fortified foods available in Australia, and were used to extrapolate to similar foods. Where this was not appropriate, label information was used.

### **General limitations of food composition data**

Nutrient data presented in AUSNUT 2007 should be regarded as estimates of the likely nutrient content of the food or beverage to which they refer. This is because the nutrient composition of foods is variable and dependent on a range of factors, including variability in production, formulation and storage practices (FSANZ 2008c).

### **Background to FSANZ Food Composition Program**

FSANZ publishes two types of databases:

- AUSNUT – a survey database in which the foods and nutrients vary according to the survey. The nutrient data are derived from various methods, and there is a complete data set for each food.
- NUTTAB – a reference database in which the foods and nutrients vary according to the data available. The nutrient data are derived primarily from food analysis, but there are some incomplete data sets for foods.

AUSNUT 2007 is FSANZ's most recent survey-specific nutrient database developed for estimating nutrient intakes from foods, beverages and dietary supplements consumed as part of the 2007 Children's Nutrition Survey.

### **Discussion**

The Food Composition Program at FSANZ is ongoing, and data can be used in conjunction with updated food consumption data to determine folic acid intake following fortification. FSANZ has committed to continue to update the folic acid database as part of the fortification monitoring program.

### **Observation for future monitoring**

FSANZ food composition data are recommended as the basis for monitoring the folic acid content of foods. This will allow assessment of the reach of the fortification standard, which includes the carry-over into other food products, not just bread.

## **3.2 Food industry compliance**

### **Compliance and enforcement model for mandatory folic acid fortification**

A Compliance and enforcement model for the Australian mandatory folic acid fortification standard was developed by a working group of the Implementation Sub Committee. The model will be used by enforcement agencies to guide their approach to assessing the flour milling industry's compliance with the requirements of the standard. It has been developed to ensure a consistent approach across jurisdictions.

The model is based on mills incorporating components designed to control compliance with mandatory folic acid fortification into existing quality assurance arrangements. As part of these arrangements, samples will be taken for analysis by the mills, and the levels of folic acid documented.

Enforcement agencies plan to do compliance monitoring in late 2010 under a survey plan coordinated by the Implementation Sub Committee. This will provide a snapshot of how effectively flour mills have implemented the standard, and will include an assessment of mills' quality assurance arrangement documentation, and appropriate sampling and analysis protocols for wheat flour used for making bread.

### **Observation for future monitoring**

Information collected by jurisdictional enforcement agencies on the level of industry compliance, for example, as part of the Implementation Sub Committee Coordinated Survey, should be used for monitoring.

## **3.3 Folic acid intake**

In estimating folic acid intakes, it is necessary to determine intakes from both food sources and dietary supplements. This section outlines the various data sources that will be used to establish baseline dietary intakes of folic acid. Data on adequacy (for women of child-bearing age) and safety (for all population groups) will be reported. The assessment of safety is based on folic acid intakes being above the upper level of intake. Section 3.4 provides an assessment of folic acid supplement intakes.

### **FSANZ's dietary intake assessment for folic acid for Proposal P295**

As part of the standards development process for Proposal P295 – Consideration of mandatory fortification with folic acid, FSANZ did a dietary intake assessment for folic acid in Australia. This was used to generate folic acid intakes for various population groups, and to estimate the proportion of the population with intakes above the upper level of intake (UL). These data will be the primary reference for establishing Australian baseline folic acid intake data before the introduction of mandatory fortification.

## Results

### Adequacy

Based on existing levels of voluntary folic acid fortification, women of child-bearing age consume an estimated average of 108 µg of folic acid a day, with a 95th percentile intake of 283 µg/day (excluding supplements) (FSANZ 2007b). Consequently, intake levels are well below the recommended 400 µg/day. Further details on folic acid intakes for various Australian population subgroups are provided in Table 3.2.

**Table 3.2: Mean and 95th percentile folic acid intakes, and proportion of the Australian population with folic acid intakes above the upper level of intake, by age and sex<sup>(a)</sup>**

Age group (years)	Mean (µg/day)	95th percentile (µg/day)	Upper level of intake (per cent)
<b>Males</b>			
2–3	141	250	3
4–8	157	313	2
9–13	192	420	2
14–18	202	539	1
19–29	179	449	<1
30–49	140	373	<1
50–69	131	403	<1
70+	126	331	0
<b>Females</b>			
2–3	118	210	<1
4–8	121	246	<1
9–13	128	291	<1
14–18	117	273	0
19–29	118	286	<1
30–49	100	299	<1
50–69	99	325	0
70+	111	369	0
16–44	108	283	<1
<b>Persons</b>			
2+	129	346	..
2–3	128	232	2
4–8	140	282	1
9–13	162	367	1
14–18	161	378	<1
19–29	146	365	<1
30–49	119	342	<1
50–69	114	368	<1
70+	117	357	0

(a) Concentration of folic acid in foods is weighted according to the proportion of a food group that is fortified. This estimates dietary intakes over the long-term and across the population.

Source: FSANZ 2007b.

## **Safety**

The assessment of safety is based on folic acid intakes being above the upper level of intake (the level likely to pose no adverse effects for nearly everyone in the population). Based on existing levels of voluntary folic acid fortification, the proportion of each population group with intakes above the UL is very small (3% and below) (Table 3.2). Children are more likely to exceed the UL than adults because of the lower value for this age group combined with their lower body weight and higher consumption of food per kilogram of body weight (FSANZ 2007b).

## **Background to FSANZ's dietary intake assessment for Proposal P295**

The following description of the FSANZ dietary intake assessment process has been taken from the FSANZ final assessment report for Proposal P295 (attachments 7a and 7b) (FSANZ 2006). Further details can be found in that report.

Dietary modelling is a tool used to estimate intakes of food nutrients from the diet. It requires records of the foods people have eaten, and the concentration of nutrients in each food.

Folic acid intakes were estimated by combining usual patterns of food consumption, as derived from National Nutrition Survey (NNS) data. This was then combined with current levels of fortification based on the update of voluntary folic acid fortification permissions provided by the food industry. FSANZ does this using DIAMOND (Dietary Modelling Of Nutritional Data), its dietary modelling computer program. Food consumption data were derived from the 1995 Australian NNS (see Appendix for details on the survey).

## **Population groups**

Women aged 16–44 years were assessed as a separate group to represent the target population of women of child-bearing age. Other population groups were assessed according to those outlined in the Nutrient Reference Value for Australia and New Zealand (NHMRC & NZMoH 2006). All age groups were split by gender.

## **Concentration data**

Folic acid concentrations for foods that are voluntarily fortified were derived from three main sources and used to build the concentration database. The database does not take into account naturally-occurring folate in food or folic acid from the use of supplements. These were:

1. unpublished FSANZ analytical data for samples purchased in Australia in 1997, 2005 and 2006, including several different types of common breakfast cereals, breakfast juice and white bread
2. current label data for foods where no analytical values were available, without adjustment for potential under- or overages of folic acid
3. recipe calculation for foods that contain a folic acid fortified food as one of their ingredients (for examples, chocolate crackles that contain fortified puffed rice breakfast cereal).

The effect of cooking foods on folic acid concentrations was also taken into consideration when building the database. Information from the three sources was matched against the 1995 Australian NNS food codes for all those foods identified as being fortified with folic acid (149 out of 4,550 foods).

Folic acid concentration data were updated to reflect the current market share of a particular food category. For example, the Australian NNS did not distinguish between the consumption of white bread fortified with folic acid from unfortified bread. When the database was developed, the market share for bread fortified with folic acid was 15% of all breads, based on sales information for a major bakery retail chain. So a value representing 15% of the analysed or labelled concentration of folic acid in fortified breads has now been assigned to all white bread.

### **Assumptions**

In doing its dietary intake assessments, FSANZ makes assumptions to ensure intakes are not underestimated. For Proposal P295 the following assumptions were made:

#### *Consumer behaviour*

- Consumption of foods as recorded in the 1995 NNS represents current food consumption amounts.
- The dietary patterns for females aged 16–44 years are representative of the dietary patterns for pregnant women.
- Consumers always select products containing folic acid at the concentrations specified.
- Consumption patterns reflect the proportions of fortified and non-fortified products currently available within certain food categories; that is, more consumers now select folic acid-fortified products. The current food consumption patterns were reflected in the dietary modelling by weighting the folic acid concentration values for these food groups according to market share.

#### *Concentration data*

- New Zealand folic acid concentration data can be used if no Australian data are available.
- There was no contribution to folic acid intake through the use of complementary medicines.

## **2007 Australian National Children’s Nutrition and Physical Activity Survey**

The 2007 Children’s Survey was done to assess food and nutrient intake in Australian children (CSIRO & University of South Australia 2008). Data collection took place between February and August 2007. The survey provides the most recent national data on food intakes for Australian children aged 2–16 years. Further details are in the Appendix.

### **CSIRO analysis of results**

Food consumption data were analysed by the CSIRO Preventative Health National Research Flagship and the University of South Australia. The findings are presented in *2007 Australian National Children’s Nutrition and Physical Activity Survey: main findings* (CSIRO & University of South Australia 2008). All data have been weighted to more closely reflect the whole Australian child population.

## Concentration data

In collaboration with FSANZ, the food and beverage intake data were translated to daily nutrient intake data using the AUSNUT 2007 nutrient composition database. Nutrient data derived from supplements were excluded from the analysis in the summary report, as the initial focus was to determine the nutrients provided to children by consumption of food and beverages alone.

## Reporting of results

Reported mean nutrient intakes are based on 1 day of food consumption only. However, the data using 2 days of food consumption were used to obtain an estimate of usual intake to assess against the EAR. Usual intake distributions were estimated using the software package C-SIDE, V1.0, Iowa State University. Further details on the analysis are reported in the user guide (University of South Australia et al. 2008). For folic acid, data are presented for total folate and dietary folate equivalents (DFEs), which incorporate a conversion factor for folic acid to accommodate its higher bioavailability.

## Folic acid intakes

Mean folic acid intakes for all age groups in the 2007 Children's Survey were about 100 µg/day (Table 3.3). Data on total folate and DFEs were used to manually calculate folic acid intakes. These values do not include folic acid intakes from supplements. No analysis was done for the proportion of the population exceeding the UL for folic acid.

**Table 3.3: Mean folic acid intakes (µg/day) for Australian children, by age, 2007<sup>(a)</sup>**

Age group (years)	Males	Females	Persons
2–3	105	100	103
4–8	109	104	107
9–13	114	94	104
14–16	121	89	105

(a) Folic acid intakes calculated from total folate and DFE values.

Note: Population weights applied.

Source: CSIRO & University of South Australia 2008.

## FSANZ analysis of results

FSANZ is importing data from the survey into its DIAMOND (Dietary Modelling Of Nutritional Data) program. This program will generate results using similar methods to the dietary intake assessment for Proposal P295. This includes mean and 95th percentile intakes from food and supplements from the 2 days, and the proportion of population groups with intakes above the UL. Results will be weighted to account for over-sampling of some age groups. The FSANZ analysis of results from the 2007 Children's Survey will be included in the baseline monitoring supplement.

## **Victorian Health Monitor**

The Victorian Health Monitor, done in 2009–10, is a program of studies designed to assess the health and nutritional status of adults living in Victoria. Data collection began in April 2009 and finished in June 2010, so these data span the period before and after the start of mandatory folic acid fortification. The researchers have indicated they can separate data before the start of mandatory folic acid fortification, so these data can be used to establish baseline data. Further details of the survey are in the Appendix.

Baseline folic acid intake data from the Victorian Health Monitor were unavailable for this report, but are anticipated to be included in the baseline monitoring supplement.

## **Western Australian Population Health Genomics Folate Study**

The Office of Population Health Genomics in Western Australia is researching the effect of mandatory fortification with folic acid in an Indigenous and non-Indigenous population sample before and after implementation of the folic acid fortification standard (Western Australian Folate Study).

The Indigenous component of the study is being done in collaboration with Broome Regional Aboriginal Medical Service, Derbarl Yerrigan Health Service, Kimberley Aboriginal Health Service, Western Australia Country Health Service – Goldfields, Western Diagnostic Pathology, Telethon Institute for Child Health Research and the School of Population Health, University of Western Australia.

The non-Indigenous component of the study is being done in collaboration with Western Diagnostic Pathology, Telethon Institute for Child Health Research and the School of Population Health, University of Western Australia.

Food consumption data will be collected via a specifically designed FFQ to assess folate intake (Hickling et al. 2005). Analysis will be done in-house using food composition tables. The first phase of data collection was done in 2009. Data will not be available until after the researchers have published their findings. So there may be some delay in the availability of these baseline data.

## **Roy Morgan Single Source data**

Due to the lack of current population food consumption data, trend information from Roy Morgan Research Single Source Databases will help assess changes in the proportion of the population consuming different foods that contribute significantly to the intake of folic acid from fortified foods. FSANZ has access to Roy Morgan Single Source data, which will enable an assessment of consumption trends of fortified products (2001–2008). The data were not available for inclusion in this report but will be published in the baseline monitoring supplement.

## **FSANZ consumer fortification survey**

FSANZ commissioned a qualitative survey to assess behaviours and attitudes to, and awareness of, fortified food. It also intends to do a quantitative consumer survey of fortified foods, and will then release both reports together. As a result, there may be some delay in the availability of these baseline data.

## **Discussion**

Data from NNSs provide the best indication of nutrient intake (Category 1 data). Folic acid intake data for children aged 2–16 years from the 1995 survey have been included in this report, because comprehensive data from the 2007 Children’s Survey are not yet available for publication.

An ongoing Australian Health Survey Program (incorporating an NNS) is being developed, with the initial survey planned for 2011–12. This will provide a means of monitoring the effect of mandatory folic acid fortification on nutrient intakes.

The 1995 NNS is the most recent national survey of food consumption for the population aged 16 years and over in Australia. Limitations with using 14-year-old data for an estimate of current folic acid intakes relate to changes in eating patterns that may have occurred since the data were collected. However, based on a study comparing results from two previous nutrition surveys, FSANZ concluded that consumption of staple foods is unlikely to have changed markedly since 1995 (FSANZ 2007b). While more recent food consumption data would be desirable, dietary modelling based on these 1995 data provides a suitable estimate of dietary intakes of folic acid for the population.

When data from different NNSs are compared, consideration must be given to methodological differences between surveys. Cook et al. (2001) have developed a process to assess time trends from the 1983, 1985 and 1995 Australian surveys, and this should be applied to subsequent NNSs.

While nutrient intake data from NNSs are the most suitable for monitoring, data from the Victorian Health Monitor (Category 2b data) may be beneficial in monitoring the impact within the Victorian population and complement the data from NNSs. However, a repeat of the study is dependent on funding and cannot be guaranteed. Consideration must be given as to whether the whole sample is included in the analysis, which would result in a cross-over between data collection and the implementation of the mandatory standard. This may not be an issue for folic acid intake, given the use of a food composition database that does not consider mandatory fortification, and assuming consumption patterns have not changed in the immediate months following mandatory folic acid fortification.

The Western Australian Folate Study aims to assess the impact of mandatory folic acid fortification (Category 2b data). However, it is important to acknowledge that nutrient intake data generated from FFQs are not as precise as that from a 24-hour recall. While a repeat of the study post-implementation is planned, this is dependent on funding.

Follow-up data from the Roy Morgan Single Source surveys are dependent on funding. In future years, FSANZ plans to collect quantitative data as part of the consumer fortification survey. However, this is also dependent on funding.

## Recommendations for baseline data

- The FSANZ analysis of the 2007 Children's Survey should be included as baseline data in the monitoring process to complement data from the 1995 National Nutrition Survey. It will be important to include a detailed overview of the data analysis methods.
- Data from the Victorian Health Monitor should be considered for inclusion as baseline data in the monitoring process to complement data from the 1995 National Nutrition Survey and 2007 Children's Survey. Consideration needs to be given to whether the entire data or only those collected before September 2009 are included in the analysis.
- Data from the Western Australian Folate Study should be considered for inclusion as baseline data in the monitoring process to complement data from the 1995 National Nutrition Survey, especially as the study includes data on Aboriginal and Torres Strait Islander people.
- The consumer behaviour and food intake data from FSANZ on fortified products should be included as baseline data in the monitoring process.

## Observations for future monitoring

- The Australian Health Survey should be used for future monitoring.
- A repeat of the Victorian Health Monitor would make a valuable contribution to future monitoring.
- A repeat of the Western Australian Folate Study post-implementation would provide an indication of the effect of mandatory folic acid fortification within the population group being assessed.
- Continued collation of consumer behaviour and food intake data by FSANZ on fortified products would be beneficial to the monitoring process.

## 3.4 Supplement use

### Victorian Population Health Survey

The Victorian Population Health Survey is an annual survey series and an ongoing source of information on the health of Victorians using computer assisted telephone interviewing. A set of questions relating to the knowledge and consumption of folate was included in the 2007 survey (DHS 2008). Further details of the Victorian Population Health Survey are in the Appendix.

Women aged 18–50 years were asked about: their current consumption of folate supplements or multivitamins containing folate; the main reason for taking a supplement; the main reason for (not) taking a supplement; and their main source of information about folate or folic acid.

## Results

More than 1 in 5 (22%) women reported taking a folate supplement or any multivitamins containing folate daily (Table 3.4). A higher proportion of females aged 25–34 years reported taking supplements daily (30%).

The most common reason for taking a supplement across all age groups was for general health. More than 1 in 5 (22%) aged 25–34 years were taking a supplement because they were pregnant, with a further 14% taking a supplement because they were trying to become pregnant (Table 3.5).

**Table 3.4: Australian women currently taking a folate supplement or a multivitamin containing folate, by age group, 2007**

Response	18–24 years		25–34 years		35–50 years		All (18–50 years)	
	%	SE (%)	%	SE (%)	%	SE (%)	%	SE (%)
No	75.1	3.8	61.9	2.7	71.4	1.5	69.2	1.4
Yes, daily	14.9	3.1	29.8	2.6	20.8	1.3	22.4	1.2
Yes, 1–3 times/week	2.0	1.3	3.0	0.9	2.3	0.5	2.4	0.4
Yes, 4–6 times/week	1.3	0.9	2.2	0.9	0.5	0.2	1.2	0.4
Yes, less often	0.0	0.0	0.1	0.1	0.6	0.2	0.3	0.1
Don't know	6.8	2.3	3.1	1.1	4.4	0.7	4.5	0.7

*Notes*

1. SE—standard error.
2. Figures may not add up to 100% due to a proportion of 'don't know' or 'refused' responses.

Source: DHS 2008.

**Table 3.5: Main reason for Australian women taking folate, by age group, 2007<sup>(a)</sup>**

Response	18–24 years		25–34 years		35–50 years		All (18–50 years)	
	%	SE (%)	%	SE (%)	%	SE (%)	%	SE (%)
I could become pregnant	3.1	2.3	5.2	2.0	5.1	1.4	4.9	1.1
I am trying to become pregnant	1.0	1.0	14.1	3.2	5.6	1.5	8.4	1.5
I am pregnant	8.4	5.9	22.1	4.2	4.0	1.3	12.0	2.1
General health	34.8	10.2	21.4	3.8	36.5	3.2	30.1	2.6
Part of a multivitamin	20.4	7.1	18.1	3.6	23.1	2.8	20.7	2.2
Other	29.3	9.6	15.1	3.5	22.5	2.9	20.5	2.4
Don't know	2.9	2.9	3.0	1.7	3.2	1.2	3.1	1.0

(a) For those women currently taking a folate supplement or a multivitamin containing folate.

*Notes*

1. SE—standard error.
2. Figures may not add up to 100% due to a proportion of 'don't know' or 'refused' responses.

Source: DHS 2008.

## NSW Population Health Survey

The New South Wales Population Health Survey is an ongoing survey of the health of people of New South Wales, which includes a child component, and is done using the computer assisted telephone interview method. The reporting plan for the Population Health Survey includes a biennial report on child health for the whole state. The most recent survey results are from 2005–06 (Centre for Epidemiology and Research 2008). Details of the sample design and study population are in the Appendix.

The target population for the child component of the Population Health Survey was all children aged 0–15 years living in households with private telephones. A total of 4,578 interviews were done with parents or carers of children aged 0–15 years. Mothers of infants aged less than 12 months were asked whether they took tablets or capsules containing folate or folic acid in the month immediately before and/or in the first 3 months of this pregnancy.

### Results

Overall, among mothers of infants aged less than 12 months, about half (53%) took a folate or folic acid supplement in the month before and the first 3 months of pregnancy, and about a quarter (27%) in the first 3 months only (Table 3.6).

**Table 3.6: Folate or folic acid supplement use before and during pregnancy, Australian mothers of infants 0–11 months, 2005–2006**

Response	Per cent
Yes, in the month before and first 3 months of pregnancy	53.1
Yes, in the month before only	2.3
Yes, in the first 3 months of pregnancy only	27.4
No	17.3

*Note:* Estimates are based on 263 respondents.

*Source:* Centre for Epidemiology and Research 2008.

Despite the apparent divergence, there was no statistically significant variation in the proportion of mothers who took supplements 1 month before and during the first 3 months of pregnancy by socioeconomic status (Table 3.7). While there is no gradient, there are big differences between most disadvantaged fifth (39%) and the least disadvantaged fifth (66%). Upon comparison with results from 2001–2002, the proportion of mothers who took supplements 1 month before and during the first 3 months of pregnancy has not changed significantly (Centre for Epidemiology and Research 2008).

**Table 3.7: Folate or folic acid supplement use before and during pregnancy by socioeconomic status, Australian mothers of infants 0–11 months**

<b>Socioeconomic status</b>	<b>Per cent</b>
5th (most disadvantaged)	39.0
4th	54.8
3rd	54.4
2nd	55.4
1st (least disadvantaged)	66.0
<b>Total average</b>	<b>53.1</b>

*Note:* The indicator includes Australian mothers of infants aged 0–11 months who took folate or folic acid supplements 1 month before and 3 months after conception.

Source: Centre for Epidemiology and Research 2008.

## **South Australian Monitoring and Surveillance System**

The South Australian Monitoring and Surveillance System, established in 2002, monitors population trends in key health issues. Data from the system were presented in a study by Chan et al. (2008) to investigate folate awareness and the prevalence of NTDs in South Australia. The aim of this study was to ascertain changes in: women’s knowledge of the role of folic acid in the prevention of NTDs, intake of folic acid among pregnant women and prevalence of NTDs in South Australia.

Data on knowledge about folic acid and intake of folic acid supplements during the periconceptual period were obtained from women aged 18–50 years. There were 1,038 women in the study population in 2006–2007.

Women surveyed who were pregnant or had given birth within the preceding 3 years (190 women) were asked whether they had consumed folic acid tablets daily for that (or the most recent) pregnancy in the month before becoming pregnant and in the first 3 months of pregnancy.

### **Results**

In 2006–2007, about two-thirds (64%) of the 190 women surveyed reported they took folic acid tablets during the periconceptual period.

## **Australian Capital Territory General Health Survey**

The 2007 and 2008 Australian Capital Territory General Health Surveys collected data on folic acid supplement use in the periconceptual period. Further details and results are not yet available for publication, but they may be available for inclusion in the baseline monitoring supplement.

## **Victorian Health Monitor**

Background information on the Victorian Health Monitor is outlined in Section 3.3. Data on folic acid supplement use and concentration from this monitor were not available for publication in this report, but will be included in the baseline monitoring supplement.

## **Western Australian Population Health Genomics Folate Study**

Background information on the Western Australian Folate Study is outlined in Section 3.3. Data on supplement intakes will be collected as part of the specifically designed FFQ. The first phase of data collection was done in 2009. Data will not be available until after the researchers have published their findings, so there may be some delay in the availability of these baseline data.

## **Population Survey Monitor**

In 1995, a revised food standard was introduced by the National Food Authority (now FSANZ), which regulated the addition of vitamins and minerals to general purpose food products for sale in Australia. The National Food Authority identified the need to collect quantitative baseline data on nutrient intake from food and supplements to provide the basis for evaluating the impact of the regulatory changes. As the 1995 NNS did not collect quantitative data on supplement intake, the National Food Authority commissioned questions on nutrient supplement use by adults in two Australian Bureau of Statistics (ABS) Population Survey Monitor surveys done during August 1995 and February 1996. Both surveys took place during the data collection for the 1995 NNS (Lawrence et al. 2001b).

If the person interviewed reported having taken one or more vitamin supplements during the previous day they were asked to provide the supplement container(s) so the AUST L or AUST R number could be recorded (classifications of the Therapeutic Goods Administration). For products without these numbers, the brand name and other relevant product information were recorded. Participants were then asked to quantify their intake of the supplement in the previous day (Lawrence et al. 2001b).

## **Results**

Results are presented on the analysis done by Lawrence et al. (2001a) for women aged 18–44 years ( $n=1,684$ ). Less than 2% of women took a supplement that solely contained folic acid, with a median intake of 300 µg folic acid/day. A slightly higher proportion (10%) took a supplement that also contained other nutrients (median intake of 200 µg folic acid/day).

## **Methods**

### **Sample design**

The Population Survey Monitor covered rural and urban areas across all states and territories of Australia except sparsely settled areas. All usual residents in private households were included in the sampling frame (Lawrence et al. 2001b). The ABS (1995) indicates that the number of households surveyed in each quarterly survey is considered to be adequate to provide quarterly data for Australia, and annual data for the states and territories, at an acceptable level of accuracy and reliability.

## Study population

A total of 5,422 households were included in the two surveys. Weighting factors provided by the ABS were used by Lawrence et al. (2001a) in their analysis of the data on folic acid supplements. This was to adjust the sample data to provide estimates for the Australian population that minimise the effect of age–sex–area variation in non-response in the population sample.

## Discussion

The Population Survey Monitor provides nationally representative data on folic acid supplement use, including concentration, but these data date back to 1995 (Category 1 data). Although numerous other studies provide data on folic acid supplement use, they are not directly comparable due to the different questions posed.

Data collection from the Victorian and New South Wales Population Health Surveys, the South Australian Monitoring and Surveillance System and the Australian Capital Territory General Health Survey are ongoing, but currently the data do not provide supplement concentration data (Category 2b data). Since 2008, the New South Wales questions on supplements were modified to measure folic acid supplements containing at least 500 µg folic acid in the periconceptional period.

The Victorian Health Monitor is representative of the Victorian population (Category 2b data). However, a repeat of the study is dependent on funding and cannot be guaranteed.

## Recommendations for baseline data

- The most recent supplement data from the Victorian and New South Wales Population Health Surveys, the South Australian Monitoring and Surveillance System and Australian Capital Territory General Health Survey should be included when available as baseline data in the monitoring process to complement the Population Survey Monitor data, noting the lack of data on concentrations.
- A better indication of supplement use and concentration may be via the Victorian Health Monitor. It is recommended that results be considered for inclusion as baseline data in the monitoring process, with consideration given to the date of data collection.

## Observations for future monitoring

- The Australian Health Survey Program is likely to collect data on supplement use, including concentration, and should be used as a means for monitoring. Data may specifically be compared with the Population Survey Monitor.
- Data from ongoing jurisdictional surveys would contribute to the monitoring program. Consideration should be given to collecting folic acid concentrations.
- A repeat of the Victorian Health Monitor would make a valuable contribution to future monitoring.

## 3.5 Serum folate

### Child Determinants of Adult Health Study

The Child Determinants of Adult Health (CDAH) study is a cohort study of schoolchildren Australia-wide who were originally assessed in 1985 as part of the Australian Schools Health and Fitness Survey. This study was designed to provide benchmark data on the health and fitness of Australian schoolchildren. As part of this study, blood samples were taken and serum folate analysed, initially to investigate links between cardiovascular risk and folate status. Subsequently, it also provided a retrospective opportunity to determine folate status among a national cohort of women before mandatory fortification.

The Menzies Research Institute in Tasmania has frozen serum samples from 1,042 women aged 26–36 years, collected as part of the CDAH study from 2004 to 2006. Blood samples (32 mL) were taken after an overnight fast. The Tasmanian Department of Health and Human Services has commissioned for these samples to be analysed for serum folate levels. This will be done at the Institute of Medical and Veterinary Sciences in Adelaide, South Australia.

### Results

Results from the analysis of serum folate will be available for inclusion in the baseline monitoring supplement. Although the quality of the data is good, there is potential for a participation bias due to the low participation rate (25%), so these data have been classified as Category 3. However, a further follow-up CDAH study would increase the interpretability of these data, allowing it to be classified as Category 1 data.

### Methods

Serum folate tests were undertaken on the CDAH serum samples as part of the analysis of the biomarkers for cardiovascular disease according to the study's original hypotheses. This analysis also provided a retrospective opportunity to describe the folate status of Australian women aged 26–36 post voluntary and prior to mandatory fortification particularly as questions had also been included in the CDAH study on supplement use.

### Sample design

A two-stage random probability sample was used for the Australian Schools Health and Fitness Survey. The first stage was sampling schools and second stage was sampling of students within schools. A total of 121 schools were approached, and 109 agreed – a response rate of 90%. The investigators aimed for 10 students per age and sex category for each school. But they needed to approach 15 students to achieve the sample size. A total of 8,498 children aged 7–15 years participated in the survey (response rate of 68%), of which 4,191 were female.

### Study population

Of these, 6,840 were successfully traced for the CDAH study (80%), and 5,170 agreed to participate and provide demographic information (61% of original sample). Blood samples were available for 2,538 people (1,341 (53%) were female), with 1,042 available for folate analysis. Table 3.8 provides an overview of participation by females in the CDAH study.

The representativeness of the sample against the original cohort in the Australian Schools Health and Fitness Survey is demonstrated in Table 3.9.

**Table 3.8: Summary of participation by females in the Australian Child Determinants of Adult Health study, 2004–2006**

Variable	Number	Per cent
Number in Australian Schools Health and Fitness Survey	4,191 <sup>(a)</sup>	100
Traced	3,413	81
Enrolled	2,733	65
Blood sample collected	1,341 <sup>(b)</sup>	32
Number with serum sample	1,042 <sup>(c)</sup>	25

(a) Of 8,498 male and female participants in the Australian Schools Health and Fitness Survey.

(b) Not all CDAH participants provided a blood sample, as they were required to visit a clinic or pathology collection centre.

(c) Serum samples were not available for all of the original 1,341 participants, as all the serum for some samples had been used in earlier testing or inadequate blood was taken initially.

Source: Personal communication with CDAH study researchers.

**Table 3.9: Comparison of females ( $n=4,191$ ) with and without serum samples, using data from the Australian Schools Health and Fitness Survey, 2004–2006**

Variable	With serum sample ( $n=1,046^{(a)}$ )	Without serum sample ( $n=3,145$ )
		<b>Years</b>
Mean age (Standard deviation)	10.8 (2.5)	10.9 (2.6)
		<b>Body mass index</b>
Mean body mass index (Standard deviation)	18.0 (2.8)	18.4 (3.0)
		<b>Per cent</b>
Area-based socioeconomic status		
High socioeconomic status	26	23
Mid-high socioeconomic status	29	28
Mid-low socioeconomic status	38	39
Low socioeconomic status	7	9
Childhood regular smoker	13	15
School-assessed scholastic ability		
Excellent	16	10
Above average	35	30
Average	39	40
Below average	9	16
Poor	2	4

(a) This analysis was done using  $n=1,046$  for serum samples, but this value was later revised to 1,042. This change is unlikely to result in major changes to the comparison.

Source: Personal communication with CDAH study researchers.

## **Aboriginal Birth Cohort Study**

The Aboriginal Birth Cohort Study is a prospective longitudinal study established in 1987 in the Northern Territory. The study was designed with the initial hypothesis on the influences of birth antecedents and perinatal outcomes on childhood growth and hospital admissions (Sayers et al. 2003).

A third follow-up of the study was done in 2006–07 when the participants were aged 16–20 years. Serum folate was measured from blood samples.

### **Results**

Data will not become available until after the researchers have published their findings, so there may be some delay in the availability of these baseline data for monitoring. It is important to note that a common brand of bread sold in these communities has been fortified for some years with folic acid under the voluntary permissions.

### **Methods**

#### **Sample design**

Babies were eligible to participate in the study if they were live born singletons delivered at the Royal Darwin Hospital between January 1987 and March 1990 to a mother who was recorded as Aboriginal in the delivery suite register.

#### **Study population**

During the recruitment period, 686 Aboriginal maternal–child pairs were enrolled in the study. Further details on the methods of the study are described in Sayers et al. (2003).

### **Discussion**

Data from the CDAH study represent the Australian population aged 26–36 years, but do not represent all women of child-bearing age (about 16–44 years). These data could be compared with serum folate levels from a similar subsample of women from the Australian Health Survey Program to determine the impact of mandatory folic acid fortification.

The next follow-up of the Aboriginal Birth Cohort Study is due in 2011–12.

### **Recommendations for baseline data**

- Data from the CDAH and Aboriginal Birth Cohort studies should be included as baseline data in the monitoring process.

### **Observations for future monitoring**

- The Australian Health Survey should be used for future monitoring, and data specifically compared with baseline data from the CDAH study.
- A repeat of the Aboriginal Birth Cohort Study can track the serum folate status of female participants.

## **3.6 Red blood cell folate**

### **Western Australian Folate Study**

Background information on the Western Australian Folate Study is outlined in Section 3.3. Blood samples will be measured for red blood cell folate.

### **Victorian Health Monitor**

Background information on the Victorian Health Monitor is outlined in Section 3.3. Fasting blood samples from women aged 18–44 years will be taken for red blood cell folate analysis.

### **Discussion**

There are no nationally representative data on red blood cell folate status for the Australian female population of child-bearing age. Two studies, however, provide estimates of the red blood cell folate status in specific populations (Category 2b data).

The Victorian Health Monitor is representative of the Victorian population. However, a repeat of the study is dependent on funding and cannot be guaranteed. It will be important to consider only data collected before mandatory folic acid fortification began.

The Western Australian Folate Study aims to assess the impact of mandatory folic acid fortification (Category 2b data). While a repeat of the study after the start of mandatory folic acid fortification is planned, this is dependent on funding and cannot be guaranteed.

### **Recommendations for baseline data**

- Data from the Victorian Health Monitor should be considered for inclusion as baseline data in the monitoring process, with consideration given to the date of data collection.
- The baseline results from the Western Australian Folate Study should be included as baseline data in the monitoring process.

### **Observations for future monitoring**

- A repeat of the Victorian Health Monitor would make a valuable contribution to future monitoring.
- A repeat of the Western Australian Folate Study after mandatory folic acid fortification began would track the red blood cell folate status of participants.
- The Australian Health Survey should be used for future monitoring.

## 3.7 Neural tube defects

### Neural tube defect incidence in Australia 1992–2005

The Australian Congenital Anomalies Monitoring System collates data on congenital anomalies submitted from state and territory birth defect and perinatal data collections in each of the jurisdictions except the Northern Territory. The system currently includes data up to 2003. The AIHW National Perinatal Epidemiology and Statistics Unit has produced a report on NTD occurrences from 1992 to 2005 using data from the Australian Congenital Anomalies Monitoring System, with additional data for 2004 and 2005 specifically requested from the states and territories. The three distinct forms of NTDs reported on are anencephaly, encephalocele and spina bifida (AIHW: Abeywardana & Sullivan 2008).

In all jurisdictions, perinatal data collections gather information about live births and fetal deaths. The data from South Australia, Western Australia, Victoria and New South Wales include data on early pregnancy terminations. However, New South Wales relies on voluntary reporting of information about congenital anomalies, and the data are considered to be incomplete. The data presented here are from South Australia, Western Australia and Victoria. Data from these states provide the most accurate baseline of NTD incidence before mandatory fortification of bread-making flour with folic acid.

#### Results

From 1992 to 2005, the number of pregnancies affected by NTDs decreased from 201 to 149 in the three states (Table 3.10). The highest incidence rate was 21.3 cases per 10,000 births in 1995, and the lowest was 11.9 in 2003.

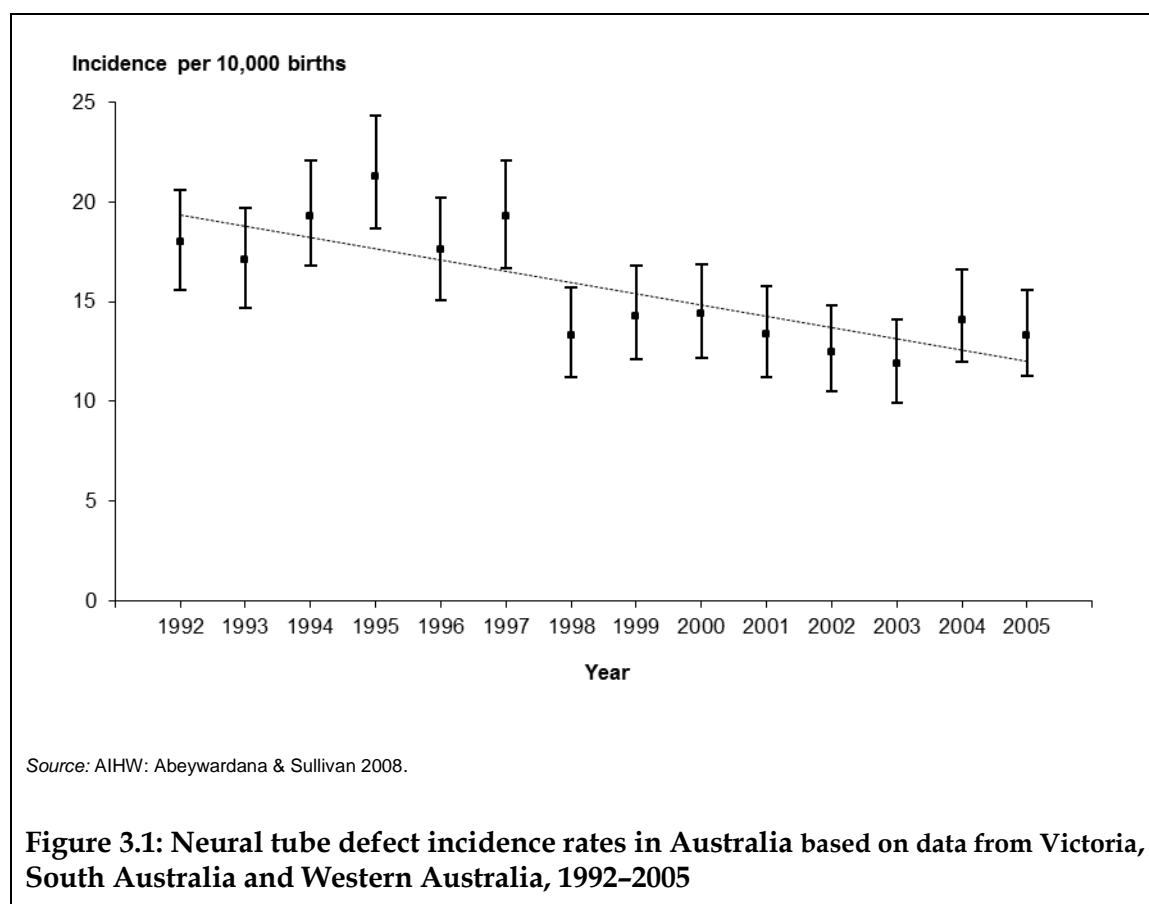
In 2005, NTD rates were the highest in early pregnancy terminations (6.9 cases per 10,000 births), with similar rates for live births and fetal deaths (3.0 and 3.4 cases per 10,000 births respectively) (Table 3.11). Each year, early termination rates were higher than the total of live birth and fetal deaths.

**Table 3.10: All neural tube defects, by year of birth or pregnancy termination, Victoria, South Australia and Western Australia, 1992-2005**

Year	Number	Rate <sup>(a)</sup>	95% confidence interval
1992	201	18.0	15.6–20.6
1993	188	17.1	14.7–19.7
1994	213	19.3	16.8–22.1
1995	232	21.3	18.7–24.3
1996	189	17.6	15.1–20.2
1997	205	19.3	16.7–22.1
1998	142	13.3	11.2–15.7
1999	153	14.3	12.1–16.8
2000	152	14.4	12.2–16.9
2001	140	13.4	11.2–15.8
2002	132	12.5	10.5–14.8
2003	126	11.9	9.9–14.1
2004	151	14.1	12.0–16.6
2005	149	13.3	11.3–15.6

(a) Rates are per 10,000 births.

Source: AIHW: Abeywardana & Sullivan 2008.



**Table 3.11: All neural tube defects, by outcome and year of birth or pregnancy termination, Victoria, South Australia and Western Australia, 1998–2005**

Year	Live births		Fetal deaths		Terminations <20 weeks		All neural tube defects	
	Number	Rate <sup>(b)</sup>	Number	Rate <sup>(a)</sup>	Number	Rate <sup>(a)</sup>	Number	Rate <sup>(a)</sup>
1998	38	3.6	20	1.9	84	7.9	142	13.3
1999	33	3.1	24	2.2	96	9.0	153	14.3
2000	35	3.3	23	2.2	94	8.9	152	14.4
2001	27	2.6	33	3.1	80	7.6	140	13.4
2002	23	2.2	26	2.5	83	7.9	132	12.5
2003	20	1.9	28	2.6	78	7.4	126	11.9
2004	31	2.9	38	3.6	82	7.7	151	14.1
2005	34	3.0	38	3.4	77	6.9	149	13.3

(a) Rates are per 10,000 births.

Source: AIHW: Abeywardana & Sullivan 2008.

## Discussion

Reasonable data are available in Australia on NTD incidence. The data from Victoria, South Australia and Western Australia can be used as a substitute for national estimates, as it represents 40% of births in Australia (Category 2a data). However, differences in data collected among the jurisdictions demonstrate the need for a good quality national data set that includes pregnancy terminations before 20 weeks gestation for NTDs. A data set specification has recently been developed for congenital anomalies, but it does not include early pregnancy terminations. More recent data on NTD incidence will be included in the baseline monitoring supplement.

## Recommendations for baseline data

- The most recent data on NTD incidence should be included as baseline data in the monitoring process.

## Observations for future monitoring

- Data from other states, where possible, should be included in the monitoring, with the inclusion of pregnancy terminations before 20 weeks gestation.
- A central agency for reporting NTD occurrences, drawing on the Australian Congenital Anomalies Monitoring System, should be continued to help with reporting NTD incidence.

## 3.8 Cancer incidence and mortality

Cancer, with the exception of non-melanocytic skin cancer, is a notifiable disease in all states and territories of Australia. The data are collected by cancer registries, and obtained from hospitals, pathologists, radiation oncologists, cancer treatment centres and nursing homes.

The Australian Cancer Database (previously known as the National Cancer Statistics Clearing House) holds cancer incidence data from 1982. The database is compiled and maintained by the AIHW, in partnership with the Australasian Association of Cancer Registries, with each state and territory providing data to the AIHW annually.

Registration of deaths in Australia is the responsibility of the state and territory Registrars of Births, Deaths and Marriages. Information on the cause of death is supplied by the medical practitioner certifying the death or by a coroner. Registration of death is a legal requirement in Australia, and compliance is virtually complete. The registrars provide deaths data to the ABS for coding and compiling into national statistics. National statistics are currently available up to 2007.

Cancer registries code cancers using the International Classification of Diseases for Oncology, 3rd edition (ICD-O-3). To allow comparisons of incidence and mortality data, which are coded by the ABS in ICD-10, the ICD-O-3 topography and morphology codes are mapped to ICD-10 codes.

Age-standardised rates are presented in this report. More detailed data, including the number of cases, are available online in the Australian Cancer Incidence and Mortality Books.

Cancer incidence data up to 2005 and cancer mortality data up to 2006 are available for this report. More recent data will be included in the baseline monitoring supplement.

### Bowel cancer

Age-standardised incidence and mortality rate data from 1982 to 2006 are presented in Table 3.2, and a summary is provided below.

#### Incidence

##### Males

From 1982 to 2005, the age-standardised incidence rate for males was relatively unchanged, with an average annual increase of 0.4%, from 66.7 cases per 100,000 population in 1982 to 73.2 in 2005 (Figure 3.2). The highest rate was 79.6 in 2000.

##### Females

From 1982 to 2005, the age-standardised incidence rate for females was relatively unchanged, with an average annual decrease of 0.1%, from 51.9 cases per 100,000 population in 1982 to 50.8 in 2005 (Figure 3.2). The highest rate was 54.5 in 2001.

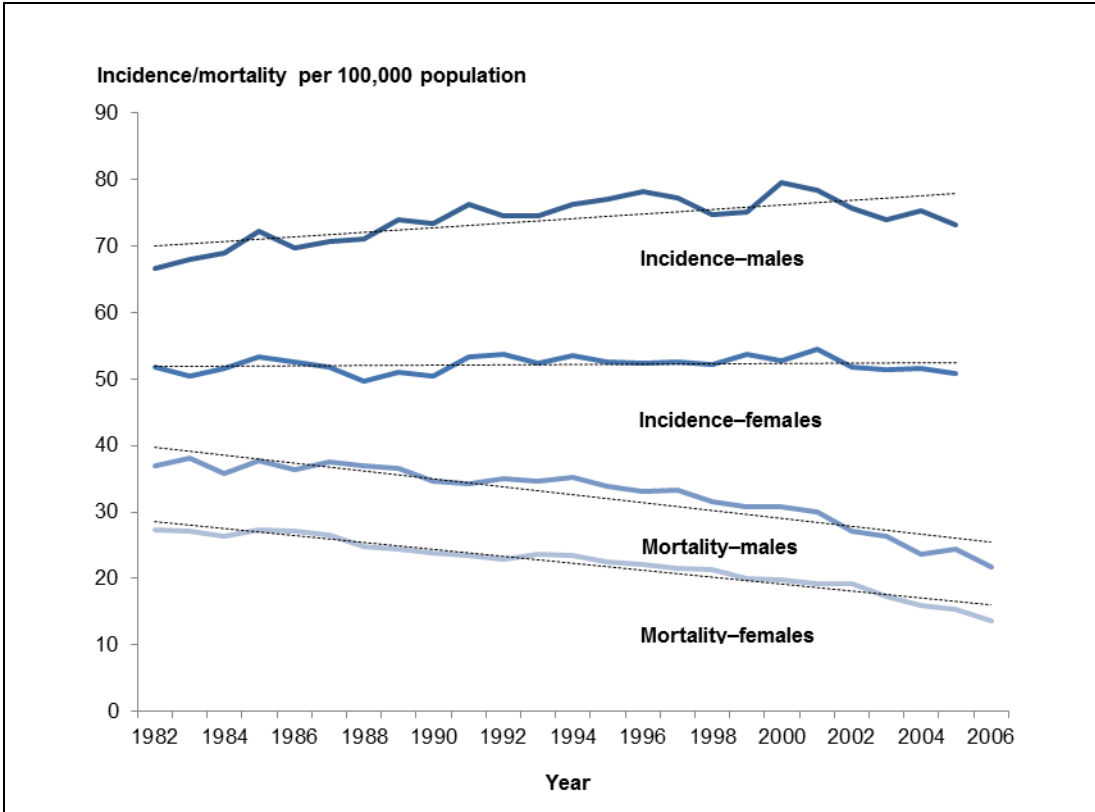
# Mortality

## Males

From 1982 to 2006 the age-standardised mortality rate for males decreased by an average of 2.2% per year, from 37.0 cases per 100,000 population in 1982 to 21.7 in 2006 (Figure 3.2). The highest rate was 38.1 in 1983.

## Females

From 1982 to 2006 the age-standardised mortality rate for females decreased by an average of 2.9% per year, from 27.4 cases per 100,000 population in 1982 to 13.6 in 2006 (Figure 3.2). The highest rate was 27.4 in 1982.



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW 2009a.

**Figure 3.4: Bowel cancer incidence rates, 1982-2005, and mortality rates, 1982-2006, Australia**

**Table 3.12: Age-standardised incidence and mortality rates for bowel cancer, Australia, 1982–2006 (ICD-10 codes C18–C20)**

Year	Incidence			Mortality		
	Males	Females	Persons	Males	Females	Persons
1982	66.7	51.9	58.1	37.0	27.4	31.5
1983	68.0	50.5	58.1	38.1	27.2	31.7
1984	69.0	51.6	59.0	35.9	26.4	30.5
1985	72.3	53.4	61.5	37.7	27.3	31.7
1986	69.7	52.6	60.1	36.3	27.2	31.2
1987	70.7	51.9	60.0	37.5	26.6	31.3
1988	71.0	49.6	58.9	37.0	24.9	30.0
1989	74.0	51.1	61.1	36.5	24.4	29.5
1990	73.3	50.4	60.2	34.7	23.8	28.4
1991	76.3	53.4	63.6	34.2	23.5	28.2
1992	74.6	53.7	62.7	35.1	22.9	28.1
1993	74.6	52.3	62.4	34.6	23.7	28.4
1994	76.2	53.6	63.5	35.3	23.4	28.7
1995	77.0	52.6	63.6	33.8	22.5	27.3
1996	78.3	52.3	64.0	33.2	22.2	27.1
1997	77.2	52.5	63.7	33.3	21.6	26.8
1998	74.8	52.1	62.3	31.6	21.3	25.8
1999	75.1	53.8	63.5	30.8	20.0	24.8
2000	79.6	52.7	64.9	30.7	19.9	24.8
2001	78.4	54.5	65.4	30.1	19.3	24.1
2002	75.7	51.8	62.8	27.2	19.2	22.8
2003	73.9	51.5	61.8	26.4	17.3	21.4
2004	75.4	51.6	62.6	23.7	16.0	19.5
2005	73.2	50.8	61.3	24.4	15.3	19.4
2006	n.y.a.	n.y.a.	n.y.a.	21.7	13.6	17.2

*Notes*

1. Rates are the number of cases per 100,000 population.
2. Mortality data for 1982 to 2005 are tabulated by the year of death. Data for 2006 are tabulated by the year of registration.
3. Rates are standardised to the Australian population as at 30 June 2001.

Source: AIHW 2009a.

## Prostate cancer

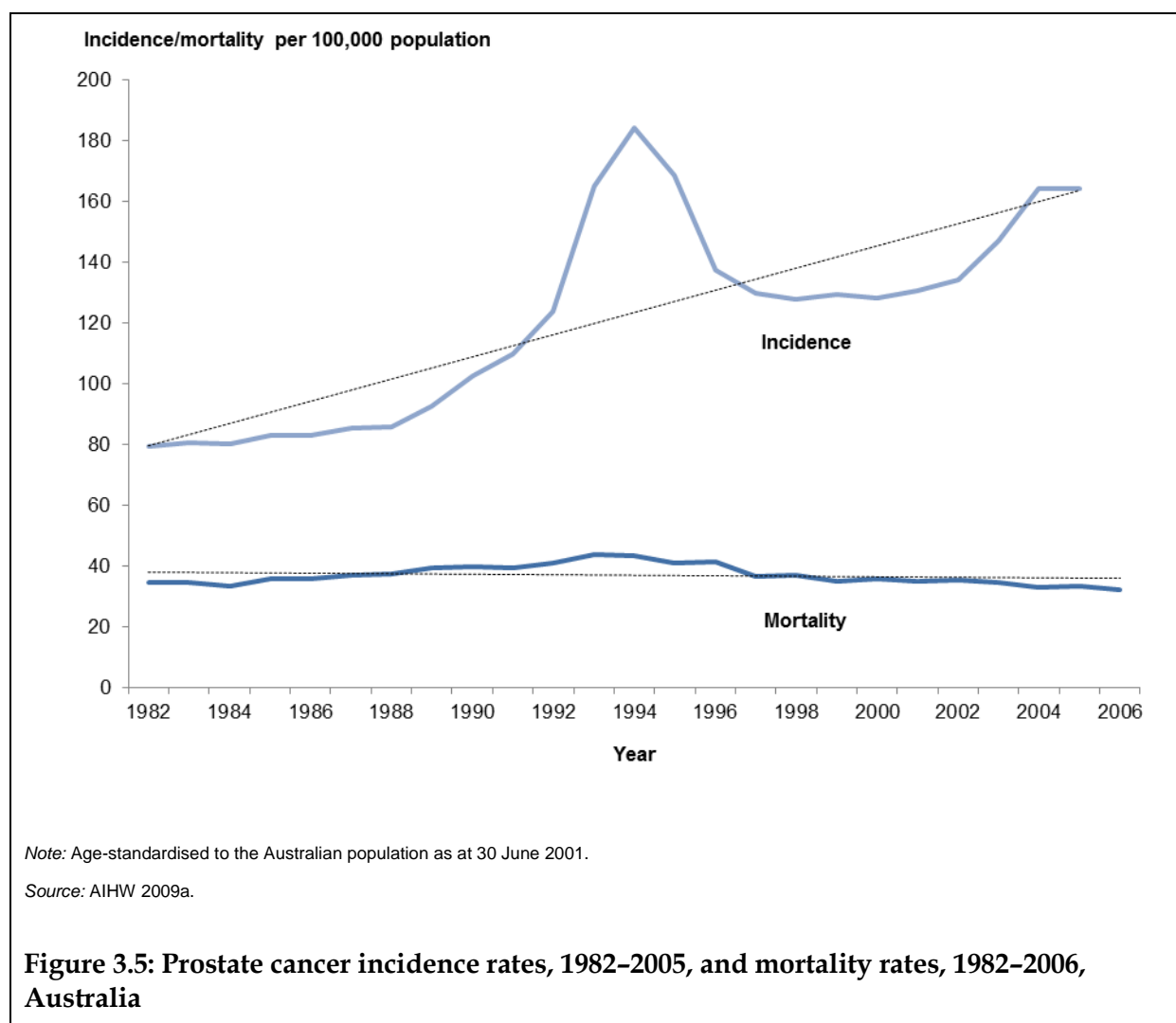
Age-standardised incidence and mortality rate data are presented in Table 3.3, and a summary provided below.

### Incidence

From 1982 to 2005, the age-standardised incidence rate increased by an average of 3.2% per year, from 79.5 cases per 100,000 population in 1982 to 164.4 in 2005 (Figure 3.3). The highest rate was 184.2 in 1994, which may be influenced by the increase in prostate-specific antigen testing.

### Mortality

From 1982 to 2006, the age-standardised mortality rate was relatively unchanged, with an average annual decrease of 0.3%, from 34.5 cases per 100,000 population in 1982 to 32.3 in 2006 (Figure 3.3). The highest rate was 43.7 in 1993.



**Table 3. 13: Age-standardised incidence and mortality rates for prostate cancer, Australia, 1982–2006 (ICD-10 code: C61)**

<b>Year</b>	<b>Incidence</b>	<b>Mortality</b>
1982	79.5	34.5
1983	80.8	34.7
1984	80.1	33.3
1985	83.2	35.7
1986	82.9	35.7
1987	85.5	37.2
1988	85.7	37.6
1989	92.7	39.6
1990	102.7	39.7
1991	110.1	39.3
1992	124.1	41.2
1993	165.0	43.7
1994	184.2	43.6
1995	168.6	41.2
1996	137.6	41.3
1997	129.9	36.8
1998	128.0	37.2
1999	129.7	35.2
2000	128.4	35.9
2001	130.6	35.2
2002	134.5	35.3
2003	147.2	34.5
2004	164.3	32.9
2005	164.4	33.5
2006	n.y.a.	32.3

*Notes*

1. Rates are the number of cases per 100,000 population.
2. Mortality data for 1982 to 2005 are tabulated by the year of death. Data for 2006 are tabulated by the year of registration.
3. Rates are standardised to the Australian population as at 30 June 2001.

*Source:* AIHW 2009a.

## Discussion

The collection of cancer data is ongoing and provides a means for monitoring incidence and mortality, but not the effect of folic acid on these. As such, these data have limited application and interpretability in the monitoring framework (Category 3 data).

### Recommendations for baseline data

- The most recent data on cancer incidence and mortality up to 2008 should be included as baseline data in the monitoring process.

### Observations for future monitoring

- All possible causes for changes in incidence and mortality rates should be carefully considered when monitoring change over time.

## 3.9 Bowel cancer screening

### National Bowel Cancer Screening Program

In August 2006, in partnership with state and territory governments, the Australian Government implemented the first phase of the National Bowel Cancer Screening Program. This followed the success of the Bowel Cancer Screening Pilot Program that ran from November 2002 to June 2004. Data from this first phase are now available, and the data in this section are from *Cancer in Australia: an overview 2008* (AIHW & AACR 2008). More detailed data are available in the National Bowel Cancer Screening Program monitoring report 2008 (AIHW & DoHA 2008).

From 7 August 2006, people across Australia turning 55 or 65 years between 1 May 2006 and 30 June 2008 were invited to participate in the National Bowel Cancer Screening Program, which aims to:

- reduce the incidence and mortality of bowel cancer through screening to detect abnormalities of the colon and rectum at an early stage
- detect cancers at an early stage to maximise the effectiveness of treatment.

The screening tool used is a faecal occult blood test, a non-invasive test that detects microscopic amounts of blood in the faeces, which can be an early indication of bowel cancer. The test requires no dietary restrictions, and can be easily used at home. Participants are sent detailed instructions and requested to post their completed test to a pathology laboratory for analysis.

A total of 929,329 invitations were issued to people aged 55 or 65 years between 7 August 2006 and 30 June 2008. Of these 366,826 returned a faecal occult blood test for analysis.

## Results

The proportion of persons with a positive faecal occult blood test result was 7.5%. Males had a higher rate than females (8.9% compared with 6.4%, respectively) (Table 3.14). Of those who had results from a positive test investigated by colonoscopy and the outcomes reported to the register (Table 3.15):

- 5.2% were found to have suspected or confirmed cancer (cancer confirmed by histopathology or cancer suspected at colonoscopy but not yet confirmed by histopathology)
- 12.4% had adenomas confirmed by histopathology
- 41.3% had polyps detected at colonoscopy, but histopathology results were not recorded in the register at 30 June 2008
- 41.1% were found to have no cancer or adenoma

**Table 3.14: National Bowel Cancer Screening Program faecal occult blood test positivity rates, by age and sex, Australia, 7 August 2006–30 June 2008**

Population group	Positive results	Valid results	Rate (per 100 valid results)
<b>Males</b>			
55 years	6,876	91,212	7.5
65 years	8,006	75,293	10.6
<i>Total</i>	<i>14,882</i>	<i>166,505</i>	<i>8.9</i>
<b>Females</b>			
55 years	6,297	113,553	5.5
65 years	6,163	82,419	7.5
<i>Total</i>	<i>12,460</i>	<i>195,972</i>	<i>6.4</i>
<b>Persons</b>			
55 years	13,173	204,765	6.4
65 years	14,169	157,712	9.0
<b>Total</b>	<b>27,342</b>	<b>362,477</b>	<b>7.5</b>

### Notes

1. Rates are the number of faecal occult blood test positive results as a percentage of the total number of valid results.
2. A valid result is either positive or negative. Inconclusive results are excluded.

Source: AIHW & AACR 2008; AIHW & DoHA 2008.

**Table 3.15: National Bowel Cancer Screening Program outcomes from colonoscopic investigation of positive faecal occult blood test, by age and sex, Australia, 7 August 2006-30 June 2008**

Population group	No cancer or adenoma detected <sup>(a)</sup>		Polyps <sup>(b)</sup>		Adenomas <sup>(c)</sup>		Cancer <sup>(d)</sup>		Total <sup>(e)</sup>
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
<b>Males</b>									
55 years	1,297	35.7	1,656	45.6	518	14.3	164	4.5	3,635
65 years	1,274	30.4	2,050	49.0	592	14.1	270	6.5	4,186
<i>Total</i>	<i>2,571</i>	<i>32.9</i>	<i>3,706</i>	<i>47.4</i>	<i>1,110</i>	<i>14.2</i>	<i>434</i>	<i>5.5</i>	<i>7,821</i>
<b>Females</b>									
55 years	1,818	54.7	1,069	32.2	314	9.4	124	3.7	3,325
65 years	1,549	47.2	1,180	35.9	360	11.0	194	5.9	3,283
<i>Total</i>	<i>3,367</i>	<i>51.0</i>	<i>2,249</i>	<i>34.0</i>	<i>674</i>	<i>10.2</i>	<i>318</i>	<i>4.8</i>	<i>6,608</i>
<b>Persons</b>									
55 years	3,115	44.8	2,725	39.2	832	12.0	288	4.1	6,960
65 years	2,823	37.8	3,230	43.2	952	12.7	464	6.2	7,469
<b>Total</b>	<b>5,938</b>	<b>41.1</b>	<b>5,955</b>	<b>41.3</b>	<b>1,784</b>	<b>12.4</b>	<b>752</b>	<b>5.2</b>	<b>14,429</b>

(a) Either no polyps were identified at colonoscopy; the polyps were confirmed as non-adenomatous by histopathology; no cancers were suspected at colonoscopy; or the sample was confirmed as non-cancerous by histopathology.

(b) Polyps detected at colonoscopy and sent to histopathology for analysis, but histopathology results not received by register.

(c) Adenomas confirmed by histopathology.

(d) Cancer confirmed by histopathology or cancer suspected at colonoscopy but not yet confirmed by histopathology.

(e) Total number of colonoscopies with outcome data recorded in the National Bowel Cancer Screening Program Register.

Source: AIHW & DoHA 2008.

## Discussion

These data may be used as baseline data in conjunction with the data on bowel cancer incidence to assess the impact of screening on cancer detection, and therefore interpret any change in cancer in the years following fortification.

A report on the bowel cancer screening program for the period 1 January 2008 to 31 December 2008 is now available, and includes positivity rates for those age 50 years. It is important to note that there is some cross-over in the dates for the data presented in this monitoring report (AIHW 2009b).

## Recommendation for baseline data

- The most recent data from the bowel cancer screening program up to 2008 should be considered as baseline data in the monitoring process.

## 3.10 Summary of Australian baseline data sources for mandatory folic acid fortification

The baseline data for mandatory folic acid fortification are summarised in the tables below, according to each measure of the monitoring framework.

**Table 3.16: Monitoring framework component number 1: Food composition and industry compliance**

Measure	Data source	Notes
Folic acid content of food	<ul style="list-style-type: none"> <li>AUSNUT<sup>(a)</sup></li> <li>NUTTAB<sup>(a)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Ongoing data compilation by FSANZ</li> </ul>
Compliance monitoring arrangements of the enforcement agencies	Details of compliance and enforcement	<ul style="list-style-type: none"> <li>For baseline report: an overview of arrangements</li> <li>For monitoring: data collected by jurisdictions to be sent to a coordinating agency</li> </ul>

(a) Details of the AUSNUT and NUTTAB databases are in Section 3.1.

**Table 3.17: Monitoring framework component number 2: Nutrient intake**

Measure	Data source	Notes
Intakes in women of child-bearing age	1995 NNS (FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>Future NNSs for monitoring</li> </ul>
Intakes more than the upper level of intake for total population (A component of 'Adverse health effects', but listed here because it relates to folic acid intake)	2007 Children's Survey	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>To include in the baseline supplement report following FSANZ analysis</li> <li>Future NNSs for monitoring</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>Cross-over with data collection and mandatory implementation date will need to be considered in the analysis of results</li> <li>Complementary data (Category 2b)</li> <li>To include in the baseline supplement report following finalisation of data collection and analysis</li> <li>Repeat survey dependent on funding</li> </ul>
	Western Australian Folate Study	<ul style="list-style-type: none"> <li>Data are from food frequency questionnaire as opposed to 24-hour recall</li> <li>Complementary data (Category 2b)</li> <li>To include in the baseline supplement report following finalisation of data collection, analysis and publication</li> <li>Repeat survey dependent on funding</li> </ul>
	Roy Morgan consumer behaviour survey	<ul style="list-style-type: none"> <li>FSANZ analysis of Roy Morgan food consumption data on consumption trends of fortified products</li> <li>To include in the baseline supplement report following finalisation of data analysis</li> <li>Follow-up dependent on funding</li> </ul>

*(continued)*

**Table 3.17 (continued): Monitoring framework component number 2: Nutrient intake**

Measure	Data source	Notes
Supplement use in women of child-bearing age	FSANZ qualitative consumer fortification survey	<ul style="list-style-type: none"> <li>To assess behaviours and attitudes to, and awareness of, fortified food</li> <li>To be followed up with a quantitative follow-up survey</li> <li>To include in the baseline supplement report following finalisation of data collection and analysis</li> </ul>
	Victorian Population Health Survey	<ul style="list-style-type: none"> <li>Regional data (Category 2b)</li> <li>Data on concentration is unavailable—behaviours only</li> <li>Ongoing</li> </ul>
	NSW Population Health Survey	<ul style="list-style-type: none"> <li>Regional data (Category 2b)</li> <li>Data on folic acid supplement concentration are unavailable for baseline—behaviours only</li> <li>Ongoing; future surveys to include concentrations</li> </ul>
	South Australian Monitoring and Surveillance System	<ul style="list-style-type: none"> <li>Regional data (Category 2b)</li> <li>Data on folic acid supplement concentration are unavailable—behaviours only</li> <li>Ongoing</li> </ul>
	ACT General Health Survey	<ul style="list-style-type: none"> <li>Regional data (Category 2b)</li> <li>Data on folic acid supplement concentration are unavailable—behaviours only</li> <li>Ongoing</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>Collecting data on supplement use, including concentration</li> <li>Cross-over with data collection and implementation date, which will need to be considered in the analysis of results</li> <li>Regional data (Category 2b)</li> <li>To include in the baseline supplement report following finalisation of data collection and analysis</li> <li>Repeat survey dependent on funding</li> </ul>
	Population Survey Monitor	<ul style="list-style-type: none"> <li>National data (Category 1)</li> <li>Concentrations included</li> <li>Future NNSs for monitoring</li> </ul>

**Table 3.18: Monitoring framework component number 3: Nutrient status**

<b>Measure</b>	<b>Data source</b>	<b>Notes</b>
Serum and red blood cell folate in women of child-bearing age	Child Determinants of Adult Health study	<ul style="list-style-type: none"> <li>• National data (Category 3)</li> <li>• Serum folate being analysed</li> <li>• To include in the baseline supplement report following data analysis</li> <li>• Recommend a repeat study on similar population (part of Australian Health Survey)</li> </ul>
	Western Australian Folate Study	<ul style="list-style-type: none"> <li>• Sentinel data (Category 2b)</li> <li>• To include in the baseline supplement report following finalisation of data collection, analysis and publication</li> <li>• Repeat survey dependent on funding</li> </ul>
	Aboriginal Birth Cohort Study	<ul style="list-style-type: none"> <li>• Sentinel data (Category 2b)</li> <li>• To be a late addition following finalisation of data analysis and publication</li> <li>• The next follow-up will take place in 2011–12</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>• Cross-over with data collection and implementation date, which will need to be considered in the analysis of results</li> <li>• Regional data (Category 2b)</li> <li>• To be a late addition following finalisation of data collection and analysis</li> <li>• Repeat survey dependent on funding</li> </ul>

**Table 3.19: Monitoring framework component number 4: Health benefits**

Measure	Data source	Notes
Neural tube defect incidence	Australian Congenital Anomalies Monitoring System	<ul style="list-style-type: none"> <li>• Data including early terminations of pregnancy for Victoria, South Australia and Western Australia to be used as substitute for national data (Category 2a)</li> <li>• Currently ongoing collection for these three states, including early terminations</li> </ul>

**Table 3.20: Monitoring framework component number 5: Adverse health effects**

Measure	Data source	Notes
Literature review	Monitoring the literature on adverse health effects associated with folic acid intake	<ul style="list-style-type: none"> <li>• An ongoing review is being done, but it is not a component of the monitoring framework</li> </ul>
Cancer incidence and mortality	Australian Cancer Database	<ul style="list-style-type: none"> <li>• To look at bowel and prostate cancer</li> <li>• Ongoing collection</li> </ul>
	National Mortality Database	<ul style="list-style-type: none"> <li>• Limited confidence in this measure due to the limitations with associating any change in cancer incidence/mortality caused by mandatory fortification</li> <li>• Category 3 data</li> </ul>
	Bowel cancer screening program	<ul style="list-style-type: none"> <li>• Included to assess impact of screening on cancer incidence</li> </ul>
Intakes above the upper level of intake for the total population		<ul style="list-style-type: none"> <li>• Assessed as part of 'Nutrient intake' (component number 2)</li> </ul>

## 4 Australian baseline data for mandatory iodine fortification

This section reports the Australian baseline data for monitoring mandatory iodine fortification, observations on data requirements for future monitoring, and a summary of baseline data sources. Data are presented for each of the five key components of the monitoring framework.

### 4.1 Food composition

#### FSANZ Food Composition Database, AUSNUT 2007

Details on the FSANZ Food Composition Program are outlined in Section 3.1. The iodine values reported in AUSNUT 2007 are derived largely from analysis of Australian foods, borrowing from relevant New Zealand data or by calculation.

AUSNUT 2007 has been used to provide a point of reference for the concentration of iodine in the Australian food supply. Seafood is a primary source of iodine in the Australian diet, with eggs and dairy also contributing (Table 4.1). Unfortified bread provides minimal iodine.

**Table 4.1: Iodine concentration of selected Australian foods**

Food name	µg/100 g
Table salt, iodised	4,400
Seaweed, nori, dried	1,800
Mussel, green, steamed or boiled	160
Scallop, raw	150
Snapper, raw	40
Egg, hard-boiled	37
Prawn, king (large size), flesh only, purchased cooked	25
Cheddar cheese (mild, tasty and vintage styles), regular fat	24
Ice cream, regular fat, vanilla flavour	23
Milk, regular fat	23
Table salt, non-iodised	20
Milk chocolate, with added milk solids	20
Salmon, red, canned in brine, drained	19
Extruded snacks, cheese-flavoured	18
Fruit yoghurt, regular fat	17
Tuna, canned in brine, drained	11
Soy beverage, regular fat, unflavoured, unfortified	10
Bread, unfortified	3
Tap water (national average)	1

Source: Provided by FSANZ from AUSNUT 2007.

## **Discussion**

The Food Composition Program at FSANZ is ongoing, and data can be used in conjunction with updated food consumption data to determine iodine intake following fortification.

### **Observation for future monitoring**

- FSANZ food composition data should be used as the basis for monitoring the iodine content of foods. This will assess the reach of the fortification standard, which includes the carry-over into other food products, not just bread.

## **4.2 Food industry compliance**

### **Compliance and enforcement model for mandatory fortification**

The compliance and enforcement model developed by a working group of the Implementation Sub Committee for mandatory folic acid fortification has been adapted to cover the range of mandatory fortification standards, including iodine. The model will be used by enforcement agencies to guide their approach to assessing the salt manufacturing industries compliance with the requirements of the standard. Compliance by the baking industry will be assessed via jurisdictions' regular compliance monitoring activities.

### **Observation for future monitoring**

- Information collected by jurisdictional enforcement agencies on the level of compliance should be sent to a coordinating agency, designated by the Implementation Sub Committee, as part of its Coordinated Survey.

## **4.3 Iodine intake**

In this section, an assessment is provided on iodine intake in terms of both efficacy and safety. The assessment of safety is a component of 'Adverse health effects' but has been included here because it is based on iodine intake.

### **FSANZ's dietary intake assessment for iodine for Proposal P1003**

As part of the standards development process for Proposal P1003 – Mandatory iodine fortification for Australia, FSANZ did a dietary intake assessment for iodine. This was used to determine baseline iodine intakes for various population groups, and the proportion of the population with intakes above the UL and below the EAR.

## Results

### Adequacy

The assessment of adequacy for iodine intakes is based on population groups meeting the estimated average requirement (EAR) for this nutrient. Table 4.2 shows that all population groups have a large proportion with inadequate iodine intakes which is indicative of an inadequate population-wide intake. Females generally have lower intakes than males and more than 50% of females aged 14 years and over do not meet the iodine EAR. When the EAR for pregnancy and lactation is applied to intakes for females aged 16–44 years, more than 90% of females have inadequate intakes. Further details on iodine intakes, including mean and 95th percentile intakes, can be found in Table 4.3.

**Table 4.2: Proportion of the Australian population with iodine intakes below the estimated average requirement<sup>(a)</sup> (per cent)**

Population group (years)	Males	Females
2–3	20	13
4–8	20	16
9–13	19	24
14–18	16	56
19–29	21	58
30–49	27	60
50–69	42	63
70+	53	71
16–44	..	59
Pregnancy	..	93
Lactation	..	97

(a) Results are representative of mean population intakes over a period of time, and reflect that about 20% of discretionary salt is iodised in Australia.

Source: FSANZ 2008b.

**Table 4.3: Mean and 95th percentile iodine intakes ( $\mu\text{g}/\text{day}$ ), and proportion of the population with iodine intakes below the estimated average requirement and above the upper level of intake, Australia, by age and sex<sup>(a)</sup>**

Population group (years)	Mean	95th percentile	< EAR (per cent)	> UL (per cent)
<b>Males</b>				
2+	121	206	26	<1
2–3	101	171	20	<1
4–8	101	175	20	0
9–13	120	240	19	0
14–18	143	228	16	0
19–29	140	233	21	0
30–49	128	209	27	0
50–69	114	189	42	0
70+	102	165	53	0
<b>Females</b>				
2+	97	157	55	0
2–3	91	133	13	0
4–8	87	134	16	0
9–13	95	151	24	0
14–18	98	181	56	0
19–29	101	177	58	0
30–49	99	161	60	0
50–69	96	146	63	0
70+	90	137	71	0
16–44	100	n.a.	59	0
Pregnancy	..	..	93	..
Lactation	..	..	97	..
<b>Persons</b>				
2+	108	n.a.	43	<1
2–3	95	n.a.	16	<1
4–8	94	n.a.	18	0
9–13	108	n.a.	21	0
14–18	121	n.a.	35	0
19–29	119	n.a.	41	0
30–49	110	n.a.	47	0
50–69	105	n.a.	53	0
70+	96	n.a.	63	0

(a) Results are representative of mean population intakes over a period of time, and reflect that about 20% of discretionary salt is iodised in Australia.

Source: FSANZ 2008b.

## Safety

The assessment of safety is based on iodine intakes being above the upper level of intake. Less than 1% of males aged 2–3 years and no-one in the remaining population groups exceeded the UL (Table 4.4).

**Table 4.4: Proportion of the Australian population with iodine intakes above the upper level of intake<sup>(a)</sup> (per cent)**

Population group (years)	Males	Females
2–3	<1	0
4–8	0	0
9–13	0	0
14–18	0	0
19–29	0	0
30–49	0	0
50–69	0	0
70+	0	0
16–44	..	0

(a) Results are representative of mean population intakes over a period of time, and reflect that about 20% of discretionary salt is iodised in Australia.

Source: FSANZ 2008b.

## Background to FSANZ’s dietary intake assessment for Proposal P1003

The following description of the FSANZ dietary intake assessment process has been taken from the FSANZ approval report for Proposal P1003 (Supporting Document 10 – Attachment 1) (FSANZ 2008b). Further details can be found in that report.

Iodine intakes were estimated by combining usual patterns of food consumption, as derived from the 1995 NNS data, with current concentrations of iodine in food. FSANZ does this using its dietary modelling computer program, DIAMOND.

### Population groups

Females aged 16–44 years were assessed as a separate group to represent women of child-bearing age, a specific target population. Other population groups were assessed according to those outlined in the Nutrient Reference Values for Australia and New Zealand (NHMRC & NZMoH 2006). All age groups were split by gender.

### Concentration data

Iodine concentrations for foods were derived from four main sources, and used to build the concentration database. These were:

- the 22nd Australian Total Diet Study (FSANZ 2008a), which provided information on about 90 commonly consumed foods
- analytical data for foods sampled in Australia and New Zealand from about 2000 to 2005, many of which were dairy and seafood

- overseas analytical data, when no relevant Australian data were identified and a food was known to be imported into the country (for example, canned fish or European cheese). Data from the United Kingdom and Denmark were major information sources
- recipe calculations, to derive iodine levels in mixed foods (for example, spaghetti bolognese) for which analytical data were not available.

Information from the four sources was matched against the 1995 Australian NNS food codes, assigning an iodine value to virtually all individual food codes.

### **Assumptions**

In doing its dietary intake assessments, FSANZ makes assumptions to ensure intakes are not underestimated. For Proposal P1003 the following assumptions were used:

#### *Consumer behaviour*

- Consumption of foods as recorded in the 1995 NNS represents current food consumption amounts.
- The dietary patterns for females aged 16–44 years are representative of the dietary patterns for pregnant and lactating women.
- Consumers select products that, on average, contain iodine at the concentrations specified.
- Consumers do not alter their food consumption habits upon iodine-fortified products becoming more available on the market.

#### *Concentration data*

- Non-iodised salt has an iodine concentration of zero.
- New Zealand iodine concentration data can be used if no Australian data are available.
- There is no contribution to iodine intakes through use of complementary medicines.
- To determine the amount of discretionary salt consumed by Australians, all sodium from processed foods is from sodium chloride. This is likely to result in an overestimate of the amount of discretionary salt.

#### *General*

- For this assessment, it is assumed that 1 millilitre is equal to 1 gram for all liquid and semi-liquid foods (for example, orange juice).

## **2007 Australian National Children’s Nutrition and Physical Activity Survey**

Background information on the 2007 Children’s Survey is outlined in Section 3.3.

### **CSIRO analysis of results**

#### **Adequacy**

Data from 2 days of food consumption, excluding supplements, show that children aged 2–16 years have inadequate iodine intakes (Table 4.5).

A greater proportion of females have inadequate intakes, with the highest proportion in females aged 14–16 years where about a quarter have intakes below the EAR. Mean male iodine intakes generally increase with age whereas female iodine intakes remain relatively unchanged with age (Table 4.6).

**Table 4.5: Proportion of the Australian children’s population with iodine intakes below the estimated average requirement, 2007 (per cent)**

Population group (years)	Males	Females
2–3	5	9
4–8	5	9
9–13	4	9
14–16	5	26

Note: Population weights applied.

Source: CSIRO & University of South Australia 2008.

**Table 4.6: Mean iodine intakes (µg/day) and proportion of the Australian children’s population with iodine intakes below the estimated average requirement, by age, 2007 (per cent)**

Population group (years)	Mean	< EAR (per cent)
<b>Males</b>		
2–3	128	5
4–8	125	5
9–13	153	4
14–16	175	5
<b>Females</b>		
2–3	123	9
4–8	112	9
9–13	121	9
14–16	119	26
<b>Persons</b>		
2–3	126	7
4–8	118	7
9–13	137	6
14–16	148	15

Note: Population weights applied.

Source: CSIRO & University of South Australia 2008.

## Safety

No analysis was done for the proportion of the population with intakes above the UL for iodine.

## **FSANZ analysis of results**

FSANZ is importing data from the survey into its DIAMOND program, and will be able to provide results using similar methods to the analysis of data from the 1995 adults NNS. This includes mean and 95th percentile intakes from food and supplements from the 2 days, and the proportion of population groups with intakes below the EAR and above the UL. These data will be included in the baseline monitoring supplement.

## **Victorian Health Monitor**

Background information on the Victorian Health Monitor is outlined in Section 3.3. Food consumption data will be obtained via three 24-hour recalls, done 2 weeks apart. Use of iodine supplements will be included. These data will be entered into the FoodWorks (Xyris software) dietary analysis program to obtain iodine intake data for various population groups, including women aged 18–44 years.

## **Discussion**

Data from NNSs provide the best indication of nutrient intake (Category 1 data). Iodine intake data for children aged 2–16 years from the 1995 NNS have been included in this report, because comprehensive data from the 2007 Children's Survey are not yet available for publication.

The Australian Health Survey will provide a means of monitoring the effect of mandatory iodine fortification on nutrient intakes.

The 1995 NNS is the most recent national surveys of food consumption for the population aged 16 years and over. Eating patterns may have changed since 1995, but FSANZ concluded that consumption of staple foods are unlikely to have changed markedly since 1995 (FSANZ 2007b).

In addition, FSANZ uses the most up-to-date food composition data available. While more recent food consumption data would be desirable, dietary modelling based on 1995 NNS food consumption data provides a suitable estimate of dietary intakes of iodine for the population.

When data from different NNSs are compared, consideration must be given to methodological differences between surveys; Cook et al. (2001) have developed a process to assess time trends from the 1983, 1985 and 1995 Australian NNSs, and this should be applied to subsequent NNSs.

While nutrient intake data from NNSs are the most suitable for monitoring, data from the Victorian Health Monitor may be beneficial in monitoring the impact within the Victorian population, and complement the data from NNSs (Category 2b data). However, a repeat of the study is dependent on funding and cannot be guaranteed.

Consideration must be given as to whether the whole sample of the Victorian Health Monitor is included in the analysis of iodine intake. This would result in a cross-over between data collection and the implementation of the mandatory standard. But this may not be an issue for iodine intake, given the food composition database would remain unchanged, and assuming consumption patterns don't change in the immediate months following mandatory iodine fortification.

## **Recommendations for baseline data**

- The FSANZ analysis of the 2007 Children's Survey should be included as baseline data in the monitoring process to complement data from the 1995 National Nutrition Survey. It will be important to include a detailed overview of the methods of data analysis.
- Data from the Victorian Health Monitor should be considered for inclusion as baseline data in the monitoring process to complement data from the 1995 National Nutrition Survey and 2007 Children's Survey. Consideration needs to be given on whether the entire data or only those collected before September 2009 are included in the analysis.

## **Observations for future monitoring**

- The National Nutrition and Physical Activity Survey (part of the Australian Health Survey) should be used for future monitoring.
- A repeat of the Victorian Health Monitor would make a valuable contribution to future monitoring.

## **4.4 Supplement use**

### **2007 Australian National Children's Nutrition and Physical Activity Survey**

Background information on the 2007 Children's Survey is outlined in Section 3.3. Use of supplements was included in the food consumption component of this survey.

#### **Results**

Data on supplement use have been analysed by AIHW from computer-assisted personal interviews. Results indicate that iodine supplements contribute minimally to children's iodine intake. Very few children reported taking supplements containing iodine, ranging from 1% to 4% across the population groups (Table 4.7). The mean intake from supplements across the population groups was also quite low, ranging from 0.2 µg/day to 2.1 µg/day.

**Table 4.7: Proportion of Australian children taking supplements containing iodine and mean<sup>(a)</sup> iodine intake from supplements ( $\mu\text{g}/\text{day}$ ), by age, 2007**

Population group (years)	Males		Females	
	Per cent	Mean	Per cent	Mean
2–3	0.8	0.2	1.3	0.5
4–8	3.7	1.9	3.7	1.0
9–13	2.4	1.8	2.1	1.1
14–16	3.2	1.5	2.4	2.1
2–16	2.6	1.4	2.4	1.1

(a) Mean intake for all respondents.

Note: Population weights applied.

Source: AIHW analysis of data from the Commonwealth Department of Health and Ageing 2008.

## Victorian Health Monitor

Background information on the Victorian Health Monitor is outlined in Section 3.3. Data are being collected on iodine supplement use and concentration. These data are not available for this report, but is anticipated to be included in the baseline monitoring supplement.

## Discussion

The 2007 Children’s Survey provides nationally representative data on iodine supplement use, including concentration (Category 1 data). The Australian Health Survey Program will collect data on supplement use, including concentration, and should be used as a means for monitoring.

The Victorian Health Monitor is representative of the Victorian population (Category 2b data). However, a repeat of the study is dependent on funding and cannot be guaranteed.

## Recommendations for baseline data

- Data from the 2007 Children’s Survey should be used as the primary data source for iodine supplement use for Australian children.
- Data from the Victorian Health Monitor should be considered for inclusion as baseline data in the monitoring process, with consideration given to the date of data collection.

## Observations for future monitoring

- Data collected on supplement use, including concentration, in the National Nutrition and Physical Activity Survey (part of the Australian Health Survey) should be used as a means for monitoring.
- A repeat of the Victorian Health Monitor would make a valuable contribution to future monitoring.

## 4.5 Median urinary iodine concentration

### Australian National Iodine Nutrition Study

The Australian National Iodine Nutrition Study was done to document the population iodine nutritional status of schoolchildren in Australia (Li et al. 2006, 2008). The study occurred between July 2003 and December 2004, and included schoolchildren aged 8–10 years across five states, including New South Wales, Victoria, Queensland, Western Australia and South Australia. Tasmania was excluded because a voluntary iodine fortification program, using iodised salt in bread, was ongoing in the state, and the Northern Territory was excluded for logistical reasons.

The study used a purpose-built vehicle ('ThyroMobil') that has been used for similar studies of iodine nutrition in other countries. Students who brought their first morning urine sample to school with a pre-labelled specific identification number were registered, weighed and their height measured (to calculate body surface area). Median urinary iodine concentrations (MUIC) were calculated from spot urines. In total, 1,709 students (comprising 881 boys and 828 girls) participated, representing 85% of the estimated target number of students. Further details of the study are in the Appendix.

### Results

The MUIC of 96 µg/L across all states indicates that children in mainland Australia are mildly iodine deficient (Table 4.8). There are variations in MUIC across the continent, with, overall, West Australian and Queensland children being iodine replete and Victorian and New South Wales children being mildly iodine deficient. Li et al. (2006) indicate that 59% of New South Wales children and 72.6 Victorian children had urinary iodine concentration of less than 100 µg/L in New South Wales and 73% in Victoria, indicating inadequate iodine nutrition.

**Table 4.8: Australian National Iodine Nutrition Study median urinary iodine concentration data, 2003–2004**

State	Students participated/ target number	Per cent	Male to female ratio	Mean age (years) (Standard deviation)	MUIC (µg/L)	Interquartile range (µg/L)
NSW	427/400	106	1:1.0	9.3 (0.6)	89.0	65.0–123.5
Vic	348/400	87	1:0.8	9.7 (0.5)	73.5	53.0–104.3
Qld	294/400	73	1:1.3	9.1 (0.4)	136.5	104.3–183.8
WA	323/400	80	1:0.8	8.9 (0.6)	142.5	103.5–214.0
SA	317/400	79	1:0.9	9.0 (0.5)	101.0	74.0–130.0
<b>Total for sample</b>	<b>1,709/2,000</b>	<b>85</b>	<b>1:0.9</b>	<b>9.2 (0.6)</b>	<b>104.0</b>	<b>71.0–147.0</b>
Estimates for mainland states <sup>(a)</sup>			1:1.0	9.3 (0.6)	96.0	66.0–135.0

(a) Formed by weighting the sample data from each state according to the distribution of all Year 4 schoolchildren, by mainland states.

Source: Li et al. 2008.

## Tasmanian Iodine Monitoring Program

The Tasmanian Government began an iodine supplementation program in October 2001. Voluntary replacement of salt with iodised salt in bread was chosen to tackle iodine deficiency. As a result, about 80% of bread baked and sold in Tasmania was made with iodised salt (Burgess et al. 2007). Studies were done to assess MUIC in schoolchildren before and after this voluntary fortification initiative. Data are presented in this report for both time points which will help with monitoring the impact of mandatory iodine fortification in Tasmania.

### Results

Data presented are from Seal et al. (2007), and the samples from the 1998 and 2000 surveys include only those aged 8–11 years to match the age for the 2003, 2004 and 2005 surveys. MUIC was higher in each of the years after voluntary fortification compared with the years before (Table 4.9). In the years before fortification the MUIC was indicative of mild iodine deficiency, whereas after the intervention results are consistent with optimal iodine nutrition. The proportion of children with iodine concentrations less than 50 µg/L also decreased.

**Table 4.9: Urinary iodine concentration in Tasmanian schoolchildren, 1998 and 2005**

Year	Sample size	Median		Percentage below 50 µg/L	
		µg/L	95% CI <sup>(a)</sup>	µg/L	95% CI <sup>(a)</sup>
Before voluntary fortification					
1998	124	72	72–80	16.9	10.3–23.6
2000	91	72	67–84	18.7	10.6–26.7
After voluntary fortification					
2003	347	105	98–111	10.1	6.9–13.3
2004	430	109	103–115	10.0	7.2–12.8
2005	401	105	98–118	10.5	7.5–13.5

(a) Confidence intervals estimated by the Wald binomial method.

Source: Seal et al. 2007.

### Methods

#### Sample design

##### *Before voluntary fortification*

Subjects were selected using a two-stage stratified sampling procedure. All Tasmanian schools with more than 15 children of primary school-age were included in the sampling frame. Thirty schools were chosen with a probability proportional to enrolments in grades from kindergarten to Year 6, with the aim of selecting at random 15 students from the list of enrolments at each of those 30 schools. Two schools declined to participate, and 322 children from the remaining 28 schools were invited to participate (Hynes et al. 2004).

#### *After voluntary fortification*

A one-stage cluster sampling method was used to randomly select participants. There were 451 school classes identified from 227 schools throughout Tasmania. In 2003, 52 classes from 47 schools were randomly selected, and in 2004 and 2005 an additional 8 classes were randomly selected (Seal et al. 2007).

#### **Study population**

##### *Before voluntary fortification*

There were 241 children aged 4–12 years in the 1998–1999 survey. Of these, 170 were followed up in 2000–2001, when they were aged 5–14 years (Hynes et al. 2004).

##### *After voluntary fortification*

There were 347 children surveyed in 2003, 430 in 2004 and 401 in 2005. Children were aged 8–11 years (Seal et al. 2007).

#### **Median urinary iodine concentration**

First-void samples were collected in the surveys before voluntary fortification, and casual spot samples collected after voluntary fortification (Seal et al. 2007).

### **Aboriginal Birth Cohort Study**

Background information on the Aboriginal Birth Cohort Study is outlined in Section 3.6.

#### **Results**

The MUIC was 55 µg/L in both males and females. Assuming a total daily urinary volume of 1.5 litres for adults (which may not be accurate in hot, humid climates), this would be equivalent to a median intake of about 78 µg/day. This adjusted value places the participants in the mild iodine deficiency range (Mackerras et al. 2008).

#### **Methods**

Urinary iodine concentrations were measured from spot urine samples in both boys ( $n=183$ ) and girls who were neither pregnant nor had a child aged less than 6 months ( $n=158$ ). Iodine analysis was done at the Westmead Hospital laboratory (Mackerras et al. 2008).

### **Victorian Health Monitor**

Background information on the Victorian Health Monitor is outlined in Section 3.3. Spot urine samples will be taken for the assessment of MUIC and are anticipated to be included in the baseline monitoring supplement.

## **Discussion**

The Australian National Iodine Nutrition Study is specific to monitoring of iodine status in schoolchildren, and covered the majority of jurisdictions in Australia. This study provides a substitute for baseline data for iodine status of the population (Category 2a data). At this stage there is no commitment for a repeat of this study.

The Tasmanian Iodine Monitoring Program provides representative data for Tasmanian children, and complements data from the Australian National Iodine Nutrition Study (Category 2b data).

The next follow-up of the Aboriginal Birth Cohort Study is due to take place in 2011–2012 (Category 2b data).

The Victorian Health Monitor is representative of the Victorian population (Category 2b data). However, a repeat of the study is dependent on funding and cannot be guaranteed. It will be important to consider only data collected before the implementation date for mandatory iodine fortification.

## **Recommendations for baseline data**

- Data from the Victorian Health Monitor should be considered for inclusion as baseline data in the monitoring process, with consideration given to the date of data collection. Data would complement that from the Australian National Iodine Nutrition Study, Tasmanian Iodine Monitoring Program and Aboriginal Birth Cohort Study.

## **Observations for future monitoring**

- A repeat of the Aboriginal Birth Cohort Study could track the iodine status in this group.
- A repeat of the Victorian Health Monitor could make a valuable contribution to future monitoring.
- The National Health Measures Survey (part of the Australian Health Survey) should be used as a means of monitoring.

## 4.6 Summary of Australian baseline data sources for mandatory iodine fortification

The baseline data for mandatory iodine fortification are summarised in the tables below, according to each measure of the monitoring framework.

**Table 4.10: Monitoring framework component number 1: Food composition and industry compliance**

Measure	Data source	Notes
Iodine content of foods	<ul style="list-style-type: none"> <li>AUSNUT<sup>(a)</sup></li> <li>NUTTAB<sup>(a)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Ongoing data compilation by FSANZ</li> </ul>
Compliance monitoring arrangements of the enforcement agencies	Details of compliance and enforcement	<ul style="list-style-type: none"> <li>For baseline report: an overview of arrangements</li> <li>For monitoring: data collected by jurisdictions to be sent to a coordinating agency</li> </ul>

(a) Details of the AUSNUT and NUTTAB databases are in Section 3.1.

**Table 4.11: Monitoring framework component number 2: Nutrient intake**

Measure	Data source	Notes
Intakes in the population	1995 NNS (FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>Future NNSs for monitoring</li> </ul>
Intakes above the upper level of intake (A component of 'Adverse health effects', but listed here because it relates to iodine intake)	2007 Children's Survey	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>To be a late addition following FSANZ analysis</li> <li>Future NNSs for monitoring</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>Potential limitation: Cross-over with data collection and implementation date, which will need to be considered in the analysis of results</li> <li>Complementary data (Category 2b)</li> <li>To be a late addition following finalisation of data collection and analysis</li> <li>Repeat survey dependent on funding</li> </ul>
Supplement use	2007 Children's Survey	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>Future NNSs for monitoring</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>Collecting data on supplement use, including concentration</li> <li>Potential limitation: Cross-over with data collection and implementation date, which will need to be considered in the analysis of results</li> <li>Regional data (Category 2b)</li> <li>To be a late addition following finalisation of data collection and analysis</li> <li>Repeat survey dependent on funding</li> </ul>

**Table 4.12: Monitoring framework component number 3: Nutrient status**

Measure	Data source	Notes
Median urinary iodine concentration	Australian National Iodine Nutrition Study	<ul style="list-style-type: none"> <li>• Primary data (Category 2a)</li> <li>• Recommend a repeat study following fortification using same methods</li> </ul>
	Tasmanian Iodine Monitoring Program (children)	<ul style="list-style-type: none"> <li>• Primary data (Category 2b)</li> </ul>
	Aboriginal Birth Cohort Study	<ul style="list-style-type: none"> <li>• Complementary data (Category 2b)</li> <li>• The next follow-up will take place in 2011–12</li> </ul>
	Victorian Health Monitor	<ul style="list-style-type: none"> <li>• Potential limitation: Cross-over with data collection and implementation date which will need to be considered in the analysis of results</li> <li>• Complementary data (Category 2b)</li> <li>• To be a late addition following finalisation of data collection and analysis</li> <li>• Repeat survey dependent on funding</li> </ul>

**Table 4.13: Monitoring framework component number 4: Health benefits**

Measure	Data source	Notes
Median urinary iodine concentration	Refer to information on iodine status	<ul style="list-style-type: none"> <li>• To be assessed via the analysis of data obtained for iodine status</li> </ul>

**Table 4.14: Monitoring framework component number 5: Adverse health effects**

Measure	Data source	Notes
Median urinary iodine concentration	Refer to information on iodine status	<ul style="list-style-type: none"> <li>• Data from surveys can be used to assess population groups with median urinary iodine concentrations above the recommended level (that is, above 300 µg/L)</li> </ul>
Intakes above the upper level of intake		<ul style="list-style-type: none"> <li>• Assessed as part of nutrient intake</li> </ul>

# 5 New Zealand baseline data for mandatory folic acid fortification

This section reports the New Zealand baseline data for monitoring mandatory folic acid fortification, observations on data requirements for future monitoring and a summary of the baseline data sources. Data are presented for each of the five key components of the monitoring framework.

## 5.1 Food composition

### Manufactured Food Database

The Manufactured Food Database is a contracted service between the New Zealand Food Safety Authority (NZFSA) and the Auckland District Health Board. It provides vitamin and mineral label information for a broad variety of fortified foods available in New Zealand.

The database has been compiled from information supplied voluntarily by New Zealand food manufacturers at the annual request of the Auckland District Health Board.

Various products are currently fortified with folic acid through the current voluntary fortification permissions (Table 5.1). The breakfast cereals category had the highest number of products containing folic acid (70) with a mean concentration of 191 µg/100 g. There are six breads available that contain folic acid with a mean concentration of 212 µg/100g.

**Table 5.1: Number of New Zealand products containing folic acid and concentrations, 2008**

Category	Number of products with folic acid	Concentration (µg/100 grams or millilitres)		
		Mean	Minimum	Maximum
Baby foods	4	81	22	140
Biscuits	4	283	280	290
Breads	6	212	200	286
Breakfast cereals	70	191	53	333
Extracts of meat, yeast, or vegetables	3	2,000	2,000	2,000
Food drinks	23	119	29	296
Fruit cordial	1	8	8	8
Fruit drinks and fruit nectar	7	28	20	39
Fruit juice	3	29	23	40
Miscellaneous	13	202	38	300

Source: Provided by NZFSA from the Manufactured Food Database.

## **Discussion**

Data from the Manufactured Food Database provide an indication of the extent of folic acid fortification. However, the concentration value, based on label data, may not be a true reflection of the actual content. This would be achieved through analytical data being commissioned and/or compiled by the New Zealand Food Composition Database. At present, folic acid values on the database are not the most current.

### **Observations for future monitoring**

- The Manufactured Food Database should be used to estimate the extent of folic acid food fortification.
- The New Zealand Food Composition Database should be used as the basis for monitoring the folic acid content of foods through analysed values. This will more accurately assess the reach of the fortification standard, which includes the carry-over into other food products, not just bread.

## **5.2 Food industry compliance**

NZFSA has responsibility for compliance and enforcement aspects of the mandatory folic acid fortification standard. NZFSA will take the same approach to this task as with its assessment of other standards.

### **Observation for future monitoring**

- Compliance information collected by NZFSA should be sent to a coordinating agency.

## **5.3 Folic acid intake**

In this section, an assessment is provided on folic acid intake in terms of both efficacy (for women of child-bearing age) and safety (for all population groups). Data on safety are a component of 'Adverse health effects', but have been included here due to it being based on folic acid intake.

### **FSANZ's dietary intake assessment for folic acid for Proposal P295**

As part of the standards development process for Proposal P295 – Consideration of mandatory fortification with folic acid, FSANZ did a dietary intake assessment for folic acid in New Zealand. This was used to generate folic acid intakes for various population groups and the proportion of the population with intakes above the UL. The following description of the FSANZ dietary intake assessment process has been taken from the FSANZ final assessment report for Proposal P295 (attachments 7a and 7b) (FSANZ 2006). Further details can be found in that report.

## Results

### Adequacy

Given the current levels of voluntary folic acid fortification, women of child-bearing age consume an average of 62 µg of folic acid a day, with a 95th percentile intake of 190 µg/day (excluding supplements). Consequently, intake levels are well below the recommended 400 µg/day. Further details on folic acid intakes for various New Zealand population subgroups, including 95th percentile intakes are provided in Table 3.2.

**Table 5.2: Mean and 95th percentile folic acid intakes and proportion of the population with folic acid intakes above the upper level of intake, New Zealand, by age and sex<sup>(a)</sup>**

Population group (years)	Mean (µg/day)	95th percentile (µg/day)	> UL (per cent)
<b>Males</b>			
15–18	113	225	0
19–29	112	221	0
30–49	86	246	0
50–69	84	262	0
70+	69	188	0
<b>Females</b>			
15–18	54	157	0
19–29	56	162	0
30–49	67	205	<1
50–69	69	210	0
70+	70	179	0
16–44	62	190	<1
<b>Persons</b>			
15+	75	214	..
15–18	81	195	0
19–29	76	194	0
30–49	75	223	<1
50–69	76	238	0
70+	70	187	0

(a) Concentration of folic acid in foods is weighted according to the proportion of a food group that is fortified. This estimates dietary intakes over the long term and across the population.

Source: FSANZ 2007b.

## Safety

The assessment of safety is based on folic acid intakes being above the upper level of intake (the level likely to pose no adverse effects for the majority of the population). Table 5.3 shows that given the current levels of voluntary fortification, the proportion of each population group with intakes above the UL is < 1%.

**Table 5.3: Proportion of the New Zealand population with folic acid intakes above the upper level of intake<sup>(a)</sup> (per cent)**

Population group (years)	Males	Females
15–18	0	0
19–29	0	0
30–49	0	<1
50–69	0	0
70+	0	0
16–44	..	<1

(a) Concentration of folic acid in foods is weighted according to the proportion of a food group that is fortified. This estimates dietary intakes over the long term and across the population.

Source: FSANZ 2007b.

## Methods

Folic acid intakes were estimated by combining usual patterns of food consumption, as derived from the 1997 New Zealand NNS, with current levels of fortification based on the update of voluntary folic acid fortification permissions by the food industry.

The 1997 New Zealand NNS surveyed 4,636 people aged 15 years and over using 24-hour food recall methodology, and provides a representative indication of food consumption. A second 24-hour recall was also collected on a subset of respondents, and intakes from a single day were adjusted to estimate 'usual intake' by including information from a second 24-hour record.

### Population groups

Females aged 16–44 years were assessed as a separate group to represent the target population – women of child-bearing age. Other population groups were assessed according to those outlined in the Nutrient Reference Value for Australia and New Zealand (NHMRC & NZMoH 2006). All age groups were split by gender.

### Concentration data

Folic acid concentrations for foods that are voluntarily fortified were derived from three main sources, and used to build the concentration database. It does not take into account naturally-occurring folate in food or folic acid from the use of supplements. These were:

- analytical data for samples purchased in New Zealand in 2003 and 2004, including breakfast cereals, juice, bread and food drinks
- Current label data for foods where no analytical values were available, without adjustment for potential under- or overages of folic acid.

- recipe calculation for foods that contain a folic acid fortified food as one of their ingredients (for example, chocolate crackles that contain fortified puffed rice breakfast cereal).

The effect of cooking foods on folic acid concentrations was also taken into consideration when building the database.

Information from the three sources was matched against the 1997 New Zealand NNS food codes for all those foods identified as being fortified with folic acid (101 out of 4,950 foods).

### **Assumptions**

In doing its dietary intake assessments, FSANZ makes assumptions to ensure intakes are not underestimated. For Proposal P295 the following assumptions were used.

#### *Consumer behaviour*

- Consumption of foods as recorded in the 1997 NNS represents current food consumption amounts.
- The dietary patterns for females aged 16–44 years are representative of the dietary patterns for pregnant women.
- Consumers always select products containing folic acid at the concentrations specified.
- The consumer consumption patterns reflect the proportions of fortified and non-fortified products currently available within certain food categories; that is, more consumers now select folic acid-fortified products. The current food consumption patterns were reflected in the dietary modelling by weighting the folic acid concentration values for these food groups according to market share.

#### *Concentration data*

- Australian folic acid concentration data can be used if no New Zealand data are available.
- There was no contribution to folic acid intake through the use of dietary supplements.

## **2008–09 New Zealand Adult Nutrition Survey**

The 2008–09 New Zealand Adult Nutrition Survey (ANS) collected information about the eating habits and health characteristics of adult New Zealanders

### **Results**

The survey data will not be available until mid-2011 and there may be an additional delay in obtaining folic acid intake data due to the analysis required.

## **Methods**

### **Sample design**

The survey is based on a complex multi-stage area-based sample design, consisting of random selection of primary sampling units, random selection of households within a primary sampling unit, and random selection of a single adult within a household. The survey includes booster samples for Māori and Pacific adults.

The expected survey sample size is 5,700 adults aged 15 years and over. The survey has been designed to be nationally representative.

### **Food consumption data**

One day of food, beverage and supplement intakes have been collected using 24-hour recall methodology. A repeat 24-hour recall has been collected on a subsample within 1 month, so that nutrient intakes for each subgroup can be adjusted to obtain usual intake distributions.

## **2002 National Children's Nutrition Survey**

The 2002 National Children's Nutrition Survey (Children's Survey) was a cross-sectional population survey to assess: food and nutrient intake; eating patterns; food security and frequently eaten foods; physical activity patterns; dental health; anthropometric measures and nutrition-related clinical measures in a sample of New Zealand children (Ministry of Health 2003).

## **Results**

### **University of Otago analysis of results**

When completing the dietary intake assessment for Proposal P295, FSANZ did not hold food consumption data from the 2002 Children's Survey. The New Zealand Food Safety Authority (NZFSA) commissioned the University of Otago (LINZ Activity and Health Research Unit) to do a dietary assessment. The assessment presented intakes according to the scenarios for folic acid fortification, and did not separate out baseline intakes. As a result, it cannot be used for the baseline report.

## **Methods**

### **Sample design**

The 2002 Children's Survey was a voluntary, school-based survey. Children were selected for participation to ensure a nationally representative sample with sufficient Māori and Pacific children so ethnic-specific analyses could be done. A two-stage sampling frame was used to recruit children from schools in New Zealand. The first stage involved 160 schools randomly sampled from the Ministry of Education list of schools. In the second stage, students were randomly sampled from rolls of the selected schools.

### **Study population**

The 2002 Children's Survey included 3,275 children aged 5–14 years and was done during the school year (February to December).

## **Food consumption data**

One day of food, beverage and supplement intakes were collected using 24-hour recall methodology. A repeat 24-hour recall was collected on a subsample, so that nutrient intakes for each subgroup could be adjusted to obtain usual intake distributions. The 24-hour recall was usually carried out in the home in the presence of a carer. Further details on the methods are reported in the survey report (Ministry of Health 2003).

## **Discussion**

Data from NNSs provide the best indication of nutrient intake (Category 1 data). Data from the 1997 NNS have been included in this report because data from the 2008–09 ANS are not yet available for publication. In the analysis of results from the 2008–09 ANS, it will be important to consider the date in which data collection ceased.

Repeat NNSs would provide a means of monitoring the effect of mandatory folic acid fortification on nutrient intake, and ultimately intakes above the UL. However, consideration must be given to methodological differences between surveys in analysing time trends.

## **Recommendations for baseline data**

- Folic acid intakes from the 2002 Children’s Survey and the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process to complement data from the 1997 National Nutrition Survey. It will also be important to include a detailed overview of the methods of data analysis and further details on data collection.
- Two days of food consumption data should be used in the analysis of results from the 2008–09 New Zealand Adult Nutrition Survey (usual intakes). Data required are mean and 95th percentile intakes for males, females and persons of the various age groups according to the Nutrient Reference Values. Women aged 16–44 years should be a separate subgroup. Data on the proportion of each population subgroup with intakes above the UL can be generated from individual intakes.

## **Observation for future monitoring**

- Future National Nutrition Surveys should be used as a means for monitoring.

## **5.4 Supplement use**

### **2008–09 New Zealand Adult Nutrition Survey**

Background information on the 2008–09 ANS is outlined in Section 5.3. Data have been collected on folic acid supplements but these data will not be available until mid-2011.

## Folate status of representative populations in Dunedin

The Dunedin study was done February to July 1999 to assess the folate status of a randomly selected sample of women of child-bearing age (20–44 years) and young adolescent males (14–19 years) in New Zealand before folic acid fortification of foods becomes widespread. The authors suggest that this study provides baseline data for monitoring the impact of folic acid fortification (Ferguson et al. 2000). Further details of this study are in the Appendix.

### Results

A total of 28% of females had taken a folic acid supplement in the previous 6 months, but only 13% had done so daily (Table 5.4). The proportion of females taking a folic acid supplement before and during their first trimester of their last pregnancy was 5% and 20%, respectively.

Among those who had been pregnant within the previous 5 years, intake of a folic acid supplement was somewhat higher (11% before pregnancy and 44% during the first trimester) (Table 5.5). Of those taking a folic acid supplement before or during pregnancy, most took the supplement daily (Table 5.6).

**Table 5.4: Proportion of New Zealand females taking a folic acid supplement, by frequency of consumption, 1999**

Frequency	Per cent
Never	72
<1 per month	5
1–2 per month	3
1–3 per month	2
3–6 per month	5
1 per day	13
>1 per day	0

Source: Ferguson et al. 2000.

**Table 5.5: Proportion of New Zealand females<sup>(a)</sup> taking a folic acid supplement during their last pregnancy, 1995–1999 (per cent)**

	Last pregnancy <sup>(b)</sup>	Pregnant in 1995–1999 (n=54)
Before or during pregnancy	25	48
Before pregnancy	5	11
1st trimester	20	44
2nd trimester	7	17
3rd trimester	6	11

(a) Percentage of total population of women who had been pregnant (n=126).

(b) Includes females who had their last pregnancy in the 1995–1999 period.

Source: Ferguson et al. 2000.

**Table 5.6: Frequency of folic acid supplement intake during last pregnancy, 1995–1999<sup>(a)</sup>**

Frequency	Last pregnancy <sup>(b)</sup>	Pregnant in 1995–1999 ( <i>n</i> =54)
Before or during pregnancy	25	48
Episodically	2	2
<1 per week	1	0
1–3 per week	2	4
4–6 per week	2	6
Daily	18	37

(a) Percentage of total population of New Zealand women who had been pregnant (*n*=126).

(b) Includes women who had their last pregnancy in the 1995–1999 period.

Source: Ferguson et al. 2000.

## Methods

Individuals living in Dunedin were recruited using a stratified randomised cluster sampling technique. In this technique, participants were identified using a door knocking protocol. A total of 216 women and 140 boys agreed to participate. A self-administered general questionnaire was used to collect information on folic acid supplement use in the previous 6 months, but this did not include concentrations. Results are presented for females only.

## Discussion

Data from National Nutrition Surveys provide the best indication of supplement use (Category 1 data). In the analysis of results from the 2008–09 New Zealand Adult Nutrition Survey, it will be important to consider the date in which data collection ceased.

Data from the Dunedin study by Ferguson et al. (2000) provide representative sentinel data (Category 2b data), and a repeat study is planned.

## Recommendations for baseline data

- Results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process, with a detailed overview of the methods. Consideration should be given to the date in which data collection ceased.
- Data from the Dunedin study can complement data from the National Nutrition Survey.

## Observations for future monitoring

- Future National Nutrition Surveys should be used as a means for monitoring.
- The planned repeat of the Dunedin study will help with monitoring.

## **5.5 Serum folate**

### **2008–09 New Zealand Adult Nutrition Survey**

Background information on the 2008–09 New Zealand Adult Nutrition Survey is outlined in Section 5.3. Following an interview, participants were asked whether they are willing to provide a blood sample. If they agree, the collection will take place at a clinic close to their home. Analysis of serum folate concentrations will be done.

### **Folate status of representative populations in Dunedin**

Background information on the Dunedin study is outlined in Section 5.4.

#### **Results**

The median serum folate level was 13.4 nmol/L (interquartile range: 9.4, 19.4).

#### **Methods**

Fasting serum folate concentrations were measured, and values presented for 213 females. No cut-points were used in the assessment of concentrations.

#### **Discussion**

Data from NNSs provide the best indication of serum folate status (Category 1 data). In the analysis of results from the 2008–09 ANS, it will be important to consider the date in which data collection ceased.

Data from the Dunedin study provide representative sentinel data (Category 2b data), and a repeat study is planned.

### **Recommendations for baseline data**

- Results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process, with a detailed overview of the methods. Consideration should be given to the date in which data collection ceased.
- Data from the Dunedin study can complement data from the National Nutrition Survey.

### **Observations for future monitoring**

- Future National Nutrition Surveys should be used as a means for monitoring.
- The planned repeat of the Dunedin study will help with monitoring.

## 5.6 Red blood cell folate

### 2008–09 New Zealand Adult Nutrition Survey

Background information on the 2008–09 New Zealand Adult Nutrition Survey is outlined in Section 5.3. Following an interview, participants were asked whether they are willing to provide a blood sample. If they agree, the collection will take place at a clinic close to their home. Analysis of red blood cell folate concentrations will be done.

### Folate status of representative populations in Dunedin

Background information on the Dunedin study is outlined in Section 5.4.

#### Results

The median red blood cell folate level was 787 nmol/L. Less than 5% of females had red blood cell folate levels indicative of suboptimal folate status ( $\leq 363$  nmol/L); however, only 33% had levels  $\geq 906$  nmol, which is the level associated with a very low risk of NTDs (Table 5.7).

**Table 5.7: Proportion of the New Zealand population with red blood cell folate status at various cut-points**

Parameter	Per cent
Deficient (<317 nmol/L)	1
Borderline (317–363 nmol/L)	2
Acceptable (>363 nmol/L)	97
Risk of NTD	
High ( $\leq 339$ nmol/L)	2
340–679 nmol/L	36
680–905 nmol/L	29
Low ( $\geq 906$ nmol/L)	33

#### Notes

1. Sample size is 212.
2. Median (interquartile range) = 787 nmol/L (616, 1,073).

Source: Ferguson et al. 2000.

#### Methods

Fasting red blood cell folate concentrations were measured, and values presented for 212 females.

The cut-points for classification of folate status were based on those outlined by Daly et al. (1995).

## Discussion

Data from NNSs provide the best indication of red blood cell folate levels (Category 1 data). In the analysis of results from the 2008–09 ANS, it will be important to consider the date in which data collection ceased.

Data from the Dunedin study provide representative sentinel data (Category 2b data), and a repeat study is planned.

## Recommendations for baseline data

- Results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process, with a detailed overview of the methods. Consideration should be given to the date in which data collection ceased.
- Data from the Dunedin study can complement data from the National Nutrition Survey.

## Observations for future monitoring

- Future National Nutrition Surveys should be used as a means for monitoring.
- The planned repeat of the Dunedin study will help with monitoring.

## 5.7 Neural tube defects

### Neural tube defect incidence in New Zealand 1998–2003

Data on neural tube defects are available from the National Minimum Dataset for public and private hospital discharges (for live births) and the Adult and Perinatal Mortality Database (for stillbirths).

Data from 1998 to 2003 on therapeutic pregnancy terminations were obtained from Statistics New Zealand, which process data from the Abortion Supervisory Committee. It is important to note that this committee only collect information on fetal abnormalities for terminations performed less than 20 weeks gestation. This is because, under the *Crimes Act 1961*, fetal abnormality is not grounds for abortion in pregnancies over 20 weeks. In this report NTD data for late pregnancy terminations are recorded as fetal deaths.

Children diagnosed with spina bifida, anencephaly or encephalocele are included in the data. Because children with spina bifida are not always diagnosed at birth in New Zealand, they have been added to the data set retrospectively for their birth year. As a result, data after 2003 have not been included as the numbers of children with NTD will not be accurate. Data on early pregnancy terminations affected by NTDs are only available from 1998 onwards.

From 1998–2003 the number of pregnancies affected by NTDs decreased from 97 to 63 (Table 5.8). The highest incidence rate was 17.4 cases per 10,000 births in 1998, and the lowest was 9.6 in 2001.

In 2003, NTD rates were the highest in early pregnancy terminations (5.7 cases per 10,000 births), followed by live births (3.4 per 10,000) and fetal deaths (2.1 per 10,000) (Table 5.9).

**Table 5.8: All neural tube defects, by year of birth or termination of pregnancy, New Zealand, 1998–2003**

Year	Number	Rate <sup>(a)</sup>
1998	97	17.4
1999	91	15.8
2000	84	14.7
2001	54	9.6
2002	68	12.5
2003	63	11.2

(a) Rates are per 10,000 births.

Source: New Zealand Ministry of Health and Statistics New Zealand.

**Table 5.9: All neural tube defects, by outcome and year of birth or termination of pregnancy, New Zealand, 1998–2003**

Year	Live births		Fetal deaths		Terminations <20 weeks gestation		All NTD	
	Number	Rate <sup>(a)</sup>	Number	Rate <sup>(a)</sup>	Number	Rate <sup>(a)</sup>	Number	Rate <sup>(a)</sup>
1998	42	7.5	14	2.5	41	7.4	97	17.4
1999	44	7.7	9	1.6	38	6.6	91	15.8
2000	36	6.3	9	1.6	39	6.8	84	14.7
2001	24	4.3	7	1.2	23	4.1	54	9.6
2002	29	5.3	7	1.3	32	5.9	68	12.5
2003	19	3.4	12	2.1	32	5.7	63	11.2

(a) Rates are per 10,000 births.

Source: New Zealand Ministry of Health and Statistics New Zealand.

## Discussion

Data from 1998 to 2003 provide an accurate picture of NTD incidence in New Zealand as it includes early pregnancy terminations. However, the question regarding fetal abnormalities was not included in the 2009 Abortion Notification Form, which will affect the completeness of NTD rates for that year. Since March 2011, a new system has been instigated whereby fetal abnormalities if detected in terminations will be notified to the New Zealand Birth Defects Monitoring Programme.

## Recommendation for baseline data

- The most recent data on NTD incidence should be included as baseline data in the monitoring process.

## 5.8 Cancer incidence and mortality

The New Zealand Cancer Registry is a population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous cell and basal cell skin cancers.

The registry was set up in 1948, primarily using information sent by public hospitals to the National Minimum Dataset. Since the Cancer Registry Regulations 1994 came into effect, laboratory test results have been collected, and the data quality and completeness have significantly improved.

Data on deaths from cancer are sourced from the Mortality Collection held by the Ministry of Health Information Directorate. The Mortality Collection includes all deaths recorded in New Zealand for a particular year. Overseas deaths of cancer patients registered in New Zealand are not included in the collection.

The cancers are classified using the International Statistical Classification of Diseases and Related Health Problems (ICD), and the International Classification of Diseases for Oncology (ICD-O). All data are mapped to ICD-10 codes.

Age-standardised rates are presented in this report. More detailed data, including the number of cases, are available from the New Zealand Health Information Service publications.

### Bowel cancer

#### Results

Age-standardised incidence and mortality rate data on bowel cancer are shown in Figure 5.1 and in Table 5.10, and a summary of these results is provided below.

#### Incidence

##### *Males*

From 1994 to 2005 the age-standardised incidence rate for males decreased by an average of 1.5% per year, from 63.5 cases per 100,000 population in 1994 to 50.4 in 2005 (Figure 5.1). The highest rate was in 1994.

##### *Females*

From 1994 to 2005 the age-standardised incidence rate for females decreased by an average of 1.0% per year, from 50.3 cases per 100,000 population in 1994 to 42.5 in 2005 (Figure 5.1). As with males, the highest rate was in 1994.

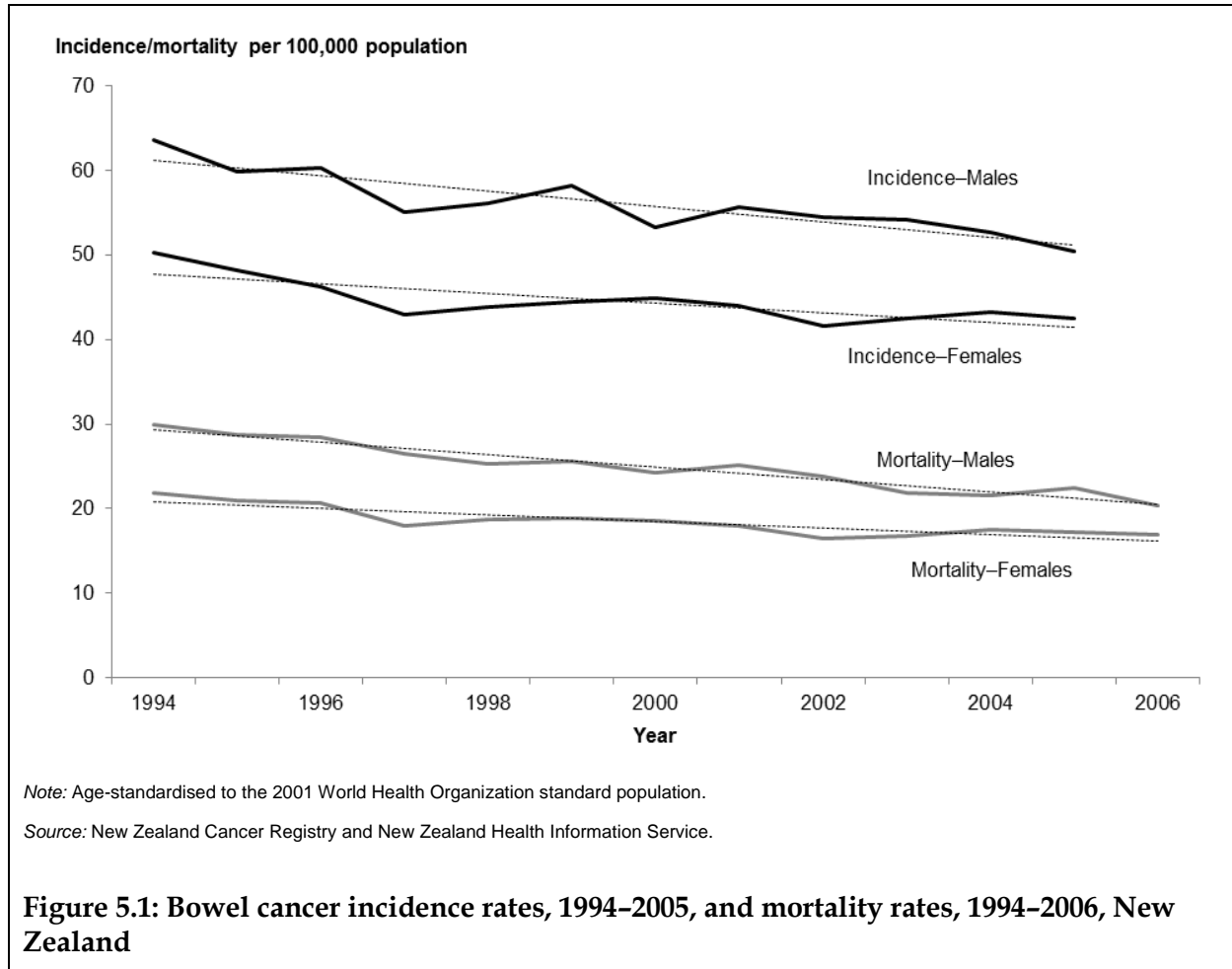
#### Mortality

##### *Males*

From 1994 to 2006 the age-standardised mortality rate for males decreased by an average of 2.7% per year, from 30.0 cases per 100,000 population in 1994 to 20.3 in 2006 (Figure 5.1). The highest rate was in 1994.

### Females

From 1994 to 2006 the age-standardised mortality rate for females decreased by an average of 1.6% per year, from 21.9 cases per 100,000 population in 1994 to 16.9 in 2006 (Figure 5.1). The highest rate was in 1994.



**Table 5.10: Age-standardised incidence and mortality rates for bowel cancer, New Zealand, 1994–2006 (ICD-10 codes: C18–C20)**

Year	Incidence			Mortality		
	Males	Females	Persons	Males	Females	Persons
1994	63.5	50.3	56.2	30.0	21.9	25.6
1995	59.8	48.1	53.4	28.8	21.0	24.2
1996	60.3	46.2	52.8	28.4	20.6	24.0
1997	55.0	43.0	48.4	26.5	18.0	22.0
1998	56.1	43.9	49.4	25.3	18.7	21.7
1999	58.2	44.4	50.7	25.6	18.9	21.9
2000	53.3	44.9	48.7	24.2	18.5	21.1
2001	55.6	44.0	49.2	25.2	17.9	21.1
2002	54.4	41.6	47.6	23.8	16.5	19.8
2003	54.2	42.5	48.0	21.9	16.8	19.1
2004	52.7	43.2	47.5	21.5	17.5	19.3
2005	50.4	42.5	46.2	22.5	17.3	19.7
2006	n.y.a.	n.y.a.	n.y.a.	20.3	16.9	18.6

*Notes*

1. Rates are the number of cases per 100,000 population.
2. Mortality data are tabulated by the year of registration.
3. Rates are standardised to the 2001 World Health Organization standard population.

Source: New Zealand Cancer Registry and New Zealand Health Information Service.

## Prostate cancer

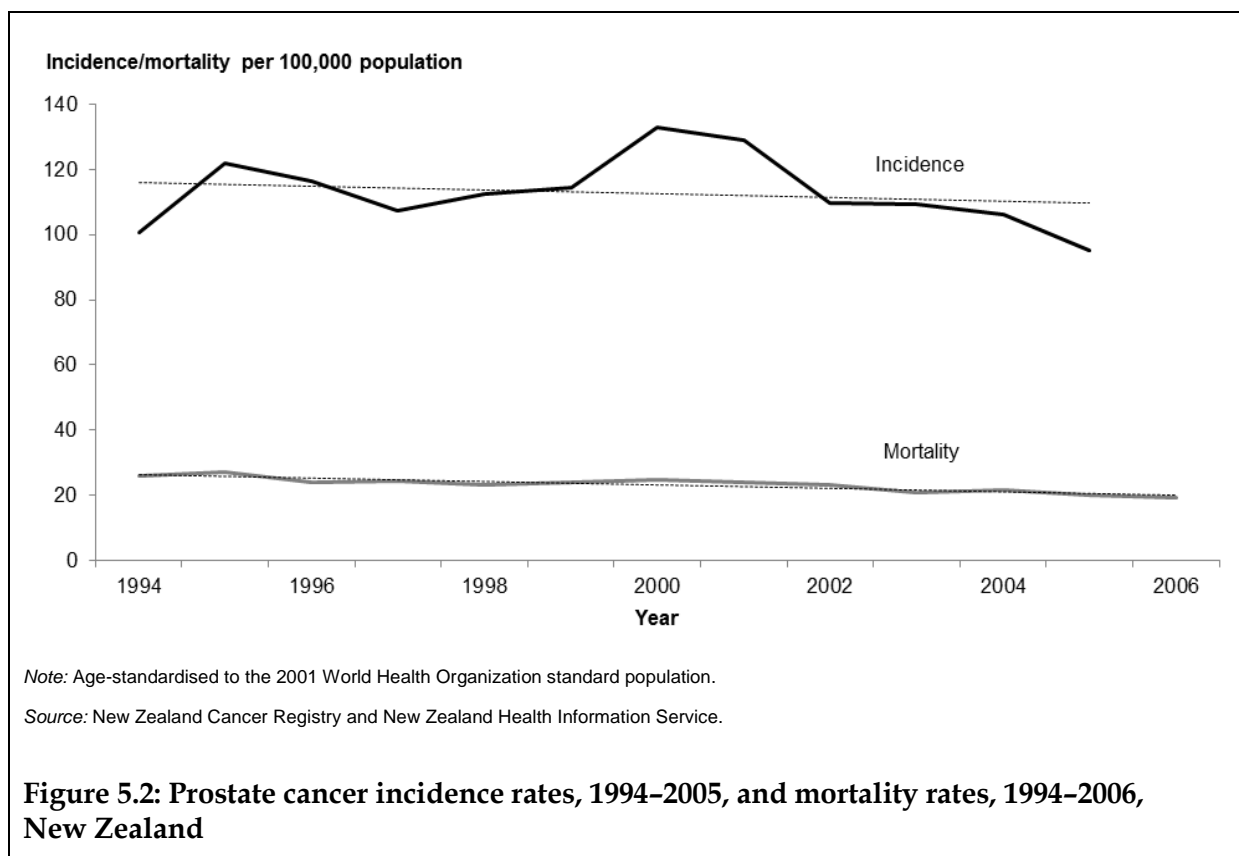
Age-standardised incidence and mortality rate data for prostate cancer are presented in Figure 5.2 and Table 5.11, and a summary provided below.

### Incidence

From 1994 to 2005 the age-standardised incidence rate was relatively unchanged, (Figure 5.2). The highest rate was 132.9 in 2000.

### Mortality

From 1994 to 2006 the age-standardised mortality rate decreased by an average of 1.7% per year, from 25.8 cases per 100,000 population in 1994 to 19.4 in 2005 (Figure 5.2). The highest rate was 27.3 in 1995.



**Table 5.11: Age-standardised incidence and mortality rates for prostate cancer, New Zealand, 1994–2006 (ICD-10 code: C61)**

Year	Incidence	Mortality
1994	100.5	25.8
1995	121.8	27.3
1996	116.4	24.0
1997	107.3	24.3
1998	112.3	23.3
1999	114.3	23.8
2000	132.9	24.9
2001	128.9	24.1
2002	109.8	23.3
2003	109.3	21.0
2004	106.1	21.5
2005	95.0	19.9
2006	n.y.a.	19.4

*Notes*

1. Rates are the number of cases per 100,000 population.
2. Mortality data are tabulated by the year of registration.
3. Rates are standardised to the 2001 World Health Organization standard population.

Source: New Zealand Cancer Registry and New Zealand Health Information Service.

## **Discussion**

The collection of cancer data is ongoing, and provides a means for monitoring incidence and mortality, but not the effect of folic acid on these. As such, these data have limited application/interpretability in the monitoring framework (Category 3 data).

### **Recommendation for baseline data**

- The most recent data on cancer incidence and mortality should be included as baseline data in the monitoring process.

### **Observation for future monitoring**

- All possible causes for changes in incidence and mortality rates should be carefully considered when monitoring change over time.

## **5.9 Bowel cancer screening**

### **National bowel cancer screening program**

In 2008, the New Zealand Government announced its support for the development of a national bowel cancer screening program. Planning is underway for a 4-year pilot program to begin in 2011. No decision will be made on a national rollout until the pilot is completed in 2015, and all the monitoring and evaluation data have been analysed.

### **Observation for future monitoring**

- Any impact of this screening program on bowel cancer incidence must be assessed in future monitoring of the fortification initiative.

## 5.10 Summary of New Zealand baseline data sources for mandatory folic acid fortification

**Table 5.12: Monitoring framework component number 1: Food composition and industry compliance**

Measure	Data sources	Notes
Folic acid content of foods	Manufactured Food Database New Zealand Food Composition Database	<ul style="list-style-type: none"> <li>The Manufactured Food Database contains label data and is updated annually</li> <li>Analytical values for more accurate monitoring via the New Zealand Food Composition Database</li> </ul>
Compliance monitoring arrangements	Details of compliance and enforcement	<ul style="list-style-type: none"> <li>For baseline report: an overview of arrangements</li> <li>For monitoring: data collected to be sent to a coordinating agency</li> </ul>

**Table 5.13: Monitoring framework component number 2: Nutrient intake**

Measure	Data source	Notes
Intakes in women of child-bearing age	1997 NNS (FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>2008–09 survey to complement as baseline data when available</li> <li>Future NNSs for monitoring</li> </ul>
Intakes above the upper level of intake for total population (A component of 'Adverse health effects', but listed here because it relates to folic acid intake)	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>To consider potential cross-over with data collection and implementation date</li> <li>Primary data (Category 1)</li> <li>To be a late addition</li> <li>Future NNSs for monitoring</li> </ul>
	2002 New Zealand Children's Nutrition Survey (FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>To be a late addition following FSANZ analysis</li> <li>Future NNSs for monitoring</li> </ul>
Supplement use in women of child-bearing age	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>To consider potential cross-over with data collection and implementation date</li> <li>Primary data (Category 1)</li> <li>To be a late addition</li> <li>Future NNSs for monitoring</li> </ul>
	Dunedin study	<ul style="list-style-type: none"> <li>Complementary data (Category 2b)</li> <li>There will be a repeat study after implementation</li> </ul>

**Table 5.14: Monitoring framework component number 3: Nutrient status**

Measure	Data source	Notes
Serum and red blood cell folate in women of child-bearing age	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>To consider potential cross-over with data collection and implementation date</li> <li>Primary data (Category 1)</li> <li>To be a late addition</li> <li>Future NNSs for monitoring</li> </ul>
	Dunedin study	<ul style="list-style-type: none"> <li>Complementary data (Category 2b)</li> <li>There will be a repeat study after implementation</li> </ul>

**Table 5.15: Monitoring framework component number 4: Health benefits**

Measure	Data source	Notes
Neural tube defect incidence	Ministry of Health: National Minimum Dataset (live births); Adult and Perinatal Mortality Database (still births)  Statistics New Zealand (terminations of pregnancy)	<ul style="list-style-type: none"> <li>National data (Category 1)</li> <li>Ongoing collection</li> </ul>

**Table 5.16: Monitoring framework component number 5: Adverse health effects**

Measure	Data source	Notes
Literature review	Monitoring the literature on adverse health effects associated with folic acid intake	<ul style="list-style-type: none"> <li>An ongoing review is being done, but it is not a component of the monitoring framework</li> </ul>
Cancer incidence and mortality	Ministry of Health: New Zealand Cancer Registry, Mortality Collection	<ul style="list-style-type: none"> <li>To look bowel and prostate cancer</li> <li>Ongoing collection</li> <li>Limited confidence in this measure because of the limitations with associating any change in cancer incidence/mortality due to mandatory fortification</li> <li>Category 3 data</li> </ul>
	Bowel cancer screening program	<ul style="list-style-type: none"> <li>Include details on proposed program</li> <li>To assess impact of screening on cancer incidence</li> </ul>
Intakes above the upper level of intake for the total population		<ul style="list-style-type: none"> <li>Assessed as part of 'Nutrient intake' (component number 2)</li> </ul>

## **6 New Zealand baseline data for mandatory iodine fortification**

This section reports the New Zealand baseline data for monitoring mandatory iodine fortification, observations on data requirements for future monitoring, and a summary of baseline data sources. Data are presented for each of the five key components of the monitoring framework.

### **6.1 Food composition**

#### **New Zealand Food Composition Database**

The New Zealand Institute for Plant and Food Research Limited and the Ministry of Health jointly own and fund the New Zealand Food Composition Database. The New Zealand Institute for Plant and Food Research manage and maintain the database.

FOOD files 2010, a subset of the New Zealand Food Composition Database, contains the most recent nutrient data, listing 49 core nutrients for more than 2,700 foods. It contains 1,542 new analytical values for New Zealand foods.

The database incorporates nutrient composition data from various sources. These include data from New Zealand Institute for Plant and Food Research analytical programs, nutrient composition data taken from international food composition tables and databases, data supplied by manufacturers, recipe calculations, and New Zealand food label data. Some values are presumed or derived from other data sources, rather than analysed, to ensure there are no missing values. Information on the origin of data for specific foods is provided in FOOD files.

#### **Iodine content of New Zealand foods**

Collaborative work with NZFSA ensured that the 2006 FOOD files contain complete information on iodine. Many of the iodine values are derived from New Zealand analytical data. All values presented in Table 6.1 are New Zealand analytical data. Baked beans, bread and cheese were analysed for iodine in 2008, and milk in 2007. The remaining values are from the 2006 FOOD files. Seafood is a primary source of iodine in the New Zealand diet, with eggs and dairy also contributing (Table 6.1).

**Table 6.1: Iodine concentration of selected of New Zealand foods**

<b>Food name</b>	<b>µg/100 grams</b>
Seaweed, dried	42,800
Table salt, iodised	4,930
Scallop, raw	245
Mussel, green, steamed or boiled	172
Snapper, baked	56
Egg, hard-boiled	52
Prawn, king, raw	42
Table salt, non-iodised	39
Salmon, red, canned in brine, drained	27
Tuna, canned in brine, drained	23
Milk chocolate bar	11
Cheddar cheese, tasty	9
Fruit yoghurt, regular fat	8
Ice cream, regular fat, vanilla flavour	7
Milk, regular fat	6
Extruded snacks, cheese-flavoured	3
Bread, mixed grain heavy, unfortified	2.5
Soy beverage, regular fat, unflavoured, unfortified	2
Tap water (national average)	0.2
Bread, mixed grain light, unfortified	<1
Bread, white, unfortified	<1

Source: New Zealand Food Composition Database.

## **General limitations of food composition data**

Very few foods have a constant composition, and the data presented in the database do not represent absolute values. Data are therefore a true reflection of the usual composition of foods as available and/or consumed, based on representative samples.

## **Discussion**

The New Zealand Food Composition Database is regularly updated, and data can be used in conjunction with updated food consumption data to determine iodine intake following fortification.

## **Observation for future monitoring**

- The New Zealand Food Composition Database should be used as the basis for monitoring the iodine content of foods. This will assess the reach of the fortification standard, which includes the carry-over into other food products, not just bread.

## 6.2 Food industry compliance

The New Zealand Food Safety Authority has responsibility for compliance and enforcement aspects of the mandatory iodine fortification standard. The Authority will take the same approach to this task as with its assessment of other standards.

### Observation for future monitoring

- Compliance information collected by the New Zealand Food Safety Authority should be sent to a coordinating agency.

## 6.3 Iodine intake

In this section, an assessment is provided on iodine intake in terms of both efficacy and safety. The assessment of safety is in fact a component of 'Adverse health effects', but has been included here because it is based on iodine intake.

### FSANZ's dietary intake assessment for iodine for Proposal P230

#### Background

As part of the standards development process for Proposal P230 – Consideration of mandatory fortification with iodine for New Zealand, FSANZ did a dietary intake assessment for iodine. This was used to determine baseline iodine intakes for various population groups, and the proportion of the population with intakes above the UL and below the EAR. The following description of the FSANZ dietary intake assessment process has been taken from the FSANZ final assessment report for Proposal P230 (Attachment 7a) (FSANZ 2007a). Further details can be found in that report.

#### Results

##### Adequacy

The assessment of adequacy for iodine intakes is based on population groups meeting the estimated average requirement (EAR) for this nutrient. With the exception of males aged 15–18 years, all population groups have a large proportion with inadequate iodine intakes (Table 6.2). Females have lower intakes than males, and inadequate intakes range from 49% for females aged 15–18 years to 88% for females aged 70 years and over. When the EAR for pregnancy and lactation is applied to intakes for females aged 16–44 years, more than 95% of females have inadequate intakes. Further details on iodine intakes, including 95th percentile intakes, can be found in Table 6.3.

**Table 6.2: Proportion of the New Zealand population with iodine intakes below the estimated average requirement<sup>(a)</sup> (per cent)**

<b>Population group (years)</b>	<b>Males</b>	<b>Females</b>
15–18	0	49
19–29	11	70
30–49	15	69
50–69	28	77
70+	35	88
16–44	..	68
Pregnancy	..	97
Lactation	..	99

(a) Results are representative of mean population intakes over a period of time, and reflect that about 60% of discretionary salt is iodised in New Zealand.

Source: AIHW analysis of FSANZ data.

## Safety

The assessment of safety is based on iodine intakes being above the upper level of intake. As shown in Table 6.3, there are no population groups that exceed the UL for iodine.

**Table 6.3: Mean and 95th percentile iodine intakes ( $\mu\text{g}/\text{day}$ ) and proportion of the New Zealand population with iodine intakes below the estimated average requirement and above the upper level of intake, by age and sex(a)**

Population group (years)	Mean	95th percentile	EAR (per cent)	> UL (per cent)
<b>Males</b>				
15+	100	160	22	0
15–18	117	151	0	0
19–29	119	162	11	0
30–49	122	167	15	0
50–69	113	152	28	0
70+	110	151	35	0
<b>Females</b>				
15+	96	130	72	0
15–18	97	123	49	0
19–29	99	134	70	0
30–49	100	136	69	0
50–69	93	120	77	0
70+	89	110	88	0
16–44	99	n.a.	68	0
Pregnancy	..	..	97	..
Lactation	..	..	99	..
<b>Persons</b>				
15+	105	n.a.	51	0
15–18	106	n.a.	27	0
19–29	106	n.a.	49	0
30–49	109	n.a.	46	0
50–69	103	n.a.	54	0
70+	95	n.a.	72	0

(a) Results are representative of mean population intakes over a period of time, and reflect that about 60% of discretionary salt is iodised in New Zealand.

Source: AIHW analysis of FSANZ data.

## Methods

Iodine intakes were estimated by combining usual patterns of food consumption, as derived from the 1997 New Zealand NNS data, with current concentrations of iodine in food. FSANZ does this using DIAMOND, its dietary modelling computer program.

## **Food consumption data**

The 1997 New Zealand NNS surveyed 4,636 people aged 15 years and over using a 24-hour food recall methodology, and provides a representative indication of food consumption. A second 24-hour recall was also collected on a subset of respondents, and intakes from a single day were adjusted to estimate usual intake by including information from a second 24-hour record.

## **Population groups**

Females aged 16–44 years were assessed as a separate group to represent women of child-bearing age, a specific target population. Other population groups were assessed according to the Nutrient Reference Values (NHMRC & NZMoH 2006). All age groups were split by gender.

## **Concentration data**

Iodine concentrations for foods were derived from four main sources, and used to build the concentration database. These were:

- the New Zealand Total Diet Study, which provided information on about 120 commonly consumed foods
- analytical data for foods sampled in Australia and New Zealand from about 2000 to 2005, many of which were dairy and seafood
- overseas analytical data, when no relevant data were identified and a food is known to be imported into the country (for example, canned fish or European cheese); data from the United Kingdom and Denmark were major information sources
- recipe calculations, to derive iodine levels in mixed foods (for example, spaghetti bolognese) for which analytical data were not available.

Information from the four sources was matched against the 1997 New Zealand NNS food codes, assigning an iodine value to virtually all individual food codes.

## **Assumptions**

In doing its dietary intake assessments, FSANZ makes assumptions to ensure intakes are not underestimated. For Proposal P230 the following assumptions were used:

### *Consumer behaviour*

- Consumption of foods as recorded in the 1997 NNS represents current food consumption amounts.
- The dietary patterns for females aged 16–44 years are representative of the dietary patterns for pregnant and lactating women.
- Consumers select products that, on average, contain iodine at the concentrations specified.
- Consumers do not alter their food consumption habits upon iodine-fortified products becoming more available on the market.
- Since data were not available to allow the identification of respondents in the 1997 NNS who consumed discretionary salt, it was assumed that all New Zealanders aged 15 years and over consumed discretionary salt.

#### *Concentration data*

- Non-iodised salt has an iodine concentration of zero.
- Australian iodine concentration data can be used if no New Zealand data are available.
- There is no contribution to iodine intakes through the use of dietary supplements.
- To determine the amount of discretionary salt consumed by New Zealanders, all sodium from processed foods is from sodium chloride. This is likely to result in an overestimate of the amount of discretionary salt.

#### *General*

- For this assessment, it is assumed that 1 millilitre is equal to 1 gram for all liquid and semi-liquid foods (for example, orange juice).

### **2008–09 New Zealand Adult Nutrition Survey**

Background information on the 2008–09 New Zealand Adult Nutrition Survey is provided in Section 5.3. Food consumption data will enable the calculation of iodine intakes, but this baseline data will not be available until mid-2011.

### **2002 Children’s National Nutrition Survey**

Background information on the 2002 Children’s Survey is provided in Section 5.3.

#### **University of Otago analysis of results**

When completing the dietary iodine intake assessment for Proposal P230, FSANZ did not hold food consumption data from the 2002 Children’s Survey. NZFSA commissioned the University of Otago (LINZ Activity and Health Research Unit) to do a dietary intake assessment. Results were based on a single-day of food consumption data, with population weights applied so that the survey sample better reflected the New Zealand children’s population to enable conclusions to be drawn about New Zealand children in general. The University of Otago used a value of 40 mg per kg salt for iodised salt in bread. This level reflects the iodine remaining after processing and baking.

The University of Otago also presented results for two different consumption scenarios: one that assumes intake of discretionary salt is non-iodised; and another that assumes intake of discretionary salt is iodised at 45 mg iodine per kg salt. Results are presented for males and females combined in each age group.

#### **Adequacy**

Outputs from the single day of food consumption models indicate that children aged 5–14 years have inadequate iodine intakes (Table 6.4). Inadequate intake increases with age, and is more prevalent with the assumption that discretionary salt is non-iodised.

**Table 6.4: Proportion of New Zealand children with iodine intakes below the estimated average requirement (with and without iodised discretionary salt), 2002 (per cent)**

Population group (years)	Iodised discretionary salt <sup>(a)</sup>	Non-iodised discretionary salt
5–8	13	79
9–13	28	81
14	54	85

(a) 1 gram of iodised discretionary salt added (iodine concentration 45mg iodine per kg salt)

Source: Blakey et al. 2007.

## Safety

Under both scenarios modelled, less than 1% of each population group exceed the UL (Table 6.5).

**Table 6.5: Mean iodine intakes (µg/day) and proportion of New Zealand children with iodine intakes above the upper level of intake, by age (without and with iodised discretionary salt), 2002**

Population group (years)	Mean		> UL (per cent)	
	Non-iodised discretionary salt	Iodised discretionary salt <sup>(a)</sup>	Non-iodised discretionary salt	Iodised discretionary salt <sup>(a)</sup>
5–8	50	95	<1	<1
9–13	54	99	<1	<1
14	64	109	<1	<1

(a) 1 gram of iodised discretionary salt added (iodine concentration 45mg iodine per kg salt)

Source: Adapted from Blakey et al. 2007.

## NZFSA/FSANZ analysis of results

FSANZ has obtained the data from the 2002 Children’s Survey, and is importing the data into its DIAMOND program. It will be able to provide results using similar methods to FSANZ analysis of data from the 1997 Adults NNS. This includes mean and 95th percentile intakes from the 2 days of food consumption data and the proportion of population groups with intakes below the EAR and above the UL.

## Discussion

Data from NNSs provide the best indication of nutrient intake (Category 1 data). Data from the 1997 NNS have been included in this report because data from the 2008–09 ANS are not yet available for publication. In the analysis of results from the 2008–09 ANS, it will be important to consider the date in which data collection ceased.

Repeat NNSs would provide a means of monitoring the effect of mandatory iodine fortification on nutrient intake, and ultimately intakes above the UL and below the EAR. However, consideration must be given to methodological differences between surveys when analysing time trends.

## **Recommendations for baseline data**

- The NZFSA/FSANZ analysis of the 2002 Children's Survey, and results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process to complement data from the 1997 National Nutrition Survey. For the 2008–09 New Zealand Adult Nutrition Survey, consideration should be given to the date in which data collection ceased. It will also be important to include a detailed overview of the methods of data analysis and further details on data collection.
- The 2 days of food consumption data should be used in the analysis of results from the 2008–09 New Zealand Adult Nutrition Survey (usual intakes). Data required are mean and 95th percentile intakes for males, females and persons of the various age groups according to the Nutrient Reference Values. Women aged 16–44 years should be a separate subgroup. Data on the proportion of each population subgroup with intakes above the UL and below the EAR can be generated from individual intakes.

## **Observation for future monitoring**

- Future National Nutrition Surveys should be used as a means for monitoring.

## **6.4 Supplement use**

### **2008–09 New Zealand Adult Nutrition Survey**

Background information on the 2008–09 ANS is outlined in Section 5.3. Data will be collected on iodine supplement use.

### **Discussion**

Very limited data will be available on iodine supplement use, with the only baseline values potentially being from the 2008–09 ANS (Category 1 data).

### **Recommendation for baseline data**

- Results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process, with a detailed overview of the methods. Consideration should be given to the date in which data collection ceased.

### **Observation for future monitoring**

- Future National Nutrition Surveys should be used as a means for monitoring.

## 6.5 Median urinary iodine concentration

### 2002 New Zealand National Children's Nutrition Survey

Background information and survey methodology on the 2002 Children's Survey is outlined in Section 5.3. Urinary iodine concentrations were measured from spot urine samples collected at school.

#### Results

Data on urinary iodine were presented in the 2002 Children's Survey report (Ministry of Health 2003) as micrograms per decilitre ( $\mu\text{g}/\text{dL}$ ). To enable direct comparison between datasets, data have been converted to  $\mu\text{g}/\text{L}$ .

When compared with the 2001 WHO et al. (2001) criteria for the assessment of iodine status, New Zealand children currently have a mild iodine deficiency (MUIC between 50 and 99  $\mu\text{g}/\text{L}$ ) (Table 6.6). In addition, more than 20% of people in each population subgroup have urinary iodine concentrations less than 50  $\mu\text{g}/\text{L}$ .

**Table 6.6: Urinary iodine ( $\mu\text{g}/\text{L}$ ) for New Zealand children, by age and sex, 2002**

Population group (years)	Mean	Standard error of the mean	Percentage under 50 $\mu\text{g}/\text{L}$	Median
<b>Males</b>				
5–6	90.7	10.3	28	71
7–10	79.6	3.8	27	66
11–14	90.3	6.8	22	70
5–14	86.0	4.3	25	68
<b>Females</b>				
5–6	75.4	6.9	33	60
7–10	72.4	2.6	30	61
11–14	77.3	7.5	33	66
5–14	74.8	3.5	31	62
<b>Persons</b>				
5–6	n.a.	n.a.	n.a.	n.a.
7–10	n.a.	n.a.	n.a.	n.a.
11–14	n.a.	n.a.	n.a.	n.a.
5–14	80.9	3.2	28	66

Source: Ministry of Health 2003.

## **2008–09 New Zealand Adult Nutrition Survey**

Background information on the 2008–09 Adult Nutrition Survey is outlined in Section 5.3. Following an interview, participants have been asked whether they are willing to provide a urine sample. If they agree, the collection will take place at a clinic close to their home.

### **Discussion**

Data from the NNSs provide representative baseline data for iodine status of the population (Category 1 data). In the analysis of results from the 2008–09 ANS, it will be important to consider the date in which data collection ceased.

### **Recommendation for baseline data**

- Results of the 2008–09 New Zealand Adult Nutrition Survey should be included as baseline data in the monitoring process, with a detailed overview of the methods. Consideration should be given to the date in which data collection ceased.

### **Observation for future monitoring**

- Future National Nutrition Surveys should be used as a means for monitoring.

## 6.6 Summary of New Zealand baseline data sources for mandatory iodine fortification

**Table 6.7: Monitoring framework component number 1: Food composition and industry compliance**

Measure	Data sources	Notes
Iodine content of foods	New Zealand Food Composition Database	<ul style="list-style-type: none"> <li>Ongoing data compilation by the New Zealand Ministry of Health</li> </ul>
Compliance monitoring arrangements	Details of compliance and enforcement	<ul style="list-style-type: none"> <li>For baseline report: an overview of arrangements</li> <li>For monitoring: data collected to be sent to a coordinating agency</li> </ul>

**Table 6.8: Monitoring framework component number 2: Nutrient intake**

Measure	Data source	Notes
Intakes in the population	1997 NNS (FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> </ul>
Intakes above upper level of intake (A component of 'Adverse health effects', but listed here because it relates to iodine intake)	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>2008–09 survey to complement as baseline data when available</li> <li>Future NNSs for monitoring</li> <li>To consider potential cross-over with data collection and implementation date</li> <li>Primary data (Category 1)</li> <li>To be a late addition</li> <li>Future NNSs for monitoring</li> </ul>
	2002 New Zealand Children's Nutrition Survey (NZFSA/FSANZ analysis)	<ul style="list-style-type: none"> <li>Primary data (Category 1)</li> <li>To be a late addition following NZFSA/FSANZ analysis</li> <li>Future NNSs for monitoring</li> </ul>
Supplement use	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>To consider potential cross-over with data collection and implementation date</li> <li>Primary data (Category 1)</li> <li>To be a late addition</li> <li>Future NNSs for monitoring</li> </ul>

**Table 6.9: Monitoring framework component number 3: Nutrient status**

Measure	Data source	Notes
Median urinary iodine concentration	2002 New Zealand Children's Nutrition Survey	<ul style="list-style-type: none"> <li>• Primary data (Category 1)</li> <li>• Future NNSs for monitoring</li> </ul>
	2008–09 New Zealand Adult Nutrition Survey	<ul style="list-style-type: none"> <li>• To consider potential cross-over with data collection and implementation date</li> <li>• Primary data (Category 1)</li> <li>• To be a late addition</li> <li>• Future NNSs for monitoring</li> </ul>

**Table 6.10: Monitoring framework component number 4: Health benefits**

Measure	Data source	Notes
Median urinary iodine concentration	Refer to information on iodine status	<ul style="list-style-type: none"> <li>• To be assessed via the analysis of data obtained for iodine status</li> </ul>

**Table 6.11: Monitoring framework component number 5: Adverse health effects**

Measure	Data source	Notes
Median urinary iodine concentration	Refer to information on iodine status	<ul style="list-style-type: none"> <li>• Data from surveys can be used to assess population groups with median urinary iodine concentration above the recommended level (that is, above 300 µg/L)</li> </ul>
Intakes above the upper level of intake		<ul style="list-style-type: none"> <li>• Assessed as part of nutrient intake</li> </ul>

## 7 Appendix—Key data sources

This chapter describes the key data sources available for folic acid and iodine fortification monitoring. The data sources contain information collected in Australia, nationally, in state or territories, or regionally where information is not available elsewhere. In New Zealand, information is collected nationally, or regionally where information is not available nationally. These data sources are listed below and details of each source follow.

### Method

Consultations with stakeholders, and an extensive search of information, provided a wide variety of folic acid and iodine data sources, which may be applied in the monitoring framework. A greater understanding of the data sources, and their application to the monitoring of folic acid and iodine fortification issues, was gained through consultation with the data sources primary contact officers and a stakeholder workshop held in August 2008.

This report focuses mainly on Australian or New Zealand data based on national population surveys and administrative national data collections within the public domain—that is, those that are available to the public either through published reports or via access to the data for research. However, the focus is not strictly exclusive to this domain. Jurisdictional or local data sources and research have been included, depending on their relevance and quality, especially where national data for either country are not available.

The key Australia and New Zealand data sources outlined in this report are those that are current or effective at the time of publication. In some cases, the data source is a planned activity to be done in the future.

The key data sources were documented individually according to a standard template. The template was designed to gather information on the purpose, collection method, data content, scope of and details on folic acid and/or iodine specific data, along with the data custodian's contact details.

### Key Australian folic acid and iodine data sources

#### National data

Australian National Children's Nutrition and Physical Activity Survey (2007)

The Adult Key Foods Program (2006–2007)

AUSNUT (2007)

Australian Congenital Anomalies Monitoring System (1998–2003)

Australian Diabetes, Obesity and Lifestyle Study (1999–2000)

Australian Food Statistics (2006)

Australian Longitudinal Study on Women's Health (1996–2016)

Australian National Iodine Nutrition Study (2004)

Australian Register of Therapeutic Goods (1989–present)

Australian Health Survey  
Bettering the Evaluation and Care of Health (1998–present)  
Disease Expenditure Database (1993–1994, 2000–2001)  
Australian Total Diet Survey (2009–2010)  
NUTTAB (2006)  
Growing Up in Australia (1999–2003)  
National Aboriginal and Torres Strait Islander Health Survey (2004–2005)  
National Cancer Statistics Clearing House (1982–present)  
National Health Survey (2004–2005)  
National Hospital Morbidity Database (1993–present)  
National Mortality Database (1964–present)  
National Nutrition Survey (1995)

## **State and Territory regional data**

### **Australian Capital Territory**

Australian Capital Territory Year 6 Physical Activity and Nutrition Survey (2006)

### **New South Wales**

Blue Mountains Eye Study (1992–2008)  
Iodine Status in Pregnant Women and Their Newborns (2004)  
New South Wales Birth Defects Register (1990–present)  
New South Wales Population Health Survey (2002)  
Prevalence of Low Serum Folate and Vitamin B<sub>12</sub> in an Older Adult Population (1997–2000)  
Sydney Older Persons Study (1991–2003)  
The 45 and Up Study (2006–2011)

### **Queensland**

First Time Blood Donors Study (1995)  
Health Kids Queensland Survey (2006)  
Queensland Health Survey (2000)

### **South Australia**

Australian Longitudinal Study of Ageing (1992–2006)  
Florey Adelaide Male Ageing Study (2002–2012)  
South Australian Monitoring and Surveillance System (2002–2006)  
South Australian Births Defects Register (1986–present)  
South Australian Health Monitor (1999–present)

## **Victoria**

Food Labelling Monitoring (1998–present)

Victorian Population Health Survey (2004)

Victorian Health Monitor (2009–10)

## **Western Australia**

Folate Intake and Primary Prevention of Non-neural Birth Defects Study (2005–2006)

Food Frequency WA (2006)

Health Measures WA (2005)

Remote Indigenous Stores and Takeaways Project (2005–2007)

Trends in Neural tube Defects in Western Australia (2004)

WA Health and Wellbeing Surveillance System (2003–2009)

WA Birth Defects Registry (1980–present)

WA Aboriginal Child Health Survey (2000–2002)

WA Population Health Genomics Folate Study (2008–2009)

## **Tasmania**

Tasmanian Iodine Monitoring Program (2003–2007)

## **Key New Zealand folic acid and iodine data sources**

### **National data**

Standards compliance – folic acid (from 2009)

Standards compliance – iodine (from 2009)

Folate overages (2005 & 2008)

Iodine in infant and toddler formula (2007)

Iodine retention in processed foods (2006–2007)

Iodine content of New Zealand bread (2008–2009)

Levels of iodine in New Zealand retail salt (2008–2009)

Manufactured Food Database (1997–present)

New Zealand Total Diet Survey (2003–2004)

National Nutrition Survey (1997)

National Children's Nutrition Survey (2002)

New Zealand National Minimum Dataset (1993–present)

New Zealand Mortality Collection (1988–present)

New Zealand Cancer Registry (1948–present)

New Zealand Births Defects Monitoring Programme (1975–present)

New Zealand Food Composition Database (1980–present)

New Zealand Adult Nutrition Survey (2008–2009)

The Thyromobile and Iodine in Pregnancy Survey (2005)

**Regional data**

Folate status of representative populations in Dunedin (1999)

The iodine status of lactating women and breastfed babies (2004–2005)

# **2007 Australian National Children's Nutrition and Physical Activity Survey**

## **Description of data source**

The 2007 Children's Survey collected data on children's food intake, physical activity level and physical measurements. Just over 4,480 Australian children between the ages of 2-16 years completed the survey.

## **Purpose(s)**

To provide some qualitative and quantitative data on: children's food, beverage and supplement intake; participation in physical activity; sedentary behaviours; and height, weight and waist circumference. Demographic information was also collected. The survey also provides some information on the Australian food supply.

## **Collection method**

- Food intake – 2 x 24-hour food recalls.
- Physical activity – self-reported Multimedia Activity Recall for children and Adolescents (MARCA)(2 x 48-hour recalls), 6 days of objective measurement using pedometers.
- Physical measurements (height, weight and waist circumference), objective measurement by trained interviewers.
- Data were collected in two stages: an initial computer-assisted personal interview, followed by a computer-assisted telephone interview 7-21 days later.

## **Data content – general**

The main variables collected were: food, beverage and supplement intake; physical activity participation; time spent on sedentary behaviours; height, weight and waist circumference; and demographic data.

## **Data content – monitoring folic acid and iodine fortification**

Collected data on children's iodine and folate consumption, which were compared with the Nutrient Reference Values. Food intake was analysed using the food composition database AUSNUT 2007 developed by Food Standards Australia New Zealand.

## **Aboriginal and Torres Strait Islander identification**

About 2% of the children were from an Aboriginal or Torres Strait Islander background. Remote areas were excluded, and so high Indigenous population were also excluded. This survey is not intended to provide specific data on Aboriginal and Torres Strait Islander children.

## **Socioeconomic identification**

Demographic data collection included parent/guardian highest level of education and income, and data are available for categorisation based on socioeconomic status.

## **Scope/target population**

Children aged 2-16 years, 1000 children from each age group (2-3 years, 4-8 years, 9-13 years and 14-16 years) matching the age groups covered by the Nutrient Reference Values. This was to allow sufficient numbers to make statistical comparisons of intakes with recommendations.

**Geographical coverage**

Children were recruited from each state and territory. An over-sample of 400 children from South Australia was obtained. Remote areas were excluded due to time and budget constraints.

**Period covered**

Fieldwork was done between February and August 2007.

**Publications and other outputs**

Summary: 2007 Australian National Children's Nutrition and Physical Activity Survey user guide. <[www.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-childrens-survey-userguide](http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-childrens-survey-userguide)>.

Summary: 2007 Australian National Children's Nutrition and Physical Activity Survey fact sheet – survey methodology  
<[www.health.gov.au/internet/main/publishing.nsf/Content/F5D1E49616A102F3CA2574D5002DB5B9/\\$File/childrens-nut-phys-survey-methodology.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/F5D1E49616A102F3CA2574D5002DB5B9/$File/childrens-nut-phys-survey-methodology.pdf)>.

Australian National Children's Nutrition and Physical Activity Survey main findings 2007  
<[www.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-childrens-survey](http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-childrens-survey)>.

Summary: 2007 Australian National Children's Nutrition and Physical Activity Survey fact sheet – key findings overview.  
<[www.health.gov.au/internet/main/publishing.nsf/Content/0E0F39AE7BCCF92FCA2574D5002C0696/\\$File/childrens-nut-phys-survey-keyfindings.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/0E0F39AE7BCCF92FCA2574D5002C0696/$File/childrens-nut-phys-survey-keyfindings.pdf)>.

**Access**

The Department of Health and Ageing will allow access to the data upon application.

**Data management agency**

Data will be managed by the Australian Social Science Data Archive. For more information on how to access the data go to: <<http://assda.anu.edu.au/>>.

## **The Adult Key Foods Program**

### **Description of data source**

The Adult Key Foods Program combined food consumption data with nutrient values to generate a list of foods that collectively account for the majority of intake of the nominated nutrients in Australian adults aged 16 years and over. A selection of these foods were then analysed to provide up-to-date information on the nutritional content of foods that contribute significantly to the dietary intake of one or more nutrients.

### **Purpose(s)**

The program was developed to help FSANZ determine analytical priorities, and to provide up-to-date nutrient data for foods that Australian adults commonly eat.

### **Collection method**

The majority of foods were sampled across summer and winter as part of the 23rd Australian Total Diet Study according to its national sampling plan. Foods deemed *National foods* (foods that are available nationwide from a small number of manufacturers) were sampled in two jurisdictions in each season. Foods categorised as *Regional foods* (foods that might be expected to show regional variation in manufacture/production such as meat, fruit and vegetables) were sampled in at least four jurisdictions in each season. Remaining foods were sampled in each capital city in one season.

### **Data content – general**

The nutrient data from this program have been incorporated into the latest version of the FSANZ reference database NUTTAB. They will be used in survey databases to estimate nutrient intakes as part of National Nutrition Surveys. The data will also be used to prepare databases to conduct dietary intake assessments for specific applications and proposals.

### **Data content – monitoring folic acid and iodine fortification**

Data on folic acid and iodine composition were gathered for some foods.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

All Australians aged 16 years and over.

### **Geographical coverage**

National – included samples from capital cities in all states and territories.

### **Period covered**

January to July 2008

**Publications and other outputs**

A report outlining details and results of the Australian Key Foods Program 2006–2008 is being prepared. Data have also been included in the NUTTAB 2009 database (yet to be released).

**Access**

Once the Australian Key Foods Program 2006–2008 report is published and made available online, further access will be at the discretion of FSANZ.

**Data management agency**

Food Standards Australia New Zealand.

## **AUSNUT 2007**

### **Description of data source**

AUSNUT has been developed by FSANZ. It is a survey-specific nutrient database for estimating nutrient intakes from food, beverages and dietary supplements consumed as part of the 2007 Australian National Children's Nutrition and Physical Activity Survey.

### **Purpose(s)**

AUSNUT 2007 is used by FSANZ in standards development work, and as a valuable resource for public health professionals, academia, and consumers.

### **Collection method**

Not applicable.

### **Data content – general**

Nutrient intake estimates of food, beverages and dietary supplements. AUSNUT 2007 incorporates nutrient composition data from various sources. These include data from FSANZ analytical programs (analysis of foods in Australia), nutrient composition data taken from international food composition tables and databases, recipe calculations, and Australian food and supplement label data. Information on the origin of data for specific foods is provided in AUSNUT 2007.

### **Data content – monitoring folic acid and iodine fortification**

Will provide data on folic acid and iodine intake from food, beverages and dietary supplements.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Not applicable.

### **Geographical coverage**

Australia.

### **Period covered**

2006–2007.

### **Publications and other outputs**

Not applicable.

### **Access**

AUSNUT is available at: <[www.foodstandards.gov.au/consumerinformation/ausnut2007](http://www.foodstandards.gov.au/consumerinformation/ausnut2007)>.

### **Data management agency**

Food Standards Australia New Zealand.

# **Australian Congenital Anomalies Monitoring System**

## **Description of data source**

State and territory birth defect registers and perinatal data collections.

## **Purpose(s)**

The system aims to:

- report information on congenital anomalies at national level, which helps develop and plan policy, including establishing areas of need and funding requirements
- enable research at the national level
- participate in international reporting and research
- enable the evaluation of national health promotion activities aimed at preventing congenital anomalies such as neural tube defects.

## **Collection method**

Currently state and territories provide data on agreed items from their collections over various periods. Data Mandatory data collection is expected up to 1 year of age, after the National Minimum Data Set is implemented.

## **Data content – general**

Gestation at birth, birth weight, plurality, Indigenous status, state, maternal age, remoteness area of residence, termination of pregnancy or not, congenital anomaly ICD code.

## **Data content – monitoring folic acid and iodine fortification**

Pregnancies affected with NTDs including early terminations (from some states).

## **Indigenous identification**

Maternal Indigenous status.

## **Socioeconomic identification**

No.

## **Scope/target population**

All pregnancies in Australia.

## **Geographical coverage**

All states and territories.

## **Period covered**

Ongoing since 1998.

## **Publications and other outputs**

Abeywardana S, Karim M, Grayson N & Sullivan EA 2007. Congenital anomalies in Australia 1998-2001. Cat. no. PER 37. Canberra: AIHW.

Abeywardana S & Sullivan EA 2008. Congenital anomalies in Australia 2002-2003. Cat. no. PER 41. Canberra: AIHW.

## **Access**

Summary tables can be provided on published data.

**Data management agency and contact details**

National Perinatal Statistics Unit

Level 2, McNevin Dickson Building, Randwick Hospitals Campus

Randwick NSW 2031

Phone: (02) 9382 1014

# **Australian Diabetes, Obesity and Lifestyle Study**

## **Description of data source**

The Australian Diabetes, Obesity and Lifestyle Study (AusDiab) is the largest Australian longitudinal population-based study looking at the natural history of diabetes, pre-diabetes (in which glucose metabolism is impaired but not to the level to cause diabetes), heart disease and kidney disease.

## **Purpose(s)**

The results provide a picture of the incidence of diabetes, cardiovascular disease and kidney disease, as well as the factors that increase the risk of these conditions.

## **Collection method**

AusDiab is a field survey involving both physical testing as well as questionnaires. A team of researchers went to each of the 42 randomly selected testing sites around Australia to individually test each of the 11,247 individuals who participated in the baseline study in 1999–2000. Of these original participants, about 6,500 came back to participate in similar survey 5 years later in 2004–2005. In addition, self-reported health information was obtained from more than 2,000 of those who could not attend the survey site.

## **Data content – general**

AusDiab collects data in the following categories: biochemical, demographic, medical history, disease status, survey procedures, anthropometric, smoking, exercise, clinical observations, self-efficacy, knowledge and opinion, socioeconomic, family medical history, alcohol and diet.

## **Data content – monitoring folic acid and iodine fortification**

Food and nutrient intake data that could be used to estimate folic acid and iodine intake.

## **Indigenous identification**

Participants are recorded as Aboriginal/Torres Strait Islander or neither.

## **Socioeconomic identification**

Participants provide information about accommodation, education, income and employment.

## **Scope/target population**

The baseline AusDiab (1999–2000) study was a population-based national survey of the Australian general population aged 25 years and over residing in 42 randomly selected urban and rural areas (census collection districts) in six states and the Northern Territory. AusDiab was designed to be representative of the general Australian population aged 25 years and over.

## **Geographical coverage**

Forty-two randomly selected urban and rural areas of Australia. A stratified cluster sample was used involving seven layers (the six states and the Northern Territory), and clusters were based on census collection districts.

## **Period covered**

Surveys were done in 1999–2000 and 2005. Pending further funding, a follow-up to AusDiab and a new cross-sectional survey may be done.

### **Publications and other outputs**

Barr ELM, Magliano DJ, Zimmet PZ, Polinghorne KR, Attkins RC et al. 2006. AusDiab – The Australian diabetes, obesity and lifestyle study. Melbourne: International Diabetes Institute.

Tapp R, Shaw J, Harper A, de Courten M, Balkau B & McCarty D et al. on behalf of the AusDiab Study Group 2003. The prevalence of and factors associated with diabetic retinopathy in the Australian population. *Diabetes Care* 26: 1721–7.

Tapp RJ, Zimmet PZ, Harper CA, de Courten MD, Balkau B, McCarty DJ & Taylor H et al. on behalf of the AusDiab Study Group 2004. Diabetes care in the Australian population: frequency of screening examination for eye and foot complications of diabetes. *Diabetes Care* 27:688–93.

### **Access**

The AusDiab team welcomes approaches from research workers for access to the accumulated data and biological materials and for participation in ongoing and new data collection activities. Access will generally not be granted to research groups/institutions or individuals who are receiving support from the Australian Tobacco Research Foundation or other bodies associated with the tobacco industry.

### **Data management agency and contact details**

International Diabetes Institute  
250 Kooyong Road  
Caulfield Vic 3162  
Phone: (03) 9258 5050  
Website: <[www.diabetes.com.au](http://www.diabetes.com.au)>

## **Australian Food Statistics 2008**

### **Description of data source**

Statistical overview of major aspects of the Australian food industry, and its place in the domestic economy 2007–2008.

### **Purpose(s)**

Comprehensive snapshot of the year's food production, business performance and trade.

### **Collection method**

Collection and analysis of a series of databases.

### **Data content – general**

Australian commodity production and trade from the ABS Agricultural Commodity Survey. Data from international trade from Australian Customs Service. Data on world trade in food from the COMTRADE database (United Nations Statistics Division). Data on country food balances from the FAOSTAT database of the Food and Agriculture Organisation of the United Nations. Online access to processed food and beverage industry statistics from the Department of Agriculture, Fisheries and Forestry. Retail trade statistics and Consumer Price Index from the ABS. Information from the Grocery Industry Marketing Guide (Retail World Pty Ltd).

### **Data content – monitoring folic acid and iodine fortification**

Possible data on production of food in Australia that contains folate or folic acid and iodine.

### **Indigenous identification**

No.

### **Socioeconomic identification**

No.

### **Scope/target population**

Australian Food Industry and Export.

### **Geographical coverage**

Australia.

### **Period covered**

2007–2008.

### **Publications and other outputs**

Not applicable.

### **Access**

Access to the data would be via application to the Department of Agriculture, Fisheries and Forestry.

### **Data management agency and contact details**

Australian Government Department of Agriculture, Fisheries and Forestry  
Food and Agriculture Division  
GPO Box 858, Canberra 2601  
Phone: (02) 6272 3933  
Website: <[www.daff.gov.au](http://www.daff.gov.au)>

## **Australian Longitudinal Study on Women's Health**

### **Description of data source**

The Australian Longitudinal Study on Women's Health, also known as Women's Health Australia, is a longitudinal population-based survey that looks at the health of three large cohorts of Australian women over a 20-year period. It was first funded in 1995.

The project was designed to explore factors that influence health among women who are broadly representative of the entire Australian female population. The project goes beyond a narrow perspective that equates women's health with reproductive and sexual health, and takes a comprehensive view of all aspects of health throughout women's lifespan.

### **Purpose(s)**

The project aims to:

- collect scientifically valid information that is relevant to the development of health policy, so that the Australia and state/territory governments' health departments can base policy and practice in women's health on current data and accurate information.
- clarify cause-and-effect relationships between women's health and various biological, psychological, social and lifestyle factors.
- assess the effects of changes in health policy and practice.

### **Collection method**

Participants were initially selected by simple random sampling from the Medicare Australia database, with over-sampling for rural and remote areas. Three cohorts were recruited, with each cohort surveyed every 3 years.

The questionnaire is self-completed, but a telephone interview is provided for non-English-speaking respondents or when requested by participants.

### **Data content – general**

The project assesses each participant's:

- physical and emotional health (including wellbeing, major diagnoses, symptoms)
- use of health services (general practitioner, specialists and other visits, access, satisfaction)
- health behaviours and risk factors (diet, exercise, smoking, alcohol, other drugs)
- time use (including paid and unpaid work, family roles and leisure)
- sociodemographic factors (location, education, employment, family composition)
- life stages and key events (such as childbirth, divorce, widowhood).

### **Data content – monitoring folic acid and iodine fortification**

Dietary intake could be useful information to estimate folic acid/folate and iodine intake from food and supplements. Long-term health issues and information on pregnancies affected by NTDs may be useful information.

### **Indigenous identification**

Participants are recorded as Aboriginal, Torres Strait Islander or neither.

**Socioeconomic identification**

Participants provide details of their postcode, highest educational qualification achieved and household income.

**Scope/target population**

Three age groups were selected to follow women through life stages that are critical to women's health and wellbeing. Ages at recruitment were 18–23 years (younger), 45–50 years of age (mid-aged) and 70–75 years of age (older).

The younger age group began to be tracked when they were in the early stages of transition from late adolescence to full adulthood; over time, most of them move into the workforce, entering adult relationships, and becoming mothers.

The mid-age group was selected to look at menopausal transitions and the social and personal changes of middle age. The older group was selected in their early 70s, to recruit older women who are generally still active, involved members of the community.

**Geographical coverage**

Urban, rural and remote areas, all states and territories, Australia.

**Period covered**

1996 to 2016.

**Publications and other outputs**

Annual reports and technical reports are available on the Women's Health Australia website at: <[www.alsw.org.au/reports.html](http://www.alsw.org.au/reports.html)>.

**Access**

Data may be made available to collaborating researchers where there is a formal request to make use of the material. Permission to use the data must be obtained from the Publications, Analyses and Sub studies Committee of the Australian Longitudinal Study on Women's Health.

Where data are collected in collaboration with, by, or for, a community, community permission to use data is also necessary.

Rules relating to data on Aboriginal and Torres Strait Islander communities, as set out by the National Health and Medical Research Council, apply.

**Data management agency and contact details**

Women's Health Australia  
Research Centre for Gender, Health and Ageing  
University of Newcastle  
Callaghan NSW 2308  
Website: <[www.alsw.org.au](http://www.alsw.org.au)>  
Phone: (02) 4923 6872  
Email: [emawhasec@newcastle.edu.au](mailto:emawhasec@newcastle.edu.au)

# **Australian National Iodine Nutrition Study**

## **Description of data source**

In response to the need for data on iodine nutrition status for the Australian population, the National Iodine Nutrition Study was done in Australia from July 2003 to November 2004.

Coordinated by the Australian Centre for Control of Iodine Deficiency Disorders, and overseen by a national steering committee, the study looked at children in each state by measuring iodine in a urine sample, and the size of the thyroid gland in the neck by ultrasound examination.

Schoolchildren between 8–10 years of age were selected for the study.

## **Purpose(s)**

The study aims to document the population iodine status in Australian schoolchildren.

## **Collection method**

Cross-sectional survey of schoolchildren aged 8–10 years, based on a one-stage random cluster sample drawn from all Year 4 school classes in government and non-government schools in New South Wales, Victoria, South Australia, Western Australia and Queensland.

## **Data content – general**

Just over 1,700 students from 88 schools (881 boys and 828 girls), representing 85% of the estimated target number of students. Main outcome measures were:

- urinary iodine excretion levels (compared with the criteria for the severity of iodine deficiency of the World Health Organization/ International Council for the Control of Iodine Deficiency Disorders: iodine replete, 100 µg/L; mild iodine deficiency, 50–99 µg/L; moderate iodine deficiency, 20–49 µg/L; severe iodine deficiency, below 20 µg/L)
- thyroid volumes measured by ultrasound (compared with new international reference values).

## **Data content – monitoring folic acid and iodine fortification**

Study is specific to monitoring of iodine status in schoolchildren.

## **Indigenous identification**

No.

## **Socioeconomic identification**

No.

## **Scope/target population**

Schoolchildren aged 8–10 years.

## **Geographical coverage**

New South Wales, Victoria, South Australia, Western Australia, Queensland.

## **Period covered**

July 2003 to December 2004.

### **Publications and other outputs**

Li M, Eastman CJ, Waite KV, Ma G, Zacharin MR, Topliss DJ et al. 2006. Are Australian children iodine deficient? Results of the Australian National Iodine Nutrition Study. *Medical Journal of Australia* 184(4):165-169.

### **Access**

Access is via published results or a formal request to Professor Creswell Eastman and Dr Mu Li for permission to use various data findings.

### **Data management agency and contact details**

Prof. Creswell Eastman AM MD

Chairman, Australian Centre for Control of Iodine Deficiency Disorders

Director, Institute of Clinical Pathology and Medical Research, Division of Analytical Laboratories

Regional Coordinator, Asia Pacific Region, International Council for the Control of Iodine Deficiency Disorder

Phone: (02) 9845 6188

Fax: (02) 9891 6908

Email: [eastmanc@icpmr.wsahs.nsw.gov.au](mailto:eastmanc@icpmr.wsahs.nsw.gov.au)

Dr Mu Li

Project Coordinator, Institute of Clinical Pathology and Medical Research

Phone: (02) 9845 6188

Fax: (02) 9891 6908

Email: [muli@icpmr.wsahs.nsw.gov.au](mailto:muli@icpmr.wsahs.nsw.gov.au)

## **Australian Register of Therapeutic Goods**

### **Description of data source**

The Australian Register of Therapeutic Goods is a computer database of therapeutic goods.

### **Purpose(s)**

Therapeutic goods are divided broadly into two classes: medicines and medical devices. Unless exempt, medicines must be entered as either 'registered' or 'listed' medicines, and medical devices must be included before they may be supplied in or exported from Australia.

### **Collection method**

Not applicable.

### **Data content – general**

Information on therapeutic goods is held on the database and in hard copy. There were about 54,000 products on the Australian Register of Therapeutic Goods as at 23 May 2008.

Information held on the database includes product name, formulation details sponsor, and manufacturer details.

### **Data content – monitoring folic acid and iodine fortification**

Information on supplements and medications containing folic acid and iodine.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Not applicable.

### **Geographical coverage**

Australia.

### **Period covered**

Established 1989, regularly updated.

### **Publications and other outputs**

Not applicable.

### **Access**

Online and via request to the Therapeutic Goods Administration.

### **Data management agency and contact details**

Therapeutic Goods Administration, Department of Health and Ageing

PO Box 100

Woden ACT 2606

Phone: 1800 020 653 (freecall within Australia)

Email: info@tga.gov.au

## **Bettering the Evaluation and Care of Health (BEACH)**

### **Description of data source**

The Bettering the Evaluation and Care of Health (BEACH) study continuously collects information about the patients seen, reasons people seek medical care, problems managed, and treatments provided in general practice in Australia.

### **Purpose(s)**

BEACH aims to:

- collect reliable and valid data about general practice, which are responsive to the ever-changing needs of information users
- establish an ongoing database of general practitioner/patient encounter information
- assess patient-based risk factors and the relationship these factors have with health service activity
- provide accurate and timely data to a wide variety of users.

### **Collection method**

BEACH uses a cross-sectional, paper-based data collection system developed over the past 27 years at the University of Sydney.

### **Data content – general**

BEACH collects the following information from each general practitioner/patient encounter:

- encounter characteristics
- general practitioner characteristics – age, gender, years in general practice, number of sessions per week, country of graduation, size of practice, computer use, hours worked and on call each week, and rurality of practice
- patient characteristics – age, sex, Indigenous status, Health Care Card and Veteran's Affairs status, status to the practice (new/seen before)
- patient reasons for encounter (up to three)
- problems managed at encounter (up to four)
- management for each problem (pharmacological and non-pharmacological)
- referrals, tests and investigations for each problem.

### **Data content – monitoring folic acid and iodine fortification**

Information on general practitioner/patient encounters that are related to NTDs, thyroid and other folic acid and/or iodine related conditions may be able to be extrapolated from these data.

### **Indigenous identification**

Patient may self-report as being Aboriginal and/or Torres Strait Islander.

### **Socioeconomic identification**

Postcode of usual residence.

**Scope/target population**

Patients attending a general practitioner who has been randomly selected for the study. The sample represents patients who see their general practitioner. About 85% of the population visit general practitioners in any given year. However, the sample over-represents those people who attend more often, as they have more chance of being included.

**Geographical coverage**

All states and territories, Australia.

**Period covered**

Since April 1998 to present (ongoing collection).

**Publications and other outputs**

A full list of publications can be found at: <[www.fmrc.org.au/beach.htm](http://www.fmrc.org.au/beach.htm)>.

**Access**

The general public and researchers may request ad hoc analyses of BEACH data to be done; a fee is charged for access to the data and for work done.

Contact Associate Professor Helena Britt at the Australian General Practice Statistics and Classification Centre.

**Data management agency and contact details**

Australian General Practice Statistics and Classification Centre  
Family Medicine Research Centre, Acacia House  
Westmead Hospital  
Westmead NSW 2145  
Phone: (02) 9845 8151  
Email: [gpsc@med.usyd.edu.au](mailto:gpsc@med.usyd.edu.au)  
Website: <[www.fmrc.org.au/agpscc](http://www.fmrc.org.au/agpscc)>

# **Australian Health Survey (comprising the National Nutrition and Physical Activity Survey and the National Health Measures Survey)**

## **Description of data source**

The Australian Health Survey will be implemented by the ABS, through a partnership agreement with the Department of Health and Ageing and the National Heart Foundation of Australia.

The survey will encompass the existing National Health Survey and National Aboriginal and Torres Strait Islander Health Survey (described later in this document) and two new surveys – the National Nutrition and Physical Activity Survey and the National Health Measures Survey

It is anticipated that the survey will be ongoing, with various components repeated every 3 or 6 years.

## **Purpose(s)**

The Australian Health Survey aims to:

- provide objective prevalence estimates of certain chronic diseases and disease risk factors (including those that relate to diet and physical activity) in the population as a whole
- enable monitoring and reporting against national food, nutrition and physical activity guidelines and recommendations
- inform the development and evaluation of food regulatory standards
- determine how these data vary for different population subgroups of interest.

## **Collection method**

Planning for the survey is underway, but the expected data collection methods for food, supplement and nutrient intake and nutrition status are:

- food and supplement intake:
  - two 24-hour food recalls
  - food frequency questionnaire
  - sort dietary questions
- nutrient intake:
  - survey-specific food composition database to enable translation of food and supplement intakes into nutrient intakes
- nutrition status:
  - blood, urine and possibly saliva samples analysed for various measures of nutrition status and chronic disease risk.

## **Data content – general**

Planning for the survey is underway, but it is expected to collect the following data:

- self-reported:
  - demographics
  - health conditions and actions
  - disability status

- mental health
- use of medications
- food, supplement and nutrient intake
- levels of physical activity and sedentary behaviour
- Measured:
  - physical measurements
  - blood pressure
  - nutrition status
  - physical activity levels
  - prevalence of selected chronic diseases and disease risk factors

### **Data content – monitoring folic acid and iodine fortification**

Planning for the survey is underway, but it is expected to collect data on:

- food and supplement intakes
- discretionary use of salt, including iodised salt
- intakes of iodine, folic acid, natural folate and total folate expressed as dietary folate equivalents
- urinary iodine concentration, erythrocyte folate and serum folate.

### **Indigenous identification**

In general population survey plus separate Indigenous survey.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

All Australians. Different items will have different age coverage (for example, smoking rates for those aged 15 years and over).

### **Geographical coverage**

Nationally representative sample. The general population component of the survey will exclude very remote areas. The Indigenous components will include these areas.

### **Period covered**

The survey is expected to begin fieldwork in 2011 and span about 18 months, with the general population component and Indigenous component each covering a 10-month period, with some overlap in timing of the components.

### **Publications and other outputs**

The main findings report is expected to be the first report to be published from the survey data (general survey late 2012, Indigenous survey mid 2013).

### **Access**

It is expected that microdata will be available in the form of confidentialised unit record files. Other types of products are also being considered.

### **Data management agency**

Australian Bureau of Statistics: <[www.abs.gov.au/australianhealthsurvey](http://www.abs.gov.au/australianhealthsurvey)>.

## **Disease Expenditure Database**

### **Description of data source**

The database provides an overview of total health system expenditures on disease and injury in Australia during 2000–01, based on the best possible estimates from currently available data sources.

### **Purpose(s)**

The database aims to provide a systematic analysis of Australian health expenditure by disease.

### **Collection method**

The basic approach for direct costs of health services has been to take known aggregate expenditures on health care, and apportion these to disease categories using Australian data.

### **Data content – general**

Expenditure data are collected on hospitals, aged care homes, out-of-hospital medical services, pharmaceuticals, other professional services, dental, and research (by age and sex).

### **Data content – monitoring folic acid and iodine fortification**

Data on health expenditure related to NTDs and/or thyroid conditions may be able to be extrapolated from these data and potentially tracked over time.

### **Indigenous identification**

No.

### **Socioeconomic identification**

No.

### **Scope/target population**

General Australian population.

### **Geographical coverage**

All states and territories, Australia.

### **Period covered**

1993–94 and 2000–01.

### **Publications and other outputs**

Publications, available on the AIHW website: <[www.aihw.gov.au/publications/index.cfm](http://www.aihw.gov.au/publications/index.cfm)>.

Online data cubes: <[www.aihw.gov.au/expenditure/datacubes/index.cfm](http://www.aihw.gov.au/expenditure/datacubes/index.cfm)>.

### **Access**

Access is available through the AIHW or through the online data cubes.

### **Data management agency and contact details**

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1000

Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

## **Australian Total Diet Study**

### **Description of data source**

The Australian Total Diet Study is a comprehensive data source on dietary exposure done by FSANZ.

The new smaller surveys will be done more often in response to the need for current information on the safety of substances in food. This change has allowed FSANZ greater flexibility in focusing the study on specific food chemicals where further data on dietary exposure are desirable.

The scope of the recent study (from 2002) is to include a broader range of food chemicals, with less emphasis on pesticide residues and contaminants. This approach allows investigation of food chemicals for which there are insufficient data, or where there may be concern that the dietary exposure for some population groups may exceed the reference health standard.

### **Purpose(s)**

The study aims to:

- estimate the Australian population's dietary exposure (intake) to various food chemicals, including food additives, nutrients, pesticide residues, contaminants and other substances that can be found in the food supply.
- help determine whether the determined levels of exposure pose unacceptable risk to the health of Australians.
- provide a source of information for Australia's contribution to the United Nations Food and Agriculture Organization and World Health Organization's Global Environmental Monitoring System, which monitors food contamination internationally.
- provide valuable data for the review of food regulatory standards or for the development or amendment of food regulatory measures.

### **Collection method**

Dietary exposure is estimated by determining the level of the substance in foods prepared for consumption by laboratory analysis, and then combining this with the amount of food consumed, as determined in a separate study (used NNS data).

To achieve more realistic dietary exposure estimates, the foods looked at in the study are prepared to a 'table ready' format before they are analysed; that is, they are subjected to prescribed preparation or processing. As a consequence, both raw and cooked foods are looked at.

FSANZ coordinates the study, while food agencies in the states and territories purchase the specified foods samples for their jurisdictions. The samples are forwarded to the National Measurement Analytical laboratories for analysis in accordance with quality assurance procedures.

### **Data content – general**

Main variables are the levels of the selected food chemicals that are to be determined for the food samples provided.

**Indigenous identification**

Not applicable.

**Socioeconomic identification**

Not applicable.

**Scope/target population**

Not applicable.

**Geographical coverage**

All states and territories, Australia.

**Period covered**

The 24th Australian Total Diet Study will begin in the 2010-11 financial year.

**Publications and other outputs**

FSANZ publishes the full report of the Australian Total Diet Study on its website, and produces hard copy publications.

**Access**

Available from the FSANZ website.

**Data management agency and contact details**

Scientific Strategy, International and Surveillance Section

Food Standards Australia New Zealand

Boeing House

55 Blackall Street

Barton ACT 2600

Phone: (02) 6271 2222

Fax: (02) 6271 2278

## **NUTTAB 2006—Food Composition Data Source**

### **Description of data source**

NUTTAB 2006 is a reference database that provides information on the nutrient content of foods available in Australia. It is a first major revised food composition publication by FSANZ. It replaces NUTTAB 1995, its 1997 supplement, the Nutritional Values of Australian Foods (1992), as well as Food for Health (1991). NUTTAB 2006 is not intended to replace AUSNUT (1999), a database developed specifically for the 1995 National Nutrition Survey.

The database contains nutrient data for about 2,600 foods and up to 169 nutrients, expressed as per 100 g edible portion. It incorporates a wider variety of foods and nutrients than previous databases. The updated nutrient values reflect the composition of foods currently available in Australia.

NUTTAB 2006 was developed for reference purposes and not specifically for calculating values for nutrition information panels, and is offered in three formats to cater for the needs of most users.

Preparations have begun for the development of an updated NUTTAB.

### **Purpose(s)**

The publication is developed to meet international food composition standards and to provide a more complete database that presents the composition of current Australian foods that is useful to a wide audience.

Internally, it is used by FSANZ to:

- develop survey specific nutrient databases
- undertake risk assessment processes
- track the nutrient content of Australian foods over time
- incorporate into the Nutrition Panel Calculator
- help with work on food fortification monitoring.

Externally, it is available for a variety of uses, including nutrition labelling, research on diet and disease, education, and to help consumers make healthy food choices.

### **Collection method**

The majority of data contained in NUTTAB 2006 are analysed values. However, some data contained in the database are based on:

- borrowed data from overseas food tables
- data supplied by the food industry
- data taken from food labels
- imputed values from similar foods
- values calculated using a recipe approach.

How the data are derived is shown for each food published in each version of NUTTAB 2006, representing where the majority of data are derived.

More detailed information on how each individual nutrient is derived can be found in the sampling information included in the NUTTAB 2006 online and electronic versions.

### **Data content – general**

To cater for food composition data needs of most users.

FSANZ is continually updating nutrient data based on nutrient information analysed from various projects in the agency.

The nutrient data presented in NUTTAB 2006 have been obtained from various sources, but primarily from analytical programs from the 1980s onwards, including a large amount of updated data from recent food analyses. Where possible, the data contained in the publication were updated up until the end of 2006, with many changes to sodium and folate values.

Nutrients selected for presentation in the NUTTAB 2006 Food Composition Tables are those of strong public interest and relevance, where significant amounts of data exist for these nutrients. It includes those nutrients required to be reported in nutrition information panels on food labels. However, it may not include a value for every nutrient in every food, if no data are available. Due to limited nutrient data existing for alcohol, caffeine and iodine, separate tables for foods containing these components are placed at the back of the main food composition tables.

Nutrient values reported under a specific food name in NUTTAB 2006 are not necessarily derived from the analysis of a single product. In some cases, composite samples have been analysed, which means that several very similar products, which are not necessarily the same brand, have been blended together to form a single sample, and then a portion of this sample has been analysed. So the nutrient values presented provide representative data. Foods, being biological materials, vary in their nutrient composition over different batches, and between brands due to various factors, including changes in season, processing practices and ingredient source.

### **Data content – monitoring folic acid and iodine fortification**

Provides data useful for baseline nutrient values for folic acid and iodine in some foods.

#### **Indigenous identification**

Not applicable.

#### **Socioeconomic identification**

Not applicable.

#### **Scope/target population**

Foods from all over Australia.

#### **Geographical coverage**

National.

#### **Period covered**

Incorporates nutrient data from 1980 onwards, with new analytical data to 2006. Replaces previous publications, NUTTAB 1995, its 1997 supplement, Nutritional Values of Australian Foods (1992), and Food for Health (1991).

## **Publications and other outputs**

NUTTAB 2006 is published electronically on the FSANZ website. There are three versions of the publication to cater for the needs of a wide variety of users:

1. The NUTTAB 2006 food composition tables consist of about 1,750 common foods, and include data for up to 29 nutrients. This version is available in PDF format from the FSANZ website, and is useful to those wanting summary nutrient data for commonly consumed foods.
2. The NUTTAB 2006 online version allows users to search by individual foods, food groups or individual nutrients. It consists of about 2,500 foods (including those foods published in the food composition tables), and includes nutrient values for up to 160 nutrients, including nutrient descriptions, food descriptions, references, sampling information, a search function for easy food finding, and useful links and files.
3. The NUTTAB 2006 electronic version consists of the same nutrients and foods as those in the online version, as well as all ancillary information (such as sampling details, food and nutrient descriptions), provided in comma delimited format. This version is aimed at those who want to be able to put the data into their own software and manipulate it for specific purposes.

### **Access**

NUTTAB 2006 nutrient databases are publicly available on the FSANZ website.

### **Data management agency and contact details**

Food Composition, Dietary Modelling and Evaluation Section

Food Standard Australia New Zealand

Boeing House

55 Blackall Street

Barton ACT 2600

Phone: (02) 6271 2222

Fax: (02) 6271 2278

# **Growing Up in Australia: the Longitudinal Study of Australian Children**

## **Description of data source**

The Growing Up in Australia study has been initiated and funded by the Australian Government Department of Families, Community Services and Indigenous Affairs as part of its Stronger Families and Communities Strategy.

## **Purpose(s)**

Growing Up in Australia: the Longitudinal Study of Australian Children aims to look at the impact of Australia's unique social and cultural environment on the next generation, to gain a further understanding of early childhood development, inform social policy debate, and be used to recognise opportunities for early intervention and prevention strategies in policy areas about children.

The longitudinal nature of the study aims to enable researchers to determine critical periods for the provision of services and welfare support, and to recognise the long-term consequences of policy innovations.

## **Collection method**

Data are being collected over 7 years from two cohorts every 2 years. The first main wave of data collection occurred in 2004, and three waves of data collection have now been completed. The first cohort (Infant or B cohort) of about 5,000 children aged 0-1 years when the sample was recruited in 2004 will be followed until they reach 6 to 7 years of age.

The second cohort (Child or K cohort) comprised about 5,000 children aged 4-5 years when the sample was recruited will be followed until they reach 10 or 11 years of age. Study informants include the children (when of an appropriate age) and their parents, carers and teachers.

The third cohort comprised 8,718 families: 4,386 from the B cohort (aged 4-5 years in Wave 3) and 4,332 from the K cohort (aged 8-9 years in Wave 3). The data were collected in 2008, and released in 2009.

Wave 4 of the study is under development. The study will continue to follow the two cohorts of children to the ages of 14-15 years and 18-19 years.

## **Data content – general**

Participants provide information on: child care; child care provider; child's development; child's diet and nutrition; child's health; conception, pregnancy and birth; education; family demographics; finances; housing; neighbourhood; non-resident parent; paid work; parental health; parenting; and social capital.

## **Data content – monitoring folic acid and iodine fortification**

Data on folic acid and iodine intake may be estimated from information on the child's diet and nutrition. This information could be assessed and monitored over the duration of the study. It may be possible to look at associations between a child's development and their folic acid or iodine intake.

## **Indigenous identification**

According to the ABS standard.

**Socioeconomic identification**

Information is collected about the finances of the study child's parents, their educational qualifications, their current work status and occupation, home ownership, and the ABS Socio-Economic Indexes for Areas indices. Other indicators are added to the data file for the child's neighbourhood.

**Scope/target population**

Children born from March 2003 to February 2004 (B cohort) and children born from March 1999 to February 2003 (K cohort). Children in about 40% of remote postcodes were excluded.

**Geographical coverage**

All states and territories, Australia.

**Period covered**

2003–04 to 2009–10.

**Publications and other outputs**

Publications and other products can be found at:  
<[www.aifs.gov.au/growingup/pubs.html](http://www.aifs.gov.au/growingup/pubs.html)>.

**Access**

Data from Growing Up in Australia are kept at the Australian Institute of Family Studies, and is available to researchers approved by the Department of Families, Community Services and Indigenous Affairs who must abide by strict security and confidentiality protocols. More information can be found at: <[www.aifs.gov.au/growingup/data.html](http://www.aifs.gov.au/growingup/data.html)>.

**Data management agency and contact details**

Australian Institute of Family Studies  
Level 20, 485 La Trobe Street  
Melbourne Vic 3000  
Phone: (03) 9214 7888  
Email: [lsacweb@aifs.gov.au](mailto:lsacweb@aifs.gov.au)  
Website: <[www.aifs.gov.au/growingup](http://www.aifs.gov.au/growingup)>

# **National Aboriginal and Torres Strait Islander Health Survey**

## **Description of data source**

The National Aboriginal and Torres Strait Islander Health Survey is a health survey of Aboriginal and Torres Strait Islander people done by the ABS. This survey, which was done in remote and non-remote areas throughout Australia, was designed to collect a variety of information from Indigenous Australians about health-related issues, including health status, risk factors and actions, and socioeconomic circumstances.

## **Purpose(s)**

The survey aims were to:

- provide broad information about the health of Indigenous Australians, by remoteness, and at the national and state/territory levels
- allow for the relationships across the health status, risk factors and health-related actions of Indigenous Australians to be explored
- provide comparisons over time on the health of Indigenous Australians
- provide comparisons with results for the non-Indigenous population.

## **Collection method**

Data collection was done by ABS interviewers using either computer-assisted interviewing (with a laptop) or pen and paper interviewing (paper questionnaire).

Persons aged 18 years or more were interviewed personally, with the exception of those who were too sick or otherwise unable to respond personally. Persons aged 15–17 years were interviewed (with consent from a parent or guardian) or their information was obtained from a parent or guardian. Information about children aged less than 15 years was provided by a responsible adult. A nominated household spokesperson was interviewed about household-level information.

While some information (for example, long-term conditions) was collected about Aboriginal and Torres Strait Islander people of all ages, other data were only collected for relevant subpopulations – for example, self-assessed health for Indigenous Australians aged 15 years and over, and smoking and alcohol consumption for Indigenous Australians aged 18 years and over.

## **Data content – general**

Information was collected about:

- health status, including long-term medical conditions and recent injuries
- use of health services such as consultations with health practitioners and visits to hospitals, health insurance (non-remote only), financial stress, and other health related actions
- health-related aspects of lifestyle, such as smoking, diet, exercise (non-remote only), substance use (non-remote only), alcohol consumption, and financial stress
- demographic and socioeconomic characteristics.

## **Data content – monitoring folic acid and iodine fortification**

Diet information may be useful to estimate folic acid and/or iodine intake.

### **Indigenous identification**

Respondents were identified as being of Aboriginal, Torres Strait Islander or both Aboriginal and Torres Strait Islander origin.

### **Socioeconomic identification**

The 2004–05 survey contains various socioeconomic indicators for persons and households.

### **Scope/target population**

The 2004–05 survey was done on a sample of 10,439 Aboriginal and Torres Strait Islander people (or about 1 in 45 of the total Indigenous population). The sample covered usual residents of private dwellings only.

### **Geographical coverage**

Remote and non-remote areas of Australia.

### **Period covered**

The survey is to be repeated every 6 years. Previous surveys have been done for 1995, 2001 and 2004–05. In 2004–05, it was done over an 11-month period so that seasonal variations were captured. 1995 and 2001 data were collected as Indigenous components of the National Health Survey.

### **Publications and other outputs**

ABS 2006. National Aboriginal and Torres Strait Islander Health Survey 2004–05. Cat. no. 4715.0. Canberra: ABS.

ABS 2006. National Aboriginal and Torres Strait Islander Health Survey 2004–05: users' guide. Cat. no. 4715.0.55.004. Canberra: ABS.

ABS 2006. National Aboriginal and Torres Strait Islander Health Survey 2004–05: expanded confidentialised unit record file. Cat. no. 4715.0.55.001. Canberra: ABS.

ABS 2006. National Aboriginal and Torres Strait Islander Health Survey 2004–05: expanded confidentialised unit record file, technical manual. Cat. no. 4715.0.55.002. Canberra: ABS.

ABS 2006. National Health Survey and National Aboriginal and Torres Strait Islander Health Survey 2004–05: data reference package. Cat. no. 4363.0.55.002. Canberra: ABS.

### **Access**

For users who wish to do more detailed analysis of the survey data, microdata from the 2004–05 National Aboriginal and Torres Strait Islander Health Survey are available in the form of an expanded confidentialised unit record file (see above). The expanded confidentialised unit record file is available via the ABS Remote Access Data Laboratory, which is a secure Internet-based data query service.

### **Data management agency and contact details**

Australian Bureau of Statistics  
PO Box 10  
Belconnen ACT 2612  
Email: [client.services@abs.gov.au](mailto:client.services@abs.gov.au)  
Website: [www.abs.gov.au](http://www.abs.gov.au)

## **Australian Cancer Database**

### **Description of data source**

The Australian Cancer Database holds information about 1.8 million cancer cases of Australian residents who were diagnosed with cancer (other than basal cell and squamous cell carcinomas of the skin) from 1982 to 2007.

The AIHW compiles and maintains the Australian Cancer Database, in partnership with the Australasian Association of Cancer Registries. Member registries provide data to the AIHW annually, and each Australian state and territory has legislation that makes the reporting of all cancers (excluding basal cell and squamous cell carcinomas of the skin) mandatory.

### **Purpose(s)**

Data from the Australian Cancer Database are used to monitor cancer nationally and forms the basis of various AIHW publications, including the AIHW biennial *Cancer in Australia*.

### **Collection method**

Pathology laboratories and Registrars of Births, Deaths and Marriages across Australia must report on cancer cases, as do hospitals, radiation oncology units and nursing homes in some (but not all) jurisdictions..

### **Data content – general**

The main variables collected are name, sex, date of birth, date of diagnosis, basis of diagnosis, Statistical Local Area at time of diagnosis, site of cancer and cell type.

### **Data content – monitoring folic acid and iodine fortification**

Thyroid cancer incidence, colorectal cancer incidence.

### **Indigenous identification**

Indigenous status is collected, but data quality is only satisfactory for Western Australia, Northern Territory, Queensland and South Australia for more recent years.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

All residents of Australia.

### **Geographical coverage**

All states and territories, Australia.

### **Period covered**

Since 1982 to present (ongoing collection).

### **Publications and other outputs**

The AIHW produces reports based on national incidence and mortality data. Periodically, analyses are done of specific cancer sites, cancer histology, differentials in cancer rates by country of birth, geographical variation, trends over time and survival. The most recent publications are:

Australian Cancer Incidence and Mortality (ACIM) books. These books are interactive Excel workbooks of tables and graphs, by age and sex, for all the major cancers for incidence from 1982 to 2006, and mortality from 1968 to 2007.

AIHW 2008. Cancer in Australia: an overview 2008. Cat no. CAN 46. Canberra: AIHW.

**Access**

The AIHW can make available a broad range of statistical data to researchers.

**Data management agency and contact details**

Cancer and Screening Unit

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1000

Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

Website: [www.aihw.gov.au/cancer/index.cfm](http://www.aihw.gov.au/cancer/index.cfm)

# **National Health Survey**

## **Description of data source**

The National Health Survey is a triennial health survey that collects information about the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle.

## **Purpose(s)**

The survey is designed to obtain national benchmarks on a wide variety of health issues, and to enable changes in health to be monitored over time.

## **Collection method**

Trained ABS interviewers conduct personal interviews with selected residents in sampled private dwellings. Persons included may vary from survey to survey. In the 2004–05 survey, one person aged 18 years and over in each dwelling was selected and interviewed about their health characteristics. Information was also collected about one child aged less than 18 years in sampled households. Selected children aged 15–17 years may have answered for them with parental consent; otherwise an adult, nominated by the household, was interviewed on behalf of the selected child.

## **Data content – general**

The information collected in the National Health Survey may vary from survey to survey. Information was collected in the 2004–05 survey about:

- the health status of the population, including long-term medical conditions experienced and recent injuries
- health-related aspects of people’s lifestyles, such as smoking, diet, exercise and alcohol consumption
- use of health services such as consultations with health practitioners, visits to hospital, days away from work, health insurance (non-remote only) and other actions people had recently taken for their health
- demographic and socioeconomic characteristics.

## **Data content – monitoring folic acid and iodine fortification**

Information about diet may be used to estimate folic acid and iodine intake, and potentially supplement use. Health status information tracked over time for conditions linked to folic acid or iodine intake may be useful.

## **Indigenous identification**

No. Data cannot be disaggregated by Indigenous identification. A National Aboriginal and Torres Strait Islander Health Survey was done at the same time as the 2004–05 National Health Survey.

## **Socioeconomic identification**

The 2004–05 survey contains various socioeconomic indicators for persons and households.

## **Scope/target population**

The 2004–05 survey was done on a sample of 25,906 people in urban and rural areas in all states and territories; very remote areas were excluded.

### **Geographical coverage**

For the 2004–05 survey, both urban and rural areas in all states and territories were included, but very remote areas of Australia were excluded.

### **Period covered**

The National Health Survey is done periodically: 1977–78, 1983, 1989–90, 1995, 2001, 2004–05. In 2004–05 the survey was done over a 10-month period so that seasonal variations were captured.

### **Publications and other outputs**

ABS 2006. 2004–05 National Health Survey: summary of result. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2006. National Health Survey 2004–05: users' guide. ABS cat. no. 4363.0.55.001. Canberra: ABS.

ABS 2006. 2004–05 National Health Survey: summary of results: state tables. ABS cat. no. 4362.0. Canberra: ABS.

Other topic-specific publications and snapshot articles are produced and released on the ABS website.

### **Access**

For users who wish to do more detailed analysis of the survey data, two confidentialised unit record files are available. Basic confidentialised record files are available on CD-ROM, while expanded ones (containing more detailed information) are accessible through the ABS Remote Access Data Laboratory system.

### **Data management agency and contact details**

Australian Bureau of Statistics  
Locked Bag 10  
Belconnen ACT 2616  
Email: [client.services@abs.gov.au](mailto:client.services@abs.gov.au)  
Website: [www.abs.gov.au](http://www.abs.gov.au)

# **National Hospital Morbidity Database**

## **Description of data source**

The National Hospital Morbidity Database is a collection of electronic confidentialised summary records for patients admitted in public and private hospitals in Australia.

## **Purpose(s)**

The purpose of the database is to provide information about care provided to admitted patients in Australian hospitals.

## **Collection method**

Data are collected at each hospital from patient administrative and clinical record systems. Hospitals forward data to the relevant state or territory health authority regularly (for example, monthly). State/territory health authorities forward these data to the AIHW annually.

## **Data content – general**

The information collected falls into the following categories:

- establishment data (state/territory of the hospital, sector, rural, remote and metropolitan areas, accessibility/remoteness index of Australia, remoteness area)
- demographic (sex, date of birth, age at admission, country of birth, Indigenous status, state and local area of residence, remoteness area of residence)
- administrative variables (funding source, mode of admission, mode of separation, patient election status, urgency of admission)
- length of stay data (admission and separation dates, leave days, number of patient days, intended length of stay, same day flag)
- clinical variables (care type, principal diagnosis, additional diagnoses, morphology of neoplasm, procedures, external cause of injury or poisoning, place of occurrence of external cause, activity when injured, diagnosis-related group, major diagnostic category).

## **Data content – monitoring folic acid and iodine fortification**

Hospital data about conditions that may be related to folic acid and/or iodine status, such as anaemia or thyroid disorders.

## **Indigenous identification**

Indigenous identification is based on the ABS standard for Indigenous status.

## **Socioeconomic identification**

Socio-Economic Indexes for Areas based on provided Statistical Local Area of individual.

## **Scope/target population**

Episodes of care for admitted patients in all public and private acute and psychiatric hospitals, free-standing day hospital facilities and alcohol and drug treatment centres in Australia.

## **Geographical coverage**

Data are collected for almost all public and private hospitals for all states and territories of Australia.

**Period covered**

Since 1993–94 to present (ongoing collection).

**Publications and other outputs**

Australian hospital statistics has been published annually since 1995–96. A full list of publications is available at: <[www.aihw.gov.au/hospitals/nhm\\_database.cfm](http://www.aihw.gov.au/hospitals/nhm_database.cfm)>.

Interactive data cubes are available at:

<[www.aihw.gov.au/hospitals/datacubes/index.cfm](http://www.aihw.gov.au/hospitals/datacubes/index.cfm)>.

Data sourced from the database contributes to many publications, reports and articles, both within the AIHW and by external researchers.

**Access**

The AIHW provides extracts of data from the National Hospital Morbidity Database on request. A charge may apply depending on the requirements and the complexity of the analysis done.

To use this data consultancy, email: [hospitaldata@aihw.gov.au](mailto:hospitaldata@aihw.gov.au).

**Data management agency and contact details**

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1000

Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

Website: <[www.aihw.gov.au](http://www.aihw.gov.au)>

# **National Mortality Database**

## **Description of data source**

The National Mortality Database contains cause-of-death information for all deaths registered in Australia from 1965 onwards.

Death registration has been compulsory in all states and territories since the mid-1850s and this information is registered with respective Registrars of Births, Deaths and Marriages.

## **Purpose(s)**

The database aims to monitor the cause of all deaths in Australia, and to hold a minimum of the past 10 years of mortality data.

## **Collection method**

Information about a death is recorded on the death certificate and the death information form. Information is provided to the AIHW by the Registrars of Births, Deaths and Marriages in each state and territory, and coded nationally by the ABS.

Additional demographic and administrative information is collected by funeral directors, usually through the next of kin, or a person known to the deceased.

## **Data content – general**

The collection includes data elements such as date of death, date of birth, underlying cause of death, multiple causes of death (1997 onwards), place of death by state and local government area, and Indigenous status (for later years).

## **Data content – monitoring folic acid and iodine fortification**

Deaths associated with conditions that may be linked to folate and/or iodine status.

## **Indigenous identification**

Based on the ABS standard for Indigenous identification. The quality of Indigenous identification is not reliable for all states and territories.

## **Socioeconomic identification**

Socio-Economic Indexes for Areas based on provided Statistical Local Area of deceased.

## **Scope/target population**

All deaths occurring in Australia. Deaths of Australians occurring overseas are not within scope of the collection.

## **Geographical coverage**

All states and territories, Australia.

## **Period covered**

Since 1964 to present (ongoing collection).

## **Publications and other outputs**

AIHW 2006. Mortality over the twentieth century in Australia. Cat. no. PHE 73. Canberra: AIHW.

Dunn C, Sadkowsky K & Jelfs P 2002. Trends in deaths: analysis of Australian data 1987–1998 with updates to 2000. Cat. no. PHE 40. Canberra: AIHW.

AIHW (various dates). General record of incidence of mortality (GRIM) books, <[www.aihw.gov.au/mortality/data/grim\\_books.cfm](http://www.aihw.gov.au/mortality/data/grim_books.cfm)>.

Data available as consultancy. Email: [mortality\\_info@aihw.gov.au](mailto:mortality_info@aihw.gov.au).

**Access**

Summary-level data are available publicly in the AIHW General Record of Incidence of Mortality: interactive Excel workbooks (GRIM Books), at: <[www.aihw.gov.au/mortality/data/grim\\_books.cfm](http://www.aihw.gov.au/mortality/data/grim_books.cfm)>.

**Data management agency and contact details**

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1000

Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

Website: <[www.aihw.gov.au](http://www.aihw.gov.au)>

# **National Nutrition Survey 1995**

## **Description of data source**

The National Nutrition Survey (NNS) was done across all states and territories. It collected information for people aged 2 years and over on food and beverage intake, usual frequency of intake, food-related habits and attitudes, and physical measurements.

## **Purpose(s)**

The overall objective of this survey was to provide food and nutrient data to help with the implementation of Australia's Food and Nutrition Policy.

## **Collection method**

The NNS surveyed 13,858 people aged 2 years and over using a 24-hour food recall method, and provides a representative indication of food consumption. A second 24-hour recall was also collected on a subset of respondents, and intakes from a single day were adjusted to estimate 'usual intake' by including information from a second 24-hour record.

All participants were interviewed by trained nutritionists who sought detailed information on food and beverages consumed during the day before the interview (from midnight to midnight). Each food and beverage was described in enough detail to allow its nutrient composition to be determined.

## **Data content – general**

This publication presents information on intake of:

- energy
- moisture
- macronutrients – protein, fat (total, saturated, monounsaturated and polyunsaturated), cholesterol, carbohydrate (total, starch and sugars), dietary fibre and alcohol
- vitamins – vitamin A (retinol equivalents, preformed and provitamin), thiamin, riboflavin, niacin equivalents, folate, vitamin C
- minerals – calcium, phosphorus, magnesium, iron, zinc and potassium.

It also includes information on the physical measurements of Australians aged 2 years and over.

## **Data content – monitoring folic acid and iodine fortification**

Food intake data may be used to determine folic acid and iodine intake.

## **Indigenous identification**

Yes.

## **Socioeconomic identification**

Yes.

## **Scope/target population**

All Australians 2 years and over.

## **Geographical coverage**

All states and territories.

**Period covered**

February 1995 and March 1996.

**Publications and other outputs**

Not applicable.

**Access**

Access to the data is available on request to the Australian Bureau of Statistics.

**Data management agency and contact details**

Australian Bureau of Statistics

Locked Bag 10

Belconnen ACT 2616

Phone: 1300 135 070 or (02) 9268 4909

## **Australian Capital Territory Year 6 Physical Activity and Nutrition Survey**

### **Description of data source**

Food and nutritional intake of Year 6 schoolchildren in the Australian Capital Territory.

### **Purpose(s)**

The survey aims to develop surveillance of prevalence and trends in childhood obesity in the Australian Capital Territory.

### **Collection method**

Survey of 37 primary schools in the Australian Capital Territory. Stratified sample by school type.

### **Data content – general**

Physical activity, general food intake, meal patterns.

### **Data content – monitoring folic acid and iodine fortification**

Intake data.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

Children enrolled in Year 6 classes in Australian Capital Territory primary schools.

### **Geographical coverage**

Australian Capital Territory.

### **Period covered**

2006.

### **Publications and other outputs**

Not applicable.

### **Access**

On application to the Population Health Research Centre, ACT Health.

### **Data management agency**

Population Health Research Centre, Health Improvement Division, ACT Health.

## **New South Wales Blue Mountains Eye Study**

### **Description of data source**

The Blue Mountains Eye Study was a large population-based assessment of visual impairment and common eye diseases of a representative older Australian community sample.

### **Purpose(s)**

The study aims to determine the prevalence of eye disease in older Australians.

### **Collection method**

In late 1992, the target population was identified by a door-to-door census of all dwellings in the two postcode areas. A total of 3,654 residents, aged 49–97 years, were examined between 1992 and 1994 (an overall response of 82% of non-institutionalised residents).

During 1997–1999, all surviving participants were invited to attend a 5-year follow-up examination, for which 2,334 persons returned (75% of survivors).

A second census of the same postcode areas was done in 1999, finding a further 1,510 residents now eligible to participate, of which 1,206 were examined as part of an extension study during 1999–2000.

In 2002, participants were invited to return for 10-year follow-up examinations, and during 2002–2004, 1,952 original participants were re-examined.

At each examination, a detailed assessment of eye disease and other general health measures was done. Participants were also asked to attend fasting blood tests after each examination, and complete a detailed questionnaire about the types of food they consumed. At the 5-year and 10-year examinations, a test of memory and cognition (Mini Mental State Examination) was also done, and questions about quality of life (Short Form 36) and visual functioning were asked.

### **Data content – general**

Data collected included medical history (self-reported), socioeconomic status, food frequency questionnaire, quality of life, eye examination, hearing examination, and smell test (for Wave 3 only).

### **Data content – monitoring folic acid and iodine fortification**

The prevalence of low serum vitamin B<sub>12</sub> levels in the Blue Mountains Eye Study cohort of people aged 50 years and over.

### **Indigenous identification**

Information not provided.

### **Socioeconomic identification**

Data were collected on marital status, income source and housing.

### **Scope/target population**

All residents aged 49 years and over at baseline.

### **Geographical coverage**

The project was done in an area that included Katoomba, Leura, Medlow Bath (postcode 2780) and Wentworth Falls (postcode 2782), New South Wales.

**Period covered**

The first wave of the study, with the initial recruitment of participants, was done over 1992–1994. Wave 2 was done over 1997–1999, and Wave 3 over 2002–2004. A 15-year follow-up was done in 2007–2008.

**Publications and other outputs**

More than 250 peer-reviewed papers have been published to date, and abstracts regularly presented at conferences.

Data from the Melbourne Visual Impairment Project and the Blue Mountains Eye Study have been combined and extrapolated to the entire Australian population.

Results of this study were presented in: Taylor HR, Keeffe JE, Vu HTV, Wang JJ, Rochtchina E, Pezzullo ML & Mitchell P 2005. Vision loss in Australia. *Medical Journal of Australia* 182:565–568.

**Access**

Information not provided.

**Data management agency and contact details**

Centre for Vision Research  
Department of Ophthalmology, University of Sydney  
Westmead Millennium Institute  
Westmead NSW 2145  
Phone: (02) 9845 6852  
Email: paul\_mitchell@wmi.usyd.edu.au  
Website: <www.cvr.org.au>

# **New South Wales Iodine Status in Pregnant Women and their Newborns**

## **Description of data source**

A survey of pregnant women to determine evidence of iodine deficiency.

## **Purpose (s)**

The aim of the project is to determine whether pregnant women and their newborns show evidence of iodine deficiency, and to look at the correlation between maternal urine iodine concentration and newborn thyroid stimulating hormone level.

## **Collection method**

The study was done at the antenatal and community midwife program clinics held at the public hospitals and community health centres located in the New South Wales Central Coast area (March–May 2004). Women at 28 weeks' gestation and over were invited to participate by the midwives and study project officer during routine antenatal visits. Three of the five private Central Coast obstetrician practices were invited to participate (June 2004) to recruit women giving birth at a private hospital.

Participating women consented to provide a urine sample and gave permission to access their newborn's thyroid stimulating hormone value, routinely collected by the New South Wales Newborn Screening Programme. Women from non-English speaking countries were included in the study, but they comprised less than 5% of the women attending local antenatal care services.

Newborn screening tests are offered to all babies born in New South Wales. A heel-prick blood spot sample is collected onto pre-printed filter paper cards usually at 48–72 hours after birth. Screening before 48 hours produces a high rate of false positive results due to a thyroid stimulating hormone surge immediately after birth. The 1,235 AutoDELFIA automatic fluoroimmunoassay system (Wallace/Perkin Elmer Life Sciences, Turku, Finland) is used to determine newborn whole-blood thyroid stimulating hormone level. The test can discriminate to within 2 milli-international units/L blood. Time of birth (public hospitals only) was collected and time of heel-prick test estimated to determine the effect on thyroid stimulating hormone values of the age of the newborn when the heel-prick sample was taken.

Newborns shown to have congenital hypothyroidism, and pregnant women taking thyroxine were excluded.

## **Data content – general**

Urinary iodine concentration for pregnant women and thyroid stimulating hormone values for newborns. Correlation of maternal urinary iodine concentration and newborn thyroid stimulating hormone level.

## **Data content – monitoring folic acid and iodine fortification**

Data are specific to iodine status in pregnant women and newborns.

**Indigenous identification**

No.

**Socioeconomic identification**

No.

**Scope/target population**

Pregnant women and newborns greater than or equal to 28 weeks gestation.

**Geographical coverage**

Central Coast area of New South Wales.

**Period covered**

March to June 2004.

**Publications and other outputs**

Travers CA, Guttikonda K, Norton CA, Lewis PR, Mollart LJ & Wiley V et al. 2006 Iodine status in pregnant women and their newborns: are our babies at risk of iodine deficiency? Medical Journal of Australia 184 (12): 617-20.

**Access**

Via publications and/or via formal request to Professor Creswell Eastman.

**Data management agency and contact details**

Prof. Creswell Eastman AM MD

Chairman, Australian Centre for Control of Iodine Deficiency Disorders

Director, Institute of Clinical Pathology and Medical Research, Division of Analytical Laboratories

Regional Coordinator, Asia Pacific Region, International Council for the Control of Iodine Deficiency Disorder

Phone: (02) 9845 6188

Fax: (02) 9891 6908

Email: eastmanc@icpmr.wsahs.nsw.gov.au

# **New South Wales Birth Defects Register**

## **Description of data source**

The New South Wales Birth Defects Register is a population-based surveillance system established to monitor birth defects detected during pregnancy or at birth or diagnosed in infants aged up to 1 year. The register was established in 1990, and from 1 January 1998 doctors, hospitals and laboratories have been required to notify birth defects detected during pregnancy, at birth, or up to 1 year of life.

## **Purpose(s)**

The activities of the register include: annual publication of information on birth defects in New South Wales; provision of information to area health services to help in service planning and monitoring of child health, and investigation of specific issues; provision of information in response to specific requests from the public, health professionals, and government departments; and provision of data to the AIHW National Perinatal Statistics Unit for monitoring of birth defects at a national level.

## **Collection method**

Sources of notifications to the register include: the New South Wales Midwives Data Collection, specialist paediatric hospitals, cytogenetic laboratories, and individual health care providers. It has been a requirement since 1 January 1998, under *NSW Public Health Act 1991*, for doctors, hospitals and laboratories to notify birth defects detected during pregnancy, at birth, or up to 1 year of life.

## **Data content – general**

The main variables collected include both mother and baby details. Mother details include name, date of birth, prenatal diagnosis, and address. Baby details include name, date of birth, sex, plurality, Indigenous status, birth weight and gestation, birth defects, date of diagnosis, and hospital of birth.

## **Data content – monitoring folic acid and iodine fortification**

Case information about babies diagnosed with a birth defect associated with folate.

## **Indigenous identification**

Indigenous status is collected in accordance with the National Perinatal Minimum Data Set.

## **Socioeconomic identification**

No.

## **Scope/target population**

All pregnant women and babies up to 1 year of life.

## **Geographical coverage**

New South Wales residents.

## **Period covered**

From 1990 to present (ongoing collection).

## **Publications and other outputs**

Information on birth defects in New South Wales is published annually in the *New South Wales mothers and babies* report.

## **Access**

Data for research purposes may be provided in two formats: aggregate information similar to that contained in this report, and data about individuals with identifying information removed. All requests for data should be submitted in writing to the Director, Centre for Epidemiology and Research. Requests for data about individuals for sufficiently important research purposes will be referred to the New South Wales Department of Health Ethics Committee.

## **Data management agency and contact details**

Susan Travis  
Manager  
New South Wales Birth Defects Register  
Centre for Epidemiology and Research  
New South Wales Department of Health  
Locked Mail Bag 961  
North Sydney NSW 2059  
Phone: (02) 9424 5289  
Fax: (02) 9391 9232  
Email: [strav@doh.health.nsw.gov.au](mailto:strav@doh.health.nsw.gov.au)

# **New South Wales Population Health Survey**

## **Description of data source**

An ongoing telephone survey of state residents, the New South Wales Population Health Survey is one of the main mechanisms through which New South Wales Health monitors population health and reports on performance indicators.

## **Purpose(s)**

The survey's objectives are to:

- monitor changes over time in self-reported health behaviours, health status, health service use, satisfaction with health services, and other factors that influence health
- support the planning, implementation, and evaluation of health services
- collect health information that is not available from other sources
- respond quickly to emerging needs for health information
- promote research.

## **Collection method**

The survey is done continuously between February and December each year, and covers the whole state population from birth upwards.

Households are contacted using list-assisted random digit dialling. One person from the household is randomly selected for inclusion in the survey. Carers or parents of children aged 0–15 years are interviewed on their behalf.

Trained telephone interviewers carry out the interviews. Most interviews are done in English, but the survey is also done in five other languages (Arabic, Chinese, Greek, Italian and Vietnamese).

The sample is weighted to adjust for differences: in the probabilities of selection among subjects; between the age and sex structure of the sample; and in ABS mid-year population estimates for New South Wales. This enables the prevalence estimates to be calculated for the state population rather than for the respondents selected.

## **Data content – general**

The survey collects information in modules about alcohol, asthma, cancer screening (breast, cervical, and colorectal), community health centres, demographics, diabetes, difficulties getting health care, emergency departments, hearing, hospitals, vaccination, injury (youth violence), injury prevention, mental health, nutrition, oral health, overweight and obesity, physical activity, public dental services, self-rated health, sexual health, smoking, sun protection, and vision.

## **Data content – monitoring folic acid and iodine fortification**

Nutrition information may be useful to estimate dietary intake of folic acid and iodine.

## **Indigenous identification**

Indigenous status is collected according to the ABS standard.

## **Socioeconomic identification**

Socioeconomic details are collected, including the highest achieved education level, employment, household income and postcode.

**Scope/target population**

The target population is all New South Wales residents living in households with private telephones. The target sample is about 1,500 people in each area health service (a total sample of 12,000).

**Geographical coverage**

New South Wales.

**Period covered**

Continuously since January 2002 (ongoing collection).

**Publications and other outputs**

The survey reporting plan includes:

- an annual report on adult health for the whole state
- a monthly report on adult health for the whole state
- an annual report on adult health for each health area
- a biennial report on child health for the whole state
- a triennial report on adult health for each division of general practice
- occasional reports on the health of older people, Aboriginal and Torres Strait Islander people, people from non-English-speaking backgrounds, and other specific populations.

Survey reports, which contain an analysis of the collected data, can be downloaded from [www.health.nsw.gov.au](http://www.health.nsw.gov.au).

**Access**

Survey data sets are available for further analyses. The New South Wales Department of Health encourages as many people as possible to access these data sets through the Health Outcomes Information Statistical Toolkit. For users who do not have access to the toolkit, data sets are available through specific requests to the Chief Health Officer. Any publication that reports survey data must be approved by the Chief Health Officer before publication.

**Data management agency and contact details**

New South Wales Health Survey Program

Phone: (02) 9424 5759

Email: [catiadmin@doh.health.nsw.gov.au](mailto:catiadmin@doh.health.nsw.gov.au)

# **Prevalence of Low Serum Folate and Vitamin B<sub>12</sub> in an Older Adult Population**

## **Description of data source**

The study measured serum B<sub>12</sub>, folate and homocysteine levels for a cohort population of adults aged 50 years and over in the west of Sydney.

## **Purpose(s)**

To look at the prevalence of low serum folate and vitamin B<sub>12</sub>, in association with elevated serum homocysteine, in a representative sample of older Australians.

## **Collection method**

During 1997–2000, 3,508 people aged 50 years and over were examined in a population-based study done in two postcodes, west of Sydney. Of these, 2,901 participants (83 %) provided fasting blood for estimates of serum folate, vitamin B<sub>12</sub> and total homocysteine.

## **Data content – general**

Serum B<sub>12</sub>, folate and homocysteine.

## **Data content – monitoring folic acid and iodine fortification**

Relevant as baseline data for folic acid fortification. Evidence of folic acid intake and its effect on serum B<sub>12</sub> and homocysteine.

## **Indigenous identification**

No.

## **Socioeconomic identification**

No.

## **Scope/target population**

Adults aged 50 years and over.

## **Geographical coverage**

Western Sydney.

## **Period covered**

1997–2000.

## **Publications and other outputs**

Flood VM, Smith WT, Webb KL, Rochtchina E, Anderson VE & Mitchell P 2006. Prevalence of low serum folate and vitamin B<sub>12</sub> in an older Australian population. Canberra: The Public Health Association of Australia Inc.

## **Access**

Information available via publications and via formal request to researchers.

## **Data management agency and contact details**

Centre for Vision Research  
Westmead Hospital  
North Parramatta NSW 2145.  
Fax: (02) 9845 8345  
Email: paul\_mitchell@wmi.usyd.edu.au

## **Sydney Older Persons Study**

### **Description of data source**

This study was conceived in 1988 as the Sydney Older Veterans Health and Services Project to investigate the health of community-dwelling veterans of World War II. The study was funded and began in 1991. At this stage, non-veteran members of the community were included as well.

### **Purpose(s)**

The purpose of the study was to investigate the relationships between neurodegenerative ageing in people aged 75 years and over, and various other health factors, including systemic diseases, disability, social supports and self-rated health and coping.

### **Collection method**

Stage 1 of the study (which ran from 1991–1993) involved visiting 647 people in their homes and doing medical and neuropsychological assessments. Participants were also asked questions about their health and lifestyle, and often a spouse, relative or friend was interviewed to provide further information.

Stage 2 of the study involved interviews in the homes of the original study participants. Stage 3 did not have the broad aims of the first two stages. Rather, it was based on the Sydney Older Persons Study population, and involved taking a blood sample and completing a medication history.

Stage 4 was a further follow-up of the original population using the same method and instruments used in stages 1 and 2. This allowed a broader time frame over which to study the correlates of successful and unsuccessful ageing, and the possible risk factors and protective factors for these. By this stage, 462 people remained in the sample. Of the people who participated in Stage 4, 128 took part in a further phase, which consisted of a magnetic resonance imaging (MRI) scan of the brain and more detailed neuropsychological assessments.

In 2001, Stage 5 began, with data collection completed in 2003. This study focused on the subgroup of subjects who had a MRI scan at Stage 4. These people were invited to participate in a further MRI scan, detailed neuropsychological assessment and medical review.

In addition, the informants (such as a family member or a close friend) were interviewed again to measure the presence of health changes and their impact over time. It is anticipated that these data will provide invaluable information about the correlates and predictors of cognitive decline, with the potential to help diagnose dementia and its subtypes. Data analysis is in progress.

### **Data content – general**

More than 1,000 variables, including information collected on demographics, level of difficulty associated with activities of daily living, medical conditions and disabilities.

### **Data content – monitoring folic acid and iodine fortification**

Biochemical measures were taken. Further investigation is required to determine whether these measures may be valid to folate or iodine status. Dietary intake information may be useful.

### **Indigenous identification**

No.

**Socioeconomic identification**

Income, education, occupation and retirement details.

**Scope/target population**

Community-dwelling people aged 75 years and over in the inner west of metropolitan Sydney, New South Wales.

**Geographical coverage**

The inner western municipalities of metropolitan Sydney including Concord, Drummoyne, Strathfield, Burwood, Ashfield, Leichhardt, Marrickville and South Sydney.

**Period covered**

1991 to 2003.

**Publications and other outputs**

Several papers have been published, most recently:

Bennett H, Piguet O, Grayson D, Creasey H, Waite L, Lye T et al. 2006. Cognitive, extra pyramidal and other MRI predictors of functional impairment in non-demented older community dwellers: The Sydney Older Person Study. *Journal of the American Geriatrics Society* 54: 3-10.

Piguet O, Bennett H, Waite L, Kril J, Creasey H, Broe GA et al. 2006. Preserved cognition and functional independence after a large right posterior cerebral artery infarct: longitudinal, clinical and neuropathological findings. *Neurocase* 12:81-90.

Piguet O, Cramsie J, Bennett HP, Kril JJ, Lye TC, Corbett AJ et al. 2006. Contributions of age and alcohol consumption to cerebellar integrity, gait and cognition in non-demented very old individuals. *European Archives of Psychiatry and Clinical Neuroscience* 256(8):504-511.

**Access**

Access to Sydney Older Persons Study data can be gained directly through the Prince of Wales Medical Research Institute/ Ageing Research Centre or through the Australian Social Science Data Archive at the Australian National University.

**Data management agency and contact details**

The Prince of Wales Medical Research Institute  
Corner of Barker Street and Easy Street  
Randwick NSW 2031  
Phone: (02) 9399 1000  
Website: <[www.powmri.edu.au](http://www.powmri.edu.au)>

## **The 45 and Up Study**

### **Description of data source**

The 45 and Up Study is a long-term health study in Australia of men and women aged 45 years and over. A key feature of this study is its linkage to various established health data sets such as general practitioner services, medication use, procedures and hospitalisations.

### **Purpose(s)**

The primary aim of the study is to investigate the main factors that determine healthy ageing in the population.

Areas investigated in depth include questions relating to common diseases and health conditions that people might encounter as they grow older, including cancer, cardiovascular disease, obesity, arthritis, diabetes and depression.

### **Collection method**

More than 250,000 men and women aged 45 years and over were randomly selected across New South Wales and invited to join the 45 and Up Study. They received an information leaflet and a questionnaire for either men or women. Both men's and women's questionnaires had the same number and type of questions about health, lifestyle and experience. All questions have been carefully selected by leading New South Wales health professionals and researchers.

Participants were asked to complete the questionnaire as accurately as possible, and to sign the accompanying consent form before enclosing it in the provided envelope and returning it. A follow-up questionnaire will be sent to participants within about 5 years to update information about their health and lifestyle.

In addition, their health will be followed via linkages to already routinely collected data sources such as records of hospital admissions and medical and surgical procedures, registers of deaths, cancers and infectious diseases, and use of medications and aged care facilities. Participation in the study is voluntary.

### **Data content – general**

The questionnaire contains demographic, social, health, lifestyle, screening and other variables. Copies of questionnaires are available at: <[www.45andup.org.au](http://www.45andup.org.au)>. A wide variety of other variables is available via data linkage. Biological samples will be collected, and relevant data will be stored in study records.

### **Data content – monitoring folic acid and iodine fortification**

Any questions about nutritional intake may be useful to estimate folic acid and iodine intake. Health condition data over time may be useful, particularly in regard to colorectal cancer and thyroid conditions.

### **Indigenous identification**

Participants are asked whether they are of Aboriginal and/or Torres Strait Islander origin.

### **Socioeconomic identification**

Participants are asked about their address, highest educational qualification achieved, household income and current work status.

**Scope/target population**

Men and women aged 45 years or over, living in New South Wales and on Medicare Australia's records. The eligible population is highly representative of the Australian population in that age group.

**Geographical coverage**

All of New South Wales.

**Period covered**

The recruitment of participants began in February 2006, and will continue for at least 5 years.

**Publications and other outputs**

Papers will be published by the 45 and Up Study and participating studies.

**Access**

There are plans to make certain data available via a website interface. A more complete data set will be available directly from the 45 and Up Study, following appropriate approvals.

**Data management agency and contact details**

The Sax Institute  
PO Box 123  
Broadway NSW 2007  
Phone: (02) 9514 5950  
Email: [directorate@saxinstitute.org.au](mailto:directorate@saxinstitute.org.au)  
Website: [www.saxinstitute.org.au](http://www.saxinstitute.org.au)

## **Brisbane First Time Blood Donors Study**

### **Description of data source**

A study of all first-time blood donors ( $n=1,776$ ) attending the Brisbane Queen Street Centre of the Red Cross Blood Transfusion Service in 1995.

### **Purpose(s)**

The study aims to determine the prevalence of folate, thiamin, vitamin B<sub>6</sub> and riboflavin deficiency among apparently healthy Brisbane adults.

### **Collection method**

A blood sample was collected from all first-time blood donors attending the Brisbane Queen Street Centre of the Red Cross Blood Transfusion Service in 1995. Healthy adults from the Queensland University of Technology were invited to participate and screened for acceptance into the reference group. Screening included adequate dietary intake, good liver function, lipid and iron status, vitamin B<sub>12</sub> status, and general medical check.

### **Data content – general**

Main variables included residential postcode, date of birth, gender, blood test results for folate, thiamin, vitamin B<sub>6</sub> and riboflavin status.

### **Data content – monitoring folic acid and iodine fortification**

Laboratory results for red cell folate, thiamin, vitamin B<sub>6</sub> and riboflavin (survey group). Reference group also included total plasma homocysteine.

### **Indigenous identification**

No.

### **Socioeconomic identification**

Yes (by postcode).

### **Scope/target population**

Brisbane city blood donors.

### **Geographical coverage**

Brisbane and suburbs.

### **Period covered**

1995.

### **Publications and other outputs**

Booth C, Clark T & Fenn A 1998. Folic acid, riboflavin, thiamine, and vitamin B<sub>6</sub> status of a group of first-time blood donors. *American Journal of Clinical Nutrition* 68:1075–80.

### **Access**

All raw data are available from Christine Booth.

### **Data management agency and contact details**

Christine Booth

Defence Science and Technology Organisation

Po Box 147

Scottsdale Tas 7260

Phone: (03) 6352 6609.

## Healthy Kids Queensland Survey 2006

### Description of data source

The Healthy Kids Queensland Survey collected 24-hour records and food frequency data from children aged 5–17 years. A total of 3,691 schoolchildren in years 1, 5 and 10 participated in the study.

### Purpose(s)

This survey provides important data to help plan, develop and implement effective policies and programs to improve young Queenslanders' dietary and physical activity behaviour, and to achieve healthy weight.

### Collection method

Data were collected throughout Queensland from April to September 2006. A total of 3,691 schoolchildren aged 5–17 years in years 1, 5 or 10 participated in the survey. Government and non-government schools ( $n=112$ ) were selected to participate using a random cluster design, and the data were weighted to ensure the equal probability of inclusion of all children in the target population. The following information was collected:

- anthropometric assessment to indicate the proportion of Queensland children who are underweight, of a healthy weight, overweight or obese:
  - height, weight (to determine body mass index)
  - waist circumference
- dietary assessment to understand the eating patterns and nutrient intake of Queensland children:
  - food frequency
  - 24-hour dietary record
- physical activity assessment to understand the physical activity behaviours and exercise patterns of Queensland children:
  - physical activity questionnaire
  - pedometer study.

### Data content – general

The mean intakes of some nutrients were calculated but not folate or iodine.

### Data content – monitoring folic acid and iodine fortification

Folic acid/folate and iodine intake could be estimated from the data collected.

### Indigenous identification

No.

### Socioeconomic identification

Yes.

### Scope/target population

Children aged 5–17 years.

### Geographical coverage

Queensland.

**Period covered**

2006.

**Publications and other outputs**

Not applicable.

**Access**

The report is available from Queensland Health; further information available on request.

**Data management agency**

The report is available at: <[www.health.qld.gov.au/healthieryou/default.asp](http://www.health.qld.gov.au/healthieryou/default.asp)>.

## **Queensland Health Survey**

### **Description of data source**

Indicators of nutritional status of Queensland adults.

### **Purpose(s)**

Data collected as part of a national study of diabetes prevalence and cardiovascular risk factors (the Australian Diabetes, Obesity and Lifestyle Study – AusDiab).

### **Collection method**

Sampling was planned at a national level, and was based on a stratified cluster method with 7 layers (6 states and the Northern Territory) and clusters formed through census collection districts. There were 6 districts in urban areas across Queensland. About 1,600 adults aged 25 years and over participated, with complete data were obtained for 1,583 persons.

Demographic data and blood samples were taken from participants. Data on dietary intake, food habits and supplement use were collected.

### **Data content – general**

Age, gender, fasting blood glucose and 2-hour glucose load tests, educational level, smoking, cholesterol range, physical activity, body mass index, alcohol consumption, red blood cell folate, plasma homocysteine, serum carotenoids and serum ferritin, food intake and habits, and vitamin and mineral supplement intake.

### **Data content – monitoring folic acid and iodine fortification**

Red blood cell folate was measured using an automated immunoassay system. Values were reported as mean and standard error. Reported means were weighted to the Queensland population distribution by age and sex. Means were unadjusted for potentially confounding factors.

### **Indigenous identification**

Yes. Collection districts were excluded from the sampling frame if there was less than 10% Aboriginal or Torres Strait Islander.

### **Socioeconomic identification**

No.

### **Scope/target population**

Adults aged 25 years and over.

### **Geographical coverage**

Six urban areas in Queensland: Cairns, Brisbane (Chapel and Kedron), Nambour, Toowoomba and Currumbin.

### **Period covered**

October to December 2000.

### **Publications and other outputs**

Queensland Health 2002. An overview of indicators of nutritional status of Queensland adults: collected as part of the AusDiab study. Brisbane: Queensland Health.

### **Access**

Hard copy or electronically.

**Data management agency and contact details**

Catherine Harper  
Coordinating Epidemiologist  
Planning and Development Unit  
Queensland Health  
GPO Box 48  
Brisbane Qld 4001  
Phone: (07) 3234 1454  
Email: [Catherine\\_Harper@health.qld.gov.au](mailto:Catherine_Harper@health.qld.gov.au)

# **Australian Longitudinal Study of Ageing**

## **Description of data source**

The Australian Longitudinal Study of Ageing is a population-based bio-psychosocial and behavioural study of older adults. The longitudinal data collected in the course of the study comprise the most comprehensive longitudinal database yet assembled on ageing Australians.

## **Purpose(s)**

The study aims to:

- determine levels of health and functional status of an older population, and track the changes in these characteristics over time
- establish the factors that promote and maintain health and wellbeing in an ageing population
- establish the risk factors for major morbid conditions, and social, behavioural and other problems among an ageing population
- assess the effects of disease processes on functional status and the demand for health-care services, and both informal and formal long-term care.

## **Collection method**

Data from older people residing in South Australia, both in the community and residential care, are collected using a mixture of personal and telephone interviews. Waves 1 and 3 used comprehensive home interviews, functional assessments and optional mail-back questionnaires. Waves 2, 4 and 5 used telephone interviews of about 20 minutes discussing major life events, accommodation changes, health and daily living activities. Data were also gathered during Wave 1 from medical practitioners and service providers (for example, domiciliary care, Meals on Wheels).

## **Data content – general**

Demographic characteristics, health, formal and informal support systems, chronic conditions, mental health, housing, living arrangements, social activities, lifestyles, labour force participation and economic circumstances, nutrition and psychological wellbeing.

Physical tests measured included anthropometric parameters, blood pressure, visual and auditory acuity, tremor sway, grip strength, respiratory function and dental health.

Neuropsychological tests assessed memory, language and speed of information processing.

Laboratory investigations covered basic haematology, 20 channel biochemical analysis, lipid profiles and hormone analysis. Urine samples were tested for calcium, phosphate, sodium and creatine.

## **Data content – monitoring folic acid and iodine fortification**

This long-term study collected blood and urine samples. There may be scope for inclusion of folate and iodine status measures. Dietary intake data over time may also be useful to estimate folic acid and iodine intake. General health information over time may be useful if linked to increasing folic acid/folate or iodine intake and/or status.

## **Indigenous identification**

No.

**Socioeconomic identification**

Information is collected on housing, labour force participation, highest level of education achieved and economic circumstances.

**Scope/target population**

South Australian residents aged 70 years and over at Wave 1 of the study.

**Geographical coverage**

South Australia.

**Period covered**

1992 (Wave 1) to 2009 (Wave 10); further waves are dependent on future funding.

**Publications and other outputs**

A full list of publications can be found at: <[www.cas.flinders.edu.au/alsapub.html](http://www.cas.flinders.edu.au/alsapub.html)>.

**Access**

Access to the Australian Longitudinal Study of Ageing can be obtained through the Centre for Ageing Studies.

**Data management agency and contact details**

Centre for Ageing Studies  
Flinders University Campus, Mark Oliphant Building  
Laffer Drive  
Bedford Park SA 5042  
Phone: (08) 8201 7552  
Email: [cas@flinders.edu.au](mailto:cas@flinders.edu.au)  
Website: <[www.cas.flinders.edu.au](http://www.cas.flinders.edu.au)>

## **Florey Adelaide Male Ageing Study**

### **Description of data source**

The Florey Adelaide Male Ageing Study is a major study into the health and ageing of Australian men. It is believed to be the first of its kind in Australia to try to establish the wide range of factors that contribute to Australian men's health (reproductive, physical and emotional), and their relationship with the ageing process. It is a longitudinal study involving biomedical assessments, self-reported measures and data linkage with established national databases.

### **Purpose(s)**

The study aims to establish the causes of men's poorer physical and mental health, in an effort to develop and implement measures to promote a healthy and active lifestyle, prevent diseases and guide the development of appropriate health services and policy collaborators.

### **Collection method**

Random sampling using the electronic White Pages (telephone directory) was used to recruit 1,200 men aged 35–80 years from Adelaide's north-west suburbs.

Biomedical clinic investigations occur every 5 years, beginning in 2002. Follow-up questionnaires are completed annually. Participants are invited on occasion to participate in substudies.

### **Data content – general**

Data collected include: use of health services, including preventive and early intervention services; endocrinology of ageing, especially male sex hormones and the insulin growth factor axis; and prostate health and function in relation to the hormonal changes of ageing.

Chronic medical and psychological conditions such as obesity, cancer, diabetes, cardiovascular disease and mental health are also investigated.

### **Data content – monitoring folic acid and iodine fortification**

Biomedical analysis is done. A request could be made if considered necessary in the future to analyse folate status.

### **Indigenous identification**

As per ABS Census 2001.

### **Socioeconomic identification**

As per ABS Census 2001 and other statutory sources.

### **Scope/target population**

Males aged 35–80 years, residing in the northern and western regions of Adelaide. Participants' data were compared with the 2001 Australian Census to assess, where possible, the representativeness of the cohort with the local and national populations.

Overall, participants were comparable with men in the same age group from the north-west Adelaide and Australian regions. Participants were found to be under-represented in the younger age group and over-represented in the older bracket, a common finding in studies of this type. In addition, there was an under-representation of men who had never married, reflecting previous findings that men without live-in support systems tend not to participate in health studies.

The cohort displayed both a higher proportion of men with some form of post-school qualification (specifically, trade and tertiary qualifications) as well as men from the lowest income bracket, both previously demonstrated as predictors of study involvement.

**Geographical coverage**

The ABS Northern and Western Statistical Divisions of Adelaide.

**Period covered**

Initial investigations began in 2002. Funding dependent, the study will continue for 15–20 years.

**Publications and other outputs**

Data analysis for the initial cross-sectional data is continuing. A baseline/methodological paper and a cohort description paper have been submitted for the broader Florey Adelaide Male Ageing Study.

**Access**

Submissions for collaboration are reviewed at Florey Adelaide Male Ageing Study investigator meetings as appropriate. A final decision on collaboration is made by the study's executive committee.

**Data management agency and contact details**

Data Management and Analysis Centre

A joint data management centre of The University of Adelaide's departments of Public Health and General Practice

Phone: (08) 8303 3465

Website: <[www.dmac.adelaide.edu.au](http://www.dmac.adelaide.edu.au)>

# South Australian Monitoring and Surveillance System

## Description of data source

The South Australian Monitoring and Surveillance System was established in 2002 by the Population Research and Outcome Studies Unit of the South Australian Department of Health. The system monitors population trends in state and national risk factors and chronic diseases so that the Department of Health has appropriate, timely and valid population health information to monitor health status, respond to population changes, and support planning, implementation, and evaluation of health services and programs.

## Purpose(s)

The system's objectives are to:

- provide representative data
- characterise the problem or topic by time
- detect epidemics or changes in the topic occurrence
- find high-risk groups or risk factors associated with the problem or topic, and suggest hypotheses for further investigation
- estimate the burden of the problem or topic
- highlight gaps in information and services that affect South Australians' general health and wellbeing
- disseminate findings to professionals and administrators within the South Australian Department of Health, and other human services professionals or organisations in South Australia and Australia
- project future health-care needs
- set priorities for allocation of resources
- strengthen the network for surveillance and monitoring of issues relevant to the South Australian Department of Health to improve information gathering and exchange.

## Collection method

The South Australian Monitoring and Surveillance System is relatively simple, efficient and timely. That is, data collection is quick without compromising the quality of the information collection. The system is flexible to accommodate the changing characteristics of the population and needs of health professionals, administrators and policy makers.

The survey is done by telephone using the computer-assisted telephone interview system. The advantages of such surveys are that they are flexible, quick, efficient, relatively cost-effective and timely. About 600 interviews are done each month with people of all ages.

## Data content – general

Data collected include demographics, health conditions, physiological risk factors, behaviours, health service use, medication use, social capital, quality of life, economic indicators and sociodemographics.

## Data content – monitoring folic acid and iodine fortification

General health status over time and any dietary intake information may be useful.

**Indigenous identification**

Yes.

**Socioeconomic identification**

Economic indicators and sociodemographics are collected.

**Scope/target population**

South Australian residents of all ages.

**Geographical coverage**

South Australia.

**Period covered**

Data collection started in June 2002 and as at May 2006, more 26,000 interviews had been done in South Australia for all ages.

**Publications and other outputs**

Avery J, Dal Grande E, Taylor A & Gill T 2004. Which South Australians experience psychological distress? Kessler distress 10-item scale. July 2002–June 2004. Adelaide: Department of Health.

Dal Grande E, Taylor A, Hurst B, Kenny B & Catcheside B 2004. The health status of people living in the South Australian divisions of general practice. July 2002– December 2003. Adelaide: Department of Health.

Dal Grande E, Taylor A, Hurst B, Kenny B & Catcheside B 2004. The health status of people living in the South Australian health regions. July 2002–December 2003. Adelaide: Department of Health.

Dal Grande E, Taylor A, Hurst B, Kenny B & Catcheside B 2004. The health of status of South Australian by socio-economic status (SEIFA). Adelaide: Department of Health.

Population Research and Outcome Studies Unit 2006. The health status of people living in South Australian health regions: overweight and obese, physical activity and nutrition. July 2004–June 2005. Adelaide: Department of Health.

**Access**

Access to South Australian Monitoring and Surveillance System can be obtained through the Population Research and Outcome Studies Unit.

**Data management agency and contact details**

Population Research and Outcome Studies Unit  
Department of Health, Government of South Australia  
PO Box 287  
11 Hindmarsh Square  
Adelaide SA 5000  
Phone: (08) 8226 7042  
Email: pros@health.sa.gov.au  
Website: <www.health.sa.gov.au/pros>

# **South Australian Births Defects Register**

## **Description of data source**

The South Australian Birth Defects Register receives data under legislation on births and terminations of pregnancy with birth defects, and children with birth defects diagnosed before their 5th birthday.

## **Purpose(s)**

The register aims to ascertain prevalence and epidemiological characteristics of children with birth defects in South Australia for monitoring, provision of information, health planning and research into birth defects.

## **Collection method**

Data are collected from SA Health, South Australian hospitals, paediatric rehabilitation centres, paediatricians and other health professionals.

## **Data content – general**

Name, sex, race, residence, plurality, date of birth or termination, hospital/place of birth, family history of birth defects, types of defects (and syndrome if available).

## **Data content – monitoring folic acid and iodine fortification**

Information for calculating the prevalence of neural tube defects from births and terminations of pregnancy, to monitor impact of periconceptional folate promotion programs and mandatory fortification of staple foods with folic acid.

## **Indigenous identification**

Available in births but not in terminations of pregnancy.

## **Socioeconomic identification**

Postcode of residence for births and terminations, and occupation of mother and father for births.

## **Scope/target population**

South Australian women.

## **Geographical coverage**

South Australia. A very small proportion of births and terminations of pregnancy are those of women from interstate – for example, New South Wales and Victoria near the South Australian border, and Alice Springs in the Northern Territory.

## **Period covered**

1986 onwards.

## **Publications and other outputs**

The annual report of the South Australian Birth Defects Register is at:

<[www.wch.sa.gov.au/services/az/divisions/labs/geneticmed](http://www.wch.sa.gov.au/services/az/divisions/labs/geneticmed)>

These data are also presented in the congenital abnormality reports of the National Perinatal Statistics Unit at: <[www.npsu.unsw.edu.au](http://www.npsu.unsw.edu.au)>

Neural tube defect prevalence papers published:

Chan A, Robertson EF, Haan EA, Keane RJ, Ranieri E & Carney A 1993. Prevalence of neural tube defects in South Australia, 1966–1991: effectiveness and impact of prenatal diagnosis. *British Medical Journal* 307:703–6.

Chan A, Pickering J, Haan EA, Netting M, Burford A, Johnson A & Keane RJ 2001. Folate before pregnancy: the impact on women and health professionals of a population-based health promotion campaign in South Australia. *Medical Journal of Australia* 174:631–6.

#### **Access**

Prevalence statistics available. More detailed data on request, but may require ethics committee approval.

#### **Data management agency and contact details**

The Manager  
SA Birth Defects Register  
Public Health Research Unit  
Women's and Children's Hospital Campus  
Children, Youth and Women's Health Service  
8th Floor Clarence Rieger Building  
72 King William Road,  
North Adelaide SA 5006  
Phone: (08) 81617368  
Fax: (08) 81616088  
Email: [cywhs.sabdr@cywhs.sa.gov.au](mailto:cywhs.sabdr@cywhs.sa.gov.au)

## **South Australian Health Monitor**

### **Description of data source**

Health Monitor is a telephone survey system that does large representative surveys of 2,000 South Australian households, and will be done three times a year.

The Health Monitor supplements the Health Omnibus Survey, which is done annually. Epidemiological techniques are applied in the process, including sample selection, interview method and data analysis. Health Monitor can be used by health professionals and policy makers for planning, and to develop strategies.

### **Purpose(s)**

The goal of the Health Monitor survey is to collect, analyse and interpret data, which can be used to plan, implement and monitor health programs and other initiatives.

Health Monitor is a user-pays service. Each organisation pays only for survey questions that have direct relevance to their information requirements. Alternatively, surveys that focus on a specific topic may be commissioned by a sole organisation.

### **Collection method**

Health Monitor uses a computer-aided telephone interviewing system.

Households to be included in the survey are randomly selected from the electronic White Pages (telephone directory). Within households, the person who was last to have a birthday (aged 18 years or over) is usually selected to participate in the survey.

Selected persons are non-replaceable; so if the selected person is not available, interviews are not done with alternative household members. At least six calls are made to each household before the selected individual is classified as a non-contact.

### **Data content – general**

The Population Research and Outcome Studies Unit of the Department of Health helps clients formulate questions, and coordinates the preparation of the survey questionnaire. Each questionnaire includes about 60 questions, with 10 background demographic questions included free of charge to users.

### **Data content – monitoring folic acid and iodine fortification**

Health Monitor could be used to ask questions about folic acid and iodine intake and supplement use.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Employment status, pension received, education, household income.

### **Scope/target population**

South Australian residents aged 18 years and over living in a household listed in the electronic White Pages.

The survey represents the population of South Australia aged 18 years and over.

### **Geographical coverage**

South Australia.

**Period covered**

Since 1999 to present (ongoing collection).

**Publications and other outputs**

Go to the Population Research and Outcome Studies Unit website (see below) for full details of publications and reports at: <[www.health.sa.gov.au/pros](http://www.health.sa.gov.au/pros)>.

**Access**

Access to the Health Monitor survey can be obtained through the Population Research and Outcome Studies Unit.

**Data management agency and contact details**

Population Research and Outcome Studies Unit  
Department of Health, Government of South Australia  
PO Box 287  
11 Hindmarsh Square  
Adelaide SA 5000  
Phone: (08) 8226 7042  
Email: [pros@health.sa.gov.au](mailto:pros@health.sa.gov.au)  
Website: <[www.health.sa.gov.au/pros](http://www.health.sa.gov.au/pros)>

## **Victorian Food Labelling Monitoring**

### **Description of data source**

Food product label information.

### **Purpose(s)**

To monitor trends in folate and folic acid composition, and use of folic acid/NTD health claim on food products.

### **Collection method**

Food product label information (about 800 per year) available in metropolitan Melbourne supermarkets is collected using FSANZ food category framework. The 1998–2001 analysis is complete, the 2005 data are still to be analysed.

### **Data content – general**

Use of folic acid and NTD health claims in food labels compared with folic acid composition.

### **Data content – monitoring folic acid and iodine fortification**

Folate and folic acid composition, and use of folic acid NTD health claims.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

Not applicable.

### **Geographical coverage**

Victoria.

### **Period covered**

1998–2001, 2005–ongoing.

### **Publications and other outputs**

Food label information, one paper published and ongoing publications are planned as analysis proceeds.

### **Access**

Data can be made available via contacting Mark Lawrence.

### **Data management agency and contact details**

Mark Lawrence

Public Health Research, Policy and Evaluation cluster

Faculty of Health, Medicine, Nursing and Behavioural Sciences

Deakin University

Phone: (03) 9244 3789

Email: mark.lawrence@deakin.edu.au

# **Victorian Population Health Survey**

## **Description of data source**

This annual computer-assisted telephone interview survey is based on a core set of question modules that are critical to informing decisions about public health priorities.

## **Purpose(s)**

The survey findings fill a significant void in the accessible data required to ensure public health programs are relevant and responsive to current and emerging health issues.

## **Collection method**

A representative state-wide sample of 7,500 adults aged 18 years and over is randomly selected from households in each of the Victorian Department of Human Services' eight health regions.

## **Data content – general**

The main variables collected are demographic and health and lifestyle including the SNAP indicators (Smoking, nutrition, alcohol, physical activity).

## **Data content – monitoring folic acid and iodine fortification**

Self-reported information is collected from women aged 18–50 years about their current consumption of folic acid supplements or multivitamins containing folic acid, the main reasons why women in their age group may be advised to take folic acid, the main reason for consuming or not consuming folic acid and the main source of information about folic acid.

## **Indigenous identification**

Indigenous status is collected.

## **Socioeconomic identification**

Socioeconomic indicators are collected.

## **Scope/target population**

A representative sample of adults living in Victoria.

## **Geographical coverage**

Victoria.

## **Period covered**

Ongoing annual collection since 2004.

## **Publications and other outputs**

An annual survey report is published.

## **Access**

Access to the data files will be available under a Department of Human Services licence deed arrangement.

## **Data management agency and contact details**

Loretta Vaughan  
Victorian Department of Human Services  
Phone: (03) 9096 5286  
Email: [Loretta.vaughan@dhs.vic.gov.au](mailto:Loretta.vaughan@dhs.vic.gov.au)

## **The Victorian Health Monitor**

### **Description of data source**

The Victorian Health Monitor done in 2009–2010, collected physical, biomedical and self-reported nutrition and risk factor information from 4,000 adults living in Victoria aged 18–75 years.

### **Purpose(s)**

The project aims to collect comprehensive physical and biomedical measurement data on the prevalence for risk factors for cardiovascular disease and diabetes in the adult population, to inform policy development and contribute to overall planning for chronic disease prevention activities in Victoria.

### **Collection method**

Measurement of height, weight, hip/waist circumference, blood pressure, and collection of blood and urine to measure biomedical measures.

### **Data content – general**

Demographic data, dietary information and physical and biomedical data including measurement of folate and iodine.

### **Data content – monitoring folate and iodine fortification**

Direct measurement of red cell folate and urinary iodine.

### **Indigenous identification**

Indigenous status is collected.

### **Socioeconomic identification**

Socioeconomic indicators is collected.

### **Scope/target population**

All residents living in Victoria aged 18–75 years.

### **Geographical coverage**

Victoria.

### **Period covered**

2009-10.

### **Publications and other outputs**

*Cardiovascular disease and diabetes risk factor report* and *Food and Nutrition Survey report*.

### **Access**

Access to the data files will be available under a Department of Human Services licence deed arrangement.

### **Data management agency and contact details**

Loretta Vaughan  
Victorian Department of Human Services  
Phone: (03) 9096 5286  
Email: [Loretta.vaughan@dhs.vic.gov.au](mailto:Loretta.vaughan@dhs.vic.gov.au)

# **Western Australian Folate Intake and Primary Prevention of Non-neural Birth Defects Study**

## **Description of data source**

Folate intake data related to non-neural birth defects. This study provides no evidence of folate being an important factor in the prevention of birth defects other than neural tube defects.

## **Purpose(s)**

To investigate whether maternal periconceptional folic acid or folate intake is associated with a reduction in selected non-neural birth defects in Western Australia

## **Collection method**

Case-control study of folate intake in women whose infants had orofacial clefts (62), congenital heart defects (151), urinary tract defects (117), limb reduction defects (26), or other major birth defects (119), and 578 control women.

## **Data content – general**

Data of relevance are folic acid supplement intake and folate dietary intake.

## **Data content – monitoring folic acid and iodine fortification**

As above.

## **Indigenous identification**

No.

## **Socioeconomic identification**

Yes.

## **Scope/target population**

Women in Western Australia who have infants with non-neural birth defects.

## **Geographical coverage**

Western Australia.

## **Period covered**

2005–2006.

## **Publications and other outputs**

Not applicable.

## **Access**

Via published reports and by request to the Telethon Institute for Child Health Research.

## **Data management agency and contact details**

Telethon Institute for Child Health Research  
Centre for Child Health Research  
University of Western Australia  
West Perth WA 6005  
Email: carolb@ichr.uwa.edu.au

## **Food Frequency Western Australia 2006**

### **Description of data source**

Food frequency and daily equivalent frequency. The survey gives an indication of the frequency at which respondents eat specific foods.

### **Purpose(s)**

The survey is part of the Western Australian Health and Wellbeing Surveillance System.

### **Collection method**

A computer-assisted telephone interview survey, with households selected by random process. Respondents who participated in the Health and Wellbeing Surveillance System were asked whether they would be willing to participate in the Food Frequency survey.

### **Data content – general**

Mean daily equivalent frequencies of intake for each item of food. Proportion of respondents usually consuming specific food items.

### **Data content – monitoring folic acid and iodine fortification**

Potential consumption data of foods that contain folic acid or folate and iodine.

### **Indigenous identification**

No.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

Adults in Western Australia.

### **Geographical coverage**

Western Australia.

### **Period covered**

2006.

### **Publications and other outputs**

Published as part of the Western Australia Health and Wellbeing Surveillance System documents.

### **Access**

Data available on request to the Health Outcomes Assessment Unit, Department of Health Western Australia.

### **Data management agency and contact details**

Health Outcomes Assessment Unit, Epidemiology Branch, Information Management and Reporting Directorate Health Information Division, Department of Health Western Australia  
PO Box 8172  
Perth Business Centre  
Perth WA 6849  
Phone: (08) 9222 4222  
Website: <[www.health.wa.gov.au](http://www.health.wa.gov.au)>

## **Health Measures Western Australia**

### **Description of data source**

Data on health and wellbeing risk factors for the Western Australian population.

### **Purpose(s)**

To provide information about disease risk factors, and monitor changes in health and wellbeing of the Western Australian population. Updates health status indicators and extends trend data for the Western Australian population from the earlier edition in 2000.

### **Collection method**

A routine data collection on demographics, births, deaths, hospitalisation and specific disease registers.

### **Data content – general**

Perinatal and infant health, child health, asthma, dental health, hospital use, diabetes, injury, poisoning, stroke, arthritis and musculoskeletal conditions, mental health, communicable disease, cancer, coronary heart disease, mortality, older persons, disadvantaged groups, Indigenous health, burden of disease, and health status.

### **Data content – monitoring folic acid and iodine fortification**

Nutrition and food intake data may be useful. Cancer, child health and perinatal statistics may be relevant.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

Western Australian population.

### **Geographical coverage**

Western Australia.

### **Period covered**

2005.

### **Publications and other outputs**

Not applicable.

### **Access**

Available on request from the Department of Health Western Australia.

### **Data management agency and contact details**

Department of Health Western Australia

PO Box 8172

Perth Business Centre

Perth WA 6849

Phone: (08) 9222 4222

Website: <[www.health.wa.gov.au](http://www.health.wa.gov.au)>

## **Remote Indigenous Stores and Takeaways Project**

### **Description of data source**

The Remote Indigenous Stores and Takeaways Project was implemented in 2005 by the health departments from New South Wales, Queensland, South Australia, Western Australia, and the Northern Territory, and the Australian Government to improve access to a healthy food supply for Aboriginal and Torres Strait Islander people in remote communities. The project aims to establish and improve standards for healthy remote stores. Guidelines and resources were developed and implemented to help store and takeaway managers, as well as health and nutrition stakeholders, improve the freight, stocking, promotion, policy development and monitoring of the sale of healthy foods.

### **Purpose(s)**

This 3-year project (2005–2008) aimed to improve access to good quality, affordable, and healthy foods, particularly fresh fruit and vegetables in remote communities.

### **Collection method**

A monitoring tool was developed that uses scanned sales data to assess a community's consumption of healthy foods and nutrients. This information is indicative of a remote community's food purchasing habits and nutritional issues.

### **Data content – general**

Local community food purchasing data.

### **Data content – monitoring folic acid and iodine fortification**

Potential use as baseline data for apparent consumption for remote communities.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

No.

### **Scope/target population**

Remote Aboriginal and Torres Strait Islander populations.

### **Geographical coverage**

This project was supported by the National Public Health Partnership as a part of the National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000–2010, and several jurisdictions (Queensland, New South Wales, South Australia, Northern Territory, Western Australia, as well as the Australian Government) jointly funded and contributed to the project.

### **Period covered**

2005–2008.

## **Publications and other outputs**

As part of the project, a collection of guidelines and resources were developed to promote access to healthy foods. These resources are intended for use by store managers, store staff, and nutrition and health professionals working in remote communities across Australia. The resources were piloted in seven trial sites over a period of 6–8 months during 2007.

Piloting of these resources demonstrated improvements in the sale of healthy foods when local nutritionists worked in partnership with the stores and communities to support their implementation.

The project is now complete, and each state and territory jurisdiction involved has developed an individual plan to integrate and disseminate the resources within existing networks. The resources have also been used by the Department of Families, Housing, Community Services and Indigenous Affairs to determine criteria for licensing of remote stores in the Northern Territory, and by Outback Stores to develop stores policies.

## **Access**

Via formal request to the Australian Indigenous Health*Info*Net.

## **Data management agency and contact details**

Australian Indigenous Health*Info*Net  
Kurongkurl Katitjin, School of Indigenous Australian Studies  
Edith Cowan University  
2 Bradford Street  
Mt Lawley WA 6050  
Phone: (08) 9370 6336  
Fax: (08) 9370 6022  
Email: [healthinfont@ecu.edu.au](mailto:healthinfont@ecu.edu.au)

## **Trends in Neural Tube Defects in Western Australia**

### **Description of data source**

This study has highlighted that health promotion was successful in reducing the risk of NTDs overall, but failed to be effective for Aboriginal and Torres Strait Islander children.

### **Purpose(s)**

The study aims to determine whether the fall in NTDs in Western Australia since the promotion of folate and the voluntary fortification of food occurred in Indigenous and non-Indigenous infants.

### **Collection method**

Data on NTDs (births and terminations) were obtained from the Western Australian Birth Defects Registry, and on all births from the Maternal and Child Health Research Database.

### **Data content – general**

Data on NTDs from the Western Australian Birth Defects Registry and births from the Maternal and Child Health Research Database, as well as survey results on knowledge of folate.

### **Data content – monitoring folic acid and iodine fortification**

Prevalence of NTDs.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Yes.

### **Scope/target population**

Indigenous and non-Indigenous infants in Western Australia.

### **Period covered**

2004.

### **Publications and other outputs**

Bower, C., Eades, S., Payne, J., D'Antoine, H. and Stanley, F. (2004), Trends in neural tube defects in Western Australia in Indigenous and non-Indigenous populations. *Paediatric and Perinatal Epidemiology*, 18: 277-280.

### **Access**

Via published data and via formal request to researcher.

### **Data management agency and contact details**

Professor Carol Bower, Telethon Institute for Child Health Research  
PO Box 855  
West Perth WA 6872  
Email: carolb@ichr.uwa.edu.au

# **WA Health and Wellbeing Surveillance System**

## **Description of data source**

The data source is a health and wellbeing surveillance system based on collecting data by self-report.

## **Purpose(s)**

The system aims to:

- monitor the health and wellbeing of Western Australians, using validated reliable indicators
- determine health status and lifestyle trends over time
- establish emerging and salient issues in a timely manner
- recognise and report on health-improving behaviours, as well as risk factor behaviours
- ensure that the data collected reflect the need for information within a particular age group

## **Collection method**

Computer-assisted telephone interviews.

## **Data content – general**

A set of core questions that are essential health status indicators. These include:

- illness patterns including the National Health Priority Areas – cancer, cardiovascular disease, asthma, diabetes, injury and mental health
- protective factors such as sun protection, vaccination and social support
- risk factors such as smoking, physical activity, nutrition and alcohol consumption
- health service use patterns
- sociodemographic information such as age, sex and geographic location.

Plus the addition of special modules looking at specific health issues that will be included in the survey for specific durations. Modules may cover:

- extended information on risk factor behaviour
- extended information on health conditions
- emerging issues
- environmental health concerns.

The concept of the surveillance system and support for content areas was approved by the Department of Health's Health Survey Advisory Group in 2000. The content and quality of surveys will be regularly monitored by a steering committee comprising key stakeholders and experts in survey methods and analysis.

## **Data content – monitoring folic acid and iodine fortification**

Health and wellbeing trends, baseline data before fortification, food intake data.

## **Indigenous identification**

Yes.

**Socioeconomic identification**

Yes.

**Scope/target population**

Adults in Western Australia.

**Geographical coverage**

Western Australia.

**Period covered**

Annually, since 2002.

**Publications and other outputs**

Not applicable.

**Access**

Via formal request to the Department of Health Western Australia.

**Data management agency**

Further information about the survey can be found at:  
<[www.health.wa.gov.au/Publications/cwhs](http://www.health.wa.gov.au/Publications/cwhs)>

## **Western Australian Birth Defects Registry**

### **Description of data source**

Contains data on malformations occurring in live births and stillbirths in Western Australia and in pregnancies terminated because of fetal abnormalities. Birth defects diagnosed prenatally and in children aged up to 6 years are included.

### **Purpose(s)**

The Western Australian Birth Defects Registry has a commitment to obtain high quality, complete, and population-based information on birth defects for Western Australia, and to use this information to:

- establish how often birth defects occur in Western Australia
- carry out research into the causes and prevention of birth defects
- investigate changes in the frequency of birth defects, which may point to a possible cause or provide reassurance that an increase has not occurred
- give doctors and other health professionals information about birth defects in Western Australia
- provide local statistics to help health workers who counsel families about their chance of having a child with a birth defect
- evaluate screening for, and treatment and prevention of, birth defects
- help with planning health care facilities
- increase knowledge generally about birth defects.

### **Collection method**

The major sources of notification to the registry were hospitals and private practitioners, Department of Health databases (midwives', mortality and hospital morbidity systems), and investigative and treatment centres.

### **Data content – general**

The main variables include: date of birth, race, sex, weight, date of death, diagnosis, time to diagnosis, birth outcome, plurality, and postcode.

### **Data content – monitoring folic acid and iodine fortification**

Neural tube defects occurring in live births, stillbirths and terminated pregnancies.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Currently on postcode basis, geocoding at census district level will be available shortly.

### **Scope/target population**

All birth defects in Western Australia.

### **Geographical coverage**

Western Australia.

### **Period covered**

1980 onwards.

**Publications and other outputs**

Annual reports and various publications identified in the annual report.

**Access**

Data from the Western Australian Birth Defects Registry can be made available to researchers after a strict scientific and ethical review process.

**Data management agency and contact details**

Professor Carol Bower

King Edward Memorial Hospital.

Email: [caroline.bower@health.wa.gov.au](mailto:caroline.bower@health.wa.gov.au)

Website: [http://kemh.health.wa.gov.au/services/birth\\_defects/#contact](http://kemh.health.wa.gov.au/services/birth_defects/#contact)

# Western Australian Aboriginal Child Health Survey

## Description of data source

The Western Australian Aboriginal Child Health Survey, a large-scale epidemiological survey of the health and wellbeing of 5,289 Western Australian Aboriginal and Torres Strait Islander children, was done in 2001 and 2002 by the Telethon Institute for Child Health Research, under the direction of the project's Aboriginal Steering Committee.

The survey was designed to build an epidemiological knowledge base from which preventive strategies can be developed to promote and maintain healthy development, and the social, emotional, academic and vocational wellbeing of young people.

## Purpose(s)

The specific aims of the survey were to:

- describe and define the health and wellbeing of Western Australian Aboriginal and Torres Strait Islander children and young people aged 0–17 years
- estimate the prevalence and distribution of commonly occurring chronic medical conditions and disabilities (for example, asthma, cerebral palsy, visual and hearing impairments, intellectual disability), and describe how they may affect a child's wellbeing and functioning
- estimate the prevalence, distribution and functional impact of common health and mental health problems in Aboriginal and Torres Strait Islander children and young people aged 0–17 years and their families
- estimate the prevalence and distribution of adverse health behaviours (for example, smoking, alcohol, drug and volatile substance misuse)
- estimate the prevalence and distribution of other psychosocial problems such as early school leaving, conduct problems, and juvenile offending
- describe Aboriginal and Torres Strait Islander children, adolescents and their families' access to, effective use of, and satisfaction with: health care, education, juvenile justice, housing and social services
- establish markers that result in protection from, and amelioration of, poor health and wellbeing (mental health), adverse health behaviour(s) and other psychosocial problems
- develop estimates of risk and markers finding Aboriginal and Torres Strait Islander children and young people at increased risk for various health, educational and vocational outcomes.

## Collection method

Survey method and instrumentation were developed in consultation with Aboriginal leaders, key Aboriginal bodies (the Aboriginal and Torres Strait Islander Commission regional council, the Aboriginal Council of Elders, the Aboriginal Justice Council, and the Western Australian Aboriginal Community Controlled Health Organisation), and through extensive community consultations throughout the state.

Dwellings were selected for screening using an area-based clustered multi-stage sample design. From 166,290 dwellings in 761 census collection districts, 139,000 dwellings were approached to determine whether residents were eligible to participate in the survey. Using this method, a random sample of 2,386 families with 6,209 eligible children was identified throughout metropolitan, rural and remote regions of Western Australia.

A total of 1,999 of these families (84%) with 5,513 eligible children consented to participate in the survey. Interviewers gathered useable data on 5,289 (96%) of these participating children. Data were collected from interviews with the carers in the household who were the most knowledgeable about the survey children. In addition to the information collected on children, separate interviews were done, with up to two carers per child, to gather information about the demographic and social characteristics of the household and family, and to ask questions about the dwelling, neighbourhood and community. In addition to the data gathered on children, data were also gathered on families.

### **Data content – general**

Questionnaire content covered: child and youth development; health and wellbeing; functional impairment and disability; use and access to health, education and social services; diet; demographic and social characteristics of the household and family; and information about the dwelling, neighbourhood and community.

The survey was subsequently linked to records of hospital admissions, diagnoses, procedures, and transfers through the Western Australia Record Linkage System.

### **Data content – monitoring folic acid and iodine fortification**

No direct association with folic acid or iodine intake or status, but information on general health and wellbeing and development of Indigenous children may be of use.

### **Indigenous identification**

Yes.

### **Socioeconomic identification**

Employment, education, and remoteness are identified in the scope of the survey.

### **Scope/target population**

The survey was based on area sample of dwellings. Families in selected dwellings who reported that there were Aboriginal or Torres Strait Islander children or teenagers living at their address who were aged between 0 and 18 years were eligible to be in the survey.

Children living within group homes, institutions and non-private dwellings were not in the scope of the survey. However, where a selected household had a child temporarily living away from home (for example, in a boarding school or hostel), these children were included.

### **Geographical coverage**

Western Australia.

### **Period covered**

Between May 2000 and June 2002.

### **Publications and other outputs**

Zubrick SR, Lawrence DM, Silburn SR, Blair E, Milroy H, Wilkes T et al. 2004. The Western Australian Aboriginal Child Health Survey: the health of Aboriginal children and young people. Perth: Telethon Institute for Child Health Research.

Zubrick SR, Silburn SR, Lawrence DM, Mitrou FG, Dalby RB, Blair EM et al. 2005. The Western Australian Aboriginal Child Health Survey: the social and emotional wellbeing of Aboriginal children and young people. Perth: Curtin University of Technology & Telethon Institute for Child Health Research.

Zubrick SR, Silburn SR, De Maio JA, Shepherd C, Griffin J, Dalby RB et al. 2006. The Western Australian Aboriginal Child Health Survey: improving the educational experiences of Aboriginal children and young people. Perth: Curtin University of Technology & Telethon Institute for Child Health Research.

### **Access**

General enquiries about the survey, and enquiries seeking statistical clarification of any of the topics covered should be directed to the Telethon Institute for Child Health.

### **Data management agency and contact details**

Telethon Institute for Child Health Research

PO Box 855

West Perth WA 6872

Phone: (08) 9489 7967

Email: [enquire@ichr.uwa.edu.au](mailto:enquire@ichr.uwa.edu.au)

Website: <[www.ichr.uwa.edu.au](http://www.ichr.uwa.edu.au)>

# **Western Australian Population Health Genomics Folate Study**

## **Description of data source**

A study is being done to assess the effect of mandatory fortification with folic acid by measuring blood folate and dietary folate in an Indigenous and non-Indigenous population sample before and after implementation.

## **Collection method**

A cross-section of Aboriginal and Torres Strait Islander men and women aged 16–44 years who need to have blood samples taken as part of their presentation at an Aboriginal Community Controlled Health Organisation Clinic will complete a dietary questionnaire aimed at assessing dietary folate intake, and have a blood sample taken from which serum and red cell folate and vitamin B<sub>12</sub> levels can be measured.

A non-Indigenous study will also be done on men and women who attend the Western Diagnostic Pathology Centres for blood tests in the Perth metropolitan area. Posters and information leaflets about the study will be displayed in the collection centres. On presentation at the collection centre, patients will be asked whether they would consent to having extra blood taken to be tested for folate and vitamin B<sub>12</sub>. Those consenting will also be given a food intake questionnaire to complete at the collection centre.

## **Data content – general**

Food consumption data will be collected via a specifically designed food frequency questionnaire to assess folate intake (Hickling et al. 2005). Analysis will be done in-house using food composition tables.

## **Data content – monitoring folic acid and iodine fortification**

Dietary folate intake, red blood cell folate and vitamin B<sub>12</sub>.

## **Indigenous identification**

Yes.

## **Socioeconomic identification**

No.

## **Scope/target population**

The target population will be 150 Aboriginal and Torres Strait Islander people living in the Broome and Balgo areas of the Kimberley, and from the Perth metropolitan area, and people attending the Western Diagnostic Pathology Centres for a blood test in the Perth metropolitan area. This will include about 150 males and females aged 16 and over.

## **Geographical coverage**

Western Australia.

## **Period covered**

Before and after implementation of folic acid fortification.

## **Publications and other outputs**

Not applicable.

## **Access**

Information about this study is available from the Office of Population Health Genomics in Western Australia.

**Data management agency and contact details**

Office of Population Health Genomics  
Department of Health Western Australia  
Level 8, East Point Plaza  
233 Adelaide Terrace  
Perth WA 6000  
Phone: (08) 9323 6600  
Fax: (08) 9323 6611  
Email: [genomics@health.wa.gov.au](mailto:genomics@health.wa.gov.au)  
Website: [www.genomics.health.wa.gov.au](http://www.genomics.health.wa.gov.au)

## **Tasmanian Iodine Monitoring Program**

### **Description of data source**

Urinary iodine in schoolchildren; urinary iodine in pregnant women; hospital pathology data; neonatal thyroid stimulating hormone data.

### **Purpose(s)**

The program aims to assess changes in population iodine status following introduction of voluntary iodine fortification in Tasmania.

### **Collection method**

Spot urinary iodine surveys of schoolchildren (cluster sampling using schools – government, independent, catholic – and classes with Year 4 students as the sampling frame) and pregnant women done between 2003 and 2007. It involved collating thyroid pathology data from public and private providers from 2003, and neonatal thyroid stimulation hormone data from congenital hypothyroidism monitoring from 1998.

### **Data content – general**

- Schoolchildren: urinary iodine concentration; gender; school.
- Pregnant women: urinary iodine concentration; week's gestation.
- Infants: neonatal thyroid stimulating hormone, age in hours, date of birth.
- Thyroid pathology: thyroid pathology use; thyroid stimulating hormone, thyroxine, triiodothyronine.

### **Data content – monitoring folic acid and iodine fortification**

Iodine status of the general population; iodine status of pregnant women; incidence of hyperthyroidism and hypothyroidism; rates of elevated thyroid stimulating hormone in newborns.

### **Indigenous identification**

No.

### **Socioeconomic identification**

No, except a school educational needs index variable.

### **Scope/target population**

Tasmanian general population and high-risk groups (that is, pregnant women).

### **Geographical coverage**

State-wide.

### **Period covered**

Urinary iodine concentration 2003–2007; thyroid path from 1994; neonatal thyroid stimulating hormone from 1998.

### **Publications and other outputs**

Seal JA, Doyle Z, Burgess JR, Taylor R & Cameron AR 2007. Iodine status of Tasmanians following voluntary fortification of bread with iodine. *The Medical Journal of Australia* 186:69–71.

Burgess JR, Seal JA, Stilwell GM, Reynolds J, Taylor ER & Parameswaran V 2007. A case for universal salt iodisation to correct iodine deficiency in pregnancy: another salutary lesson from Tasmania. *The Medical Journal of Australia* 186:574–6.

Robertson IK 2006. Could low population iodine intake be identified using neonatal TSH surveillance results? In: Australia and New Zealand Society of the History of Medicine. *Medicine & Society Past Present and Future*. Tasmania: Conference Design Pty Ltd, 40.

Reardon MA 2002. Iodine status of the Tasmanian Population – development of a monitoring and surveillance program: Matters in Public Health project. Perth: Curtin University.

Cameron A & Doyle Z 2007. Final report on the Tasmanian Iodine Monitoring Program. Hobart: Tasmanian Department of Health and Human Services.

McClintock C 2006. Report on the review of the Tasmanian Iodine Monitoring Program for the period 1 July 2002– 30 June 2005. Hobart: Tasmanian Department of Health and Human Services.

#### **Access**

The first two references can be accessed from the Medical Journal of Australia. The last two references can be accessed from the Tasmanian Department of Health and Human Services.

#### **Data management agency and contact details**

Judy Seal  
Department of Health and Human Services  
Email: [judy.seal@dhhs.tas.gov.au](mailto:judy.seal@dhhs.tas.gov.au)

## **New Zealand standards compliance—folic acid**

### **Description of data source**

New Zealand Mandatory fortification of bread with folic acid food standard 2007.

### **Purpose(s)**

To ensure industry compliance with mandatory fortification standard.

### **Collection method**

Audits of the food industry will be done to ensure compliance with the mandatory fortification standard. The audit procedure is not confirmed, but is likely to include paper trail to establish that folic acid is being added during bread manufacturing process, as well as some testing of final bread product to confirm folic acid is being added within the range defined in the standard. There may also be some review of food packaging to ensure appropriate label changes have been made.

### **Data content – monitoring folic acid and iodine fortification**

The audit will check that folic acid is being added in quantities appropriate to achieve the level required by standard.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

All manufacturers of bread in New Zealand.

### **Geographical coverage**

New Zealand.

### **Access**

Data would be made available for monitoring purposes, with appropriate confidentiality agreements.

### **Data management agency and contact details**

New Zealand Food Safety Authority  
PO Box 2835  
Wellington 6011, New Zealand  
Phone: +64 4894 2500  
Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **New Zealand standards compliance—iodine**

### **Description of data source**

NZFSA will put in place appropriate measures to ensure compliance with Standard 2.1.1 – *Cereal and cereal products* of the Food Standards Code.

### **Purpose(s)**

To ensure industry compliance with the Standard 2.1.1, specifically replacing non-iodised salt with iodised salt in non-organic bread.

### **Collection method**

Audits of the food industry will be done to ensure compliance with the mandatory fortification standard. The audit procedure is not confirmed, but is likely to include paper trail to establish that iodised salt is being added during bread manufacturing process, as well as some testing of final bread product. There may also be some review of food packaging to ensure appropriate label changes have been made.

### **Data content – monitoring folic acid and iodine fortification**

The audit will check that iodised salt is being added as required by the standard.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

All manufacturers of bread in New Zealand.

### **Geographical coverage**

New Zealand.

### **Access**

Data would be made available for monitoring purposes, with appropriate confidentiality agreements.

### **Data management agency and contact details**

New Zealand Food Safety Authority  
PO Box 2835  
Wellington 6011, New Zealand  
Phone: +64 4894 2500  
Website: <www.nzfsa.govt.nz>

## **New Zealand folate overages**

### **Description of data source**

This contracted service between NZFSA and Environmental Science and Research aims to measure the levels of micronutrients in various fortified food types, and to compare these levels with those claimed in the nutrition information panel on the product labels.

### **Collection method**

Overages data are collected from analysing food samples identified as containing the micronutrient being studied. Samples are tested for micronutrient content, and the results are compared with the label claim.

### **Data content – general**

Overages reports are available for vitamins A, C, D, and folate and minerals calcium, zinc, selenium (in infant formula), and iron.

### **Data content – monitoring folic acid and iodine fortification**

Overages reports provide data on measured levels of folate and/or folic acid in fortified foods.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Fortified foods available in New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

Overages reports have been published in 2005 and 2009.

### **Publications and other outputs**

Thomson B 2005. Fortification overages of the food supply: folate and iron. Christchurch: NZFSA.

Thomson B & Jones S 2008. Fortification overages of the food supply: folate (draft). Christchurch: NZFSA.

### **Access**

Final copies of the 2005 and 2009 overages reports can be requested from NZFSA or downloaded from: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>.

**Data management agency and contact details**

New Zealand Food Safety Authority

PO Box 2835

Wellington 601, New Zealand

Phone: +64 4894 2500

Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **Iodine in infant and toddler formula**

### **Description of data source**

This contracted service between NZFSA and Environmental Science and Research provided analytical information on infant formula products available for sale in New Zealand supermarkets.

### **Purpose(s)**

The service aims to investigate the iodine content of infant formula and toddler formula (made to the manufacturer's instructions), to estimate potential iodine intakes and recognise possible nutritional risks.

### **Collection method**

All infant formula products were purchased from supermarkets in Christchurch, New Zealand. Thirty-two products were analysed, including infant formula ( $n=19$ ), follow-on formula ( $n=8$ ) and toddler formula ( $n=5$ ).

### **Data content – general**

The main variables considered were: comparison with similar 1997 survey; analysed iodine content of infant formula versus label claim; comparison of iodine concentrations in infant formula with regulatory limits; comparison with other studies of iodine content of infant formula products; and comparison of iodine concentrations in infant formula products with iodine concentrations in human milk and cow milk in New Zealand.

### **Data content – monitoring folic acid and iodine fortification**

Using a stochastic model, estimates were made of dietary iodine intakes for fully formula-fed infants (1–6 months). Estimates were also made of dietary iodine intakes for infants (7–12 months), and for toddlers (1–3 years) using simulated diets from the 2003–04 New Zealand Total Diet Survey.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Infants and toddlers 0–3 years, specifically, infants 1–6 months.

### **Geographical coverage**

Nationally distributed products. Of the 32 products identified, 19 products were manufactured in New Zealand. The remaining 13 products were manufactured in Ireland ( $n=8$ ) or France ( $n=5$ ).

### **Period covered**

December 2007.

### **Publications and other outputs**

Cressey P 2008. Iodine in infant and toddler formulae. Prepared as part of a NZFSA contract for scientific services. Christchurch: NZFSA

**Access**

Copies of the final report can be requested from NZFSA.

**Data management agency and contact details**

New Zealand Food Safety Authority

PO Box 2835

Wellington 6011, New Zealand

Phone: +64 4894 2500

Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **Iodine retention in processed foods**

### **Description of data source**

Analytical information on iodine retention from iodised salt in a sample of foods.

### **Purpose(s)**

The aim is to investigate the retention of iodine from iodised salt when substituted with non-iodised salt in a selection of processed foods.

### **Collection method**

White and grain bread, a sweet oatmeal and dried fruit biscuit, Weetbix®, rice bubbles and toasted muesli were analysed. Samples for iodine analysis were digested with tetramethylammonium hydroxide, filtered and analysed by inductively coupled plasma-mass spectrometry by Hill Laboratories, Hamilton, based on the method of Fecher et al. (1998).

### **Data content – general**

The main data were iodine retention results for various possible foods considered within Proposal P230.

### **Data content – monitoring folic acid and iodine fortification**

Mean iodine content of triplicate samples of white bread, grain bread, sweet biscuits and cereals (mg/kg dry weight).

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Geographical coverage**

New Zealand.

### **Period covered**

September 2006 to May 2007.

### **Publications and other outputs**

Thomson BM 2007. Iodine retention in processed foods. Prepared as part of a NZFSA contract for scientific services. Christchurch: NZFSA.

### **Access**

Copies of the final report can be requested from NZFSA.

### **Data management agency and contact details**

New Zealand Food Safety Authority  
PO Box 2835  
Wellington 6011, New Zealand  
Phone: +64 4894 2500  
Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **Iodine content of New Zealand bread**

### **Description of data source**

This study will provide useful baseline data on the iodine content of New Zealand breads for future modelling purposes.

### **Purpose(s)**

The study aims to analyse the sodium and iodine content in a range of bread currently being sold in New Zealand.

### **Collection method**

- Buy five batches of about 100 breads across four regions, with about 125 samples purchased in each region.
- Record packaging information, and keep packaging.
- Analyse 500 samples for sodium, and 100 samples for moisture and iodine.
- Quality assurance to include within analytical repeatability (for sodium and iodine) and between batch variability (for sodium).

### **Data content – general**

The main variables being considered were analysed content of bread compared with label claim for iodine ( $\mu\text{g}/100\text{g}$ ) and sodium ( $\text{mg}/100\text{g}$ ).

### **Data content – monitoring folic acid and iodine fortification**

The report will provide data on measured levels of iodine in New Zealand breads.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Non-organic breads available in New Zealand supermarkets.

### **Geographical coverage**

New Zealand.

### **Period covered**

November 2008 to June 2009.

### **Publications and other outputs**

Environmental Science and Research will produce a final report for NZFSA.

### **Access**

Copies of the report once finalised can be requested from NZFSA.

### **Data management agency and contact details**

New Zealand Food Safety Authority  
PO Box 2835  
Wellington 6011, New Zealand  
Phone: +64 4894 2500  
Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **Levels of iodine in New Zealand retail salt**

### **Description of data source**

This contracted service between NZFSA and Environmental Science and Research will help NZFSA estimate population exposure to iodine through discretionary salt use.

### **Purpose(s)**

The aim is to determine the analytical levels of iodine in retail salt available in New Zealand.

### **Collection method**

- Purchase five batches of about 20 different products, including iodised and non-iodised salt. Sampling will be biased towards products that imply iodine content.
- If five batches cannot be bought within the timeframe of the project, multiple bags of the same product will be purchased. All sample packaging will be retained.
- Samples will be purchased from up to four different locations (coordinated with the sodium in bread project).

### **Data content – general**

The main variables being considered were the analysed content of retail salt compared with label claim for iodine (mcg/100g).

### **Data content – monitoring folic acid and iodine fortification**

The report will provide data on measured levels of iodine in New Zealand retail salt, with a sampling bias to those products making a label claim for iodine.

### **Scope/target population**

Iodised and non-iodised salt available for retail sale in New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

November 2008 to June 2009

### **Publications and other outputs**

Environmental Science and Research will produce a final report for NZFSA.

### **Access**

Copies of the report can be requested from NZFSA once finalised.

### **Data management agency and contact details**

New Zealand Food Safety Authority

PO Box 2835

Wellington 6011, New Zealand

Phone: +64 4894 2500

Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

## **Manufactured Food Database**

### **Description of data source**

This contracted service between NZFSA and Auckland District Health Board provides vitamin and mineral label information for a broad variety of fortified foods available in New Zealand.

### **Purpose(s)**

The aim is to provide up-to-date data on foods in New Zealand that fortify products with vitamins and minerals.

### **Collection method**

The Manufactured Food Database has been compiled from information supplied voluntarily by New Zealand food manufacturers at the annual request of the Auckland District Health Board.

### **Data content – general**

The database compiles the: list of ingredients; additives including chemical name and code number; and the presence/absence of clinically significant components (egg, milk, peanut, soya, wheat and gluten), including in the form of an ingredient, carryover ingredient, food additive or in a precautionary warning statement.

Nutritional data for the amount of energy, protein, fat, saturated fat, total carbohydrate, sugar and sodium expressed per 100 g or 100 ml is also requested. This information is supplied voluntarily by the manufacturer or supplier, so cannot be considered a complete list of all fortified foods available in New Zealand.

### **Data content – monitoring folic acid and iodine fortification**

The Manufactured Food Database finds and categorises those food products that have been established as being fortified with folic acid and iodine, and records the folic acid and iodine level claimed on the label (per 100 g or 100 ml) and the start date of fortification.

### **Indigenous identification**

Not applicable.

### **Socioeconomic identification**

Not applicable.

### **Scope/target population**

Fortified foods available in New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

Updated annually, with historical information on iodine and folic available from 1997.

### **Publications and other outputs**

The Auckland District Health Board produces an annual report *Fortified foods available in New Zealand*.

**Access**

The fortification information is accessed by authorised Auckland District Health Board staff for maintenance, data quality, audit and analytical purposes. Authorised members of NZFSA have access to data for anonymous analytical purposes.

**Data management agency and contact details**

Manufactured Food Database

Nutrition Services

Auckland City Hospital

Private Bag 92024

Auckland Mail Centre 1142, New Zealand

Phone: +64 09 307 4949, extension 25087

Website: <[www.mfd.co.nz](http://www.mfd.co.nz)>

New Zealand Food Safety Authority

PO Box 2835

Wellington 6011, New Zealand

Phone: +64 4 894 2500

Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

# **New Zealand Total Diet Survey**

## **Description of data source**

This is a contracted service between NZFSA and Environmental Science and Research. Iodine is a core element of past and present New Zealand Total Diet Surveys done at about 5-yearly intervals, thus enabling intake trends to be followed over time.

## **Purpose(s)**

The purpose of the survey is to obtain national estimates of the dietary exposure of agricultural compounds, contaminants and selected nutrients for selected age and sex groups. Specific goals for the 2003–04 survey were to:

- estimate dietary exposure for selected chemical residues, contaminant and nutrient elements in the New Zealand food supply, compare this with internationally recognised acceptable exposures or recommended levels, and establish trends over time
- compare dietary exposure estimates with those in other countries, where comparable data are available
- ensure that the outcomes of the survey complement data on chemical residues, contaminant and nutrient elements generated from other sources in New Zealand
- where appropriate, provide data on selected chemical residues, contaminant and nutrient elements for incorporation into other databases
- communicate findings in a timely and transparent manner.

## **Collection method**

Using food lists of commonly consumed foods and some self-selected high-risk foods, 14-day simulated diets were established for eight population groups. Foods identified in the lists were divided into national ( $n=63$ ) and regional ( $n=58$ ) foods. Samples of each food were collected on two occasions and over four sampling rounds (two for national foods and two for regional foods) during 2003–04 by Health Protection Officers, using standardised sampling instructions.

## **Data content – general**

Foods in the 2003–04 survey were analysed for up to 221 agricultural compounds and eight elements.

## **Data content – monitoring folic acid and iodine fortification**

Historical comparisons of dietary exposure to iodine for various age–sex groups, and the contribution of iodine from specific food categories.

## **Indigenous identification**

Not applicable.

## **Socioeconomic identification**

Not applicable.

## **Scope/target population**

New Zealand males and females aged 6–12 months, 1–3 years, 5–6 years, 11–14 years, and 25 years and over, and males aged 19–24 years.

**Geographical coverage**

National coverage based on sampling of national foods, plus four regional locations: Auckland, Napier, Christchurch and Dunedin.

**Period covered**

2003–04.

**Publications and other outputs**

Simulated diets and food lists for the 2003–04 survey are available at <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>. Analytical results are available on this website for each sampling quarter, and further summarised in the final report. Other relevant publications from the survey include:

Vannoort RW, Cressey P, Silvers K 2000. Total Diet Survey 1997–98 part 2: elements – elected contaminants and nutrients. Wellington: Ministry of Health. <[www.moh.govt.nz](http://www.moh.govt.nz)>.

Thomson BM, Vannoort RW, Haslemore RM 2008. Dietary exposure and trends of exposure to nutrient elements iodine, iron, selenium and sodium from the 2003–2004 New Zealand Total Diet Survey. *British Journal of Nutrition* March 99(3): 614–25.

**Access**

Analytical results for the 2003–04 New Zealand Total Diet Survey are available at: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)> for each sampling quarter, and further summarised in the final report.

**Data management agency and contact details**

New Zealand Food Safety Authority  
PO Box 2835  
Wellington 6011, New Zealand  
Phone: +64 4 894 2500  
Website: <[www.nzfsa.govt.nz](http://www.nzfsa.govt.nz)>

# 1997 National Nutrition Survey

## Description of data source

The 1997 National Nutrition Survey (NNS) is part of a series of population-based health surveys commissioned by the New Zealand Ministry of Health. The 1997 NNS provides information on food and nutrient intakes, dietary habits, body size and nutrition-related health status for adult New Zealanders.

## Purpose(s)

The objectives of the 1997 NNS were to provide reliable national estimates of food and nutrient intakes, dietary habits, body size and nutrition-related health status for adult New Zealanders.

## Collection method

The 1997 NNS was linked to the 1996–97 New Zealand Health Survey, which was a complex multi-stage area-based sample design, consisting of random selection of primary sampling units, random selection of households within a primary sampling unit, and random selection of a single adult within a household. The survey includes small booster samples for Māori and Pacific adults.

Data were primarily collected in the household via a combination of computer-assisted personal interview (24-hour dietary recall, eating patterns, dietary supplement use), physical measurements (anthropometry, blood pressure), and a non-fasting blood sample. Additional information was collected via a self-administered food frequency questionnaire.

The sample size for the 24-hour recall module was 4,636 adults aged 15 years and over. The overall response rate was 50% (74% response rate for the 1996–97 New Zealand Health Survey, with 68% of those participating in the 1997 NNS).

## Data content – general

Nutrient intake, probability of inadequate intake for selected nutrients, dietary sources of key nutrients, commonly eaten foods, eating patterns (type of diet, food preparation, dietary changes, household food security), dietary supplement use, nutritional and health status (body size, blood pressure, blood analyses), and sociodemographic variables (age, sex, ethnicity, income, education, urban/rural, neighbourhood, deprivation).

## Data content – monitoring folic acid and iodine fortification

Dietary folic acid or folate intake and probability of inadequate intake compared with the United Kingdom Dietary Reference Values (1991).

Dietary iodine intake not reported due to incomplete food composition data, but intake was estimated as part of the development of the standard for mandatory iodine fortification.

Serum B<sub>12</sub> status was measured in a subset of older adults using surplus blood samples.

## Indigenous identification

Self-identified ethnicity, including Māori.

## Socioeconomic identification

Education, income, 1996 New Zealand Deprivation Index (an area-based index of socioeconomic deprivation).

**Scope/target population**

Usually resident, non-institutionalised, civilian adult population (aged 15 years and over) living in permanent private dwellings.

**Geographical coverage**

National, excluding offshore islands.

**Period covered**

December 1996 to November 1997.

**Publications and other outputs**

Russell DG, Parnell WR, Wilson NC et al. 1999. NZ food: NZ people: key results of the 1997 National Nutrition Survey. Wellington: Ministry of Health. <[www.moh.govt.nz/moh.nsf/ea6005dc347e7bd44c2566a40079ae6f/8f1dbeb1e0e1c70c4c2567d80009b770?OpenDocument](http://www.moh.govt.nz/moh.nsf/ea6005dc347e7bd44c2566a40079ae6f/8f1dbeb1e0e1c70c4c2567d80009b770?OpenDocument)>.

Ministry of Health. 1997. Food comes first: methodologies for the National Nutrition Survey of New Zealand. <[www.moh.govt.nz/moh.nsf/ea6005dc347e7bd44c2566a40079ae6f/8bf3be812cd9ec5e4c25667000341ba2?OpenDocument](http://www.moh.govt.nz/moh.nsf/ea6005dc347e7bd44c2566a40079ae6f/8bf3be812cd9ec5e4c25667000341ba2?OpenDocument)>

Green TJ, Venn BJ, Skeaff CM & Williams SM 2005. Serum vitamin B<sub>12</sub> concentrations and atrophic gastritis in older New Zealander. *European Journal of Clinical Nutrition* 59:205–10.

**Access**

Researchers can request access to confidentialised unit record data subject to the terms and conditions of the Ministry of Health's Microdata Access Policy, at:  
<[www.moh.govt.nz/phi/dataaccess](http://www.moh.govt.nz/phi/dataaccess)>

Note that the data set held by the Ministry of Health does not include the food composition data used in the survey. The complete dataset is held by the Department of Human Nutrition, University of Otago.

**Data management agency and contact details**

Health and Disability Intelligence Unit  
Health and Disability Systems Strategy Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

## **2002 National Children's Nutrition Survey**

### **Description of data source**

The 2002 National Children's Nutrition Survey is part of a series of population-based health surveys commissioned by the New Zealand Ministry of Health. The 2002 survey provides information on food and nutrient intakes, dietary habits, physical activity, dental health, body size and nutrition-related health status for children aged 5–14 years.

### **Purpose(s)**

The objectives of the 2002 Children's Nutrition Survey were to provide reliable estimates of food and nutrient intakes, dietary habits, physical activity, dental health, body size and nutrition-related health status for school aged children.

### **Collection method**

The 2002 survey was a two-stage sample design, consisting of random selection of schools, and random selection of children within schools. The survey included booster samples for Māori and Pacific children.

Most data were collected in the household via a combination of computer-assisted personal interview (24-hour dietary recall, eating patterns, physical activity and dental health), although some data were collected in schools. Parents/caregivers were required to be present for interviews with children aged 5–9 years, and encouraged to be present for older children. A self-complete food frequency questionnaire was completed by the child and parent/caregiver at the interview, and checked by the interviewer. Physical measurements (anthropometry) and blood and urine samples were collected in schools (blood and urine samples were only collected from children in urban schools).

The sample size for the 24-hour recall module was 3,275 children aged 5–14 years. Overall 91% of schools agreed to participate, and 69% of children at participating schools completed the 24-hour recall.

### **Data content – general**

Nutrient intake, probability of inadequate intake for selected nutrients, dietary sources of key nutrients, commonly eaten foods, eating patterns (dietary choices, school food habits, dietary supplement use, salt additions, household food security), nutritional and health status (body size, blood and urine analyses), physical activity, dental health, and sociodemographic variables (age, sex, ethnicity, income, education, urban/rural, neighbourhood, deprivation).

### **Data content – monitoring folic acid and iodine fortification**

Dietary folic acid or folate intake and probability of inadequate intake compared with the United Kingdom Dietary Reference Values (1991).

Urinary iodine concentration and prevalence of low urinary iodine according to International Council for Control of Iodine Deficiency Disorders criteria.

Dietary iodine intake was not reported due to incomplete food composition data at the time of the survey, but was estimated as part of the development of the standard for mandatory iodine fortification.

Serum/plasma thyroid hormone status (thyroid stimulating hormone, thyroglobulin, tri-iodothyronine and thyroxine) were measured in subset of children using surplus blood samples.

**Indigenous identification**

Self-identified ethnicity, including Māori.

**Socioeconomic identification**

Education, income, 2001 New Zealand Deprivation Index (an area-based index of multiple socioeconomic deprivation).

**Scope/target population**

New Zealand schoolchildren aged 5–14 years.

**Geographical coverage**

National, excluding offshore islands. Blood and urine samples only collected in urban areas.

**Period covered**

February to December 2002.

**Publications and other outputs**

Ministry of Health 2003. NZ food NZ children: key results of the 2002 National Children's Nutrition Survey. Wellington: Ministry of Health.

<[www.moh.govt.nz/moh.nsf/238fd5fb4fd051844c256669006aed57/064234a7283a0478cc256dd6000ab4c?OpenDocument#NZ\\_Food\\_NZ\\_Children](http://www.moh.govt.nz/moh.nsf/238fd5fb4fd051844c256669006aed57/064234a7283a0478cc256dd6000ab4c?OpenDocument#NZ_Food_NZ_Children)>

Skeaff S, Thomson CD, McLachlan SK & Morgen A 2005. Thyroid hormone status of children from the 2002 National Children's Nutrition Survey. Report for the Ministry of Health (unpublished).

**Access**

Researchers can access confidentialised unit record data subject to the terms and conditions of the Ministry of Health's Microdata Access Policy, at:

<[www.moh.govt.nz/phi/dataaccess](http://www.moh.govt.nz/phi/dataaccess)>

Note that data set held by the Ministry of Health does not include the food composition data used in the survey. The complete dataset is held by the Department of Human Nutrition, University of Otago.

**Data management agency and contact details**

Health and Disability Intelligence Unit  
Health and Disability Systems Strategy Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

## **New Zealand National Minimum Dataset**

### **Description of data source**

The National Minimum Dataset is a national collection of public and private hospital discharge information, including clinical information, for inpatients and day patients.

### **Purpose(s)**

The National Minimum Dataset provides statistical information about hospital inpatient and day patient health services, and is used for policy formulation, performance monitoring, research and review.

### **Collection method**

Data are provided to the New Zealand Health Information Service by public and larger private hospitals in an agreed electronic file format. Paper forms and a cut-down electronic file format are forwarded by other private hospitals. Publicly funded hospital events are required to be loaded into the National Minimum Dataset within 21 days after the month of discharge.

### **Data content – general**

The main variables collected are National Health Index, sex, ethnic group, date of birth, event start date, event end date, diagnoses, procedures, Diagnostic Related Group.

### **Data content – monitoring folic acid and iodine fortification**

Hospitalisation data for conditions associated with folic acid and iodine.

### **Indigenous identification**

Ethnic group, including Māori.

### **Socioeconomic identification**

Domicile and meshblock, which can be linked to the New Zealand Deprivation Index (an area-based indicator of socioeconomic deprivation).

### **Scope/target population**

All residents of New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

Public hospital data have been collected electronically since 1993. Private hospital discharge information for publicly funded events has been collected since 1997. Public hospital data before 1993 are available electronically, but may not be complete.

### **Publications and other outputs**

The New Zealand Health Information Service publishes an annual report *Selected morbidity data for publicly funded hospitalisations*. The most recent publication is:

New Zealand Health Information Service 2007. Selected morbidity data for publicly funded hospitals 1 July 2003 to 30 June 2004: summary tables. Wellington: Ministry of Health.

<[www.nzhis.govt.nz/moh.nsf/pagesns/33/\\$File/Morbidity03\\_04+Summary+tables.doc](http://www.nzhis.govt.nz/moh.nsf/pagesns/33/$File/Morbidity03_04+Summary+tables.doc)>

**Access**

The National Minimum Dataset is accessed by authorised New Zealand Health Information Service staff for maintenance, data quality, audit and analytical purposes. Authorised members of the Ministry of Health and District Health Boards have access to a confidentialised National Minimum Dataset for analytical purposes. Researchers requiring identifiable data will usually need approval from an ethics committee. Customised data sets or summary reports are available on request.

**Data management agency and contact details**

Information Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

## **New Zealand Mortality Collection**

### **Description of data source**

The Mortality Collection is a national data collection that provides statistical information about all deaths registered in New Zealand.

### **Purpose(s)**

The Mortality Collection was established to provide data for public health research, policy formulation, monitoring, cancer survival studies, and international reporting requirements (World Health Organization).

### **Collection method**

Each month, Births, Deaths and Marriages sends the New Zealand Health Information Service electronic death registration and stillbirth information, medical certificates of causes of death, and coroner's reports. Additional information on underlying causes of death is obtained from electronic hospital discharge data from the National Minimum Dataset and private hospital returns, the New Zealand Cancer Registry, the Department of Courts, the Police, the Land Transport Safety Authority, Water Safety New Zealand, media search, and from writing letters to certifying doctors, coroners, and medical records officers in public hospitals.

### **Data content – general**

The main variables collected are National Health Index, sex, ethnic group, occupation, date of birth, date of death, and cause(s) of death.

### **Data content – monitoring folic acid and iodine fortification**

Mortality data for conditions associated with folic acid and iodine.

### **Indigenous identification**

Ethnic group, including Māori.

### **Socioeconomic identification**

Occupation, domicile and meshblock, which can be linked to the New Zealand Deprivation Index (an area-based indicator of socioeconomic deprivation).

### **Scope/target population**

All residents of New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

The Mortality Collection includes deaths registered in New Zealand from 1988 onwards. Data from 1970 to 1987 are available on request.

### **Publications and other outputs**

The New Zealand Health Information Service publishes two annual report series *Mortality and demographic data* and *Fetal and infant deaths*. The most recent publications are:

New Zealand Health Information Service 2007. *Mortality and demographic data 2004*. Wellington: Ministry of Health. <[www.nzhis.govt.nz/moh.nsf/pagesns/528](http://www.nzhis.govt.nz/moh.nsf/pagesns/528)>

New Zealand Health Information Service 2007. Fetal and infant deaths 2003 and 2004.  
Wellington: Ministry of Health. <[www.nzhis.govt.nz/moh.nsf/pagesns/72](http://www.nzhis.govt.nz/moh.nsf/pagesns/72)>

### **Access**

The Mortality Collections is accessed by authorised New Zealand Health Information Service staff for maintenance, data quality, audit and analytical purposes. Authorised members of the Ministry of Health and District Health Boards have access to anonymous data for analytical purposes. Researchers requiring identifiable data will usually need approval from an ethics committee. Customised data sets or summary reports are available on request.

### **Data management agency and contact details**

Information Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

## **New Zealand Cancer Registry**

### **Description of data source**

The New Zealand Cancer Registry is a population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous cell and basal cell skin cancers.

### **Purpose(s)**

The register is used to provide data for public health research, policy formulation, monitoring and evaluation of cancer screening programs, and for international reporting requirements.

### **Collection method**

Laboratories are required by law to report any new diagnosis of cancer in New Zealand, excluding squamous and basal cell skin cancers. Currently, laboratories send pathology reports to the New Zealand Health Information Service. Additional data sources include medical certificates of causes of death, coroner's findings, hospital discharge data on the National Minimum Dataset, and private hospital discharge returns.

### **Data content – general**

The main variables collected are National Health Index, sex, ethnic group, date of birth, date of diagnosis, and site of cancer.

### **Data content – monitoring folic acid and iodine fortification**

Cancer registrations for conditions associated with folic acid and iodine.

### **Indigenous identification**

Ethnic group, including Māori.

### **Socioeconomic identification**

Domicile and meshblock, which can be linked to the New Zealand Deprivation Index (an area-based indicator of socioeconomic deprivation).

### **Scope/target population**

All residents of New Zealand.

### **Geographical coverage**

New Zealand.

### **Period covered**

The New Zealand Cancer Registry was established in 1948 using information sent by public hospitals to the National Minimum Dataset. The *Cancer Registry Act 1993* and *Cancer Registry Regulations 1994* were introduced to increase reporting of primary cancers in New Zealand. Data quality and completeness have significantly improved since 1994.

### **Publications and other outputs**

The New Zealand Health Information Service publishes an annual report *Cancer: new registrations and deaths*. The most recent publication is:

New Zealand Health Information Service 2007. *Cancer: new registrations and deaths 2004*. Wellington: Ministry of Health. <[www.nzhis.govt.nz/moh.nsf/pagesns/500](http://www.nzhis.govt.nz/moh.nsf/pagesns/500)>

**Access**

The Mortality Collection is accessed by authorised New Zealand Health Information Service staff for maintenance, data quality, audit and analytical purposes. Authorised members of the Ministry of Health and District Health Boards have access to confidentialised data for analytical purposes. Researchers requiring identifiable data will usually need approval from an ethics committee. Customised data sets or summary reports are available on request.

**Data management agency and contact details**

Information Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

## **New Zealand Births Defects Monitoring Programme**

### **Description of data source**

The New Zealand Birth Defects Monitoring Programme collects data on all live births with a diagnosed birth defect born in, or admitted to, a public hospital. Data on stillbirths and terminations are retrospectively added.

### **Purpose(s)**

The program monitors the number and prevalence of birth defects in New Zealand. Quarterly and annual tables are submitted to the International Clearinghouse for Birth Defects Monitoring Systems in Rome.

### **Collection method**

Data collected on all live births with a diagnosed birth defect delivered or treated in a publicly funded hospital. Data on stillbirths are retrospectively added to the database, together with additional cases derived from the national perinatal and mortality databases. Data on terminations of pregnancy are being added to the database.

### **Data content – general**

Birth defect by type of defect for live births, stillbirths and terminations.

### **Data content – monitoring folic acid and iodine fortification**

Number and prevalence of NTDs, including live births, stillbirths and terminations.

### **Indigenous identification**

Ethnicity, including Māori.

### **Socioeconomic identification**

No.

### **Geographical coverage**

New Zealand.

### **Period covered**

Established in 1975 to collect data on all live births with a diagnosed birth defect born in, or admitted to, a public hospital.

### **Publications and other outputs**

International Clearinghouse for Birth Defects Monitoring Systems reports.

### **Access**

Contact the Health and Disability Intelligence Unit.

### **Data management agency and contact details**

New Zealand Ministry of Health

PO Box 5013

Wellington 6011, New Zealand

Phone: +64 4 816 2000

Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

# **New Zealand Food Composition Database**

## **Description of data source**

The New Zealand Food Composition Database is jointly owned by the Ministry of Health and the Institute for Crop and Food Research Limited. The database provides nutrient information for foods and beverages consumed in New Zealand, specifically, containing nutritional composition data for more than 2,700 foods with 50 core nutrients. Currently, about 67% of the foods sampled are from New Zealand sources, and 50% of the nutrient values are New Zealand analytical values (actual or derived).

## **Purpose(s)**

To provide high-quality and up-to-date nutrient data for foods and beverages commonly consumed in New Zealand.

Data from the database are used for:

- nutrition surveys and research studies
- food and nutrition regulations, policies and guidelines, including food standards
- food labelling – nutrition information panels and content/health claims
- nutrition and health education, including dietary counselling.

## **Collection method**

Ongoing development and maintenance of the database includes a minimum increase of 2,200 newly analysed New Zealand nutrient values per year (minimum of 50 unique foods), with a full set of core components for each unique food.

## **Data content – general**

The database includes data for more than 2,700 foods and 50 core nutrients. About two-thirds of the foods sampled are from New Zealand sources, and about half of all nutrient values are based on New Zealand analytical data (actual or derived). Core nutrients include folate, folic acid and iodine.

## **Data content – monitoring folic acid and iodine fortification**

Folate and iodine values are available for all foods. Folic acid values are available for foods known to be fortified with folic acid.

## **Indigenous identification**

Not applicable.

## **Socioeconomic identification**

Not applicable.

## **Scope/target population**

Not applicable.

## **Geographical coverage**

National and regional foods, as appropriate.

### **Period covered**

The New Zealand Food Composition Database was developed in the early 1980s. It was originally based on the United Kingdom food composition tables, but gradually United Kingdom data have been replaced with New Zealand data. Ongoing development of the database includes adding or updating nutrient data for about 50 foods annually.

### **Publications and other outputs**

Data from the database are disseminated in the several different ways.

*The concise New Zealand food composition tables* is a printed report containing a subset of data from the New Zealand Food Composition Database (900 foods and 28 nutrients). The most recent edition is:

Athar N, McLaughlin J, Taylor G & Mishra S 2006. *The concise New Zealand food composition tables*, 7th edition. Palmerston North: New Zealand Institute for Crop and Food Research.

FOOD files – an electronic subset of data from the New Zealand Food Composition Database (2,600 foods and 49 nutrients). The most recent version of FOOD files was released in December 2006. <[www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-foodfiles/index.php](http://www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-foodfiles/index.php)>

The Nutrient Information Panel database includes nutrient information for the seven panel nutrients and more than 2,500 foods and ingredients. It is freely available at:

<[www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-nutrition-database.php](http://www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-nutrition-database.php)>

### **Access**

*The concise New Zealand food composition tables* can be ordered at:

<[http://secure.crop.cri.nz/cart/catalog/product\\_info.php?products\\_id=65](http://secure.crop.cri.nz/cart/catalog/product_info.php?products_id=65)>

FOOD files can be ordered online, free to New Zealand researchers (subject to permission by Ministry of Health) at: <[www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-foodfiles/index.php](http://www.crop.cri.nz/home/products-services/nutrition/foodcompdata/fcd-products/fcd-foodfiles/index.php)>

### **Data management agency and contact details**

Institute for Crop and Food Research Ltd

Private Bag 11 600

Palmerston North 4410, New Zealand

Phone: +64 6 356 8300

Website: <[www.crop.cri.nz/home/products-services/nutrition/foodcompdata/index.php](http://www.crop.cri.nz/home/products-services/nutrition/foodcompdata/index.php)>

Health and Disability Intelligence Unit

Health and Disability Systems Strategy Directorate

New Zealand Ministry of Health

PO Box 5013

Wellington 6011, New Zealand

Phone: +64 4 816 2000

Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

# **New Zealand Adult Nutrition Survey 2008–2009**

## **Description of data source**

The 2008–2009 New Zealand Adult Nutrition Survey is part of a series of population-based health surveys commissioned by the New Zealand Ministry of Health. The 2008–09 survey will provide information on food and nutrient intakes, dietary habits and nutrition-related health status for adult New Zealanders.

## **Purpose(s)**

The objectives of the 2008–09 survey are to provide reliable national estimates of food and nutrient intakes, dietary habits and nutrition-related health status for adult New Zealanders.

## **Collection method**

The 2008–09 NZANS is a complex multi-stage area-based sample design, consisting of random selection of primary sampling units, random selection of households within a primary sampling unit, and random selection of a single adult within a household. The survey includes booster samples for Māori and Pacific adults.

Data have been collected in the household via a combination of computer-assisted personal interview (24-hour dietary recall, dietary habits, and health status), and physical measurements (anthropometry, blood pressure). A non-fasting blood sample and urine sample were collected in a clinic.

The sample size was about 5,700 adults aged 15 years and over.

## **Data content – general**

Nutrient intake, probability of inadequate intake for selected nutrients, dietary sources of key nutrients, dietary habits, food security, dietary supplement use, nutritional and health status (body size, blood pressure, blood and urine analyses), and sociodemographic variables (age, sex, ethnicity, income, education, urban/rural, neighbourhood, deprivation).

## **Data content – monitoring folic acid and iodine fortification**

- Dietary folate, folic acid and iodine intake
- Serum folate
- Urinary iodine.

## **Indigenous identification**

Self-identified ethnicity, including Māori

## **Socioeconomic identification**

Education, income, 2006 New Zealand Deprivation Index (an area-based index of socioeconomic deprivation).

## **Scope/target population**

Usually resident, non-institutionalised, civilian adult population (aged 15 years and over) living in permanent private dwellings.

## **Geographical coverage**

National, excluding offshore islands.

## **Period covered**

October 2008 to September 2009.

**Publications and other outputs**

Descriptive report will be published in 2011.

**Access**

Researchers will be able to request access to confidentialised unit record data subject to the terms and conditions of the Ministry of Health's Microdata Access Policy from mid-2011, at: <[www.moh.govt.nz/phi/dataaccess](http://www.moh.govt.nz/phi/dataaccess)>

**Data management agency and contact details**

Health and Disability Intelligence Unit  
Health and Disability Systems Strategy Directorate  
New Zealand Ministry of Health  
PO Box 5013  
Wellington 6011, New Zealand  
Phone: +64 4 816 2000  
Website: <[www.moh.govt.nz/moh.nsf](http://www.moh.govt.nz/moh.nsf)>

# **The Thyromobile and Iodine in Pregnancy Survey**

## **Description of data source**

The Thyromobile and Iodine Pregnancy Survey was assessed the iodine status and the prevalence of goitre in pregnant women in New Zealand.

## **Purpose(s)**

The aim of the survey was to assess the iodine status and the prevalence of goitre in a nationally representative sample of New Zealand pregnant women.

## **Collection method**

Cross-sectional study using a two-stage cluster sampling design to select participants via maternity clinics. The Thyromobile (a mobile health van) travelled throughout New Zealand collecting data from pregnant women on iodine status.

## **Data content – general**

Nutrient intake, iodine supplement use, food frequency questionnaire, iodine status, and prevalence of goitre.

## **Data content – monitoring folic acid and iodine fortification**

Dietary iodine intake, urinary iodine concentration, thyroid gland volume, serum thyroid stimulating hormone, and free thyroxine concentration.

## **Indigenous identification**

Self-identified ethnicity, including Māori.

## **Scope/target population**

Pregnant women attending maternity clinics throughout New Zealand.

## **Geographical coverage**

New Zealand, excluding offshore islands.

## **Period covered**

October to November 2005.

## **Publications and other outputs**

Pettigrew Porter A, Skeaff S, Thomson C, Croxson M & Gray A 2006. The Thyromobile and iodine in pregnancy survey: assessing the iodine status of New Zealand pregnant women. Wellington: New Zealand Dietetic Association Conference.

## **Access**

University of Otago.

## **Data management agency and contact details**

Dr Shelia Skeaff  
Department of Human Nutrition  
University of Otago  
PO Box 56  
Dunedin 9010, New Zealand

## **Folate status of representative populations in Dunedin**

### **Description of data source**

A one-off study aimed at providing baseline data on folate status, as well as data on behaviour, and knowledge of folate among populations at risk of inadequate or excess folate consumption.

### **Purpose(s)**

The study aimed to assess the folate status of a representative sample of women of child-bearing age (20–44 years) and of adolescent boys (14–19 years) living in Dunedin.

### **Collection method**

A cross-sectional survey, using a stratified randomised cluster sampling design, consisting of a random selection of primary sampling units in Dunedin, random selection of households within a primary sampling unit, and random selection of eligible individual.

Weighed food record for 3 non-consecutive days; self-administered food frequency questionnaire and general questionnaire (health status, smoking, alcohol consumption, physical activity, supplement use, obstetric history); interviewer administered questionnaire on knowledge, attitudes and practices around folate (women only); anthropometric measurements; fasting blood sample for folate and vitamin B<sub>12</sub> biochemical analysis.

The sample size for women of child-bearing age was 216 (response rate 57%). The sample size for adolescent boys was 140 (response rate 56%).

### **Data content – general**

Nutrient intake, probability of inadequate intake for selected nutrients; key dietary sources of folate; frequency of consumption of selected foods and food groups; folic acid supplement use; nutritional status; body size; folate knowledge, attitudes and practices; general health status; and sociodemographic variables (age, sex, ethnicity, income, employment).

### **Data content – monitoring folic acid and iodine fortification**

- Dietary folate and folic acid intake, probability of inadequate dietary folate intake, key sources of dietary folate, frequency of consumption of foods high in folate and foods targeted for fortification.
- Folic acid supplement use among women of child-bearing age – overall and by pregnancy trimester.
- Red blood cell folate, serum folate, plasma vitamin B<sub>12</sub>, and plasma homocysteine concentrations.
- Determinants of red blood cell folate concentrations.
- Folate knowledge, attitudes and practices.

### **Indigenous identification**

Self-identified ethnicity, including Māori.

### **Socioeconomic identification**

Education, employment, income.

### **Scope/target population**

Women of child-bearing age (20–44 years) and adolescent males (14–19 years).

**Geographical coverage**

Dunedin, New Zealand.

**Period covered**

February to July 1999.

**Publications and other outputs**

Ferguson EL, Skeaff CM, Bourn DM, Nixon M & Parnell WR 2000. Folate status of representative populations in Dunedin: issues for folate fortification. Report to Ministry of Health and the Australian New Zealand Food Authority.

**Access**

Contact the New Zealand Ministry of Health.

**Data management agency and contact details**

New Zealand Ministry of Health

PO Box 5013

Wellington 6011, New Zealand

Phone: +64 4 496 2000

Fax: +64 4 496 2340

Website: <[www.moh.govt.nz](http://www.moh.govt.nz)>

# **The iodine status of lactating women and breastfed babies in Dunedin**

## **Description of data source**

A one-off randomised controlled double-blind trial of iodine supplementation in breastfeeding women in Dunedin done as part of a Master of Science research study.

## **Purpose(s)**

The aim of the project was to assess the iodine status of lactating women and their breastfed infants over 24 weeks postpartum, in women receiving a placebo or one of two levels of iodine supplementation (75 µg iodine per day or 150 µg iodine per day).

## **Collection method**

A randomised, placebo-controlled double blind intervention trial.

Self-selected sample, with participants recruited via posters and advertisements in local hospitals, shops and newspapers. Data and sample collection was done in the participants' home.

A maternal antenatal urine sample was collected in the final month of pregnancy. Maternal and infant urine and maternal breastmilk samples were collected at weeks 1, 2, 4, 8, 12, 16, 20, and 24 postpartum. A blood sample was also collected from mothers at 24 weeks postpartum. Participants completed questionnaires, including a food frequency questionnaire in the final month of pregnancy and at 12 and 24 weeks postpartum.

A total of 109 pregnant women were recruited.

## **Data content – general**

- Questionnaires covering thyroid problems, general health, medication, supplement use, and dietary patterns.
- Maternal characteristics – age, ethnicity, parity, previous breast feeding experience, smoking, body size, employment status, education and household income.
- Infant birth weight, sex, use of infant formula, complementary feeding.

## **Data content – monitoring folic acid and iodine fortification**

- Urinary iodine concentrations in final month of pregnancy and weeks 1, 2, 4, 8, 12, 16, 20, and 24 postpartum.
- Breastmilk iodine concentration at weeks 1, 2, 4, 8, 12, 16, 20, and 24 postpartum.
- Thyroid-related blood constituents (thyroid stimulating hormone and thyroxine at 24 weeks postpartum).
- Frequency of consumption of iodine containing foods in the final month of pregnancy, and at 12 and 24 weeks postpartum.

## **Indigenous identification**

Self-identified ethnicity, including Māori.

## **Socioeconomic identification**

Employment status, education.

**Scope/target population**

Self-selected sample of pregnant women in their third trimester (singleton births) who were intending to breastfeed.

**Geographical coverage**

Dunedin, New Zealand.

**Period covered**

April 2004 to April 2005.

**Publications and other outputs**

Mulrine H 2006. Masters Thesis. Dunedin: University of Otago.

**Access**

University of Otago Library, Dunedin.

**Data management agency and contact details**

Dr Shelia Skeaff  
Department of Human Nutrition  
University of Otago  
PO Box 56  
Dunedin 9010, New Zealand

# Glossary

## **Adenoma**

An adenoma (adenomatous polyp) is a benign tumour that arises from epithelial cells that line the inside surface of the organ. All adenomas have the potential to develop into cancer (adenocarcinoma). Adenoma classifications are derived from information reported by colonoscopists and pathologists, and are classified from high risk (advanced) to lowest risk (diminutive).

## **Adequate intake**

A daily nutrient level estimated to meet the requirements of half the healthy individuals in a particular life-stage and gender group.

## **Computer-assisted telephone interviews**

A computerised questionnaire that is administered to respondents over the telephone.

## **Colonoscopy**

A medical procedure in which a long, thin, flexible tube with a light and camera lens at the end is inserted into the rectum to view the inside of the bowel.

## **Dietary folate equivalents (DFE)**

A measure that accounts for the difference in bioavailability between the different forms of folates. The bioavailability of folates in food is about 50–60%, whereas folic acid, the form used to fortify foods or in supplements, is about 85% when taken with meals or in fortified foods, and 100% when taken on an empty stomach.

## **Early pregnancy termination**

Pregnancies that are terminated before 20 weeks gestation.

## **Faecal occult blood test**

A test to detect microscopic blood in the stool that is used as a screening tool for colorectal cancer.

## **Estimated average requirement**

A daily nutrient level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group.

## **Fetal deaths**

Late pregnancy terminations and stillbirths.

## **International classification of diseases (ICD)**

The underlying cause of death in the mortality data has been coded according to rules set out in various versions of the International Classification of Diseases, published by the World Health Organization.

**Interquartile range**

The distance between the top of the lower quartile and the bottom of the upper quartile of a distribution. It is a measure of the spread of the distribution.

**Late pregnancy termination**

Pregnancies that are terminated at 20 weeks gestation or thereafter.

**Median urinary iodine concentration**

Urinary iodine concentration is the main indicator of nutritional iodine status and is used to evaluate population-based iodine status. Urinary iodine values from populations are usually not normally distributed, so the median rather than the mean is used as a measure of central tendency.

**Neural tube defects**

Defects, such as spina bifida and anencephalus, that result from the early disruption of the development of the brain and spinal cord in the embryo. The neural tube usually closes by the end of the fourth week after fertilisation.

**Neural tube defect incidence**

The number of live births, fetal deaths and early pregnancy terminations affected by an NTD expressed as a rate per 10,000 total births.

**Nutrient Reference Values (NRV)**

Nutrient reference values are a set of reference values to help people select healthy diets, set national nutrition policy, and establish safe upper limits of intake. They include the following values; estimated average requirement, recommended dietary intake, adequate intake, and upper level of intake.

**Standard error**

Is the estimated standard deviation or measure of variability in the sampling distribution of a statistic.

**Polyps**

Colorectal polyps are small growths of colon tissue that protrude into the colonic or rectal lumen. They may become cancerous and are generally defined as:

- hyperplastic: a polyp that has a low risk, if any, of developing into a cancer, though people with multiple hyperplastic polyps are associated with an increased risk of bowel cancer
- adenoma (adenomatous): a polyp that has a higher chance of becoming cancerous as it contains molecular characteristics that are common with adenocarcinoma. See adenoma classifications above.

**Pregnancy**

Encompasses live births, fetal deaths and early pregnancy terminations.

**Recommended dietary intake**

The average daily dietary intake level that is sufficient to meet the nutrient requirements of nearly all (97–98%) healthy individuals in a particular life stage and gender group.

**Total births**

Live births and fetal deaths.

**Upper level of intake**

The highest daily nutrient intake level likely to pose no adverse health effects to almost all individuals in the general population.

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