

TRANSLATING NATIONAL AUSTRALIAN  
DIETARY GUIDELINES TO A WEB-BASED TOOL  
TO EVALUATE DIET QUALITY AND PROVIDE  
REAL-TIME FEEDBACK AND BRIEF ADVICE:

## THE HEALTHY EATING QUIZ



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

FACULTY OF HEALTH



[www.newcastle.edu.au](http://www.newcastle.edu.au)

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# Acknowledgements

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# The Dietary Guidelines for Australians

## Australian Dietary Guidelines

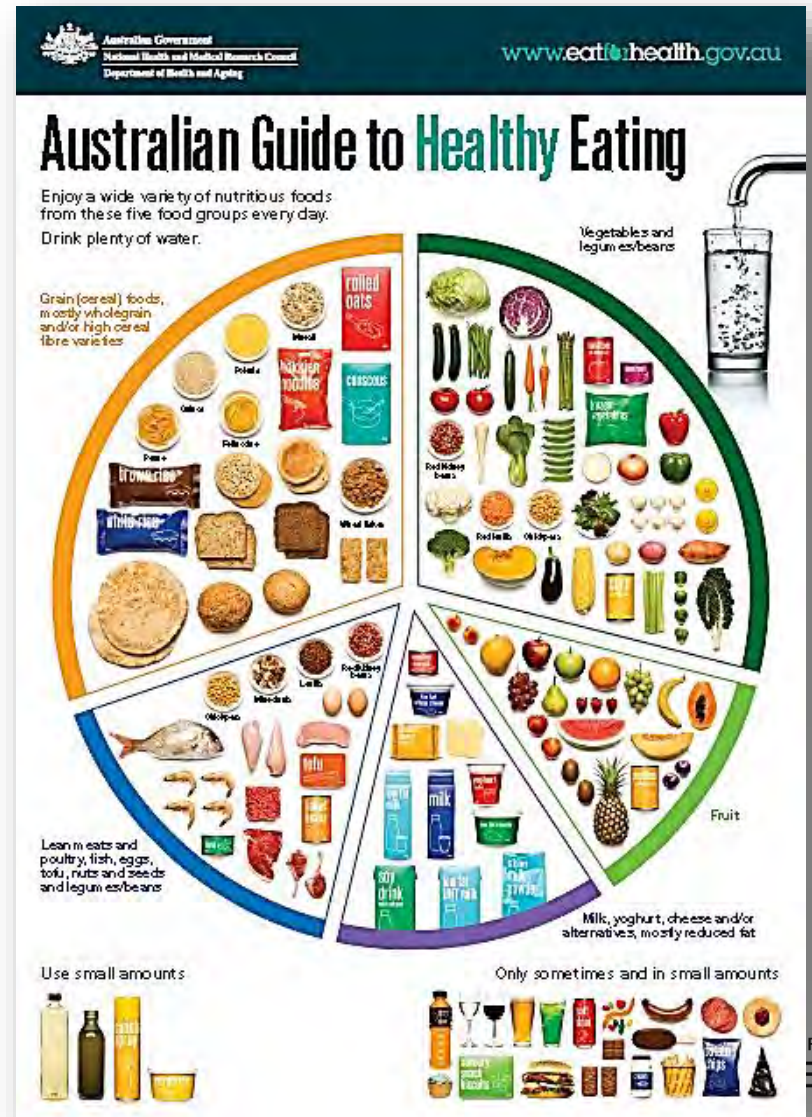
- GUIDELINE 1** To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.
- Children and adolescents should eat sufficient nutritious foods to grow and develop normally. They should be physically active every day and their growth should be checked regularly.
  - Older people should eat nutritious foods and keep physically active to help maintain muscle strength and a healthy weight.

- GUIDELINE 2** Enjoy a wide variety of nutritious foods from these five groups every day:
- Plenty of vegetables, including different types and colours, and legumes/beans
  - Fruit
  - Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
  - Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans
  - Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years)
- And drink plenty of water.

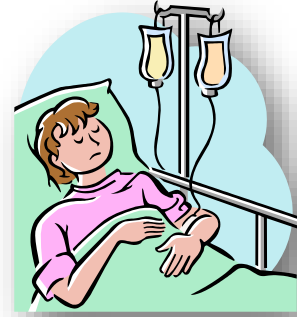
- GUIDELINE 3** Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.
- Limit intake of foods high in saturated fat such as many biscuits, cakes, pastries, pies, processed meats, commercial burgers, pizza, fried foods, potato chips, crisps and other savoury snacks.
    - Replace high fat foods which contain predominantly saturated fats such as butter, cream, cooking margarine, coconut and palm oil with foods which contain predominantly polyunsaturated and monounsaturated fats such as spreads, nut butters/pastes and avocado.
    - Low fat diets are not suitable for children under the age of 2 years.
  - Limit intake of foods and drinks containing added salt.
    - Read labels to choose lower sodium options among similar foods.
    - Do not add salt to foods in cooking or at the table.
  - Limit intake of foods and drinks containing added sugars such as confectionery, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks.
  - If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

**GUIDELINE 4** Encourage, support and promote breastfeeding.

**GUIDELINE 5** Care for your food; prepare and store it safely.



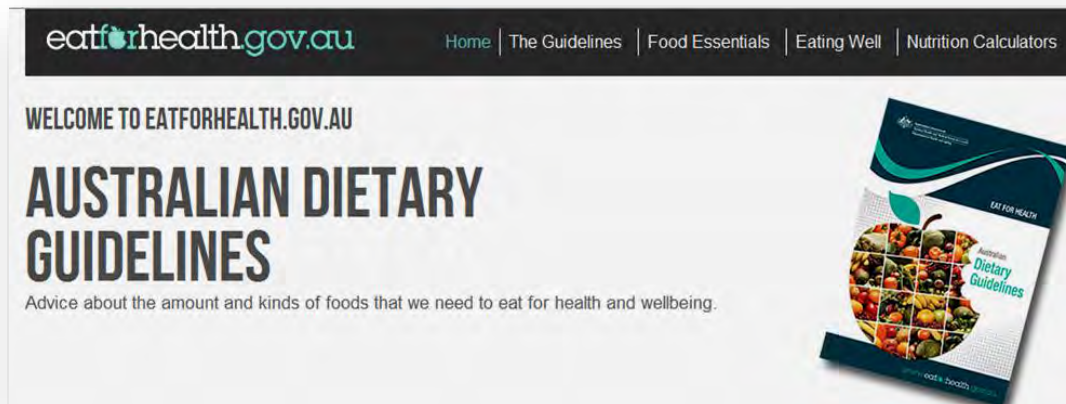
# Background



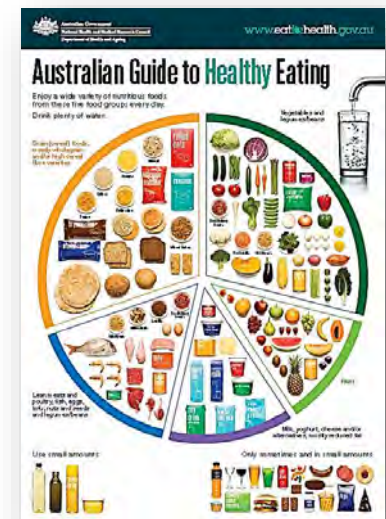
- ▶ Diet-related chronic disease is a major cause of death and disability
- ▶ WHO rates low fruit & vegetable (F&V) intakes as a top 10 risk factor for global mortality
- ▶ Massive disparities between what Australians eat and Australian Dietary Guidelines
- ▶  $\approx 33\%$  kJ from energy-dense nutrient-poor foods
- ▶  $<6\%$  adults eat 2+5 F&V daily

# Background

- ▶ Australian Dietary Guidelines recommend a wide variety of nutritious core foods
- ▶ Breads and cereals, fruits, vegetables, dairy foods, lean meat, poultry, fish, vegetarian alternatives



<https://www.nhmrc.gov.au/guidelines/publications/n55>



[www.eatforhealth.gov.au](http://www.eatforhealth.gov.au)

# Australian Dietary Guidelines evidence statement on diet quality and variety

## GUIDELINE 2

### Enjoy a wide variety of nutritious foods

#### Guideline 2

Enjoy a wide variety of nutritious foods from these five groups every day:

- Plenty of vegetables, including different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as bread, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under 2 years)

And drink plenty of water.



- You can measure Diet Quality using a pre-defined Diet Quality 'Score' or a Diet Quality 'Index'

WELCOME TO EATFORHEALTH.GOV.AU

# AUSTRALIAN DIETARY GUIDELINES

Advice about the amount and kinds of foods that we need to eat for health and wellbeing.



[www.eatforhealth.gov.au](http://www.eatforhealth.gov.au)

- ▶ Diet quality scores predict nutritional adequacy of dietary intake
- ▶ Diet quality predicts risk factors for chronic disease and health outcomes
- ▶ Most studies show an inverse relationship between diet quality and health outcomes

# Diet Quality, morbidity and mortality

- ▶ Higher diet quality was moderately protective
  - All-cause mortality reduced risk of 17-42%
  - CVD mortality ↓ 18-53%
  - CVD risk ↓ 14-28%
  - Cancer mortality ↓ 13-30%
  - All-cancer risk ↓ 7-35%



Wirt A and Collins CE. Diet Quality - What is it and does it matter? *Public Health Nutrition* 2009;12(12);2473-92



# Aim



- ▶ Describe adaptation of a brief diet quality index, *the Australian Recommended Food Score (ARFS)*, to an online format, the Healthy Eating Quiz (HEQ)
- ▶ Report selected data on HEQ use and scores obtained over first two years

# Methods: Australian Recommended Food Score (ARFS)



- ▶ ARFS reflects alignment with ADGs
- ▶ Modelled on USA Recommended Food Score (Kant)
- ▶ Scores variety of foods consumed at least weekly from 'core' food groups
- ▶ 70-questions derived from a validated 120-item semi-quantitative food frequency questionnaire
- ▶ 8 food group sub-scales (vegetables, fruit, meat/flesh foods, non-meat protein foods, breads/cereals, dairy foods, water, condiments)
- ▶ Total score ranges from 0 to 73

# Collapsed Likert scales

Think about what you ate over the last 6 months when

**FRUIT AND VEGETABLES (continued)** *Fill in*

**(F13) Zucchini, eggplant, squash**  
*(1 serving)*

Never  
 Less than 1 per month  
 1-3 per month  
 Once per week  
 2-4 per week  
 5 or more per week

**(F14) Capsicum**  
*(1 serving)*

Never  
 Less than 1 per month  
 1-3 per month  
 Once per week  
 2-4 per week  
 5 or more per week

**(F16) Mushrooms**  
*(1 serving)*

Never  
 Less than 1 per month  
 1-3 per month  
 Once per week  
 2-4 per week  
 5 or more per week

**(F17) Tomatoes**  
*(1 serving)*

Never  
 Less than 1 per month  
 1-3 per month  
 Once per week  
 2-4 per week  
 5 or more per week

- ▶ Only foods that align with Dietary Guidelines
- ▶ Likert scale reduced from 6 to 2 items:-
  - $<1/\text{week}$  or  $\geq 1/\text{wk}$
- ▶ Phase 1: arbitrary cut-points from epi research
- ▶ Provided general advice

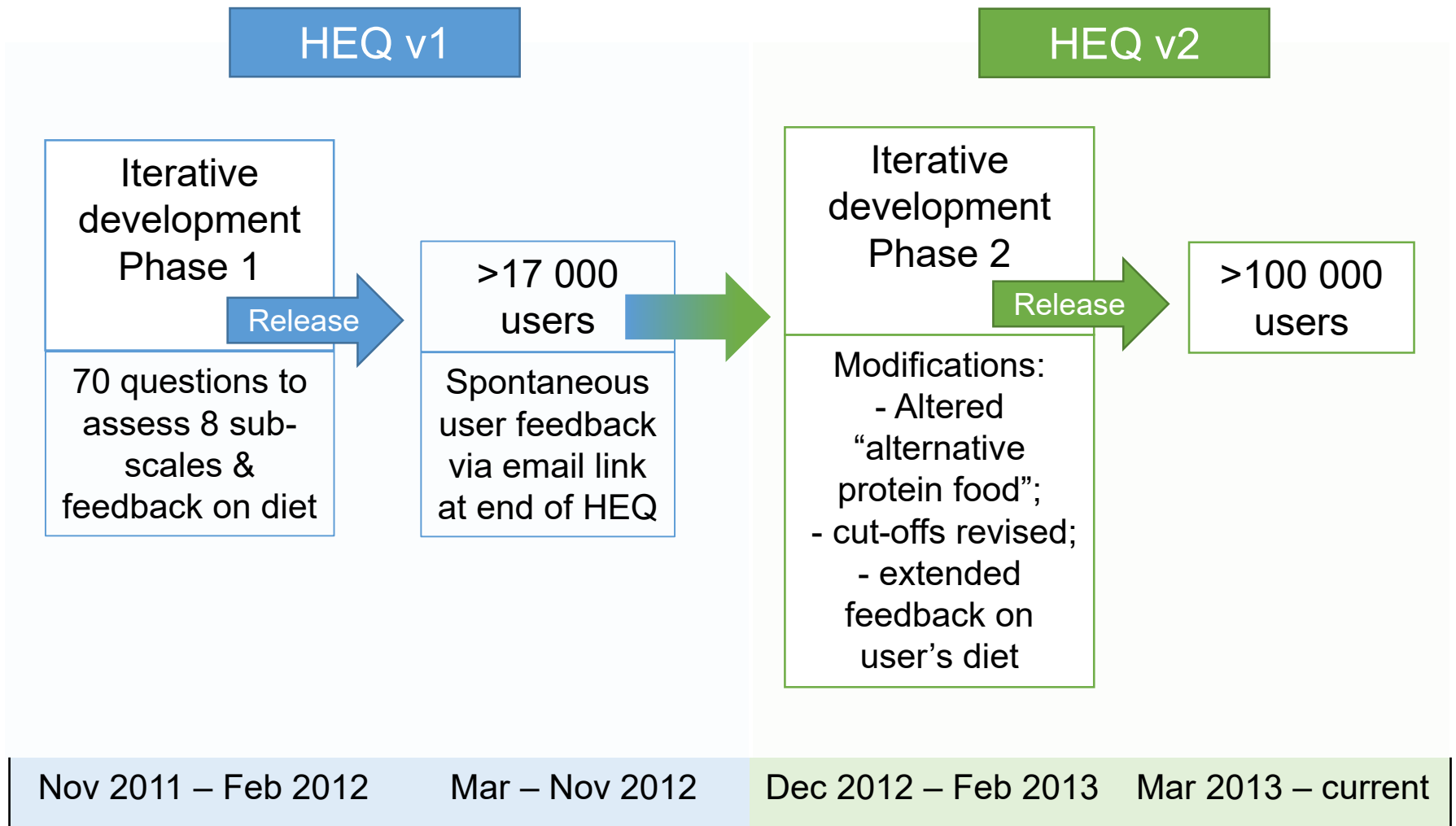
Collins CE, Young AF, Hodge A. Diet Quality Is Associated With Higher Nutrient Intake and Self-Rated Health In Mid-Aged Women. *J Am Coll Nutr*, 2008 Feb;27(1):146-57.

# Methods



- ▶ Relative validity of ARFS compared to nutrient intakes in the full AES FFQ established for adults, children/adolescents and pre-schoolers.
1. Collins K, et al. Validity of the Australian Recommended Food Score as a diet quality index for Preschoolers. *BMC Public Health* 2014, 14:517
  2. Marshall S, et al. The development and evaluation of the Australian Child and Adolescent Recommended Food Score: a cross-sectional study. *Nutr J.* 2012 Nov 19;11(1):96.
  3. Collins CE, et al. The comparative validity and reproducibility of a diet quality index for adults: the Australian Recommended Food Score. *Nutrients* 2015, 7(2), 785-798.
  4. Collins CE, et al. Diet Quality Is Associated With Higher Nutrient Intake And Self-Rated Health In Mid-Aged Women. *Journal of the American College of Nutrition*, 2008 Feb;27(1):146-57.

# Development of the Healthy Eating Quiz (HEQ)

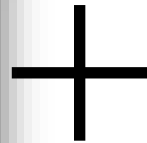


# Methods: Adaptation of scannable AES to the Healthy Eating Quiz

Think about what you ate over the last 6 months when you answer these questions

**FRUIT AND VEGETABLES (continued)** Fill in one oval for each food item

<b>F13</b> Zucchini, eggplant, squash (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F14</b> Capsicum (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F15</b> Corn, sweetcorn, corn on the cob (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week
<b>F16</b> Mushrooms (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F17</b> Tomatoes (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F18</b> Lettuce (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 times per month <input type="radio"/> Once per week <input type="radio"/> 2-4 times per week <input type="radio"/> 5-6 times per week <input type="radio"/> 2 or more times per day
<b>F19</b> Celery, cucumber (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F20</b> Avocado (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F21</b> Onion, spring onion, leek (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week
<b>F22</b> Soybeans, tofu (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F23</b> Baked beans (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week	<b>F24</b> Other beans, lentils eg, chickpeas, split peas (1 serving) <input type="radio"/> Never <input type="radio"/> Less than 1 per month <input type="radio"/> 1-3 per month <input type="radio"/> Once per week <input type="radio"/> 2-4 per week <input type="radio"/> 5 or more per week



## Take The Quiz

How long will the quiz take?  
The quiz will only take about 10-15 minutes.

### About You

Vegetables	
Fruit	
Protein foods - Meat/Fish/Chicken	
Protein foods - Vegetarian Alternatives	
Grains	
Dairy	
Water	
Extras	

### ABOUT YOU

Progress ● ● ●

Gender	<input type="radio"/> Male <input type="radio"/> Female
Age group (years)	<input type="radio"/> < 5 - Not suitable for use in this age group <input type="radio"/> 5-8 <input type="radio"/> 9-15 <input type="radio"/> 16-24 <input type="radio"/> 25-34 <input type="radio"/> 35-44 <input type="radio"/> 45-54 <input type="radio"/> 55-64 <input type="radio"/> 65-74 <input type="radio"/> 75+
Is this the first time you are taking this quiz?	<input type="radio"/> Yes <input type="radio"/> No
Height (Optional)	<input type="radio"/> centimetres <input type="radio"/> feet/inches
Weight (Optional)	<input type="radio"/> kilograms <input type="radio"/> pounds
How do you eat your main meal? (Optional)	<input type="radio"/> By yourself <input type="radio"/> With 1 other person <input type="radio"/> With 2 or more people

30 minutes to complete  
Wait 2 weeks for results

5 minutes to complete online  
Immediate feedback

# Final format presents questions across 8 screens. HEQ takes 5 minutes to complete

[www.healthyeatingquiz.com.au](http://www.healthyeatingquiz.com.au)



The screenshot shows a web browser window with the URL [www.healthyeatingquiz.com.au](http://www.healthyeatingquiz.com.au). The page features a dark header with the title "HEALTHY EATING QUIZ" and navigation links for "ABOUT", "TAKE THE QUIZ", and "TERMS OF USE". A green sidebar on the left contains the heading "About The Quiz". The main content area includes a large image of fresh vegetables (broccoli, spinach, tomatoes) and a white text box with the following text:

**WELCOME TO THE HEALTHY EATING QUIZ!**

**Purpose of the Quiz**

The healthy eating quiz is designed to help you rate how healthy your current eating habits are. It will help you identify areas in which you are already considered to be a healthy eater and where you could improve your eating habits. At the end of the quiz, you will receive a report with ideas to help you improve your healthy eating score.

Come back and visit the Health Eating Quiz again in a couple of weeks, after you have tried these tips, and see if your numbers improve.

**Who developed the Healthy Eating Quiz?**

# Healthy Eating Quiz Feedback

## OVERALL SCORE

 [Send Quiz to Friend](#) |  [Email Results](#) |  [Print Results](#)

Overall

Excellent (44 out of 73)

Your total Australian Recommended Food Score shows you are eating a good variety of foods. You are close to being in the top group. Good work!

- Boost your score to the next level by including a greater variety of healthy foods from each group
- Each week, try adding new food items you have not tried before to your meals and snacks

## SECTION BREAKDOWN

Section

Result

Vegetables

Excellent (15 out of 21)

### Health Benefits:

Did you know that eating vegetables helps slow ageing, control body weight and can even make you look healthier? Eating plenty of different types of vegetables reduces the risk of heart disease and Type 2 diabetes. Having lots of vegetables has also been shown to decrease the risk of many cancers including stomach, breast, lung, colorectal, oesophageal and oral, endometrial, ovarian and bladder cancer. Vegetables contain important vitamins and minerals such as magnesium, potassium, folate and Vitamin C. Magnesium helps keep bones strong and potassium can help reduce blood pressure. Vitamins like folate can protect you from heart disease as well as look after your DNA (the blueprint for building our bodies). Folate is very important to consume during pregnancy. Vitamin C can help to 'mop up' harmful substances, called 'free radicals', which can increase the risk of cancer. We even know that people who eat more varieties of vegetables are able to stay a healthier weight. Aim for 5 serves of vegetables per day.

[How to improve your score](#)

[Did You Know?](#)



# How to improve your score

Section

Result

Vegetables

Excellent (15 out of 21)

## Health Benefits:

Did you know that eating vegetables helps slow ageing, control body weight and can even make you look healthier? Eating plenty of different types of vegetables reduces the risk of heart disease and Type 2 diabetes. Having lots of vegetables has also been shown to decrease the risk of many cancers including stomach, breast, lung, colorectal, oesophageal and oral, endometrial, ovarian and bladder cancer. Vegetables contain important vitamins and minerals such as magnesium, potassium, folate and Vitamin C. Magnesium helps keep bones strong and potassium can help reduce blood pressure. Vitamins like folate can protect you from heart disease as well as look after your DNA (the blueprint for building our bodies). Folate is very important to consume during pregnancy. Vitamin C can help to 'mop up' harmful substances, called 'free radicals', which can increase the risk of cancer. We even know that people who eat more varieties of vegetables are able to stay a healthier weight. Aim for 5 serves of vegetables per day.

## How to improve your score

### How to improve your score:

- Increase the variety of vegetables that you taste on a weekly basis. Next time you are at the supermarket, pick up one or two different vegetables to trial each week
- Snack on raw vegetables like carrots, celery or cherry tomatoes with a low fat dip e.g. low fat hummus or salsa
- Visit a farmers market to check out new and in season vegies
- Plant a tomato vine or start a herb garden
- Try a home delivery vegetable service
- Eat a chunky vegetable soup with wholegrain crusty bread

# Did you know?

## SECTION BREAKDOWN

Section	Result
Vegetables	Excellent (15 out of 21)

### Health Benefits:

Did you know that eating vegetables helps slow ageing, control body weight and can even make you look healthier? Eating plenty of different types of vegetables reduces the risk of heart disease and Type 2 diabetes. Having lots of vegetables has also been shown to decrease the risk of many cancers including stomach, breast, lung, colorectal, oesophageal and oral, endometrial, ovarian and bladder cancer. Vegetables contain important vitamins and minerals such as magnesium, potassium, folate and Vitamin C. Magnesium helps keep bones strong and potassium can help reduce blood pressure. Vitamins like folate can protect you from heart disease as well as look after your DNA (the blueprint for building our bodies). Folate is very important to consume during pregnancy. Vitamin C can help to 'mop up' harmful substances, called 'free radicals', which can increase the risk of cancer. We even know that people who eat more varieties of vegetables are able to stay a healthier weight. Aim for 5 serves of vegetables per day.

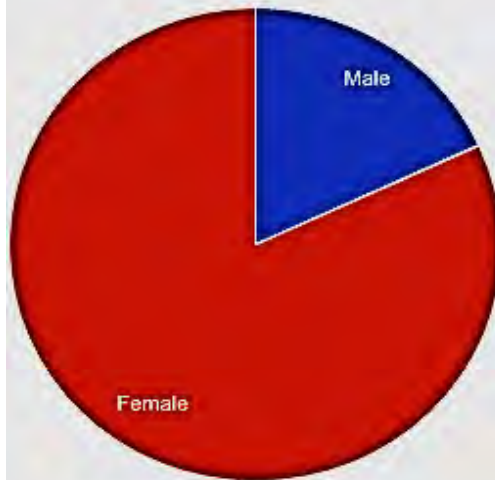
### Did You Know?

#### Did you know?

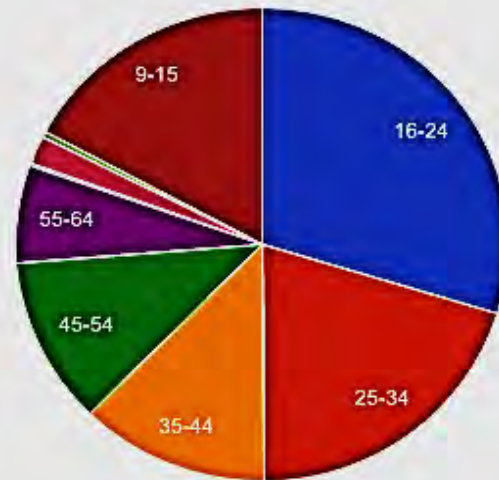
Some nutrients in vegetables (such as Vitamin C and Vitamin A) can be lost if you boil them (e.g. water soluble Vitamin C and Vitamin A). Try steaming vegetables instead of boiling to retain more of the nutrients.

# Results

## GENDER



## AGE



Phase 2 users completing the quiz

## VEGETARIAN



## FIRST TIME



# Results



Max HEQ score = 73

Needs work =  $\leq 32$

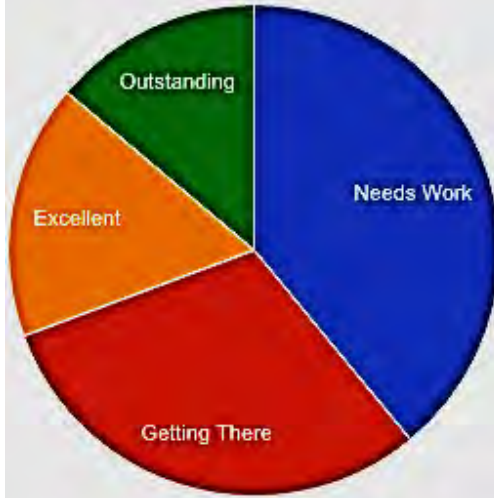
Getting there = 33-38

Excellent = 39-46

Outstanding = 47+

Phase 2 cut-points based on quantiles from Phase 1

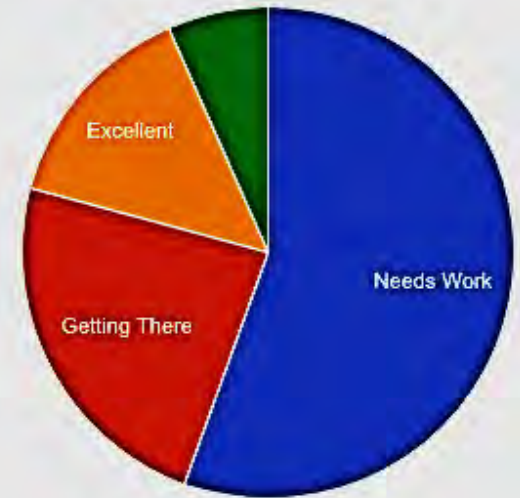
**Vegetables**



**Fruit**

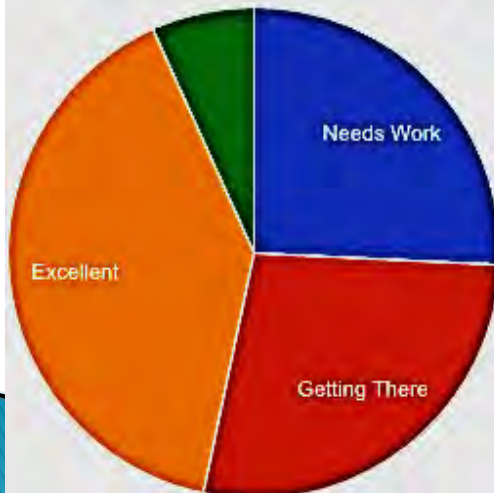


**Protein foods  
- Meat/Fish/Chicken**

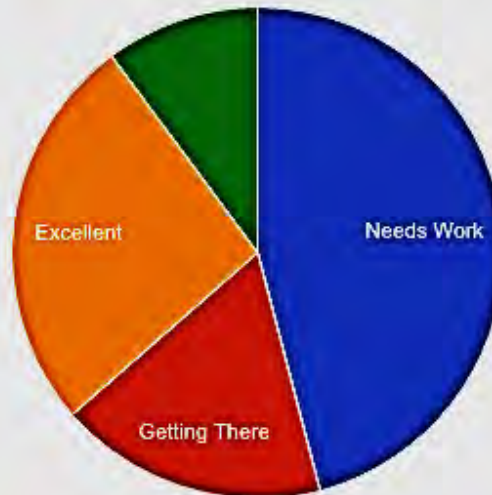


**Australians need more help to eat better!**

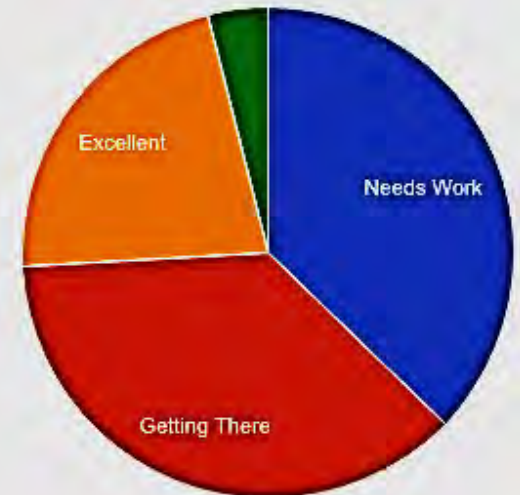
**Protein foods  
- Vegetarian Alternatives**



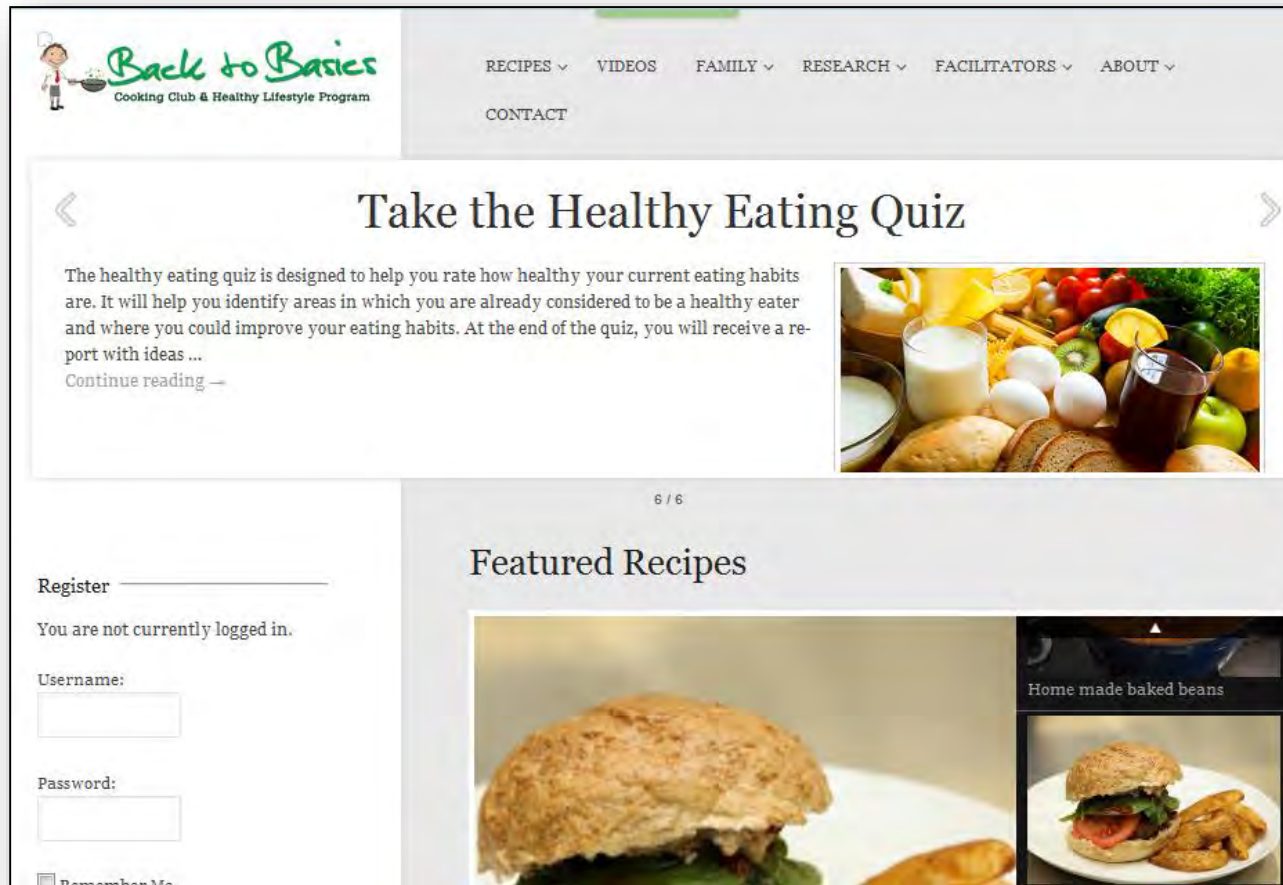
**Grains**



**Dairy**



# The Healthy Eating Quiz linked into our exiting online programs



The screenshot displays the 'Back to Basics' website interface. At the top left is the logo for 'Back to Basics Cooking Club & Healthy Lifestyle Program'. The navigation menu includes 'RECIPES', 'VIDEOS', 'FAMILY', 'RESEARCH', 'FACILITATORS', 'ABOUT', and 'CONTACT'. The main content area features a section titled 'Take the Healthy Eating Quiz' with a description: 'The healthy eating quiz is designed to help you rate how healthy your current eating habits are. It will help you identify areas in which you are already considered to be a healthy eater and where you could improve your eating habits. At the end of the quiz, you will receive a report with ideas ...' and a 'Continue reading' link. To the right of the text is an image of various fresh fruits and vegetables. Below the quiz section is a 'Featured Recipes' section with a '6 / 6' indicator. It shows a large image of a burger and a smaller image of 'Home made baked beans' with a burger and fries.

<http://cookingmattersaustralia.com.au/>

healthydadsandkids.com.au

major sponsor **COAL & ALLIED**  
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enter search terms

## Take our Healthy Eating Quiz online NOW !!!

The Australian Healthy Eating Quiz asks how often you eat a range of healthy foods. The score shows how healthy your usual food habits are and gives ideas to improve. Repeat the quiz in a month to see the difference. Already eat healthy foods? Try the suggestions and see if you can score even higher.

Feb 22, 2012 | 0 comments | View Post

### HDHK News

#### Take our Healthy Eating Quiz online NOW !!!

The Australian Healthy Eating Quiz asks how often you eat a range of healthy foods. The score shows how healthy your usual food habits are and gives ideas to improve. Repeat the quiz in a month to

### What others say

#### HDHK got Scott Hungerford on his bike!

Can you we please pass on our thanks to the organisers of the HDHK group at Singleton. Particular thanks to Zane and Wade for their patience. Our children and I enjoyed the times together and we certainly have learned from

### About this site ...

A Community Health Prevention Research Program

# Discussion



- ▶ ARFS is a validated tool, converted to an online format as the Healthy Eating Quiz
- ▶ Few validated tools available to rate diet quality and that have wide appeal
- ▶ Simple to use and provides immediate feedback
- ▶ HEQ used by individuals seeking feedback on dietary patterns, families, teachers and researchers seeking brief ways to provide dietary advice and assess dietary patterns



Display Settings:  Abstract

Send to:

*Psychiatry Res.* 2014 Jun 27. pii: S0165-1781(14)00538-1. doi: 10.1016/j.psychres.2014.06.035. [Epub ahead of print]

## 'Better Health Choices' by telephone: A feasibility trial of improving diet and physical activity in people diagnosed with psychotic disorders.

Baker AL<sup>1</sup>, Turner A<sup>2</sup>, Kelly PJ<sup>3</sup>, Spring B<sup>4</sup>, Callister R<sup>5</sup>, Collins CE<sup>5</sup>, Woodcock KL<sup>6</sup>, Kay-Lambkin FJ<sup>6</sup>, Devir H<sup>7</sup>, Lewin TJ<sup>8</sup>.

### Author information

#### Abstract

The study objective was to evaluate the feasibility of a telephone delivered intervention consisting of motivational interviewing and cognitive behavioural strategies aimed at improving diet and physical activity in people diagnosed with psychotic disorders. Twenty participants diagnosed with a non-acute psychotic disorder were recruited. The intervention consisted of eight telephone delivered sessions targeting fruit and vegetable (F&V) consumption and leisure screen time, as well as smoking and alcohol use (as appropriate). F&V frequency and variety, and overall diet quality (measured by the Australian Recommended Food Score, ARFS), leisure screen time, overall sitting and walking time, smoking, alcohol consumption, mood, quality of life, and global functioning were examined before and 4-weeks post-treatment. Nineteen participants (95%) completed all intervention sessions, and 17 (85%) completed follow-up assessments. Significant increases from baseline to post-treatment were seen in ARFS fruit, vegetable and overall diet quality scores, quality of life and global functioning. Significant reductions in leisure screen time and overall sitting time were also seen. Results indicated that a telephone delivered intervention targeting key cardiovascular disease risk behaviours appears to be feasible and relatively effective in the short-term for people diagnosed with psychosis. A randomized controlled trial is warranted to replicate and extend these findings.

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**KEYWORDS:** Fruit; Motivational interviewing; Psychotic disorder; Sedentary lifestyle; Smoking; Vegetables

PMID: 25078563 [PubMed - as supplied by publisher]



# Discussion

- ▶ User feedback contributed to refinement of HEQ in Phase 2
- ▶ Phase 1 user scores informed feedback cut-points for Phase 2
- ▶ Phase 2 accounted for vegetarians and those seeking more information on food groups



# Conclusions



- ▶ HEQ is a novel tool to evaluate diet quality and provide brief dietary advice
- ▶ People are interested in online feedback on their dietary intake
- ▶ HEQ has broad reach and appeal
- ▶ Further prospective evaluation within dietary interventions is warranted