Appendices

Appendix 1: Personnel involved

Nutrition Director
Assoc Prof Winsome Parnell  Department of Human Nutrition, University of Otago

Project Manager
John Harvey  Department of Human Nutrition, University of Otago

Ministry of Health
Dr Barry Borman  Manager, Public Health Intelligence
Stephen Manning  Manager, Health and Disability Intelligence
Dr Jackie Fawcett  Manager, Health and Disability Intelligence
Dr Niki Stefanogiannis  Public Health Physician, Team Leader
Sally Mackay  Senior Advisor (Nutrition)
Kirsten McLachlan  Advisor (Nutrition)
Maria Turley  Principal Technical Specialist (Epidemiology)
Faith Roberts  Senior Advisor (Population Surveys)
Robert Templeton  Principal Technical Specialist (Statistics)
Dr Deepa Weerasekera  Senior Advisor (Statistics)
Dev Oza  Manager, Business Unit
Elizabeth Aitken  Team Leader and Senior Advisor (Nutrition)

Senior consultants
Prof David Russell  Former Director, LINZ Unit, University of Otago
Dr Noela Wilson  Former Director, LINZ Unit, University of Otago

Sample design
Robert Templeton  Ministry of Health
Dr Robert Clark  University of Wollongong

Investigators and consultants

Nutrition

Investigators
Prof Christine Thomson  Department of Human Nutrition, University of Otago
Dr Rachel Brown  Department of Human Nutrition, University of Otago
Dr Anne-Louise Heath  Department of Human Nutrition, University of Otago
Dr Rozanne Kruger  Institute of Food, Nutrition and Human Health, Auckland Campus, Massey University
Assoc Prof Welma Stonehouse  Institute of Food, Nutrition and Human Health, Auckland Campus, Massey University
Consultants
Prof Rosalind Gibson  Department of Human Nutrition, University of Otago
Prof Jim Mann  Department of Human Nutrition, University of Otago
Dr Sheila Skeaff  Department of Human Nutrition, University of Otago

Clinical measures
Investigator
Prof Murray Skeaff  Department of Human Nutrition, University of Otago

Consultant
Dr Ted Nye  Department of Medicine, University of Otago

Biostatisticians
Investigator
Andrew Gray  Department of Preventive and Social Medicine, Dunedin School of Medicine

Consultant
Prof Peter Herbison  Department of Preventive and Social Medicine, Dunedin School of Medicine

Māori
Consultant
Prof Mason Durie  Research Centre for Māori Health and Development, Massey University

Pacific
Consultants
Dr Maika Veikune  Pacific Planning and Funding Team, Middlemore Hospital, Counties Manukau District Health Board
Dr David Schaaf  Pacific Health and School of Population Health, University of Auckland

University of Otago contract management
Dr Anna Barlow  Research and Enterprise, University of Otago
Dr Rachel Elliot  Research and Enterprise, University of Otago
Dr Jenny Shackelford  Research and Enterprise, University of Otago
Lisa Davis  Research and Enterprise, University of Otago
Canterbury Health Laboratories

Prof Peter George  Clinical Director
Kevin Taylor  Quality and Business Development Manager
Kirsten Beynon  Operations Manager
Barrie Edwards  Business Development Manager (until September 2008)
Trevor Walmsley  Section Head, Specialist Biochemistry
Christiaan Sies  Scientist, Analytical Processing
Sandy Slow  Scientist, Analytical Processing

CBG Health Research Ltd

Carol Boustead-Gibb  CBG Training and Development Director
Dr Barry Gribben  CBG Research Director
Angela Chong  CBG Survey Manager
Liz Gordon  CBG Survey Manager
Tom Robinson  Information Technology Specialist
Sarith Yorng  CBG Research Analyst

Plant and Food Research Ltd

Dr Lee Huffman  Science Group Leader, Food Solutions Group, Palmerston North
Dr Lucy Lesperance  Team Leader, Food Information Team, Palmerston North
Subathira Sivakumaram  Scientist, Food Information Team, Palmerston North
Samantha Martell  Technician, Food Information Team, Palmerston North
Kiri Sharp  Technician, Food Information Team, Palmerston North
Natala Gwiazdzinski  Personal Assistant, Food Solutions Group, Palmerston North
Zane Gilmore  Development and Web Infrastructure Team Leader, Science and Business Solutions Team, Lincoln
Thomas Schara  Software Developer (Contractor), Science and Business Solutions Team, Lincoln
Hannah Smith  Research Associate, Food Evaluation Unit, Palmerston North
Zachary Clarke  Research Associate, Food Information Team, Palmerston North
Colin Tod  IT Support Analyst, Customer Support Team, Palmerston North
John Shaw  IS Manager, Acting Science and Business Systems Development Manger, Information and Knowledge Services Group, Lincoln
Andrew King  Software Developer (Contractor)
Dr Megan Woods  Business Manager, Food Innovation Portfolio, Lincoln
Dr Kieran Elborough  General Manager of Science, Food Innovation Portfolio, Auckland
Active team members

Project office (University of Otago)

Wendy Aitken Nutritionist
Charles Blakey Computer Scientist
Liz Fleming Leader of Nutrition Team
Elizabeth Gray Administrative Secretary
Chris Linwood Assistant to Computer Scientist
Taryn McLeod Nutritionist
Jude Mahood Nutritionist
Nick Prosser Nutritionist
Hayley Stevenson Nutritionist
Anita van Rij Assistant Research Fellow
Heather Walker Biostatistician
Sisi Xin Nutritionist
Asher Regan Nutritionist
Rosemarie Petermann Technical Assistant

Field staff

Auckland:
Maggie Calvert (Supervisor)
Matt Bannan
Robyn Carley
Leonie Caulfield
Salome Kavaliku
Kevin Mellon
Kathryn Patchett
Jodi Sinkovich
Jessica Torres
Susan Stoddart

Hamilton:
Meg Davies
Fred Gould
Pauline Lazarus

Palmerston North:
Rochelle Brennan
Sonya Mudgway
Gloria Whitson

Wellington:
Sonja Pierce (Supervisor)
Paul Bennett
Jodine Waghorn
Lesley Waite
Christchurch:
Cindy Aitcheson
Karina Barney
Justine Fallon

Dunedin:
Heather Gruppelaar

Tradestaff Ltd
Jacqui Lucas

External Technical Advisory Group
Dr Barry Borman Chair, Ministry of Health
Dr Niki Stefanogiannis Chair, Ministry of Health
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Professor Jim Mann Department of Human Nutrition, University of Otago
Assoc Prof Cliona Ni Mhurchu Clinical Trials Research Unit, University of Auckland
Assoc Prof Winsome Parnell Department of Human Nutrition, University of Otago
Hiki Pihema Te Runanga o Ngāti Porou Iwi Social Services
Jenny Reid New Zealand Food Safety Authority
Assoc Prof Robert Scragg School of Population Health, University of Auckland
Prof Murray Skeaff Department of Human Nutrition, University of Otago
Kirsten McLachlan Ministry of Health
Robert Templeton Ministry of Health
Maria Turley Ministry of Health
Sally Mackay Ministry of Health
Elizabeth Aitken Ministry of Health

Assistance with recruitment of Pacific people
Dr Debbie Ryan Pacific Perspectives
Dr Api Talemaitoga Ministry of Health
Luama Fereti University of Otago

Peer review of A Focus on Nutrition: Key findings of the 2008/09 New Zealand Adult Nutrition Survey
Elizabeth Aitken Ministry of Health
Beverley Braybrook Ministry of Health
Natalie Talamaivao Ministry of Health
Prof Lynne Cobic CSIRO Australia
Assoc Prof Geoffrey Marks University of Queensland
Emeritus Prof Stewart Truswell University of Sydney
Assoc Prof Cliona Ni Mhurchu Clinical Trials Research Unit, University of Auckland
Appendix 2: Participant feedback

Dear

We are very grateful for your willingness to take part in the 2008/09 New Zealand Adult Nutrition Survey. Your involvement has been extremely helpful and we appreciate your availability and co-operation.

Results of your assessments are listed below and an explanation is given over the page. If any of your values are outside the desirable range we suggest you approach your regular doctor to discuss these results.

Height (cm):
Weight (kg):
Body mass index (BMI):

Waist (cm):

Systolic blood pressure (mmHg):
Diastolic blood pressure (mmHg):

Total cholesterol (mmol/L):
HDL cholesterol (mmol/L):

Haemoglobin (g/L):
Ferritin (µg/L):

Remember to check the explanation over the page and if any of these results concern you please discuss them with your doctor.

Please find enclosed your ................. supermarket vouchers.

Again, very many thanks for your help.

Yours sincerely

Dr Winsome Parnell
Nutrition Director
### Appendix 3: Analytical techniques for nutrients in the New Zealand Food Composition Database (NZFCDB)

#### Table A4.1: Analytical techniques for nutrients

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>INFOODS tagname</th>
<th>Units</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>ENERC</td>
<td>kJ</td>
<td>Calculated as follows: protein = 16.7 kJ/g; total fat = 37.7 kJ/g; available carbohydrate = 16.7 kJ/g; alcohol = 29.3 kJ/g. Energy from fibre is not included.</td>
</tr>
<tr>
<td>Protein</td>
<td>PROCNT</td>
<td>g</td>
<td>Calculated from total nitrogen; generally FAO/WHO conversions factors</td>
</tr>
<tr>
<td>Total fat</td>
<td>FAT</td>
<td>g</td>
<td>Several methods depending on food matrix</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>FASAT</td>
<td>g</td>
<td>Sum of individual saturated fatty acids; GC of methyl esters</td>
</tr>
<tr>
<td>Monounsaturated fat</td>
<td>FAMS</td>
<td>g</td>
<td>Sum of individual monounsaturated fatty acids; GC of methyl esters</td>
</tr>
<tr>
<td>Polyunsaturated fat</td>
<td>FAPU</td>
<td>g</td>
<td>Sum of individual polyunsaturated fatty acids; GC of methyl esters</td>
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<tr>
<td>Cholesterol</td>
<td>CHOLE</td>
<td>mg</td>
<td>GC</td>
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<tr>
<td>Carbohydrate</td>
<td>CHOAVL</td>
<td>g</td>
<td>Available carbohydrate; sum of mono-, di- and oligosaccharides, starch and glycogen; or enzymatic digestion and colorimetry</td>
</tr>
<tr>
<td>Dietary fibre</td>
<td>PSACNS</td>
<td>g</td>
<td>Non-starch polysaccharides/fibre; Englyst method</td>
</tr>
<tr>
<td>Total sugars</td>
<td>SUGAR</td>
<td>g</td>
<td>Total available sugars, sum of individual mono- and disaccharides; GC or HPLC</td>
</tr>
<tr>
<td>Fructose</td>
<td>FRUS</td>
<td>g</td>
<td>Available fructose, sum of individual d-fructose monosaccharides; GC or HPLC</td>
</tr>
<tr>
<td>Sucrose</td>
<td>SUCS</td>
<td>g</td>
<td>Available sucrose, sum of individual sucrose disaccharides; GC or HPLC</td>
</tr>
<tr>
<td>Lactose</td>
<td>LACS</td>
<td>g</td>
<td>Available lactose, sum of individual lactose disaccharides; GC or HPLC</td>
</tr>
<tr>
<td>Alcohol</td>
<td>ALC</td>
<td>g</td>
<td>Alcohol / ethyl alcohol, hydrometer or GC</td>
</tr>
<tr>
<td>Vitamin A equivalents</td>
<td>VITA</td>
<td>µg</td>
<td>Total vitamin A equivalents / retinol equivalents; equals (µg retinol) + (0.166 x µg β-carotene equivalents); HPLC. Conversion factors used for vitamin A equivalents were 6 for β-carotene and 12 for other carotenoids</td>
</tr>
<tr>
<td>Retinol</td>
<td>RETNOL</td>
<td>µg</td>
<td>All trans retinol only, HPLC</td>
</tr>
<tr>
<td>β-carotene</td>
<td>CARTBEQ</td>
<td>µg</td>
<td>Beta-carotene equivalents; equals (µg β-carotene) + (0.5 x µg other provitamin A carotenoids); HPLC</td>
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<tr>
<td>Vitamin C</td>
<td>VITC</td>
<td>mg</td>
<td>HPLC and titration</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>VITE</td>
<td>mg</td>
<td>Vitamin E/α-tocopherol equivalents; equals (mg α-tocopherol) + (0.4 x mg β-tocopherol) + (0.1 x mg gamma-tocopherol) + (0.01 x mg delta-tocopherol) + (0.3 x mg alpha-tocotrienol) + (0.05 x mg β-tocotrienol) + (0.01 x mg gamma-tocotrienol); HPLC</td>
</tr>
<tr>
<td>Thiamin</td>
<td>THIA</td>
<td>mg</td>
<td>HPLC, fluorescence detection of thiochrome</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>RIBF</td>
<td>mg</td>
<td>HPLC, fluorescence detection</td>
</tr>
<tr>
<td>Niacin equivalents</td>
<td>NIAEQ</td>
<td>mg</td>
<td>Total niacin equivalents; equals (mg preformed niacin (HPLC, UV detection)) + (1/60 x mg tryptophan (HPLC))</td>
</tr>
<tr>
<td>Vitamin B₆</td>
<td>VITB6C</td>
<td>mg</td>
<td>HPLC, fluorescence detection</td>
</tr>
</tbody>
</table>
### Nutrient INFORMATION

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>INFOODS tagname</th>
<th>Units</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B₁₂</td>
<td>VITB12</td>
<td>µg</td>
<td>Microbiological</td>
</tr>
<tr>
<td>Folate</td>
<td>FOLDFE</td>
<td>µg</td>
<td>Dietary folate equivalents (a combination of synthetic and naturally occurring folate); radioassay or microbiological. Dietary folate equivalents (FOLDFE) = food folate (FOLFD) + folic acid (FOLAC) x 1.67</td>
</tr>
<tr>
<td>Calcium</td>
<td>CA</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>P</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
</tr>
<tr>
<td>Magnesium</td>
<td>MG</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
</tr>
<tr>
<td>Iron</td>
<td>FE</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
</tr>
<tr>
<td>Zinc</td>
<td>ZN</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
</tr>
<tr>
<td>Potassium</td>
<td>K</td>
<td>mg</td>
<td>Biological material digestion, ICP-OES</td>
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<tr>
<td>Selenium</td>
<td>SE</td>
<td>µg</td>
<td>TMAH (tetra methyl ammonium hydroxide) micro digestion, ICP-MS</td>
</tr>
</tbody>
</table>

**Notes:**
- GC = gas chromatography
- HPLC = high performance liquid chromatography
- ICP-OES = inductively coupled plasma–optical emission spectroscopy
- ICP-MS = inductively coupled plasma–mass spectroscopy
Appendix 4: Nutrient matching

Figure A4.1: Matching foods to nutrient lines from food composition databases

Individual food item description (11,850 selected in total)

Is there a direct match on the NZFC Database?

Yes

Otago

Match made - document decision 3000 (25%) food item descriptions

No

Otago

Is it a branded/fortified food?

Yes

See Figure A4.3

3800 (32%) food item descriptions

No

Otago/PFR

Is it appropriate to use overseas FC data for this food item?

Yes

Otago/PFR

Is there a match from USDA, Australian, British or another FC database?

No

Otago

Convert food amounts to grams; see Figure A4.4

Yes

Otago/PFR

PFR add to NZFCDB: match made - document decision 60 (0.5%) food item descriptions

No

Otago/PFR

PFR, Ministry of Health, Otago Technical Committee

Is this food able to be analysed, eg. • cost • time • availability

Yes

Yes

Recipe solution; see Figure A4.2

4920 (42%) food item descriptions

No

Otago/PFR

PFR analysis and add to NZFCDB: match made - document decision 70 (0.6%) food item descriptions

No

Otago and PFR

Is the frequency of use high enough (relative to other foods) or does this food contribute significantly to the diet to justify New Zealand analysis of this food?

Key:

Otago—University of Otago
PFR—Plant & Food Research Ltd
FC—food composition
USDA—United States Department of Agriculture
NZFCDB—New Zealand Food Composition Database
Figure A4.2: 2008/09 NZ Adult Nutrition Survey recipes

Food list item identified as requiring a recipe. Is it a single ingredient recipe?

- Yes
  - Match to NZFCDB raw ingredient. Amount = 100 g. Is there going to be fat absorbed during cooking?
    - Yes
      - Enter fat absorbed per 100 g as an ingredient
      - Dispatch to PFR
    - No
      - Send nested ingredient recipes to PFR for calculation
      - Find or make an appropriate recipe
      - Are all the ingredients on the food list?
        - Yes
          - Insert ingredients, cooking method, time and temperature plus any nutrient override values for fortification
          - PFR apply moisture yields and retention factors and document these
          - Check nutrient lines
          - Load recipe nutrient lines (4010 recipes)
        - No
          - Import ingredients from NZFCDB or make a recipe for the ingredient if necessary
      - No
        - Insert cooking method
        - Are there going to be fat absorbed during cooking?
          - Yes
            - Enter fat absorbed per 100 g as an ingredient
            - Dispatch to PFR
          - No
            - Send nested ingredient recipes to PFR for calculation

Key
- Otago–University of Otago
- PFR–Plant & Food Research Ltd
- NZFCDB–New Zealand Food Composition Database
**Figure A4.3:** Brand and product name nutrient matching

1. **Is there a direct match on the NZFCDB?**
   - Yes: **PFR – check fortificant levels are up to date in NZFCDB**
   - No: **Is the product fortified? MFD/supermarket shelves/website**

2. **Is there a close match in the NZFCDB or an overseas match?**
   - Yes: **Identify nutrient amounts to override: from MFD; product packaging or contact the manufacturer**
   - No: **Match brand and product as other food list items**

3. **Recipe solution; see Figure A4.2**

4. **Add to NZFCDB**

5. **Send updated NZFCDB to Otago**

6. **Convert food amounts to grams; see Figure A4.4**

**Key**

- MFD–Manufactured Food Database
- PFR–Plant & Food Research Ltd
- NZFCDB–New Zealand Food Composition Database
- Record ID–unique alphanumeric number for each food item
Figure A4.4: Food amounts converted to grams

a) Recipes

Uncooked recipes, home-cooked recipes: Amount expressed as % or proportion

Calculate intake of each ingredient
If <100%, the true intake of each ingredient is a percentage of total amount of each ingredient

b) Foods

g

mL – measured by beans

Volume (shapes) – mL

Density factor applied
Appropriate to form of food (eg, solid, grated)

eg, ‘one medium apple’ = 166 g

All intakes expressed in grams
Appendix 5: Cell sizes

The following table shows the distribution of the sample numbers of final interviews and measurements. The sample size includes respondents who provided any valid data for a section (eg, answered at least one question or had at least one measurement). Pregnant women were excluded from the examination component (anthropometry, blood pressure, biochemical indices). Note that the sample size for some population subgroups was small, particularly for Māori and Pacific aged 15–18 years.
### Table A5.1: Number of respondents for each component of the survey, by age group, sex, ethnic group and NZDep2006

<table>
<thead>
<tr>
<th>Number of respondents</th>
<th>Initial demography</th>
<th>24-hour diet recall</th>
<th>Dietary habits</th>
<th>Nutrition-related health</th>
<th>Additional sociodemography</th>
<th>Food security</th>
<th>Blood pressure</th>
<th>Anthropometry</th>
<th>Blood analysis</th>
<th>Urine analysis</th>
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<tr>
<td></td>
<td>Initial</td>
<td>Repeat</td>
<td>Initial</td>
<td>Repeat</td>
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<td>Repeat</td>
<td>Initial</td>
<td>Repeat</td>
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<td>HbA1c</td>
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Notes: Includes respondents who provided valid data for each section (ie, answered at least one question or had at least one measurement).

Dietary habits includes eating habits and dietary supplements.

1. Cell sizes are based on the final food security categories.
2. Other components of anthropometry may have different cell sizes.
3. \( n = 3359 \) gave blood but the greatest number for an individual component was HbA1c \( (n = 3348) \).
4. Other components of urinary analysis may have different cell sizes.