

# **A Focus on Nutrition**

Key Findings of the 2008/09

New Zealand Adult Nutrition Survey

Citation: University of Otago and Ministry of Health. 2011.  
*A Focus on Nutrition: Key findings of the 2008/09 New Zealand Adult Nutrition Survey*. Wellington: Ministry of Health.

Published in September 2011 by the  
Ministry of Health  
PO Box 5013, Wellington, New Zealand

ISBN 978-0-478-37348-6 (online)  
HP 5412

This document is available on the Ministry of Health's website:  
<http://www.moh.govt.nz>



MANATŪ HAUORA

## Foreword

I am pleased to bring to you this report, *A Focus on Nutrition, Key findings of the 2008/09 New Zealand Adult Nutrition Survey*.

The Government's overarching goal for health is to enable New Zealanders to live longer, healthier and more independent lives. Lifelong good nutrition is needed to achieve this. The 2008/09 New Zealand Adult Nutrition Survey provides us with a wealth of reliable and up-to-date information about the nutritional health of adult New Zealanders.

There is good news in the survey. Compared to the 1997 National Nutrition Survey, there was a decline in the contribution of saturated fat to total energy intake, a decrease in total blood cholesterol, and an increase in eating the recommended two or more servings of fruit per day. However, the survey also identified areas we need to work on: since 1997, there has been an increase in the prevalence of obesity, and an increase in the prevalence of low food security.

Over time, the survey results will contribute to the development and evaluation of policy, the development of the Ministry of Health Food and Nutrition Guidelines and the review of Nutrient Reference Values. Survey data can also be used in monitoring diabetes, providing information when developing food standards, and monitoring changes in the food supply.

This report represents a significant undertaking by a large group of people over a long period of time. I congratulate the research teams and External Technical Group, and thank them for their time and commitment to this project. I especially want to thank the 4721 New Zealanders who gave their time to take part in the survey – it would not have been possible without them.

Signed by

## Acknowledgements

First, thank you to the 4721 New Zealanders who opened their homes to the interviewers and made the 2008/09 New Zealand Adult Nutrition Survey possible.

The survey was funded by the Ministry of Health and conducted by the University of Otago. CBG Health Research Ltd recruited participants into the survey.

The survey was managed in the Ministry of Health, initially by Kirsten McLachlan and then from December 2008 by Sally Mackay. We are grateful to the many colleagues in the Health and Disability Intelligence Unit of the Ministry of Health and across the Ministry who contributed to the development, implementation and analysis of this survey.

The Nutrition Director for the survey was Associate Professor Winsome Parnell of the University of Otago. John Harvey, Project Manager, handled the day-to-day co-ordination of the survey during the data collection phase.

The survey would not have been completed without the dedication of a number of people. These include members of the External Technical Group; the regional supervisors and field staff who collected the data; the University of Otago project office staff who checked and analysed the data; and the members of the academic staff of the Department of Human Nutrition who provided expert advice.

Particular thanks go to Professor David Russell and Dr Noela Wilson for their advice and encouragement throughout the survey, and for their expert editorial assistance in the drafting of the descriptive report.

The Institute of Plant and Food Research Ltd (Palmerston North) provided food composition data and assisted with nutrient matching. The contribution made by Dr Lee Huffmann was crucial in resolving many complex issues.

Canterbury Health Laboratories were responsible for collecting and analysing the biological samples. Special thanks go to Kevin Taylor, who assumed responsibility for this work after the sudden death of Barrie Edwards.

Appendix 1 outlines in more detail the many people who assisted throughout the survey.

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# Glossary

24-hour recall	A dietary assessment method that collects information on all foods and drinks consumed in a 24-hour period.
95% confidence interval	An indicator of the accuracy of a survey estimate. The 95% confidence interval (95% CI) is the interval that would be expected to contain the true population value 95% of the time, if many samples were taken. In this report, 95% confidence intervals have been presented in parentheses in tables, and as error bars in graphs.
Acceptable macronutrient distribution range (AMDR)	An estimate of the range of intake for each macronutrient (expressed as percent contribution to energy), which would allow for an adequate intake of all the other nutrients while maximising good health (applies only to adults and young people aged 14 years and over).
Adjustment	This is where rates or results have been adjusted to take account of differences in the distribution of other factors (such as age) between different groups (eg, ethnic groups).
Anthropometry	The measurement of body size (eg, height and weight).
Bioavailability	The degree to which a nutrient (eg, iron) or drug becomes available for use in the body after ingestion or administration.
Blood pressure	The pressure exerted by circulating blood on the walls of blood vessels. Blood pressure is measured as maximum (systolic) and minimum (diastolic) blood pressure.
Body mass index (BMI)	A measure of weight adjusted for height used to classify people as underweight, normal, overweight or obese. BMI is calculated by dividing weight in kilograms by height in metres squared ( $\text{kg/m}^2$ ).
Crude data	An estimate that has not been adjusted for other factors (such as age or ethnicity).
Dietary supplements	Products containing vitamins, minerals, herbs or botanicals, amino acids and various other dietary substances that are intended to supplement the diet rather than be an entire meal or diet. They are intended for ingestion as a pill, capsule, tablet or liquid and do not usually resemble conventional foods.
Estimated average requirement (EAR)	A daily nutrient level estimated to meet the requirements of half of the healthy individuals in a particular life stage and gender group.
Fatty acid	A component of fat consisting of a hydrocarbon chain with a methyl group at one end and a carboxyl group at the other. The three main types of fatty acids in the diet are: saturated, monounsaturated and polyunsaturated.
Folate	A generic term for the various forms of folate found in food. Folate is involved in the metabolism of nucleic and amino acids, and hence the synthesis of deoxyribonucleic acid (DNA), ribonucleic acid and proteins.

Folic acid	A synthetic form of folate, which is found in supplements and fortified foods and beverages. It is more bioavailable and stable than folate in food.
Food security	Access to adequate, safe, affordable and acceptable food. In contrast, food insecurity occurs when the availability of nutritionally adequate and safe foods, or the ability to acquire such foods, is limited or uncertain.
FOODfiles	An electronic subset of the New Zealand Food Composition Database.
Fortification	The addition of permitted nutrients to food. Nutrients can be added to correct a demonstrated deficiency in the population, to replace nutrients lost during processing, storage or handling, or for other reasons.
Glycated haemoglobin (HbA1c)	A measure of average blood glucose over the past four to six weeks. HBA1c is measured as a percentage
Haemoglobin	The protein that carries oxygen in the red blood cells.
LINZ®	Life in New Zealand Nutrition and Activity Research Unit, University of Otago.
LINZ24©	The data capture software package of the LINZ® Nutrition and Activity Research Unit, University of Otago.
Lipoproteins	Clusters of lipids associated with proteins that serve as transport vehicles for lipids in the lymph and blood. Dietary fats circulate in the blood bound to lipoproteins.
Macronutrients	Nutrients needed in larger quantities, such as protein, carbohydrate and fat.
Meshblock	The smallest geographic unit for which statistical data are collected by Statistics New Zealand. Meshblocks vary in size from part of a city block to large areas of rural land. Each meshblock abuts another to cover all of New Zealand.
Micronutrients	Nutrients needed in small amounts, such as vitamins and minerals.
Monounsaturated fatty acid (MUFA)	A type of unsaturated fatty acid in which there is one double bond.
Neighbourhood deprivation	A measure of the socioeconomic status of an area (see New Zealand Deprivation Index 2006).
Neural tube defects (NTDs)	A group of birth defects in which the brain, spinal cord or covering of these organs has not developed properly.



New Zealand Deprivation Index 2006 (NZDep2006)	An area-based index of deprivation, which measures the level of socioeconomic deprivation for each neighbourhood (meshblock) according to a combination of the following 2006 census variables: income, benefit receipt, transport (access to car), household crowding, home ownership, employment status, qualifications, support (sole-parent families), and access to a telephone. In this report, results are presented as quintiles (each quintile contains approximately 20% of the population).
New Zealand Food Composition Database	A database containing data on the nutrient composition of foods and drinks commonly consumed in New Zealand.
Nutrient reference values (NRVs)	A set of recommendations for intakes of energy and nutrients aimed at avoiding deficiency and excess/toxicity. They also include guidance on the dietary patterns needed to reduce the risk of chronic disease.
Obesity	Excess weight for height to the extent that health may be affected.
PC-SIDE	Computer software used to estimate distribution of usual nutrient intake for a group.
Polyunsaturated fatty acid (PUFA)	An unsaturated fatty acid with two or more double bonds. Dietary sources include most plant oils, particularly sunflower, soybean, safflower and corn, as well as most margarines and spreads.
Prevalence	The proportion of people with a health-related state (typically a disease or risk factor) at a specific period of time within a specific population. It is defined as the total number of cases in the population, divided by the number of individuals in the population.
Retinol equivalent	The recommendation for vitamin A intake is expressed as micrograms of retinol equivalents. Retinol equivalents account for the conversion of some $\beta$ -carotene to retinol. One microgram (1 $\mu\text{g}$ ) of retinol equivalent equals 1 $\mu\text{g}$ of retinol, or 6 $\mu\text{g}$ of $\beta$ -carotene.
Saturated fatty acid (SAFA)	A fatty acid in which there are no double bonds between the carbon atoms of the fatty acid chain. Diets high in saturated fatty acids increase the risk of atherosclerosis and coronary heart disease.
Total response ethnic group	A categorisation of ethnicity whereby each person is assigned to all those ethnicities they identify with. Total response ethnicity has been used in this publication.
Trans fatty acids	Unsaturated fatty acids with one or more double bonds in the trans configuration. These occur naturally in some ruminant foods, but are also produced by partial hydrogenation of polyunsaturated fats in food processing.
Usual intake	The distribution of observed intakes from a single 24-hour recall, adjusted to remove the effects of within-person (or intra-individual) variability. This can be achieved by collecting two 24-hour recalls from a representative sub-sample of the group.

## Abbreviations

AMDR	acceptable macronutrient distribution range
BMI	body mass index
CAPI	computer-assisted personal interview
CI	confidence interval
CNS	National Children's Nutrition Survey (2002)
CURF	confidentialised unit record file
DFE	dietary folate equivalent
EAR	estimated average requirement
HDL	high-density lipoprotein cholesterol
ICCIDD	International Council for Control of Iodine Deficiency Disorders
LDL	low-density lipoprotein cholesterol
LINZ®	Life in New Zealand Nutrition and Activity Research Unit, University of Otago
LINZ24©	data capture software package of the LINZ® Nutrition and Activity Research Unit, University of Otago
MUFA	monounsaturated fatty acid
NHANES	United States National Health and Nutrition Examination Survey
NNS	National Nutrition Survey (1997)
NRV	nutrient reference value
NTDs	neural tube defects
NZANS	New Zealand Adult Nutrition Survey (2008/09)
NZDep2006	New Zealand Deprivation Index 2006
NZEO	New Zealand European and Others ethnic group
NZFCDB	New Zealand Food Composition Database
PUFA	polyunsaturated fatty acid
RE	retinol equivalent
SAFA	saturated fatty acid
USDA	United States Department of Agriculture

# Executive Summary

## Introduction

The 2008/09 New Zealand Adult Nutrition Survey (NZANS) was carried out from October 2008 to October 2009, collecting information from 4721 adult New Zealanders aged 15 years and over.

The 2008/09 NZANS assessed self-reported food and nutrient intake, dietary habits and eating patterns, dietary supplement use, household food security, and nutrition-related health conditions and risk factors. The survey also included measurements (height, weight, waist circumference and blood pressure) and the collection of blood and urine samples.

A final response rate of 61% was achieved (44% for blood and urine samples). These response rates are considered good for a national nutrition survey. All results have been weighted in order to be representative of New Zealand's estimated resident population aged 15 years and over living in permanent private dwellings at 31 June 2007.

Nutrition is an important determinant of health. This survey provides valuable information for the development, implementation and monitoring of nutrition policies and programmes to improve the health of New Zealanders. Knowledge of New Zealanders' dietary habits, body size and nutrition-related health will assist health professionals to provide nutrition advice that is relevant and will help with planning services for diabetes and cardiovascular disease. Survey data can also be used to inform the development of food standards and monitor changes in the food supply.

The analyses presented in this report are only a small proportion of those that could be undertaken, and in many ways pose more questions than they answer. The Ministry of Health encourages researchers to use 2008/09 NZANS data sets to explore topics of interest. Additional descriptive results are available in the online data tables. Reports presenting results for Māori compared to non-Māori and Pacific compared to non-Pacific will be released in late 2011.

## Energy and macronutrient intake

### Energy

Energy is required in the body for metabolic processes, physiological functions, muscular activity, heat production, growth and the synthesis of new tissues. The macronutrients protein, carbohydrate, fat and alcohol from food and drinks are the only sources of energy for humans.

The median daily energy intake from foods and beverages was 10,380 kJ for males and 7448 kJ for females. The *Bread* group was the main contributor to energy intake (11%), followed by *Grains and pasta* (7%) and *Potatoes, kumara and taro* (6%).

The reported energy intake of New Zealanders aged 15 years and over has dropped since 1997, although the decrease for females was not significant. The increase in body weight, body mass index and the prevalence of obesity in the intervening period suggests that the energy 'equation' continues to be unbalanced, with energy 'in' exceeding energy 'out'. The survey did not assess energy expenditure, so further research is needed to explore the underlying reasons for the reported decrease in energy intake from 1997 to 2008/09.

## Protein

Protein is necessary to build, maintain and repair tissue and to synthesise hormones, enzymes and antibodies. Proteins are made up of 20 amino acids, some of which the body can synthesise, but others must be obtained from food.

The median usual daily intake was 102 g of protein for males and 71 g for females, with most people (98%) meeting the recommended average protein requirement. Protein provided 16.4% and 16.5% of energy for males and females, respectively; this falls within the recommended range of 15–25% energy from protein. The single biggest contributor of protein in the diet was the *Bread* group (11%), followed by the groups *Poultry* and *Milk* (each 9%). The contribution of protein to energy has increased from 1997 to 2008/09 for both males and females.

## Fat

Fats are the most concentrated sources of energy. Dietary fats also help in the absorption of fat-soluble vitamins, are the precursors of many hormones, and are an important structural component of cell membranes. There are three main types of fatty acids in the diet: saturated, monounsaturated and polyunsaturated.

The median usual daily intake of total fat was 95 g for males and 67 g for females. Total fat provided 33.7% and 33.8% of energy for males and females, respectively; this falls within the recommended range of 20–35% energy from total fat. The biggest single contributor to total fat in the diet was the group *Butter and margarine* (9%), followed by *Potatoes, kumara and taro*, *Bread-based dishes* and *Poultry* (each 6%). The contribution of total fat to energy has decreased from 1997 to 2008/09 for males and females, although the decrease was not significant for females.

The median usual daily intake of saturated fat was 36.5 g for males and 25.8 g for females. Saturated fat was provided by the following groups: *Butter and margarine* and *Milk* (each 8%), *Bread-based dishes*, *Cheese* and *Potatoes, kumara and taro* (each 6%). From 1997 to 2008/09 there was a decline in the contribution of saturated fat to daily energy intake for both males (15.1% to 13.1%) and females (14.7% to 13.1%). However, this contribution is still above the recommended 10% contribution of saturated fat to total energy.

The median usual daily intake of monounsaturated fat was 35.1 g for males and 24.3 g for females. The *Butter and margarine* group provided 10% of monounsaturated fat, *Poultry* and *Potatoes, kumara and taro* each provided 7%, and *Bread-based dishes* and *Beef and veal* each provided 6%. From 1997 to 2008/09 the proportion of energy from monounsaturated fat increased for both males (11.8% to 12.4%) and females (11.4% to 12.3%).

The median usual daily intake of polyunsaturated fat was 13.1 g for males and 9.6 g for females. Polyunsaturated fat provided 4.8% and 4.9% of energy for males and females, respectively. The *Butter and margarine* group provided 12% of polyunsaturated fat, *Bread* 9%, *Bread-based dishes* and *Potatoes, kumara and taro* each 7%, and *Vegetables* and *Poultry* each 6%. There was no change in polyunsaturated fat intake from 1997 to 2008/09.

## Carbohydrate

Carbohydrates are a diverse group of substances with varied chemical and physiological properties with varying importance to health. They include the sugars, starches and fibres.

The median usual daily intake was 278 g of carbohydrate for males and 207 g for females. The mean contribution of carbohydrate to daily energy intake was 46.0% for males and 47.1% for females; this falls within the recommended range of 45–65% energy from carbohydrate. *Bread* was the biggest single contributor to carbohydrate intake (17%). There was no change in the contribution of carbohydrate to daily energy from 1997 to 2008/09.

The median usual daily intake of total sugars was 120 g for males and 96 g for females. Sucrose was the major contributor to total sugars, followed by fructose, glucose, lactose and maltose. Almost one-quarter of the sucrose came from the group *Sugars and sweets* (23%), followed by *Non-alcoholic beverages* and *Fruit* (each 16%).

Dietary fibre intake was 22.1 g and 17.5 g per day for males and females, respectively. *Bread* (17%) and *Vegetables* (16%) were the main contributors to dietary fibre intake, followed by *Potatoes, kumara and taro*, and *Fruit* (each 12%).

## Micronutrient intake

Micronutrients are nutrients needed in small amounts, such as vitamins and minerals. The survey measured intakes of vitamins A, B, C and E and the minerals calcium, iron, zinc, potassium and selenium. Where appropriate, micronutrient intakes were compared to nutrient reference values to estimate the prevalence of inadequate intake. Estimates of vitamin and mineral intake are from food and beverages only, and do not include micronutrients from supplements (other than supplements providing energy, eg meal replacements).

## Vitamins

Forty-two percent of vitamin A in the diet came from retinol (animal-based foods) and the remainder from carotenoids (plant-based foods). The estimated prevalence of inadequate vitamin A intake was higher for males (22.7%) than for females (12.1%). There was a decrease in vitamin A intake from 1997 to 2008/09 for both males and females.

The B vitamins – thiamin, riboflavin, niacin, vitamin B6 and vitamin B12 – appear to be adequate for many males and females, but intakes in some age groups were less than optimal.

Vitamin C intakes were adequate for almost all New Zealanders aged 15 years and over. The predominant sources of vitamin C were *Vegetables* (28%), *Fruit* (22%), *Non-alcoholic beverages* (15%) and *Potatoes, kumara and taro* (13%).

## Minerals

Most New Zealanders aged 15 years and over do not meet the recommendations for calcium intake. However, the adequacy of calcium intake is difficult to interpret given the high recommended levels to which they are compared and because calcium intake is only one of many factors that affect bone health. Experts worldwide are not agreed on optimal intakes because although calcium is of major importance to attaining and maintaining bone health, many other factors such as vitamin D status, physical activity levels and habitual levels of intake also influence bone health.

One in four (24.7%) New Zealanders aged 15 years and over had an inadequate intake of zinc (males 39.1%; females 11.2%). *Beef and veal* (10%), *Bread* (10%) and *Grains and pasta* (9%) were the largest contributors of zinc to the diet. There was a decrease in zinc intake from 1997 to 2008/09 for both males and females.

Selenium intakes increased from 1997 to 2008/09, but intakes were still inadequate for about one-third of males (31.5%) and over half (58.2%) of females. The *Bread* group was the largest single contributor of selenium to the diet (15%), followed by *Fish and seafood* (12%), and *Poultry* (10%).

## Dietary supplements

Although the energy nutrient intakes of the population have been calculated without adding nutrients from supplements (other than supplements providing energy), information about the use of dietary supplements was collected.

*Oils* (fish oils and plant oils) was the supplement group used most often by New Zealanders aged 15 years and over. The *Regular* use of supplements was more frequent among older New Zealanders and *Occasional* use more frequent among younger age groups.

## Dietary habits

Dietary habits and patterns are associated with diet quality and nutrition-related health status. Participants were asked about key behaviours such as breakfast consumption, the frequency of eating certain foods and food groups, food preparation and cooking practices (eg, removal of excess fat, addition of salt), and choosing low fat or reduced-salt foods.

Breakfast was eaten daily by two-thirds of New Zealanders aged 15 years and over (males 64.5%; females 69.1%). Those aged 51+ years were more likely to have eaten breakfast daily than younger age groups.

Three-fifths (59.3%) of males and 72.2% of females reported eating the recommended three or more servings of vegetables each day, and 54.6% of males and 65.8% of females reported eating the recommended two or more servings of fruit each day. From 1997 to 2008/09 there was an increase in the proportion of males and females who reported eating the recommended number of servings of fruit, with no change in the proportion who reported eating the recommended number of servings of vegetables.

Whole-grain bread (heavy or light grain) was chosen most often by 60.4% of males and 65.9% of females. The proportion of males and females choosing whole-grain bread increased with increasing age.

Reduced-fat or trim milk was chosen most of the time by 44.5% of males and 51.9% of females. The use of reduced-fat or trim milk increased with increasing age for both males and females.

The excess fat was regularly or always removed from meat by 56.5% of males and 67.4% of females. Chicken skin was regularly or always removed by 42.3% of males and 53.5% of females.

Two-thirds of males (68.4%) and females (68.8%) reported choosing margarine as a spread most of the time, and one-fifth (20.1%) chose butter. Oil was used most often when cooking by 89.7% of males and 90.1% of females.

Almost all (98%) males and females used salt in the home. Of those who used salt in the home, 85.7% used iodised salt.

## Food security

'Food security' is an internationally recognised term that encompasses the ready availability of nutritionally adequate and safe foods, and the assured ability to acquire personally acceptable foods in a socially acceptable way.

Based on responses to a series of eight statements, 59.1% of households were classified as being *Fully/almost food secure*, 33.7% were classified as being *Moderately food secure*, and 7.3% were classified as having *Low food security*. From 1997 to 2008/09 the proportion of households classified as having *Low food security* increased for males (1.6% to 5.6%) and females (3.8% to 8.8%).

## **Nutrition-related health outcomes**

A range of anthropometric, biochemical and clinical measures were used to assess nutrition-related health status.

### **Body size and obesity**

A healthy body size is important for good health and wellbeing. Obesity is associated with a long list of health conditions, including: cardiovascular disease (ischaemic heart disease, high blood pressure and stroke), various types of cancer, type 2 diabetes, osteoarthritis, sleep apnoea, and psychological and social problems.

Mean BMI was 27.6 kg/m<sup>2</sup> for both males and females. From 1997 to 2008/09 there was an increase in mean BMI in both males and females.

The prevalence of obesity was 27.7% in males and 27.8% in females, an increase since 1997 (males 17.0%, females 20.6%). Data from the 2002/03 and 2006/07 New Zealand Health Surveys have previously shown that the prevalence of obesity had increased since 1997.

### **Blood pressure**

Mean systolic blood pressure was 130 mmHg in males and 122 mmHg in females. Systolic blood pressure was highest in those aged 71+ years.

### **Iron status**

The prevalence of iron deficiency among females aged 15 years and over increased from 2.9% in 1997 to 7.2% in 2008/09.

### **Folate status**

It was not possible to reliably determine dietary folate intake, but biochemical measures indicate folate status is satisfactory for most New Zealanders aged 15 years and over. Four percent of women of childbearing age had red blood cell folate levels associated with a high risk of having a baby affected by neural tube defects (NTDs), such as spina bifida. Twenty-seven percent had levels associated with a low risk of NTDs ( $\geq 906$  nmol/L).

### **Iodine status**

The New Zealand population aged 15 years and over is classified as mildly iodine deficient because the median urinary iodine concentration of 53  $\mu\text{g/L}$  falls within the range defined by the International Council for the Control of Iodine Deficiency Disorders as mild iodine deficiency (50–99  $\mu\text{g/L}$ ). This survey took place before the implementation of mandatory fortification of bread with iodised salt (to reduce the prevalence of iodine deficiency) in September 2009.



## **Blood cholesterol**

From 1997 to 2008/09 total cholesterol levels decreased in males (5.70 to 5.09 mmol/L) and females (5.73 to 5.17 mmol/L), while HDL cholesterol levels have increased slightly. Although it is likely that dietary factors, such as the decrease in saturated fat intake, contributed to the decline in total cholesterol, the increased prescribing of lipid-lowering drugs is also likely to have played a role.

## **Diabetes**

Glycated haemoglobin (HbA1c) was measured in blood samples to allow the prevalence of undiagnosed diabetes to be estimated. Overall, 6.9% of New Zealanders aged 15 years and over have diabetes. Of these, just over one-quarter (2.0% of the total population) had not reported being told by a doctor that they had diabetes but had HbA1c levels  $\geq 6.5\%$ , which is indicative of undiagnosed diabetes.

HbA1c levels also give an indication of blood glucose management among those who have been diagnosed with diabetes. Just under one-half (48.5%) of those with known diabetes had good diabetes control (HbA1c levels  $< 7.0\%$ ).