

# Estimation of Dietary Folate Equivalent Intake in the Australian and New Zealand Populations

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## Introduction

Food folate and synthetic folic acid have different bioavailabilities, and this can be expressed as Dietary Folate Equivalents (DFE) and used to compare information about the two sources of folate on a common basis. Food Standards Australia New Zealand (FSANZ) undertook a dietary intake assessment to estimate DFE intakes and to determine whether Australians and New Zealanders were currently meeting the Estimated Average Requirements (EAR) for DFEs. This is the first time DFE intakes have been estimated using folate and folic acid data for Australian and New Zealand foods.

## What are Dietary Folate Equivalents?

Dietary Folate Equivalents (or DFE) are units that factor in differences in the bioavailability of food folate and of synthetic folic acid. Folic acid when consumed as a supplement on an empty stomach is almost 100% bioavailable. Absorption reduces to 85% when consumed with food. Food folate's bioavailability is approximately 50-60% (West Suitor and Bailey, 2000; National Health and Medical Research Council, 2005).

DFEs are primarily used to compare information about physiologic requirements of folate on a common basis, thus accounting for differences in absorption between food folate and folic acid.

In 2006, the NHMRC recommended Nutrient Reference Values for use in Australia and New Zealand which included new units for folate.

**Dietary Folate Equivalent (DFE) = (food folate µg) + (folic acid µg x 1.67)**

This makes the generalisation that folate from all dietary sources has the same bioavailability (NHMRC, 2006).

## Data sources and methods used in the assessment of DFE intakes

Food consumption data were derived from:

- the 1995 National Nutrition Survey (NNS) from Australia that surveyed 13,858 people aged 2 years and above; and
- the 1997 New Zealand NNS that surveyed 4,636 people aged 15 years and above.

Both NNSs used a 24-hour food recall methodology. A second 24-hour recall was also collected on a subset of respondents in both surveys. All intake estimates were adjusted using second day consumption NNS records to better estimate 'usual' patterns of consumption (Australian Bureau of Statistics, 1998).

Dietary folate and DFE concentration data used were derived from the Key Foods Program and other analytical programs undertaken by FSANZ.

Current levels of fortification of food and food products, such as orange juice and bread, as permitted by voluntary permissions in the Australia and New Zealand Food Standards Code were taken into account, as was the market share of fortified product out of each product category.

Dietary folate and DFE intakes were estimated by combining 'usual' patterns of food consumption, as derived from NNS data, with current levels of dietary folate and DFEs.

**Dietary intake = nutrient concentration x food consumption**

## Estimated intakes of DFEs

Table 1. Estimated mean and 95th percentile DFE intakes

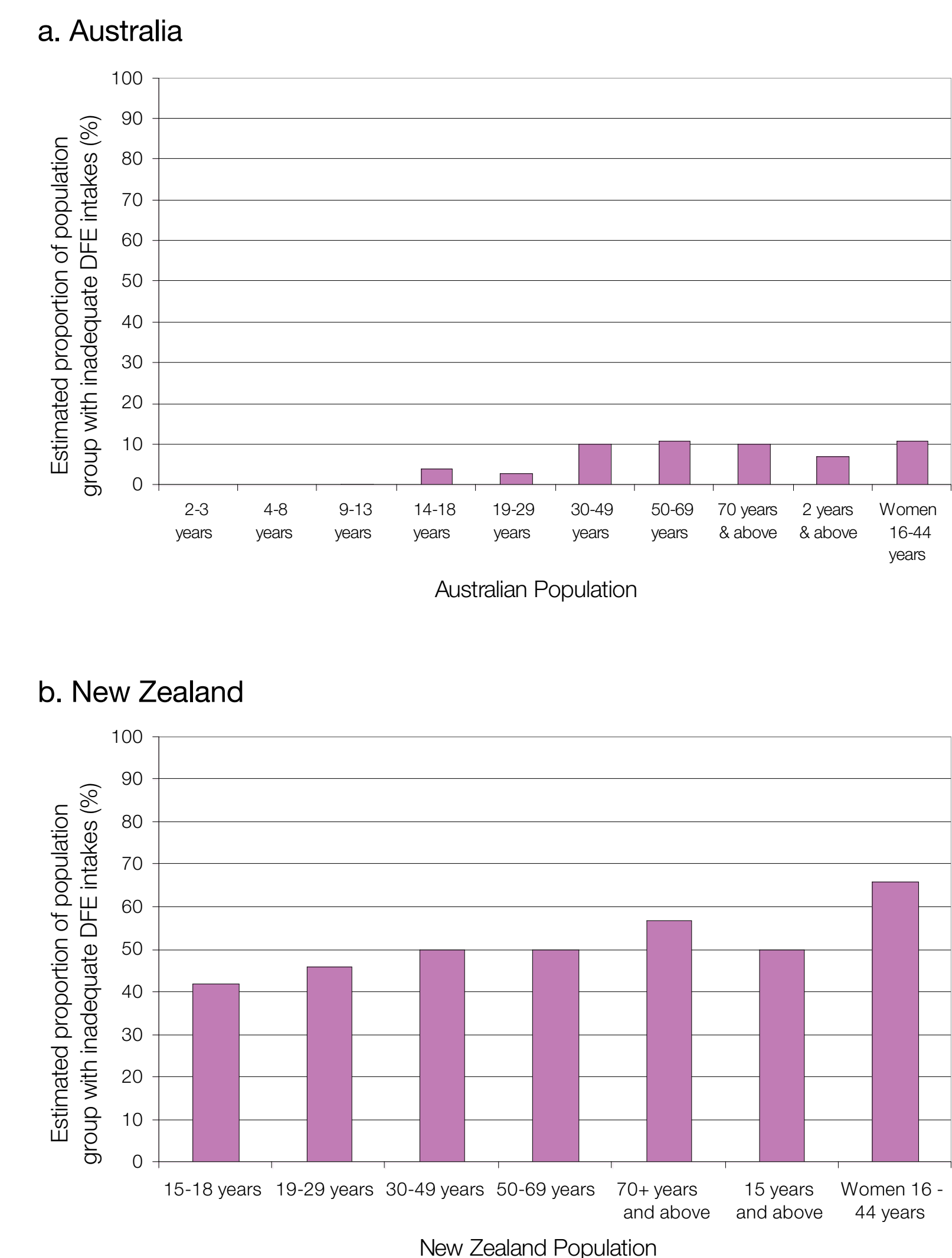
Country	Estimated DFE Intake (µg DFE/day)		
	Mean	95th Percentile	Women (16-44 years)
Australia	489 - 632	735 - 1,144	511*
New Zealand	308 - 363	558 - 712	599*

\* Estimated mean DFE intake

Figure 1. Estimated mean and 95th percentile DFE intakes



Figure 2. Estimated proportion of respondents with inadequate DFE intakes



## Comparison of results with the Estimated Average Requirements (EAR)

Estimated DFE intakes were compared with the EAR. The EAR is "A daily nutrient level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group" (National Health and Medical Research Council, 2006). When certain conditions are met, the proportion of the population group with intakes below the EAR can be used to estimate the prevalence of nutrient inadequacy (Health Canada, 2006). The proportions of the population groups with dietary DFEs intakes below the EAR were assessed and used as an estimation of the prevalence of inadequate DFEs intakes.

The proportion of Australian population groups with DFE intakes below the EAR was low (11% or less including the target group of women of child bearing age 16-44 years). For each population group assessed, females were shown to have a higher proportion with DFE intakes less than the EAR than males.

In contrast, in New Zealand a higher proportion of each population group did not meet their EAR, ranging from 42 - 66%. As with Australia, females from each population group were found to have a higher proportion with DFE intakes below the EAR than males.

Differences in DFE intakes and the proportion of population with inadequate intakes between Australia and New Zealand may be attributed to a number of possible factors. These include:

- Differences in voluntary fortification uptake for different products between Australia and New Zealand (eg. 15% of Australian breads were fortified with folic acid whereas no bread in New Zealand was fortified)
- Potential differences in patterns of food consumption between Australia and New Zealand
- Possibility of different analytical methods used in Australia and New Zealand for assessing folic acid and dietary folate levels in foods
- Different levels of dietary folate in the food supply

Major contributors to DFEs intake for Australia and New Zealand included:

- Breakfast cereals and breads
- Non-alcoholic beverages
- Vegetable products



## References

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