



Department of
Agriculture and Food



GRDC

Grains
Research &
Development
Corporation

Wholegrain Foods and Legumes in Health and Nutrition: A Review

Go Grains Health & Nutrition Ltd

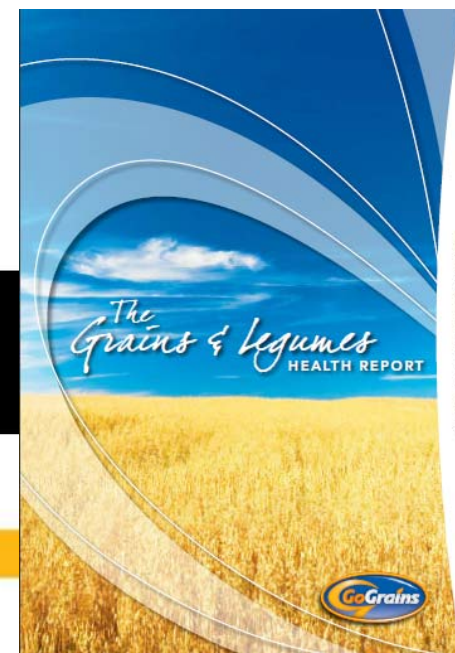
Robyn Murray

Introducing Go Grains Health & Nutrition

- **Australia's leading independent voice in grains and legumes in health and nutrition**
- Knowledge centre – specialised resources
 - translate nutrition science into key messages for influencers
 - health care professionals
 - Government
 - Regulators
 - food industry
- Key contributors
 - Members of the grains and legumes value chain

Objective of the Review

- Go Grains commissioned a review of the science in wholegrain foods and legumes in the diet in 2010
- Examined the extensive body of literature exploring evidence for the role of grain-based foods and legumes in the diet
- “The Grains & Legumes Health Report – A Review of the Science”¹, co authored by Assoc. Prof Peter Williams from the University of Wollongong and Go Grains
- Includes results from 2009 Go Grains Consumption Survey
- Report is available at www.gograins.com.au



Wholegrain Foods and Legumes in Health and Nutrition: A Review

- Grains and Wholegrain Foods
- Legumes
- Consumption
- Health Care Savings

Wholegrain Foods and Legumes in Health and Nutrition: A Review

- Grains and Wholegrain Foods
- Legumes
- Consumption
- Disease Status and Health Care Savings
- Key Messages

Background Information: Grains

- **Grains** (cereals), are the edible seeds of plants belonging to the cereal grass family
- **Wheat, rice, oats**, rye, barley, corn, triticale, sorghum and millet
- Grains are a staple food around the world
- Cereal grains are high in carbohydrates, low in fat, good sources of protein and provide varying amounts of fibre, vitamins and minerals
- NNS 95' – breads and cereal based foods were key contributors in the diet
 - Primary source - fibre, thiamin, magnesium and iron
 - Secondary source - folate, niacin, zinc and protein



Background Information: Wholegrains

- Grains need to be processed to make them suitable to eat
- Milling helps release valuable nutrients concentrated within the outer layers of the grain
- Wholegrain Definition (FSC) “the intact grain or the dehulled, ground, milled, cracked or flaked grain where the constituents – endosperm, germ and bran – are present in such proportions that represent the typical ratio of those fractions occurring in the whole cereal, and includes wholemeal²”
- Wholegrains contain many functional components that work both alone and in synergy to promote health and offer significant protection against



**Guaranteed
WHOLEGRAIN**

Key Findings: Wholegrain foods reduce disease risk

- Eating 2-3[#] serves of wholegrain foods a day is associated with a reduced risk of developing chronic disease by 20% - 30%
 - cardiovascular disease³,
 - type 2 diabetes⁴
 - certain cancers⁵
- Eating 2-4[#] serves of wholegrain foods a day can reduce the risk of heart disease by as much as 40% - equal to the effect of statin drugs^{6,7}.
- Wholegrain foods can help to lower blood pressure.⁸
- A diet high in wholegrains is associated with
 - a lower body mass index (BMI,)
 - waist circumference.

- reduce weight gain and a diet.

US serve sizes, (eg. one serve is equivalent to one slice of bread)

Key Findings: Wholegrain foods reduce disease risk

- Wholegrain foods can reduce the progression from impaired glucose tolerance to type 2 diabetes by up to 58%.¹⁰
- Wholegrain foods are associated with lower cancer risk
 - The evidence suggests wholegrain and fibre rich cereal foods may protect against colorectal cancers, gastric cancers and possibly also breast, endometrial and prostate cancers.^{11-14, 15}
- Emerging science about the benefits of wholegrain consumption for prevention of periodontal disease,¹⁶ and asthma¹⁷,
- Suggestive evidence for improvements in mood and cognitive function.¹⁸⁻²⁰

Dietary Recommendations: Grain-based foods

- Australian Dietary Guidelines / Australian Guide to Healthy Eating recommend **four serves of grain based foods each day, 'preferably wholegrain'**¹⁵
- What is a serve of grain-based food?
 - 2 slices of bread
 - ½ cup muesli
 - 1 cup cooked rice, noodles, pasta
 - 1 cup of porridge
 - 1 cup of breakfast cereal or 2 wheat flake biscuits
- In 2008, Go Grains in collaboration with the International Life Sciences Institute (ILSI) established an achievable, evidence-based Daily Target Intake (DTI) for wholegrains of 48g a day^{22,23}
- The 48g DTI can be found on the crispbreads and snacks



Wholegrain Content of Wholegrain Foods

- No Australian definition for 'wholegrain food'
- Wholegrain content varies across food categories, brands and recipe formulation
- Commonly available foods containing wholegrains (approx amounts):

Food	Serve Size	Wholegrains (g)
Wholemeal bread	2 slices	30-40
Multi-grain bread	2 slices	5-30
Wheat-flake breakfast biscuits	2 biscuits	30
Wholegrain breakfast cereal	30-45g serve	15-30
Porridge	1/3 cup raw rolled oats	30
Brown rice	1 cup cooked	65
Wholegrain pasta	1 cup cooked	55-65
Wholegrain crispbreads	2-4 slices	20-35
Popcorn (plain)	20g	15
Muesli bar	1 bar	10-15

**48g
Daily Intake
Wholegrains
- at least
2 serves /day**

Wholegrain Foods and Legumes in Health and Nutrition: A Review

- Grains and Wholegrain Foods
- Legumes
- Consumption
- Disease Status and Health Care Savings

Legumes

- Also known as pulses, include all forms of beans and peas
- Butter beans, haricot (navy beans), cannellini beans, red kidney beans, adzuki beans, black eyed-peas, soybeans, mung beans, lentils, split peas, peanuts and chickpeas.
- Provide a range of essential nutrients including protein, low glycaemic carbohydrates, dietary fibre, vitamins, minerals and phytochemicals.



Key Findings: Legumes reduce disease risk

- Low intake of legumes in most populations
- Lower number of scientific studies conducted, evidence is weaker than for wholegrain foods
- Epidemiological studies consistently show that eating legumes can help reduce the risk of
 - cardiovascular disease
 - diabetes
 - obesity
 - improve gut health²⁴

- 22% lower risk of coronary heart disease²⁵
- 11% lower risk of cardiovascular disease²⁶

Key Findings: Legumes reduce disease risk

- 20g increase in legumes per day was associated with a 7-8% lower risk of death in older people in a 7 year study of five cohorts in Japan, Sweden, Greece and Australia.²⁶
- The World Cancer Research Fund and the American Institute for Cancer Research recommend people "eat relatively unprocessed cereals (grains) and/or pulses (legumes) with every meal"²⁷
- Go Grains involved in further research with Uni SA, Uni of Manitoba, Simplot, Heinz, Sanitarium, SA Govt, Pulse Australia and GRDC
 - cardio-metabolic risk factors and cognition



Wholegrain Foods and Legumes in Health and Nutrition: A Review

- Grains and Wholegrain Foods
- Legumes
- Consumption
- Disease Status and Health Care Savings

Key Findings:

Australians don't eat enough grain-based foods

Go Grains Consumption Study 2009

- n=1718, nationally representative sample, aged 5-80yrs
- 2 day food diary (self reported), followed by an online survey
- Collected data for 63 foods

Results: Grain-based Foods

- Australians on average consumed 5 serves of grain-based foods per day
- 25% made up of non-core grain-based foods or extra foods such as cakes, biscuits, pastries, hamburgers, hot dogs, pies, sausage rolls and other takeaway foods
- Adjusted average serves per day 4.08
 - minimum number of serves recommended by Australian Dietary Guidelines

- Females - 3.28* serves per day
- Kids 5 - 14 yrs - 3.14* serves per day
- Rural communities - 3.77* serves per day



Key Findings:

Low consumption of wholegrain foods & legumes

Results: Wholegrain Foods

- Australians on average consumed 1.43 serves of wholegrains foods each day
- Rural communities consumed 1.29 serves of wholegrain foods each day

Results: Legumes

- consumed by only 23% of all Australians
- Baked beans were the main contributor to legume intake, particularly in rural communities

Go Grains Consumption Study 2011

- Extended focus on rural com



Wholegrain Foods and Legumes in Health and Nutrition: A Review

- Grains and Wholegrain Foods
- Legumes
- Consumption
- Health Care Savings



Key Findings: Significant health care savings with just three serves of wholegrain foods a day

Theoretical health expenditure cost savings with 3 serves of wholegrains each day

Disease Group	2001 Annual Healthcare Expenditure (\$million)	Percent Related to Diet	20% Annual Saving (\$million)
Cancers	2,918	40% (prostate, colorectal, breast only)	233.3
Cardiovascular	5,479	40% (CHD, stroke)	438.3
Diabetes	812	84% (type 2)	136.4
Endocrine, nutritional, metabolic	1,587	45% (obesity)	142.8
Total in 2001	10,796		950.8
Adjusted for 3.1% annual inflation in health care expenditure to 2009			1,213.8

Based on a conservative 20% reduction in the incidence of each of these major diseases, health expenditure cost savings **>\$1.2 billion annually**

The Challenge: Increasing Consumption

Barriers to wholegrain food and legume consumption

- Traditional and cultural preferences for refined grain foods
- Limited availability of wholegrain foods and legumes in supermarkets and foodservice settings
- Unfamiliarity with preparation and cooking techniques
- Confusion in product labeling

The Challenge: Increasing Consumption

Solutions:

- Consistent wholegrain and legume messaging to influencers and consumers
 - On pack
 - Education
 - Dietitian Information and Workshops
 - Go 4 Grains Kids Design Challenge
 - Go Grains brochures (www.gograins.com.au)
 - Recipes



Key Messages

- **Grains, particularly wholegrains and legumes can reduce the risk of chronic diseases, by at least 20%**
- Australian population is **under-consuming grain-based foods, particularly wholegrains and legumes**
- **Go Grains plays a role in increasing consumption**

Wholegrain Foods and Legumes in Health and Nutrition: A Review

Thank You

Further Information

www.gograins.com.au

r.murray@gograins.com.au



References:

1. The Grains and Legumes Health Report. Go Grains Health & Nutrition and Assoc. Prof Peter Williams, University of Wollongong, 2009.
2. Food Standards Australia New Zealand. The Food Standards Code. 2010 [cited 11 January 2010]; Available from: <http://www.foodstandards.gov.au/foodstandards/foodstandardscode/>
3. De Moura F, Whole grain intake and cardiovascular disease and whole grain intake and diabetes review (available at <http://www.lsro.org/articles/wholeGrainIntake.html>). 2008, Life Sciences Research Office: Bethesda, MA.
4. Priebe M, van Binsbergen J, de Vos R, and Vonk Roel J. Whole grain foods for the prevention of type 2 diabetes mellitus. Cochrane Database of Systematic Reviews. 2008(1).
5. Jacobs D, Marquart L, Slavin J, and Kushi L. Whole-grain intake and cancer: an expanded meta-analysis. Nutrition and Cancer. 1998; 30(2):85-96.
6. Flight I and Clifton P. Cereal grains and legumes in the prevention of coronary heart disease and stroke: a review of the literature. European Journal of Clinical Nutrition. 2006;60(10):1145-59.
7. Clark L. Treating dyslipidemia with statins: the risk benefit profile. American Heart Journal. 2003;145(3):387-396.
8. Behall KM, Scholfield DJ, and Hallfrisch J. Whole-Grain Diets Reduce Blood Pressure in Mildly Hypercholesterolemic Men and Women. Journal of the American Dietetic Association. 2006; 106(9):1445-1449.
9. Williams PG, Grafenauer SJ, O'Shea JE, Williams PG, Grafenauer SJ, and O'Shea JE. Cereal grains, legumes, and weight management: a comprehensive review of the scientific evidence. Nutrition Reviews. 2008;66(4):171-82.
10. Tuomilehto J, Lindstrom J, Eriksson J, Valle T, Hamalainen H, Ilanne-Parikka P, Keinanen-Kiukaanniemi S, Laakso M, Louheranta A, Rastas M, Salminen V, and Uusitupa M. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. New England Journal of Medicine. 2001;344:1343-1350.
11. La Vecchia C, Chatenoud L, Negri E, and Franceschi S. Wholegrain cereals and cancer in Italy. Proceedings of the Nutrition Society. 2003;62:45-49.
12. Jacobs D, Marquart L, Slavin J, and Kushi L. Whole-grain intake and cancer: an expanded meta-analysis. Nutrition and

References:

14. Williams MT and Hord HG. The role of dietary factors in cancer prevention: beyond fruits and vegetables. *Nutrition in Clinical Practice*. 2005;20(4):451-459
15. National Health and Medical Research Council. *Food for Health: Dietary Guidelines for Australian Adults*. Canberra: NH&MRC.2003.
16. Merchant AT, Pitiphat W, Franz M, Joshipura KJ, Merchant AT, Pitiphat W, Franz M, and Joshipura KJ. Whole-grain and fiber intakes and periodontitis risk in men. *American Journal of Clinical Nutrition*. 2006;83(6):1395-400.
17. Tabak C, Wijga A, de Meer G, Janssen N, Brunekreef B, and Smit H. Diet and asthma in Dutch school children (ISAAC-2). *Thorax*. 2006;61:1048-1053.
18. Smith A, Bazzoni C, Beale J, Elliott-Smith J, and Tiley M. High fibre breakfast cereals reduce fatigue. *Appetite*. 2001;37:249-250.
19. Logan A. Dietary fiber, mood, and behavior. *Nutrition*. 2006;22:213-214.
20. D'Anci K, Watts K, Kararek R, and Taylor H. Low-carbohydrate weight-loss diets.
21. Nutrient Data Laboratory US Department of Agriculture Oxygen radical absorbance capacity (ORAC) of selected foods - 2007. 2007 [cited 15 January 2010]; Available from: <http://www.ars.usda.gov/sp2userfiles/place/12354500/data/orac/orac07.pdf>.
22. Griffiths T and Nestel P. Developing a target for daily wholegrain intake for Australians. *Food Australia*. 2006;58(9):431-433.
23. Griffiths T. Towards an Australian 'daily target intake' for wholegrains. *Food Australia*. 2007;59(12):600-601.
24. Kushi LH, Meyer KA, and Jacobs DR, Jr. Cereals, legumes, and chronic disease risk reduction: evidence from epidemiologic studies. *Am J Clin Nutr*. 1999;70(3):451S-458.
25. Bazzano L, He J, Ogden L, Loria C, Vupputuri S, Myers L, and Whelton P. Legume consumption and risk of coronary heart disease in US men and women: NHANES 1 Epidemiologic Follow-up Study. *Archives of Internal Medicine*. 2001;161:2573-2578
26. Darmadi-Blackberry I, Wahlqvist M, Kouris-Blazos A, Steen, Lukito W, Horie Y, and Horie K. Legumes: the most important predictor of survival in older people of different ethnicities. *Asia Pacific Journal of Clinical Nutrition*.