MANATŪ HAUORA
MINISTRY OF HEALTH

133 Molesworth Street
PO Box 5013
Wellington 6140
New Zealand
T+64 4 496 2000

11 November 2022

s 9(2)(a)

By email: s 9(2)(a)
Ref: H2022014803

Tēnā koe s 9(2)(a)

Response to your request for official information

Thank you for your request under the Official Information Act 1982 (the Act) to Manatū Hauora (the Ministry of Health) on 14 October 2022 for information regarding NZ Ministry of Health Draft Eating and Activity Guidelines Statements 2014. You requested:

> *"Documents that outline the rationale for removing "calcium-fortified milk alternatives" from the NZ Ministry of Health Draft Eating and Activity Guidelines Statements 2014 statement: Enjoy a variety of nutritious foods every day including: ... some low fat milk products and/or calcium-fortified milk alternatives". The final statement was changed to: Enjoy a variety of nutritious foods every day including: some milk and milk products, mostly low and reduced fat". My specific information request is to understand why "calcium-fortified milk alternatives" was removed. Please provide me with any documents, emails, notes or any other files related to this change".*

Before providing any further documentation related to your request, I would like to provide an overview of how the wording was changed. The statement was revised in response to feedback from the consultation process held in April 2014. This included feedback from a limited number of key stakeholders and consumer focus groups and Te Hiringa Hauora (the Health Promotion Agency).

In addition to the documentation that has already been provided to you, please see attached document 1 titled '*Agenda item 5 Briefing paper with feedback from consultation and the revised eating and activity statements*'. This document and the incorporated documents are outlined in the table in Appendix one. Document 1 provides a summary of feedback received, however, it does not include an explanation of why the wording of the Statement was changed. We consider it likely that the Statement was changed from a communications point of view, to make it easier for the public to understand. The food group 'some milk and milk products, mostly low and reduced fat' includes plant-based milk alternatives. Please note, where information is withheld under section 9 of the Act, I have considered the countervailing public interest in releasing information and consider that it does not outweigh the need to withhold at this time.

I trust this information fulfils your request. Under section 28(3) of the Act, you have the right to ask the Ombudsman to review any decisions made under this request. The Ombudsman may be contacted by email at: info@ombudsman.parliament.nz or by calling 0800 802 602.

Please note that this response, with your personal details removed, may be published on the Manatū Hauora website at: www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests.

Nāku noa, nā

Dr Andrew Old
Deputy Director-General
Public Health Agency | Te Pou Hauora Tūmatanui

Appendix 1: List of documents for release

#	Date	Document details	Decision on release
1	June 2014	Agenda item 5 Briefing paper with feedback from consultation and the revised eating and activity statements	Released in full
1A	May 2014	Eating and activity guidelines series key statements	
1B	19 May 2014	Eating and activity guideline statements	
1C	April 2014	Response to Draft Dietary Guidelines Submitted to the Ministry of Health	
1D	May 2014	Response to Ministry of Health's Saturated Fat query	
1E	April 2014	Feedback on proposed key healthy eating and physical activity messages (guidelines statements) for adult New Zealanders	Some information withheld under section 9(2)(a) of the Act to protect the privacy of natural persons

Agenda item 5

Briefing paper with feedback from consultation and the revised eating and activity statements

Purpose

This paper provides:

- a summary for the Technical Advisory Group (TAG) members on the process and feedback received from consultation on the eating and activity statements (*the statements*).
- the revised *statements* and changes made to date on *the statements* following the consultation process.

Summary

Section 1 of this paper provides feedback on *the statements* from:

A. limited consultation with key stakeholder groups[i]
B. consumer focus groups and the Health Promotion Agency (HPA) (communication perspective).

Section 2 of this paper provides the revised *statements* following the consultation process.

As *the statements* have been written for health practitioners, the wider nutrition and physical activity sectors, and the public, they must be both easy to understand and based on evidence. The Ministry has revised *the statements* accordingly. However, additional supporting health education resources will be prepared for consumers in the future.

A table containing the eating statements pre/post consultation can be found in Appendix A, and the activity statements in Appendix B.

Recommendations

The Ministry recommends members of the Technical Advisory Group:

Note	the feedback from consultation and the revised *statements*
Advise	which wording can be agreed for eating statements 1 to 4, and activity statements 1 to 5 for agenda item 6
Identify	where further drafting is required for eating statements 1 to 4, and activity statements 1 to 5 for agenda item 6

[i] The statements were sent to 23 external organisations and nine groups within the Ministry, all of whom were chosen because of their expertise as health practitioners, dietitians, physical activity specialists, non-government organisations, community health providers, and the food industry.

Background

Following the last TAG meeting in November 2013, and subsequent emails between the Ministry and the TAG after the meeting, draft eating and activity statements were developed. The activity statements included information on 'why' and 'how' the statements should/could be achieved.

Information on feedback from the consultation process and revision of statements has been split into two sections in this paper. Section 1 summarises the consultation process and section 2 details the revisions made to the statements as a result of the feedback.

Section 1 – Feedback from the consultation process

Since the TAG meeting of 11 November 2013, *the statements* went through a consultation process, which included receiving feedback from:

A. a limited number of key stakeholders
B. consumer focus groups and the HPA.

A. Feedback on *the statements* from key stakeholder groups

The Ministry conducted a limited stakeholder consultation on *the statements* between 9 and 22 April 2014, involving 23 external organisations and nine teams within the Ministry. A table containing the eating statements pre/post consultation can be found in Appendix A, and the activity statements in Appendix B.

Key stakeholders were invited to make overall comments about the statements, and specific comments about individual statements. The submissions were analysed by the Ministry to identify common themes and areas of concern.

A one page summary of key findings can be found in Appendix C. A full analysis of submissions can be found attached below for those wanting more detail:

LSF analysis.docx

Refer to document 1A

B. Feedback on *the statements* from consumer focus groups and the HPA

In April 2014, the Ministry contracted the research consultancy firm Litmus to undertake focus group testing to gain information on understanding of and response to *the statements* by different consumer groups representing Māori, Pacific, South Asian and European peoples.

A one page summary of key findings from the focus group testing can be found in Appendix D. The full report on the consumer focus group testing is attached below:

Litmus PDF.pdf

Refer to document 1B

In addition, the Ministry sought feedback from a communication specialist at the Health Promotion Agency (HPA). Most of the HPA's comments and suggested changes relate to keeping the content in plain language so it is easy to understand.

Feedback from the focus groups and HPA has informed changes made to the statements and will also be used in the development of health education resources for the public in the future.

Section 2 – Revised statements

The statements, which the concise document will be based on, have been written for a wide audience so must be both easy to understand and based on evidence. The Ministry has considered both of these factors when revising *the statements* which can be found in Appendix A (eating statements), and Appendix B (activity statements).

The Ministry considered all feedback received and made changes to *the statements* as a result, incorporating the more straight forward feedback where appropriate. Some stakeholders identified more complex issues which the Ministry proposes to discuss with TAG members during the meeting. These include:

Eating statements:

- the focus on total fat versus saturated fat
- inclusion of a statement or sub-statement on decreasing intake of refined or processed foods
- a position statement on red meat and processed meat
- controversial feedback, particularly a recommendation to increase saturated fat intake.

Activity statements:

- evidence on the move from time to intensity based exercise for weight loss.

Auckland University of Technology (AUT) has provided three detailed submissions; two on nutrition and the other, via the Exercise Association of New Zealand, on physical activity. These submissions contain a number of references to support AUT's comments. Some content from the three submissions (attached below) will be discussed during agenda item 6 of the meeting.

AUT nutrition.pdf AUT saturated fat response.pdf EAoNZ&AUT physical activity.pdf

Refer to document 1C, document 1D and document 1E

This briefing paper contains the four eating statements for consideration by the TAG. The remaining two statements and their evidence i.e. food safety and alcohol are being considered outside of the TAG, by the Ministry of Health and Ministry for Primary Industries; and Health Promotion Agency, as these two organisations are responsible for food safety and alcohol related policy respectively.

The Ministry recommends the TAG considers the feedback when discussing and revising *the statements*. If possible, the Ministry would like agreement on final wording of eating statements 1 to 4, and activity statements 1 to 5 by the end of the meeting, and identification of where TAG members consider further drafting is required on these statements.

Appendix A – eating statements

Eating statements for consultation – April 2014	Revised eating statements post feedback – June 2014
1. To be a healthy weight, balance your intake of food and drinks with your activity levels.	1. To be a healthy weight, balance your intake of food and drinks with your activity levels. o Being a healthy weight increases your chances of staying healthy, active and living longer. o Being a healthy weight decreases your risk of getting diabetes, heart disease and cancer.
2. Enjoy a variety of nutritious foods every day including: • plenty of vegetables and fruit including different types and colours • a range of grains and cereals that are naturally high in fibre • some low fat milk products and/or calcium-fortified milk alternatives • some legumes, nuts, seeds, fish, eggs, lean poultry or lean red meat.	2. Enjoy a variety of nutritious foods every day o Eating a range of foods helps you get all the nutrients you need from food to be healthy. o Include: ▪ *plenty of different coloured **vegetables and fruit*** ➢ *e.g. broccoli, kumara, cabbage, fresh or canned tomatoes, carrots, taro leaves, frozen green peas or beans, lettuce, apples, oranges, plums, feijoas, bananas.* ▪ *a range of **grains and cereals** that are naturally high in fibre – go for wholegrain or wholemeal options as much as possible e.g.* ➢ *wholegrain or wholemeal bread; wholemeal pasta, brown rice, wholemeal cereals like porridge and whole wheat biscuits* ▪ *some **low fat milk products** eg green or yellow top milk, low fat yoghurt; or calcium-added milk alternatives (non-dairy milks) e.g. calcium added soy or rice milk* ▪ *some **legumes, nuts, seeds, fish, eggs, and/or poultry and red meat** with the fat removed.* ➢ *Legumes include cooked dried beans (e.g. baked beans), split peas (e.g. dahl), lentils and chickpeas (e.g. hummus).*
3. Choose foods and drinks • With minimal added fat, especially saturated fat; if you choose to add fat use plant based oils and spreads. • Low in salt (sodium); if using salt, choose iodised salt. • With minimal/little or no added sugar.	3. Choose and prepare foods and drinks: • With unsaturated (plant based) fats instead of saturated (mostly animal based) fats. o High saturated fat intakes increase your risk of heart disease and cancer. ▪ *Fat from animals as well as coconut oil and palm oil have a lot of saturated fat.*

	o The body needs some fat, and) the best type of fat is unsaturated which comes mainly from plants. ▪ *Examples of healthy plant based fats include canola and olive oil and plant based margarines.* ▪ *Other sources of healthy fats include seeds, nuts, avocados.* o Be aware that all fat, whether animal or plant based, is very high in energy (calories). Watch your total fat intake as high fat intakes are linked with increased risk of obesity. • That are low in salt (sodium); if using salt, choose iodised salt. o High intakes of salt may increase your risk of heart disease, stroke, kidney disease and some cancers. • With little or no added sugar. o Adding sugar increases the energy (calorie) content of food and drinks o A high or regular intake of foods and drinks with added sugar can lead to tooth decay.
4. Satisfy your thirst with water.	4. Make water your first choice over other drinks o The body needs water to survive and work well. o Town supplied tap water in New Zealand is safe to drink and widely available. If you are not on a town supply check the safety of your water with your local council o Plain water contains no energy (calories) so won't cause you to put on weight and is the best way to satisfy thirst. o Limit *high sugar drinks like fizzy drinks to treats only (for example, once a week).*
5. Buy, prepare, cook and store food to ensure food safety.	5. For consideration by the Ministry of Health and Ministry for Primary Industries.
6. If choosing to drink alcohol, limit your intake. Pregnant women or those planning to become pregnant are advised not to drink alcohol. Limiting your intake means having no more than two standard drinks per day for women or three standard drinks for men, with at least two alcohol-free days per week.	6. For consideration by the Ministry of Health and the Health Promotion Agency.

Appendix B – activity statements

Activity statements for consultation – April 2014	Revised activity statements post feedback – June 2014
1. Sit less, move more! Reduce sedentary behaviour and break up long periods of sitting. o Sitting less can help you live healthier and longer. ▪ *Stand up and move regularly throughout the day, at least every hour.* ▪ *If you are watching television, get up during the ad breaks.* ▪ *If you sit a lot at work, get into the habit of getting up and moving at least every hour.* ▪ *See standing and moving as an opportunity, not an inconvenience.*	1. Sit less, move more! Break up long periods of sitting. o Standing up and moving around can help you live healthier and longer. ▪ *Break up the time you are sitting throughout the day by getting up and moving at least once every hour.* ▪ *See standing and moving as a chance to be active, rather than as a hassle.*
2. Do at least 150 minutes (2½ hours) of moderate-intensity or 75 minutes (1¼ hours) of vigorous-intensity physical activity spread throughout the week. o Moderate- and vigorous-intensity activities are great for the heart, lungs, and overall fitness and wellbeing. Examples of these activities can be found in Table X ▪ *Moderate-intensity activities cause a slight but noticeable increase in breathing and heart rate.* ▪ *Vigorous-intensity activities significantly increase breathing and heart rate.* ▪ *You can achieve this recommendation by doing 30 minutes of moderate-intensity, or 15 minutes of vigorous-intensity physical activity on five days per week.* ▪ *If you have been physically inactive for some time, are just starting out, or have certain health conditions you may wish to consult a health practitioner or physical activity specialist to ensure your safety before you start being physically active.*	2. If you currently do no physical activity, take that first step and do some. o Doing something is better than doing nothing. ▪ *Walk or cycle to places you might normally drive to, play actively with the children, meet friends or whānau for a walk, do active jobs around the house.* o Be as active as you can and make sure what you do is fun! ▪ *You don't need to be daunted by doing physical activity. Do a variety of activities with whānau and friends that you enjoy and want to keep doing.* ▪ *Get off the bus one or two stops before your destination or park the car further away and walk the rest of the way, do some digging in the garden, go fishing or gathering kai for dinner.* o Being physically active with others is good for your overall wellbeing (and theirs) and can motivate you to stay active. o If you have been physically inactive for some time, are just starting out, or have a health condition you may wish to consult your GP or physical activity specialist before starting physical activity to ensure your safety.
3. Aim to do at least 300 minutes (5 hours) of moderate-intensity or 150 minutes (2½ hours) of vigorous-intensity of physical activity for extra health benefits and to manage your weight. o If you already meet the guidelines, increase the amount of physical activity you do for extra health benefits.	3. Do at least 2 ½ hours of moderate-intensity or 1 ¼ hour of vigorous-intensity aerobic physical activity spread throughout the week. o Aerobic activities are great for the heart, lungs, and overall fitness and wellbeing. o You can achieve this by doing at least 30 minutes of moderate-intensity aerobic physical activity on five days a week e.g. by walking at average speed on flat ground, playing with tamariki, and dancing.

▪ *Double the recommended amount of time being active to reduce weight.* ▪ *Increase the intensity of your activity for other health benefits including XXX*	▪ *Moderate-intensity activities make you breathe harder but you should still be able to enjoy a chat while doing them.* o You can achieve the same results by doing 15 minutes of vigorous-intensity aerobic activity on five days a week e.g. by walking fast or walking uphill, swimming or doing kapa haka. ▪ *Vigorous-intensity activities make you breathe a lot harder and you won't be able to chat while doing them.* o It is important that the physical activity is spread throughout the week. ▪ *Physical activity doesn't have to be done all at once – break it into smaller more manageable chunks*. o Try combining moderate- and vigorous-intensity activities for similar benefits.
4. Include some muscle- and bone-strengthening activities on at least two days per week. o Muscle and bone strengthening activities are important for keeping your body strong, lifting and carrying, and reducing the risk of falling or injury. ▪ *Strengthen your muscles and bones with resistance activities such as walking up hills or stairs, yoga, Pilates, swimming, aerobics, heavy gardening or weight lifting.*	4. For extra health benefits, and to manage your weight, aim for 5 hours of moderate-intensity activity; 2 ½ hours of vigorous-intensity activity or an equivalent combination of both. o Weight loss requires a lot more physical activity than that recommended for general health, and is likely to require a change in your food intake too. ▪ *You may wish to talk to your doctor or physical activity specialist about how to increase your physical activity levels safely.* ▪ *Aim to do at least 60 minutes of moderate-intensity aerobic physical activity on 5 days a week to limit your weight gain and risk of certain cancers.* ▪ *If time is a barrier, you can do the same amount of vigorous-intensity activity in less time than moderate-intensity activity.* o A mixture of resistance and aerobic activity can help weight management. ▪ *High-intensity intermittent training (short periods of intense anaerobic activity with less recovery in between) is also time efficient and good for your weight*[ii]. ▪ *You could try resistance activities that work large muscle groups such as squats, digging in the garden, or carrying shopping.*

[ii] Based on feedback from key stakeholders. References for this are still to be supplied.

	o More time spent being active or increasing the intensity of the activity will also provide extra health benefits such as reduced risk of some cancers including colon, postmenopausal breast cancer, and endometrial cancer. o Talk to your GP or practice nurse about a Green Prescription (GRx). ▪ *A GRx is advice to be physically active, as part of managing your overall health. It includes a written referral to a GRx coordinator who will support you to become more active.*
5. If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount. o Doing something is better than doing nothing. All physical activity you do counts towards the total ▪ *Walk or cycle to work, the marae or church, play actively with the children, meet friends for a walk, do active jobs around the house* ▪ *Incidental activity[iii], active jobs[iv], and active transport[v] and all helps towards the total.* ▪ *Build the activities into your daily routine that you are likely to stick to!* ▪ *Consider joining a gym or sports club.* ▪ *Set yourself goals to achieve.* o Being physically active with others is good for your overall wellbeing and can motivate you to stay active. ▪ *Being physically active with whānau is good for the hinengāro (mental and emotional wellbeing) of tangata.* ▪ *Do a variety of activities with whānau and friends that you enjoy and want to keep doing.*	5. Include some muscle and bone strengthening activities at least two days each week to keep your body strong and reduce the risk of injury. o These activities require pushing or pulling against a heavy object or weight which provides a force to stop you. ▪ *Strengthen your muscles and bones with resistance activities such as walking up hills or stairs, digging in the garden, carrying the shopping or weight lifting.* o This can be done around the home, outside, in the community, or under the supervision of a trained professional at a gym or sports club.

[iii] Incidental activity is physical activity is activity that you DO as part of usual daily living. Activities of Daily Living (ADLs) are important as they accumulate to help achieve the weekly guideline recommendations, and importantly reduce the time person spends being sedentary. ADLs include walking the dog, washing the car, gardening, and other household chores.
[iv] Occupational activities are physical activities carried out as part of work. They can help prevent health conditions and enhance general health, and may count towards meeting the weekly physical activity recommendations.
[v] Active transport is physical activity used as a mode of transport from one destination to another. It includes wa king to the shops, cycling, scooting and skating.

Appendix C – key findings from the limited stakeholder consultation

The Ministry received 20 submissions from the 23 external organisations and nine groups within the Ministry, of which three came from individuals or groups identifying as Māori, and one from a group concerned with the health of Pacific Peoples. One organisation concerned with the health of Asian Peoples was invited to submit comments, and although they showed interest in commenting, no submission was received.

Submissions received were varied, but many of the results could be summarised as follows:

1. Overall:

   - use Plain English
   - the statements are fairly European focussed and don't take into consideration the variety of healthy and nutritious multicultural diets
   - incorporate everyday Māori terminology where appropriate
   - include an overarching statement summing up the relationship between food, activity and health/well-being
   - include some behavioural suggestions i.e. eat together as a family, exercise with friends, play with children/grandchildren
   - quantify recommendations – what is a healthy weight (nutrition #1), how much is 'low' when referring to alcohol (nutrition #6), how many servings of vegetables and fruit per day (nutrition #2a) how much is 'low in salt' (nutrition #3c), move every hour and limit screen time (pa #1), how much time is needed for muscle and bone strengthening (pa #4).

2. Nutrition statements:

   - conflicting evidence/opposing views about the harm/benefit of diets high in saturated fat (nutrition #3a), the consumption of grains (nutrition #2b), and restricting the use of salt (nutrition #3b)
   - more emphasis is needed on recommending increased consumption of unprocessed wholefoods and decreased consumption of processed foods
   - advice for people to cut white refined foods is needed (nutrition #2b)
   - that cereals are interpreted as meaning 'breakfast cereals' most of which are unhealthy and cause blood sugar swings (nutrition #2b)
   - emphasising tap water is safe to drink in most places and that you don't need to buy bottled water (nutrition #4)
   - include 'gather' in the statement as how you gather kai is also a key aspect of food safety (nutrition #5).

3. Activity statements:

   - needs more information on why sedentary behaviour is a risk (pa #1)
   - include information on the 'talk test' (pa #2)
   - give daily examples of exercise time rather than the weekly one as people understand the implications better (pa #2)
   - move from time to intensity based exercise for weight loss (pa #3)
   - high intensity intermittent training (HIIT) has evidence to reduce weight and CVD risk. It's about exercising smarter rather than longer (pa #3)
   - the combined importance of diet as well as activity for weight loss (pa #3)
   - vigorous intensity activity is more time efficient than moderate intensity activity
   - activities may not meet minimum threshold for adequate training (pa #4)
   - put activity statement #5 further up so it is in sequence.

4. Length and complexity of statements:

   - nutrition statement #5 and pa statements #2 and #3 need to be simplified
   - replace the words 'nutritious foods' with 'whole foods' or 'minimally processed food and drinks' as the public will find this easier to understand
   - replace the words 'sedentary behaviour' and 'moderate/vigorous intensity activity' with easier to understand terms.

Appendix D – key findings from the consumer focus group testing

In March 2014, the Ministry commissioned Litmus to undertake focus group testing of the draft eating and activity statements to gain valuable information on different peoples' understanding of and response to the draft statements, including how they can be made relevant to people of different social and cultural backgrounds.

Method

- Four focus groups were conducted with New Zealanders who identify as New Zealand European, Māori, Pasifika and South Asian. Within group there was a mix of men and women aged 20 to 60 years.
- Participants were selected from qualitative panels and through snowball sampling (participants were recruited from existing participants' acquaintances).
- Participants were first asked to read and comment on the eating and activity statements version 1 (without the rationale ('why') and examples ('how')) to establish whether the statements could stand on their own. They were then asked to read and comment on the version 2 of the eating and activity statements which included 'why' and 'how'.
- Focus groups were audio and video recorded, and later transcribed.

Key findings

1. Eating guideline statements:

   - participants generally familiar with
   - all except one considered to be written for and would be accessible to 'everyday people'
   - exception is statement 2 - Enjoy a variety of nutritious foods every day. People thought this was too expensive and time consuming.

2. Activity guideline statements:

   - participants much less familiar with
   - considered to be written for academic or scientific audience, not 'everyday people'

3. Guidelines with specific goals (ie maximum number of drinks to keep alcohol low) are the most effective at making people think about eating and activity behaviour.

4. Most words used are ok – some need rephrasing. Specifically:

   - 'nutrient-rich', 'calcium-fortified', 'plant based oils'
   - 'sedentary behaviour', 'moderate-intensity', 'vigorous- intensity', muscle and bone strengthening'.

5. Most statements are short and 'punchy', but some are too long, containing too much info so need breaking up to enhance understanding. Specifically:

   - Eating statement #5: Buy, prepare, cook and store food to ensure food safety
   - Activity statements #2 and #3 – *Do at least 150 minutes …*

6. Longer statements (version 2) that include the 'how and why' are crucial for better understanding although acknowledged as much longer. Suggest use of pictures to convey some messages.

7. Including examples that are accessible, affordable and fit with peoples' culture and lifestyle is very important.

MINISTRY OF HEALTH
MANATŪ HAUORA

EATING AND ACTIVITY GUIDELINES SERIES KEY STATEMENTS

Analysis of submissions from key stakeholders with expertise as health practitioners, dietitians, physical activity specialists, community health providers, the food industry, and individuals that provide advice on nutrition and physical activity to the general public

MAY 2014

MINISTRY OF HEALTH
MANATŪ HAUORA

Contents

Executive summary

The Ministry of Health (the Ministry) conducted a limited stakeholder consultation between 9 and 22 April 2014 on the draft guideline statements for the *Eating and Activity Guidelines Series (EAGS)* (the statements). The statements were sent to 23 external organisations and nine groups within the Ministry, all of whom were chosen because of their expertise as health practitioners, dietitians, physical activity specialists, community health providers, the food industry, or because they provide advice on nutrition and physical activity to the general public.

This report analyses the mixture of brief and detailed feedback gathered from submissions received by the Ministry.

Generally, the statements were well received and there were a few comments that could be themed together. Four common themes emerged: the use of plain English throughout the document, appropriate promotion of the short and snappy statements, the relationship between food and activity; and the need to increase the cultural relevance of the statements for all New Zealanders.

Concerning the nutrition statements, several submitters made comments about emerging evidence on the harm/benefit of diets high in saturated fat (nutrition #3a), the consumption of grains (nutrition #2b), and restricting the use of salt. One submitter provided a complex submission calling for further investigation into the evidence supporting statement 3. The Ministry has forwarded a full, unedited copy of the submission to the Technical Advisory Group (TAG) for its consideration.

For the physical activity statements, stakeholders wanted the Ministry to give daily examples of time rather than the weekly one, as people understand the implications of this better (pa #2). Stakeholders also wanted a move from time to intensity based exercise for weight loss (pa #3); and a recommendation for high intensity intermittent training (HIIT) which has evidence to reduce weight and cardiovascular disease risk, rather than additional aerobic activity (pa #3). One submitter provided a complex submission with suggestions on how the Ministry should word the statements, with particular reference to physical activity statement 3. The Ministry has forwarded a full, unedited copy of the submission to the TAG for its consideration.

Introduction

The Ministry's current *Food and Nutrition Guidelines Series*, and Physical Activity Guidelines, which provide evidence based food, nutrition and physical activity recommendations and relevant background information to health practitioners, will transition over time to become the *EAGS*.

In 2011, the Ministry of Health contracted Pam Oliver & Associates to undertake an independent evaluation of the *Food and Nutrition Guidelines Series* to determine if the Guidelines were meeting the needs of users and how they could be improved.

The evaluation findings showed the *Food and Nutrition Guidelines Series* are valued by many health practitioners, but some changes to their development process and format would strengthen them and make them more accessible to a wider audience. Based on specific recommendations from the evaluation the Ministry is planning to change over time from the *Food and Nutrition Guidelines Series* and separate *Physical Activity Guidelines*, to the new *EAGS*.

The *EAGS* will comprise of a core document with information including evidenced based statements, and numerous issue based documents, which can be added to and updated without needing to review the entire *EAGS*. This means that the Ministry can be more responsive to the needs of the health sector.

The core document will highlight key statements (health messages) for all New Zealanders based on available graded systematic evidence. The issue-based documents will support the core document and be produced over time depending on resourcing. Examples of issue based documents may include an educators guide for health practitioners; a food model based on revised portion sizes; health education resources for the public; and a series of issue based papers as prioritised by the Ministry that include food, nutrition and physical activity topics.

Method

The Ministry conducted a limited stakeholder consultation on the statements between 9 and 22 April 2014, with 23 external organisations and nine teams within the Ministry (which we have considered as one organisation for the purpose of this document). Of the 24 organisations, two forwarded the document to other organisations they work in close conjunction with, and who have an interest in nutrition and/or physical activity.

Key stakeholders were invited to make overall comments about the statements, and specific comments about individual statements. The submissions were analysed to identify common themes.

Results

The Ministry received 20 submissions, of which three came from individuals or groups identifying as Māori, and one from a group concerned with the health of Pacific peoples. One organisation concerned with the health of Asian Peoples was invited to submit comments, and although they showed interest in commenting, no submission was received.

Generally, the statements were well received and there were few comments that could be themed together. However, concerns were raised by more than one stakeholder group about the use of technical terminology throughout the document, the need to actively promote the statements to the general public in a concise way, the need for an overarching statement summing up the relationship between food (and alcohol), activity and health/well-being, and the need to consider all cultures and ethnicities in the statements.

Submitters made comments on individual statements, and detailed discussion can be found in the submissions analysis section of this document. The Ministry has summarised the information provided accordingly and has, as a consequence, removed some of the specific detail contained in the submissions.

The Ministry, in conjunction with the TAG, will address the suggested changes which are within the project scope and integrate them into the statements where appropriate. Some of the suggestions, whilst valid, are outside the scope of this document and accordingly will not be included in the revised statements.

Submissions

Submissions were received from the following organisations and individuals. The numbers here correspond to the submission numbers given in superscript after each comment in the document.

Submission	Organisation/individual	Submission	Organisation/individual
1	Auckland University of Technology (AUT)	11	Te Kete Hauora – Ministry of Health
2	Nutrition Foundation	12	Sport and Exercise Science New Zealand
3	Dietitians New Zealand	13	Cancer Society of New Zealand
4	Te Awakairangi Health Network	14	New Zealand Nurses Organisation
5	Sport New Zealand	15	Toi Tangata
6	Accident Compensation Corporation (ACC)	16	National Services Purchasing – Ministry of Health
7	Royal New Zealand College of General Practitioners	17	Disability Support Services – Ministry of Health
8	Fonterra Co-operative Group Limited	18	Community Health Service Improvement – Ministry of Health
9	Unilever Food Solutions New Zealand	19	New Zealand Food and Grocery Council
10	Heart Foundation Pacific Heartbeat	20	Exercise Association of New Zealand/AUT

Auckland University of Technology, Unilever Food Solutions New Zealand, The Royal College of General Practitioners, and the Exercise Association of New Zealand/AUT also included references supporting their views. Where evidence was provided a * has been put next to the submission number.

Submissions analysis

Overall nutrition statements

Submitters generally found the nutrition statements logical. Five submitters commented that the terminology was too technical and needs to be made easier to understand by using plain English.[2, 3, 10, 13 & 14]

Further comments regarding the overall nutrition statements included:

1. that the target audience may not understand some words, sentences and ideas. The statements should be catchy, easy to remember, and focus group tested on end-users[2, 3 & 14]

2. that the statements are fairly European focussed and do not take into consideration the variety of healthy and nutritious multicultural diets[1]

3. that more emphasis is needed on the benefits of eating unprocessed wholefoods, particularly plants, and the avoidance of refined, highly processed foods[3]

4. aligning the recommendations with National Heart Foundation guidelines on alcohol, fats and grains[3]

5. that more emphasis needs to be placed on planning regular home cooked meals, and eating in a relaxed environment with others[3]

6. that overall the guidelines are useful for Māori as they are used in decision making and messages for Kōhanga reo and marae, but that more behavioural suggestions such as eating together as a family could be included.[15]

Nutrition statement 1

"To be a healthy weight, balance your intake of food and drinks with your activity levels."

Further comments regarding this statement included:

1. that the statement implies that weight can be managed as simply as 'energy in equals energy out'. There are other metabolic factors that influence weight[1]
2. that statements which allow people to freely choose the balance of fat and carbohydrate that suits, mainly from whole foods eaten in traditional meals, will have the best impact on energy balance[1]
3. that contemporary evidence on the benefits of a high fat, low carbohydrate diet requires review[1]
4. that healthy eating has many benefits rather than just healthy weight, so it would be preferable to start the statement with 'enjoy a variety of foods' as it is more positive and encompassing[3]
5. that this statement should go at the end of the eating statements: most people overestimate the effect of exercise and underestimate calorie intake, which has more effect on weight[7]
6. that people get confused, thinking if they exercise a lot, then they then can eat and drink a lot[15]
7. that healthy weight is influenced by factors other than food intake and activity levels[15]
8. that people may not understand the phrase 'balance your intake…'[15]

Nutrition statement 2

"Enjoy a variety of nutritious foods every day […]"

Further comments regarding this statement included:

1. that the statement should use the term 'whole foods' or 'minimally processed food and drinks' rather than 'nutritious foods'[2, 3 & 7]
2. inserting Māori concepts to make it meaningful i.e. kumara, kaimoana and including the other reasons why we need to eat this kai[15]
3. agreement on the statement for dairy and iron rich protein foods (statements 2c and 2d).[3]

MINISTRY OF HEALTH
MANATŪ HAUORA

Nutrition statement 2a

"Enjoy a variety of nutritious foods every day including [...] plenty of different coloured vegetables and fruit."

Further comments regarding this statement included:

1. adding serving sizes to the guideline statement –
    - at least 7 servings per day of different coloured vegetables and fruit.
    - at least 3 of these servings should be leafy green vegetables and 3 of fruit, unless you are diabetic
    - each serving should be about the palm of a hand in size.[10]

Nutrition statement 2b

"Enjoy a variety of nutritious foods every day including [...] a range of grains and cereals that are naturally high in fibre."

Further comments regarding this statement included:

1. that there is no evidence that grains protect against disease, and some risk that bran decreases the absorption of minerals, such as iron[3]
2. that a range of grains and cereals naturally high in fibre need to be added[3]
3. a need to quantify how much grainy food is needed,[3] and examples given[2 & 9]
4. that the terms 'fibre', 'bran', 'grains' and 'whole grains' are hard to understand. Potential for 'whole grain' to be misleading and misused by food manufacturers[3 & 9]
    - cereals seen as breakfast cereals (rather than whole grain cereals), so the exact meaning of this statement needs clarifying
5. advising people to cut out all white refined foods such as white bread, white rice, biscuits and cakes[1 & 7]
6. that almost all cereals except porridge and the most prickly bran cause blood sugar swings. Porridge, muesli or eggs make a better breakfast[7]
7. that legumes should be added to this group as they are high in fibre and can be eaten in larger quantities.[19]

Nutrition statement 2c

"Enjoy a variety of nutritious foods every day including [...] some low fat milk products and/or calcium-fortified milk alternative."

Further comments regarding this statement included:

1. that scientific evidence shows that full-fat dairy products, and not low-fat milk, are protective against diabetes, cancer and cardiovascular disease, and that dairy fat does not contribute to obesity[1 & 7]

2. that dairy fat is a source of vitamins not easily found in other foods and, like all fats, increases the absorption of the vitamins and antioxidants found in green vegetables; in fruits like tomatoes and capsicums,[1 & 7] and in grains[7 only]

3. that the statement needs to use plain English such as 'high calcium', 'added calcium' or 'yellow top milk' rather than 'calcium- fortified'[7 & 9]

4. that milk and milk products make a significant contribution of essential nutrients to intakes in New Zealand, and are the richest dietary source of calcium[8]

5. that the statements should recommend limiting butter, hard margarine and lard and increasing the consumption of polyunsaturated fats such as margarines that are low in saturated and trans fats[10]

6. adding examples of milk, e.g. light blue top, green top, yellow top, knowing that, for example, Pacific people drink less milk and are probably calcium deficient[10]

7. that more information about alternatives to low fat milk products is needed.[19]

Nutrition statement 2d

"Enjoy a variety of nutritious foods every day including [...] some legumes, nuts, seeds, fish, eggs, lean poultry or lean red meat."

Further comments regarding this statement included:

1. recommending that people avoid industrially processed meat products[1 & 7]

2. recommending that people eat meat no more than twice per week[7]

3. amending the wording to say 'with the fat cut off' rather than 'lean'[7]

4. recommending people eat two servings of legumes per day[7]

5. recommending that people don't avoid fatty cuts of meat in favour of lean muscle as it is wasteful and may be nutritionally inferior to a diet that also includes organs and other edible animal parts[1]

6. a need to quantify proportions of food groups on each plate for dinner e.g. 1/2 plate of vegetables, 1/4 plate of rice, potatoes, taro, and 1/4 plate of meat with fat off[7]

7. that legumes should be added to nutrition statement 2b instead of 3a.[19]

Nutrition statement 3a

"Choose and prepare foods and drinks…with minimal fat, especially saturated fat; if you choose to add fat use plant-based oils and spreads."

Opinion on this statement was divided about whether the Ministry should be recommending the reduction in saturated fat or not.

Further comments regarding this statement included:

1. that the evidence shows saturated fat has little impact on the risk of cardiovascular disease[1* & 7*]

2. that there may be a protective effect of the various polyunsaturated fats gained from natural sources such as fish, nuts, seeds, meat, avocado and olive oil[1*]

3. avoiding the fats (including polyunsaturated fatty acids) and non-traditional oils used in processed and deep fried foods[1]

4. a request to just say 'oil based spreads' – remove the word 'plant based'[12]

5. that total fat intake is less important than fat type in relation to cardiovascular risk. The emphasis on this statement needs to be on replacing saturated fat with healthier varieties especially omega 3, fish, flax and nuts as promoting low fat can result in consumers replacing saturated fat with simple carbohydrate[2 & 3]

6. that the Ministry should place less emphasis on total fat intake, and more emphasis on reducing saturated fat and increasing polyunsaturated fat intake[9 & 11]

7. that this guideline is inconsistent with the Dietary Guidelines for Australians, Americans and Canadians

    - the risk of Cardiovascular Heart Disease is reduced when Saturated Fatty Acids (SFAs) are replaced with polyunsaturated fatty acids (PUFAs)
    - that no clear benefit of substituting carbohydrates for SFAs has been shown, although there might be a benefit if the type of carbohydrate replacing SFA is unrefined and has a low glycaemic index[9*]

8. that this statement needs to be supported with something about label reading, i.e. how to tell what minimal fat or saturated fat is[9 & 15]

9. why the Ministry recommends increased consumption of unsaturated fat and reduced consumption of saturated fat[15]

10. recommending the words are changed to 'if adding oil or fat, choose those that are plant based and high in monounsaturated or polyunsaturated fats'[19]

11. that a statement acknowledging the place of high fat, high sugar treats is needed[19]

12. the inclusion of some guidance around treats as the current statement is spartan and unrealistic – use words like 'being selective', 'occasionally' and 'rarely' e.g. 'keep treats special, have only once a week'.[19]

Nutrition statement 3b

"Choose and prepare foods and drinks [...] low in salt (sodium); if using salt, choose iodised salt."

Further comments regarding this statement included:

1. that restricting salt without making other diet and lifestyle changes only lowers blood pressure slightly, and may increase the risk of health problems[1 & 7]

2. that the average intake of sodium in New Zealand has been estimated at 3900mg per day, a level within the range indicated as having no effect on death or disease risk (between 2,645 and 4,945 mg)[1]

3. that 10 percent of hypertensive patients have salt sensitive hypertension; a low salt diet in non-hypertensive people is more likely to increase their blood pressure than decrease it[7]

4. a need to quantify what "low in sodium" is[12]

5. that this statement is not backed by good evidence

    - that processed food includes a lot of salt and is not recommended
    - that an alternative source of iodine such as kelp could be eaten daily[7]

6. changing 'if' using salt, to 'when' using salt.[16]

Nutrition statement 3c

"Choose and prepare foods and drinks [...] with little or no added sugar."

There were no objections to this statement. One submitter expressed their support for this guideline statement as a high consumption of added sugars is strongly associated with heart disease, type 2 diabetes, tooth decay and obesity.

Further comments regarding this statement included:

1. that it would be useful to separate out the drinks statement into its own statement i.e. choose and prepare drinks with little or no added sugar [15]

2. that the Ministry needs a recommendation to limit processed foods high in sugar, and that highly refined starches may be similar to sugar in their metabolic effect.[1]

Nutrition statement 4

"Make water your first choice for drinks."

Seven submitters explicitly agreed with this guideline statement and no submitter objected to the guideline statement.

Further comments regarding this statement included:

1. that 'low fat milk' should be added as an alternative drink to water[9]

2. that emphasis on water should be stronger/higher up the statements[3 & 7]

3. emphasising that tap water is safe to drink and quantify the amount needed[7]

4. recommending avoidance of all concentrated fruit juice soft drinks, even those labelled 'diet' or 'zero'[7]

5. that making water the first choice is sensible, but the person needs to ensure that drinking water from their tap is safe, or that they have a reliable water supply (which can be an issue in smaller communities)[11]

Nutrition statement 5

"Buy, prepare, cook and store food to ensure food safety."

Further comments regarding this statement included:

1. quantifying time, temperature and the 'four C's' for clarity – reword the statement to "keep food safe by being aware of time and temperature when buying, preparing, cooking and storing food"[2, 7, 10 & 11]

2. that more information is needed about 'how' food safety may be achieved[7]

3. that cultural context needs including – 'buying' makes an assumption about how people obtain kai. There are many food safety aspects from a Māori perspective, such as how a person gathers their kai (e.g. gathering watercress, fishing hunting) that should be included[15]

4. that links to further information on how to follow this statement should be provided.[16]

Nutrition statement 6

"If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant."

Further comments regarding this statement included:

1. quantifying what the term 'low' means[2, 3 & 10]

2. that some cultural relevance should be included in this statement. The current tagline of the ad on Māori TV – Te Matarae i Orehu promoting this message is really good - i.e 'kai mau ki tou mana- tai hoa ake i te waipiro'[15]

3. replace 'don't drink' with 'avoid all alcohol' for pregnant women[19]

4. the Ministry should add that breastfeeding mothers should also avoid alcohol.[16]

Overall physical activity statements

Eleven submitters made a comment about the physical activity guideline statements overall. Submitters found the guidelines useful, and were pleased that the concept of exercise intensity has been incorporated into these guideline statements, but questioned the time based recommendations for weight loss. Two submitters liked the physical activity section[7 & 10]. Five submitters commented that the terminology was too technical and needs to be replaced with plain English.[2, 3, 10, 13 & 14]

Further comments regarding the overall physical activity guideline statements include:

1. combining statements 2 and 3[3]

2. more detail about the 'extra health benefits' and including household activities such as vacuuming, gardening etc. would be good[9]
3. that if the person has been physically inactive for some time, are just starting out, or have certain health conditions, they may wish to consult a health practitioner or physical activity specialist to ensure their safety before starting[4]
4. that it is important the physical activity section has included draft 'why and how' explanations[10]
5. that the statements need more detail[11]
6. that daily amounts of physical activity are easier to understand than weekly ones.[14]

Physical activity statement 1

"Sit less, move more! Reduce sedentary behaviour and break up long periods of sitting."

Further comments regarding this statement included:

1. that a guideline specifically around reduction of total sitting time is important[20]
2. that movement is essential to health and wellbeing[4, 7 & 20]
3. that the term 'sedentary behaviour' should be replaced with something more easily understood[18 & 19]
4. that more information is needed on why sedentary behaviour is a risk[16]

Further comments regarding examples given in physical activity statement 1 included:

5. that additional examples could be given for the how and why section including:
    - at home:
        - additional examples of sedentary pastimes such as being on the computer, reading, watching TV or playing electronic games[3]
        - limiting screen time to less than two hours per day
    - at work:
        - standing up and take a break from sitting at least every 30 to 60 minutes
        - doing household chores standing, such as folding clothes, washing dishes or ironing, while watching television
        - standing desks in the workplace[20]
        - using stairs instead of lifts[6 & 20]
        - standing to answer the phone or check texts/emails
        - walking to a colleague's desk rather than phoning or emailing them
    - out and about:
        - parking the car further away from the destination and walking the rest of the way (often cheaper or free parking as well)
        - standing to greet visitors

- walking or cycling at least part way to the destination
- standing on public transport
- getting on/off public transport one stop/station earlier.[4]

Physical activity statement 2

"Do at least 150 minutes (2½ hours) of moderate-intensity or 75 minutes (1¼ hours) of vigorous-intensity physical activity spread throughout the week."

Further comments regarding this statement included:

1. that the definitions of moderate and vigorous intensity need simplifying, e.g. by using the 'talk test'[3, 5, 11 & 12]

2. that using the phrase '30 minutes a day' is better than using minutes or hours as people are more familiar with this message[3 & 7]

3. that people may not understand the definitions of moderate- and vigorous-intensity physical activity.[19]

Physical activity statement 3

"For weight management and extra health benefits, aim to do at least 300 minutes (5 hours) of moderate- or 150 minutes (2½ hours) of vigorous-intensity physical activity spread throughout the week."

Further comments regarding this statement included:

1. objections about time-based recommendations for weight loss. The time-based activity recommendations assume that greater total exercise duration is a legitimate and independent strategy for reducing weight. Evidence does not support this, at least evidence that would be considered robust enough to make public health recommendations[20*]

2. that high intensity intermittent training (HIIT) has evidence to suggest it is a time-efficient and well-tolerated method to reduce weight and cardiovascular disease risk[12 & 20]

3. that vigorous intensity exercise is more time efficient than moderate intensity exercise if finding time to exercise is a barrier[4 & 12]

4. the combined importance of diet as well as physical activity for weight loss[20]

5. that 'extra health benefits' need defining

    - add Green Prescriptions as an example
    - put in a recommended amount of time.[19]

Physical activity statement 4

"Include some muscle- and bone-strengthening activities on at least two days per week."

Further comments regarding this statement included:

1. that you don't need a hyphen after 'muscle' or 'bone' strengthening[18]

2. changing 'per' to 'each'.[18]

Further comments regarding examples given in physical activity statement 4 included:

3. that resistance training can be performed in a variety of settings, but the activities probably do not meet minimum threshold loading for adequate training[11 & 20]

4. There are many home-based, or local environment options to include[20*]

5. that some of the examples are obscure or not accessible to lower income groups – use examples like lifting heavy items, gardening etc.[18 & 19]

6. that some examples are needed in the short version of the statements[19]

7. that additional examples could be given for the how and why section including:

    - activities that use weights, and/or body weight as resistance e.g. press ups, squats, lunges, crunches, machine weights at the gym, handheld free weights etc.
    - using household items if you don't have proper weights e.g. cans, old bottles filled with water, bags of potatoes etc.
    - combining strengthening/resistance activities into your moderate or vigorous intensity cardiovascular exercise
    - aiming for two to three sets of 10 to 20 circuit reps. Aim to do each exercise for 30 seconds to 1 minute at a time[4]

Physical activity statement 5

"If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount."

Further comments regarding this statement included:

1. reordering of the statements so this one is second in the physical activity list[3]

2. that as neither statement 3 or 4 are referred to as 'the recommended amount' rephrase physical activity statement 5[5]

3. changing the wording to 'doing any physical activity is better than doing none'[18]

4. including a safety message.[18]

Further comments regarding examples given in physical activity statement 4 included:

5. amending the statement so it reads 'walk or cycle to places you might normally drive to – you might be able to walk to work, a friend's house, your church, your community centre or marae'[11 & 16]

6. expanding and identifying active jobs[3]

7. removing the word 'consider' as it is not part of the activity[18]

8. increasing the emphasis on fun activities that a person wants to keep doing[18]
9. increasing the emphasis that these activities do not have to be done in one go[18]
10. removing 'hinengaro' as it is not a Māori term that is used in everyday language[19]

Summary of key findings

The submissions received from the consultation on the *Eating and Activity Guideline series* statements were varied, but many of the results could be summarised under the following:

1. Overall:
    - use plain English
    - the statements are fairly European focused and don't take into consideration the variety of healthy and nutritious multicultural diets
    - incorporate everyday Māori terminology where appropriate
    - include an overarching statement summing up the relationship between food, activity and health/well-being
    - include some behavioural suggestions i.e. eat together as a family, exercise with friends, play with children/grandchildren
    - quantify recommendations – what is a healthy weight (nutrition #1), how much is 'low' when referring to alcohol (nutrition #6), how many servings of vegetables and fruit per day (nutrition #2a) how much is 'low in salt' (nutrition #3c), move every hour and limit screen time (pa #1), how much time is needed for muscle and bone strengthening (pa #4).
2. Nutrition statements:
    - conflicting evidence/opposing views about the harm/benefit of diets high in saturated fat (nutrition #3a), the consumption of grains (nutrition #2b), and restricting the use of salt (nutrition #3b)
    - more emphasis is needed on recommending increased consumption of unprocessed wholefoods and decreased consumption of processed foods
    - advice for people to cut white refined foods is needed (nutrition #2b)
    - that cereals are interpreted as meaning 'breakfast cereals', most of which are unhealthy and cause blood sugar swings (nutrition #2b)
    - emphasising tap water is safe to drink in most places and that you don't need to buy bottled water (nutrition #4)
    - include 'gather' in the statement as how you gather kai is also a key aspect of food safety – is the stream you are gathering watercress from clean? harvesting, hunting, fishing etc (nutrition #5).
3. Activity statements:
    - needs more information on why sedentary behaviour is a risk (pa #1)
    - include information on the 'talk test' (pa #2)
    - give daily examples of exercise time rather than the weekly one as people understand the implications better (pa #2)
    - move from time to intensity based exercise for weight loss (pa #3)
    - high intensity intermittent training (HIIT) has evidence to reduce weight and CVD risk. It's about exercising smarter rather than longer (pa #3)

- the combined importance of diet as well as physical activity for weight loss (pa #3)
- vigorous intensity activity is more time efficient than moderate intensity activity
- activities may not meet minimum threshold for adequate training (pa #4)
- put physical activity statement #5 further up so it is in sequence.

4. Length and complexity of statements:

    - nutrition statement #5 and pa statements #2 and #3 need to be simplified
    - the nutrition statements should use 'whole foods' or 'minimally processed food and drinks' rather than 'nutritious foods' as the public will find this easier to understand
    - replace the words 'sedentary behaviour' and 'moderate/vigorous intensity activity' with easier to understand terms.

Next steps

The analysis of submissions will be used to inform the Technical Advisory Group about what stakeholders would like changing and will be considered when the Ministry finalises the statements.

Document 1B

Eating and Activity Guideline Statements

Focus group testing

19 May 2014

Prepared for Martin Dutton and Louise McIntyre, Nutrition & Physical Activity Policy, Ministry of Health

Phone: +64 4 473 3883
Fax: +64 4 473 3884
www.acidtest.co.nz

Background

- Following an independent evaluation of the Food and Nutrition Guidelines Series involving significant sector consultation in 2011, the Ministry of Health is changing its Food and Nutrition Guideline Series and Physical Activity Guidelines to better meet the needs of its target audience. In 2014, the Ministry plans to launch the new look guideline series by publishing a concise document for health practitioners and others working to promote healthy eating and physical activity to the public.
- The Eating and Activity Guideline Series statements are key messages for the public to guide them on healthy eating and appropriate physical activity as part of a healthy lifestyle. Healthy eating and regular physical activity have been shown to optimise health and decrease the risk of chronic diseases including obesity, type 2 diabetes and cardiovascular disease.
- The Ministry commissioned Litmus to undertake focus group testing of the draft eating and activity statements to gain valuable information on different peoples' understanding of and response to the draft statements, including how they can be made relevant to people from a range of social and cultural backgrounds.

Focus group testing

- Four focus groups were conducted with New Zealanders who identify as New Zealand European, Māori, Pacifika and South Asian. Within each focus group there was a mix of men and women and a range of ages (20 to 60 years).
- Focus groups lasted for two hours and were conducted in Wellington between 2 and 10 April 2014.
- Participants were recruited off qualitative panels and through snowball sampling (participants were recruited from existing participants' acquaintances). All participants gave their written consent to participate in the focus groups, to be video recorded, and to share their ideas with the Ministry.
- Participants were first asked to read and comment on the eating and activity statements (without the rationale and examples) to establish whether the statements could stand on their own. They were then asked to read and comment on the full eating and activity text which included 'why' and 'how'.
- Focus groups were audio and video recorded with participants' permission, and later transcribed.
- This report highlights common themes across the groups and specific themes to one or more groups.

Summary

- Overall, people are generally familiar with the content contained in the eating guidelines e.g. being a healthy weight, eating nutritious food that is low in fat, salt and sugar, drinking plenty of water, ensuring food safety and drinking less alcohol (and none if you are pregnant). People consider these messages are similar to existing 5 plus a day and food pyramid messages, and support alcohol harm-minimisation messages. With the exception of the guideline "enjoy a variety of nutritious foods every day" (which is considered unaffordable and time consuming for many families) the eating guidelines are considered for everyday people.
- Overall, people are less familiar with most of the content contained in the activity guidelines e.g. reducing sedentary behaviour, undertaking the required level of moderate and vigorous intensity activity, including muscle and bone strengthening activities, and starting physical activity and building up to the recommended level. These guidelines are also considered to be written for an academic or scientific audience (not for everyday people).
- Guidelines that contain specific goals for people to aim towards e.g. maximum number of standard drinks for keeping alcohol low and minimum number of hours of moderate-intensity activity per week are the most effective at making people think about their eating and activity behaviour.
- The eating and activity statements together with the *why* (the benefits of following the guideline) and the *how* (examples for achieving the guideline) are needed for comprehension. However, all these components add to the length of the guidelines. To reduce the word count some people suggest replacing words with pictures to convey key messages.
- While people understand most terms and words in the guidelines, some terms used are not everyday words and need rephrasing e.g. "nutrient-rich, "calcium-fortified milk alternatives", "plant based oils", "sedentary behaviour", "moderate-intensity", "vigorous-intensity" and "muscle and bone strengthening".
- People appreciate that most of the statements focus on individual topics and/or are short and punchy. However, eating guideline 5 and activity guidelines 2 and 3 are considered too long and require breaking up to enhance understanding.
- People value the inclusion of examples in the guidelines on how to achieve the guidelines, particularly examples that are accessible, affordable and fit with peoples' culture and lifestyles. Overall, people would like to see more examples included in the guidelines for how to eat healthy and increase activity.

Eating Guidelines

Guideline 1

What was tested?

To be a healthy weight, balance your intake of food and drinks with your activity levels.

- **Being a healthy weight decreases your risk of getting diabetes, heart disease and cancer.**
- **Being a healthy weight increases your chances of staying healthy, independent and living longer.**
    - Don't overeat – stop when you feel full.
    - Choose nutrient-rich food, low fat and sugar food and be active as much as you can.

What was said?

- People generally understand the main statement to be about eating in moderation and exercising regularly to be a healthy weight. All people aspire to be fit, healthy and happy. However, the notion of a "healthy weight" assessed through BMI is contentious, and most consider this unattainable.
- The term "balance your intake" is unfamiliar to most people. Some Pacific and South Asian peoples think this term means balance your meals throughout the day. They suggest "balance what you eat" or "eat based on what you do".
- The term "independent" is not well understood by some people in the Pacific group. They prefer the term "active".
- The Pacific group note other benefits for being a healthy weight/healthy, including having shiny hair, strong nails, good skin, greater confidence and being good at sport.
- People prefer the first example to read "Don't overeat – stop before (rather than when) you feel full".
- People prefer the second example to read "Choose nutritious (rather than nutrient-rich) food, low in fat and low in sugar (rather than low fat and sugar food) and be active as much as you can."
- Pacific and South Asian peoples suggest adding more examples for how to be a healthy weight, e.g. eating together as a family, and not skipping breakfast and other meals.

Key takeout

➢ Revise the term "balance your intake", rephrase examples to enhance meaning and add examples for how to get to a healthy weight.

Guideline 2

What was tested?

Enjoy a variety of nutritious foods every day.

- **Eating a range of foods helps you get all the nutrients you need from food to be healthy.**
- **Include:**
    - plenty of different coloured vegetables and fruit e.g. broccoli, kumara, cabbage, tomatoes, taro leaves, carrots, lettuce, apples, oranges, plums, feijoas, bananas etc
    - a range of grains and cereals that are naturally high in fibre wholegrain or wholemeal bread; pasta, rice, cereals like porridge and whole wheat biscuits
    - some low fat milk products and/or calcium-fortified milk alternatives e.g. green or yellow top milk, low fat yogurt, calcium fortified soy or rice milk
    - some legumes, nuts, seeds, fish, eggs, lean poultry or lean red meat. Legumes include cooked dried beans (e.g. baked beans), split peas, lentils and chickpeas.

What was said?

- People generally understand the main statement to be about eating a variety of foods that are rich in vitamins and nutrients and low in fat every day. Nutritious foods are considered "close to the source" and not processed. These foods are considered synonymous with food that is expensive and time intensive to prepare. This makes it less accessible for people with large families, on low incomes, and/or busy working families. Including the example of "baked beans" helps to break down this perception.
- Some people comment on the lack of specificity of this statement, i.e. "eating a range" as opposed to recommended amounts.
- People generally know what "high in fibre" means (keeping you regular). However, they would like examples of high in fibre food added.

- The term "calcium-fortified milk alternatives" is an unfamiliar term. People would prefer "added calcium" or "calcium-rich".
- The term "lean poultry and lean red meat" is considered to be an expensive meat alternative (e.g. premium mince). Some Pacific peoples think this term means small portion size, rather than trimmed of fat. People suggest adding examples for how to remove or reduce fat from more affordable standard cuts (e.g. boiling and skimming the fat off mince).
- Legumes, dried beans and split peas are considered old fashioned foods that are time consuming to prepare. People instead suggest including everyday meals that use these raw ingredients e.g. hummus and hearty soups, curries and casseroles.

Key takeout

➢ Provide examples of food that is high in fibre, revise the term "calcium-fortified milk alternatives", and include examples of familiar, easy to prepare and inexpensive nutritious foods to break down the access barrier.

Guideline 3

What was tested?

Choose and prepare foods and drinks:

- **with minimal fat, especially saturated fat; if you choose to add fat use plant based oils and spreads.**
    - High fat intakes are linked with increased risk of obesity.
    - High saturated fat intakes increase your risk of heart disease and cancer.
        - Fat from animals as well as coconut oil and palm oil have a lot of saturated fat
    - The body needs some fat, and the best type of fat is unsaturated which comes mainly from plants
        - Examples of healthy plant based oils include canola and olive oil
- **low in salt (sodium); if using salt, choose iodised salt.**
    - High intakes of salt may increase your risk of heart disease, stroke, kidney disease and some cancers
        - Choose foods with the lowest amount of salt (sodium) by comparing the food labels
        - Don't add salt to cooking or at the table

- **with little or no added sugar.**
    - Adding sugar increases the energy content of food and drinks
    - A high or regular intake of foods and drinks with added sugar can lead to tooth decay
        - Choose foods with the lowest amount of added sugar by comparing food labels
        - Add little or no sugar to food and drinks
        - Limit high sugar foods and drinks to treats only (for example, once a week)

What was said?

- Minimal fat:
    - Most people feel the content of this section is confusing and could be more clearly written. The main bullet says "fat" three times. It is also considered contradictory as it says firstly "if you choose to use fat" then later on "your body needs some fat".
    - People generally know that "saturated fat" is bad fat, but need more explanation of what "animal fat" is (e.g. lard and dripping).
    - While people assume "plant based oil" is referring to olive and vegetable oil it is not an everyday term. Pacific peoples also think it applies to coconut oil (whose good health properties are reinforced by health food shops).
    - Not everyone is familiar with the term "spreads". In addition to butter alternatives, it is also considered to include jam and peanut butter.
    - While people are aware that fat intake increases the risk of heart disease they are less aware of its link to cancer.
    - South Asian people suggest adding cooking methods to reduce fat e.g. steaming and grilling.
- Low in salt:
    - People generally understand the intent of this section. However, salt is considered to bring out the flavour of food, and most people use salt in cooking and to season their food. People therefore recommend that the statement says "reduce the amount of (not don't add) salt to cooking or at the table, which may be more realistic.
    - Most people use blue and white iodised salt for cooking and often rock salt or pink Himalayan salt for seasoning food. With the exception of South Asian people, no-one knew that iodine is necessary for the thyroid gland. They therefore feel this needs explaining.
    - South Asian people use the greatest amount of salt and some people in this focus group are looking for a recommended maximum level of daily salt intake.
- Little or no added sugar:
    - People generally understand the intent of this section.

- Some people comment that "adding sugar increases the energy content of food and drinks" does not read well, as increasing energy is considered a positive thing.
- Most people don't check food and drink labels to see how much sugar is contained in these products. They suggest adding examples of food and drink that are high and low in sugar measured in teaspoons, which is easier to grasp than grams per serve.
- Māori and Pacific parents say limiting high sugar food and drink to once a week treats is not very realistic, as children often demand these foods.
- Pacific peoples say decisions on food purchases are based on cost rather than sugar content.
- People would like to see more examples for how to reduce sugar in foods and drinks e.g. not putting sugar in tea and coffee.

Key takeout

➢ Revise the content on lowering fat, provide examples on ways to reduce fat, lower salt and reduce sugar.

Guideline 4

What was tested?

- **Make water your first choice for drinks**
  - The body needs water to survive and work well.
  - Plain water contains no energy (calories) and is the best way to satisfy thirst.

What was said?

- People generally understand the main statement to be about drinking cold water over fizzies and other sugary drinks. It is less about the importance of drinking water.
- Some NZ European and Māori people feel the term "first choice" is weak, as it implies that sugary drinks are fine as supplementary drinks. They suggest replacing this term with "preferred choice" or "only choice".
- Māori people say the term "no energy" undermines the healthy nature of water (as having energy is good). They prefer saying "no calories".

- NZ European and Māori people desire information included on the recommended amount of water they should consume in a day, expressed in litres, cups or glasses.
- The Pacific group suggest adding examples of how to encourage people to drink more water e.g. adding mint and/or fruit flavourings to water and carrying a water bottle.
- South Asian people note the quality, affordability and accessibility of New Zealand water is good, compared with water in developing countries, and think this might be useful context to include in the guidelines.

Key takeout

➢ Rephrase the terms "first choice" and "no energy", add recommended daily water intake, and practical tips to drink more water.

Guideline 5

What was tested?

Buy, prepare, cook and store food to ensure food safety.

- **Food can easily grow bugs that cause sickness/food poisoning so careful preparing, cooking and storing of food is important to reduce the risk of it happening.**
    - Don't buy food past its use-by date (check the label)
    - Follow storage advice on labels
    - Always wash your hands before handling food
    - Keep raw meat away from cooked meat and other food – the bugs on raw meat can transfer to other foods
    - Keep leftovers covered and in the fridge, reheat well before use and don't keep longer than 2 days
    - Be aware of food that is at higher risk of growing bugs and store and cook it safely, e.g., meat, chicken, fish, milk products, rice and legumes.

What was said?

- The term "food safety" is well understood across the focus groups. However, the statement is long, includes a number of elements, and people are unsure of the focus.
- The term 'buy' is particularly confusing – people think it means making safe decisions about where to buy their food from (e.g. take-aways, markets, butchers and street food). The notion of checking the use-by date is not obvious without the example.
- Most groups feel this guideline would be better placed at the end of the eating guidelines, as it is less about making healthy food choices than the other statements.
- Pacific and South Asian peoples suggest adding a recommendation about not putting open cans of food in the fridge.

Key takeout

➢ Shorten the statement and consider moving it to the end of the eating guidelines.

Guideline 6

What was tested?

- **If you drink alcohol, keep your intake low.**
  - Alcohol can cause weight gain
  - Alcohol can increase the risk of some diseases including breast cancer
    - Keeping your intake low means having no more than 2 standard drinks per day for women and 3 standard drinks for men, with at least two alcohol free days per week
- **Don't drink if you are pregnant or planning to become pregnant.**
  - Alcohol can harm your unborn baby
  - No amount of alcohol is safe for your unborn baby

What was said?

- People across the focus groups are familiar with this statement. They have heard alcohol-related-harm messages ("binge drinking") in the media and through public communication campaigns.
- The term "keep your intake low" is very subjective, and is considered to be dependent on gender and body weight. An alternative term "limit your alcohol" is generally more meaningful as a stand-alone statement.
- Alcohol's link with weight gain has particular resonance with Pacific and South Asian peoples. South Asian people would like to see included information on what types of alcoholic drinks contain more and less calories to help them make healthier choices.
- Māori and South Asian people are surprised that drinking alcohol increases the risk of breast cancer, and question the evidence base. Some participants consider alcohol links with other known diseases should be included (e.g. liver damage and kidney failure).
- People like the inclusion of the recommended number of alcohol free days per week and standard drinks in a day to keep their intake low. It also adds more meaning to "keep your alcohol low".
- The notion of drinking when pregnant causing harm to unborn babies is well known to people. However, they think it should be included, as it is a good reminder for pregnant women and their partners.

Key takeout

- Revise the term "keep your intake low", add well-known diseases associated with alcohol, and the word "proven" to alcohol's link with breast cancer.

Activity Guidelines

Guideline 1

What was tested?

Reduce sedentary behaviour and break up long periods of sitting (sit less, move more).

- **Sitting less can help you live healthier and longer.**
    - Stand up and move regularly throughout the day, at least every hour.
    - If you are watching television, get up during the ad breaks.
    - If you sit a lot at work, get into the habit of getting up and moving at least every hour.
    - See standing and moving as an opportunity, not an inconvenience.

What was said?

- The statement is generally well understood, but Pacific and South Asian peoples consider that it is aimed more at office workers.
- "Sedentary behaviour" is not an everyday term. People suggest replacing with "reduce inactivity" or "reduce stationary behaviour".
- The phrase "sit less, move more" is catchy and memorable.
- People like the examples. Other examples suggested are play more with your children, take a break from computer surfing, get up and talk to your colleagues rather than sending emails, and take a walk in your lunch break.
- Bullets 1 and 3 are considered repetitive.
- Instructional bullet points (1 and 3) are easier to understand.

Key takeout

➢ Remove repetition and add examples that illustrate that the guideline is for everyone.

Guideline 2

What was tested?

Do at least 150 minutes of moderate-intensity (or 75 minutes of vigorous-intensity) physical activity spread throughout the week.

OR

Do at least 2.5 hours of moderate-intensity (or 1.25 hours of vigorous-intensity) physical activity spread throughout the week.

- **Moderate- and vigorous-intensity activities are great for the heart, lungs, and overall fitness and wellbeing. Examples of these activities can be found in Table X.**
    - Moderate-intensity activities cause a slight but noticeable increase in breathing and heart rate.
    - Vigorous-intensity activities significantly increase breathing and heart rate.
    - You can achieve this by doing 30 minutes of moderate-intensity, or 15 minutes of vigorous-intensity physical activity on five days per week.
    - If you have been physically inactive for some time, are just starting out, or have certain health conditions you may wish to consult a health practitioner or physical activity specialist to ensure your safety before you start being physically active.

What was said?

- With the exception of the South Asian focus group, people are familiar with the 30 minutes a day guideline. By comparison, the new statement is considered clumsy, complicated and less catchy.
- If given the preference, people would prefer a daily minimum physical activity amount expressed in minutes than a weekly minimum physical activity amount expressed in hours or minutes. However, if given the choice between hours and minutes across the week, people have a preference for hours rounded to the nearest half hour (e.g. 1.5. hours rather than 1.25 hours of vigorous-intensity physical activity).
- Most people are unsure what is meant by "vigorous-intensity" activity and "moderate-intensity" activity. They suggest adding examples of each level of activity. Māori people suggest adding kapa haka, getting off the bus a few stops early, and parking away from the entrance to the supermarket and South Asian people suggest adding dancing, martial arts, badminton and cricket as examples.
- The term "spread throughout the week" has different interpretations. Some people interpret it as exercising a few days per week and others view it as exercising on all 7 days.

Key takeout

- Express in hours, provide explanations and examples of moderate-intensity and vigorous-intensity activity

Guideline 3

What was tested?

Aim to do at least 300 minutes of moderate-intensity or 150 minutes of vigorous-intensity of physical activity for extra health benefits and to manage your weight.

OR

Aim to do at least 5 hours of moderate-intensity or 2.5 hours of vigorous-intensity of physical activity for extra health benefits and to manage your weight.

- **If you already meet the guidelines, increase the amount of physical activity you do for extra health benefits.**
    - Double the recommended amount of time being active to reduce weight.
    - Increase the intensity of your activity for other health benefits including …

What was said?

- The same general comments that people made about Activity 2 can also be applied to Activity 3.
- Some people feel the content should be included under Activity 2 and should not be a standalone guideline (as it says "if you already meet the guidelines" in the first bullet point).
- Most people feel this statement is more aimed at very physically fit people, including professional sports people and endurance athletes. The Pacific group for example say this statement is for people who are intending to run a marathon.
- People feel the term "extra health benefits" would benefit from clarification.

Key takeout

- Include under guideline 2, if it is not intended to be a standalone guideline.

Guideline 4

What was tested?

Include some muscle-and bone-strengthening activities on at least two days per week.

- **Muscle and bone strengthening activities are important for keeping your body strong, lifting and carrying, and reducing the risk of falling or injury.**
    - Strengthen your muscles and bones with resistance activities such as walking up hills or stairs, yoga, Pilates, swimming, aerobics, heavy gardening or weight lifting.

What was said?

- The statement is not clear to most people as they are unfamiliar with the term "muscle-and bone strengthening activities". Most people think this means weight lifting before being shown the examples.
- The bullet "muscle and bone strengthening activities are important for keeping your body strong, lifting and carrying, and reducing the risk of falling or injury" contains a lot of information (three points). People suggest breaking this bullet up.
- Most people are unsure of the meaning of "heavy gardening" and suggest that this is explained (e.g. mowing the lawn or digging the garden).
- The Pacific group suggest adding vacuuming and housework and South Asian people suggest adding cricket, badminton and dancing to the list of activities.

Key takeout

➢ Revise statement to make it clear and add more regular activities and past times.

Guideline 5

What was tested?

If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount.

- **Doing something is better than doing nothing.**
    - Walk or cycle to work, the marae or church, play actively with the children, meet friends for a walk, do active jobs around the house.
    - Build the activities into your daily routine that you are likely to stick to!
    - Consider joining a gym or sports club.
    - Set yourself goals to achieve.
- **Being physically active with others is good for your overall wellbeing and can motivate you to stay active.**
    - Being physically active with whānau is good for the hinengāro (mental and emotional wellbeing) of tangata.
    - Do a variety of activities with whānau and friends that you enjoy and want to keep doing.

What was said?

- The statement is considered positive, supportive and achievable. Less active people feel building activity into routines is more accessible and easier to achieve than joining gyms and sports clubs. They suggest this statement should be moved to the front of the guidelines.
- Some people (particularly South Asian) say the word "exercise" should be used instead of "being physically active", as everyone is physically active to some extent (e.g. boiling the jug is being physically active).
- While there is reference to goal setting, some people feel setting both realistic and stretch goals should be included.
- The first bullet point "doing something is better than doing nothing" resonates well with people who are less active.
- The second bullet "being physically active with others is good for your overall wellbeing and can motivate you to stay active", resonates well with Pacific peoples who like the community focus.
- The examples provided are considered simple and achievable. The Pacific group suggest including ways to bring people together to exercise through online forums.

- While the terms "whānau", "hinengāro" and "tangata" resonate strongly with Māori, they appear to be dropped in as an afterthought. NZ European and South Asian people like the inclusion of the term "whānau" (as it is in everyday language), but feel "hinengāro" and "tangata" are out of place in an all-audience document.

Key takeout

➢ While the guideline is positive and affirming, it is relatively weak due to the absence of goals and targets.

HUMAN POTENTIAL CENTRE
AN AUT UNIVERSITY RESEARCH CENTRE

Response to Draft Dietary Guidelines Submitted to the Ministry of Health April 2014

Professor Grant Schofield PhD
Professor of Public Health, Director Human Potential Centre, AUT University
Dr Caryn Zinn PhD
NZ Registered Dietician. Senior lecturer Human Potential Centre, AUT University
Dr Nigel Harris PhD, BRmgmt
Senior lecturer, Human Potential Centre, AUT University
Dr Mikki Williden PhD
Registered Nutritionist, Senior lecturer Human Potential Centre, AUT University
Catherine Crofts MPS M.Phil
Research Assistant, Human Potential Centre, AUT University
Dr Simon Thornley BHB, MBChB, MPH (Hons), FAFPHM.
Professional Teaching Fellow & Research Fellow, Section of Epidemiology & Biostatistics, University of Auckland
Cliff Harvey ND
Holistic Performance Nutrition
George D. Henderson
Research Assistant, Human Potential Centre, AUT University

For further discussion please contact:
Professor Grant Schofield
Human Potential Centre, AUT University
grant.schofield@aut.ac.nz
Telephone: 09-929169
Mobile: 021-481489

Preamble

Below is our response to the request for "limited stakeholder feedback" from the Ministry of Health for the guideline statements on healthy eating and physical activity. Whilst we were not considered initially as a group that should be considered for feedback, Ministry of Health officials later granted our request.

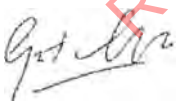
We understand that the Ministry of Health intends to publish a concise document based on revised key healthy eating and physical activity messages (guidelines statements) for adult New Zealanders. These statements will also be included in the Ministry's health education resources written for the public.

These statements are important because any increase in population levels of physical activity and healthy eating are likely to result in the prevention, and improve the treatment, of chronic diseases. These benefits will be realised at the population level, reducing the burden on the public health dollar, but more importantly confer a higher quality of life for New Zealanders. It is important that the scientific evidence is considered carefully before giving such advice and it is our view that advice over the last several decades in this arena has not had the confidence of such evidence. It is our contention that this has (partially) contributed harm to public health, especially the most vulnerable in the population. We believe this to be relevant particularly to the "demonisation" of dietary fat, the now refuted lipid hypothesis, and an emphasis on consuming large amounts of dietary carbohydrate.

As such, we have written a response to the new draft guidelines. These guidelines are more or less the same (with minor alterations) in principle to those of released during the last 40 years in New Zealand.

Our group has had a high media profile in our critique of these guidelines in recent times. We have been criticised for "cherry picking" evidence to suit our hypothesis, as well as ignoring the "totality" of evidence (see Appendix C). As such, we have tried to limit much of our scientific analysis given in this response to the same studies used to support the draft guidelines for healthy eating which promote a lower fat, higher carbohydrate diet based on the principle of energy balance. Notwithstanding, we do include additional studies but it is important to note that these studies themselves do not support the case for the current or new draft guidelines.

We are open to debate around any, or all, of the scientific points we make in this document. It is also our intention to eventually publish the review and response below for public scrutiny.



Grant Schofield
Professor of Public Health
Director Human Potential Centre
AUT University

Simplified (lay) Summary of response to draft dietary guidelines 2014

Advice on diet, as well as regulation of the food supply, has long been a function of good Government; for example, the Ministry of Food campaigns during the Second World War were designed to ensure that all citizens would be adequately fed despite wartime restrictions on the availability of many of the foods commonly eaten in peacetime. The addition of iodine to salt, the food handling regulations, the provision of nutritional information on packaged foods, are well-known examples of sound and effective Governmental foresight.

Dietary guidelines were originally intended to prevent the various deficiency diseases, to protect the population from food- and water-borne illnesses, to warn against the adulteration of the food supply with non-food items, and to discourage both food waste and the excessive use of specific items linked to disease (e.g. alcohol, sugar).

In the late 20th century some scientists and politicians came to believe that dietary guidelines could be used to alter the eating habits of the population in ways that would protect them from the effects of specific diseases. The food industry came to welcome these changes as they gave wide scope for the exploitation of cheap, often subsidised crops (sugar, wheat, corn and soy) in the manufacture of processed foods which could then be marketed as "healthy" for one reason or another. The result has been that the good intentions of those politicians have been undermined, and the mistakes in the reasoning of those scientists, working as they were from the less complete biological knowledge of an earlier era, have been magnified, while some of the original purposes of dietary guidelines have tended to be neglected by authorities or subverted by the food industry, which has itself become a surrogate authority, from which we now receive many of our popular ideas about healthy eating.

The result has been an epidemic of type 2 diabetes, obesity, and fatty liver disease, diseases clearly related to diet, and conditions which predispose people to further illnesses. While life expectancy has increased and the incidence of some diseases has dropped over the period in question, it is arguable that this has been due more to the significant decline in the rate of smoking, as well as (amongst other factors) the Clean Air act, controls on vehicle emissions, the reduction of lead in the environment, significant advances in medical treatment, OSH workplace safety regulations, and very large changes to New Zealand's ethnic (and hence genetic) makeup during the time in question, including many first-generation migrants who tend to retain their traditional eating patterns in a new country.

We have listed each of the proposed dietary guidelines below, along with our summary and comments. A more detailed scientific review follows this summary.

The new dietary guidelines (below) are essentially the same as the old dietary guidelines. Our detailed submission to the Ministry is intended to critique these guidelines in the light of the evolving scientific knowledge about the links between food and disease. A simplified summary of our discussion follows, followed by our own proposal for dietary guidelines based on real food and real meals.

Summary of our response to each proposed guideline

1. To be a healthy weight, balance your intake of food and drinks with your activity levels.

We think that this statement a truism, misleads, as it ignores the complex hormonal interaction between body, food and environment. The simplicity of this statement is being used by the food industry to justify a "balanced diet, as long as you are physically active" message. When such a statement is interpreted in food advertising and corporate marketing speak, this may mislead the public justifying the consumption of highly processed food.

Such a simplistic statement ignores the pivotal role dietary carbohydrate plays in regulating insulin and therefore fat burning and fat storage mechanisms in humans. This circular truism of the calories in and calories out explanation provides no information about the most effective ways to manage metabolic health.

Both people eating low fat (the guidelines diet) and low carbohydrate diets tend to reduce weight, when compared to people eating the standard Western diet.
However, people on low carbohydrate diets tend to have better weight control and better blood test results than people on low fat diets, even when the low fat dieters are told to eat fewer calories, and the low carbohydrate dieters are not. The low carbohydrate dieters are more likely to automatically limit their food intake to suit the amount of work they need to do.

That the recommendation to eat low fat food and the food industry's use of slogans such as "99% fat free" has coincided with our obesity epidemic seems consistent with the science we have reviewed, and we propose that guidelines which allow people to freely choose the balance of fat and carbohydrate that suits, mainly from whole foods eaten in traditional meals, will have the best impact on energy balance.

2. Enjoy a variety of nutritious foods every day including:
a) plenty of different coloured vegetables and fruit

We agree with this statement.

2. Enjoy a variety of nutritious foods every day including:
b) a range of grains and cereals that are naturally high in fibre

We disagree that grains are necessary foods for health; there have been, and still are, many societies that maintain good health with no grains in the diet. While high consumption of refined grains (flour) may be a disease risk factor, in ways whole grains are not, there is no evidence that grain fibre specifically protects against disease, and some risk that bran decreases the absorption of minerals, such as iron. Following the dietary guidelines would see the majority of calories coming from grains, yet wholegrains are a poorly defined food; wholemeal pastas and some wholegrain breads, for example, may be more accurately described as energy dense processed foods.
Though we have no wish to discourage the consumption of fibrous vegetables, which are desirable foods for other reasons, we found only one study in which these were associated with a significantly decreased risk of a disease (colon cancer), and this effect was only

seen when dairy fat was included in the diet, increasing proportionally to the intake of full-fat dairy foods.

2. Enjoy a variety of nutritious foods every day including:
c) some low fat milk products and/or calcium-fortified milk alternative

The dietary guidelines are opposed to the consumption of dairy fat, yet the available scientific evidence shows that full-fat dairy products, and not low-fat milk, are protective against diabetes, cancer and cardiovascular disease, and that dairy fat does not contribute to obesity.

Dairy fat is a source of vitamins not easily found in other foods and, like all fats, increases the absorption of the vitamins and antioxidants found in green vegetables and in fruits like tomatoes and capsicums. We believe that the guidelines oppose dairy fat consumption, despite the evidence for health benefits, purely due to the outdated theory that saturated fat is harmful, a theory that we have not found to be supported by the research.

2. Enjoy a variety of nutritious foods every day including:
d) some legumes, nuts, seeds, fish, eggs, lean poultry or lean red meat.*
**Legumes include cooked dried beans (eg baked beans), split peas, lentils and chickpeas.*

We support most of these recommendations. However we feel that the evidence supports avoiding industrially processed meat products, and does not support avoiding fatty cuts of meat in favour of lean muscle. We also wish to point out that traditional Chinese cooking as practiced in New Zealand does not focus on muscle meat but makes good use of all parts of an animal, as our forefathers used to do. A diet that includes muscle meat only is wasteful and may be nutritionally inferior to a diet that also includes organs and other edible animal parts. We believe that cheese should be a food listed in this section.

3. Choose and prepare foods and drinks:
a) With minimal fat, especially saturated fat; if you choose to add fat use plant-based oils and spreads

We do not find that the evidence supports the specific avoidance of saturated fat. Differences in saturated fat intake seem to have no impact on the risk of cardiovascular disease. There may be a protective effect of the various polyunsaturated fats in the proper quantities, which will be supplied by including foods such as fish, nuts, seeds, meat, avocado and olive oil in the diet. Given the probable health benefits of dairy fat there is no reason to use artificial spreads or non-traditional refined oils. Rather than avoiding animal fats, it makes more sense to avoid the fats and oils used in processed and deep fried foods, which may contain potentially harmful contaminants such as *trans* fats and lipid peroxides.

The effect of various fats, starches, sugars and proteins on serum cholesterol, and the subsequent effect of serum cholesterol on any disease process is a complicated and largely undecided matter, and the idea that this question can be simplified by isolating the effect of saturated fat is no longer tenable, given that there seems to be no direct link between saturated fat intake and heart disease. Pacific Islanders still eating traditional

diets who get the majority of their daily calories from coconut saturated fats have higher cholesterol, yet the same low rate of cardiovascular disease, compared to neighbouring islanders eating traditional diets with less saturated fat.

3. Choose and prepare foods and drinks:
b) low in salt (sodium); if using salt, choose iodised salt

Restricting salt without making other diet and lifestyle changes only lowers blood pressure slightly, and very low sodium intakes may increase the risk of health problems. The average intake of sodium in New Zealand has been estimated at 3900mg per day (around 1&1/2 teaspoons of salt), a level well within the range indicated as having no effect on death or disease risk (between 2,645 and 4,945 mg) and so the recommendation to reduce sodium intake is in our opinion unnecessary. New Zealanders are at risk of iodine deficiency and we support the use of iodised table salt.

3. Choose and prepare foods and drinks:
c) with little or no added sugar

Sugar as a factor in disease has been neglected until relatively recently. Recent studies show that a high consumption of added sugars is strongly associated with heart disease, type 2 diabetes, tooth decay and obesity. The World Health Organisation recently revised its maximum recommended sugar intake downwards, to 30g per day. There is more than this amount in a single serving of many sweet drinks and confectionaries, and high levels in many processed foods. We support this recommendation and feel that advice to limit intake of processed foods is needed to lower sugar intake. Highly refined (high-GI) starches may be similar to sugars in their impact on health.

3. Choose and prepare foods and drinks:
d) Make water your first choice for drinks

We agree with this recommendation.

3. Choose and prepare foods and drinks:
e) Buy, prepare, cook and store food to ensure food safety

We agree with this recommendation.

4. If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant.

We agree with this recommendation.

Summary and our proposed guidelines

Overall, we submit that the proposed dietary guidelines, which currently detail a diet eaten mainly by European, university educated professionals and the worried well, should instead be flexible enough to reflect the variety of healthy and nutritious dietary patterns possible in a multicultural society.

As well, we have developed a set of dietary guidelines which we believe are consistent with the evidence and practiced by the population would result in net public health benefit. We call these the "real" food guidelines based on the emphasis on whole unprocessed food, a set of terms absent from the current draft guidelines. Our guidelines draw some inspiration from the recent draft Brazilian dietary guidelines, which can be read in summary at http://civileats.com/2014/03/12/brazils-new-dietary-guidelines-cook-and-eat-whole-foods-be-wary-of-ads/

The real food guidelines
Real food for real people, based on real evidence

1) Enjoy nutritious foods everyday including plenty of fresh vegetables and fruit.

2) Buy and prepare food from whole unprocessed sources of dairy, nuts, seeds, eggs, meat, fish and poultry.

3) Keep sugar, added sugars, and processed foods to a minimum in all foods and drinks.

4) If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant.

5) Prepare, cook, and eat minimally processed traditional foods with family, friends, and your community.

6) Discretionary calories (energy foods) should:
a) Favour minimally refined grains and legumes, properly prepared, over refined or processed versions, and boiled or baked potatoes, kumara or taro over deep fried or processed potato fries and chips.
b) Favour traditional oils, fats and spreads over refined and processed versions.

Key points in relation to the draft eating guideline statements

The draft statements are:

1) To be a healthy weight, balance your intake of food and drinks with your activity levels.

2) Enjoy a variety of nutritious foods every day including:
   a) plenty of different coloured vegetables and fruit
   b) a range of grains and cereals that are naturally high in fibre
   c) some low fat milk products and/or calcium-fortified milk alternatives
   d) some legumes*, nuts, seeds, fish, eggs, lean poultry or lean red meat.
   *Legumes include cooked dried beans (e.g. baked beans), split peas, lentils and chickpeas.

3) Choose and prepare foods and drinks:
   a) with minimal fat, especially saturated fat; if you choose to add fat use plant-based oils and spreads
   b) low in salt (sodium); if using salt, choose iodised salt
   c) with little or no added sugar.

4) Make water your first choice for drinks.

5) Buy, prepare, cook and store food to ensure food safety.

6) If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant.

Overall response to the draft guideline statements

Regarding the proposed statements, we agree that whole unprocessed food, including vegetables and fruits, is part of a healthy and nutrient dense diet. We would like to see more emphasis on unprocessed "whole" foods in both purchasing and preparation. This is conspicuously absent. We agree with the statements regarding limits on sugar, the first choice of water as a drink, and limiting alcohol consumption.

We object to the majority of content in Guidelines 1, 2 and 3 above as the statement is either scientifically misleading or not consistent with the current body of scientific knowledge. Further, we want to provide scientific feedback on certain lines of evidence which we think do not provide evidence for improved public health, and at worst, may cause harm.

As well, we have developed a set of dietary guidelines (Appendix A) which we believe are consistent with the evidence and, if practiced by the population, would result in net public health benefit. We call these the "real" food guidelines based on an emphasis on whole unprocessed food, a set of terms absent from the current draft.

These arguments are accompanied by a short supplementary comment (Appendix B): "The lipid hypothesis; an obsolescent explanation for a dubious association."

Specific responses to each of the draft guideline statements:

1. To be a healthy weight, balance your intake of food and drinks with your activity levels.

One reason for endorsing a low-fat high-carbohydrate diet is based on the greater energy density of fats compared to carbohydrates. The Atwater factor for carbohydrate is 4 calories per gram compared to 9 calories per gram for fats. Thus avoiding fat equates to fewer calories per mouthful and therefore a greater likelihood of weight gain. Willet and Liebel (2002) concluded that "*within the United States, a substantial decline in the percentage of energy from fat during the last two decades has corresponded with a massive increase in the prevalence of obesity. Diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society, and reductions in fat will not be a solution* (p.1)."

If one objective of the Dietary Guidelines is to improve weight control or metabolic health (including a reduction in CVD risk factors), the comparisons of low-fat and high-fat diets that measure these outcomes are valuable.

It is a common finding that low-carbohydrate diets with unlimited calories are as effective for weight control as calorie-restricted low-fat diets (Nordmann et al., 2006). This is perhaps due to a spontaneous reduction in energy intake due to the greater satiating effect of fats and protein, compared to carbohydrate. This work is further supported by findings of Shai and colleagues (2008) who investigated weight loss and cardiometabolic markers in people on either an energy restricted low-fat regime, an energy restricted Mediterranean regime, or an unlimited energy low-carbohydrate regime. After 24 months, the low-carbohydrate regime had produced the greatest overall weight loss compared to the other two regimes, with more favourable changes to cardiometabolic markers including HDL cholesterol, triglycerides, and ratio of total cholesterol to HDL cholesterol.

Given that the Dietary Guidelines do not establish energy limits, it might be thought that recommendations around food choices that have a greater potential to promote the spontaneous regulation of energy balance (i.e. a low-carbohydrate, high-fat diet) should have been made if the goal is to reduce the incidence of obesity and diabetes. Guidelines that instead focus on the greater nutritional value of a diet rich in whole, unprocessed foods, minimally refined ingredients, and on the greater social and health benefits of traditional meals compared to pre-packaged and convenience food could naturally result in this outcome. This would be along similar lines to the recently proposed Brazilian Dietary Guidelines. For an English summary of these guidelines, please refer to http://civileats.com/2014/03/12/brazils-new-dietary-guidelines-cook-and-eat-whole-foods-be-wary-of-ads/.

2a) Enjoy a variety of nutritious foods every day including plenty of different coloured vegetables and fruit

We agree with this statement.

2b) Enjoy a variety of nutritious foods every day including a range of grains and cereals that are naturally high in fibre

There is contradictory evidence for the health benefits of grain fibre including concerns that cereal fibre in particular contributes to malnutrition. For decades, fibre has been promoted

as an essential component of a healthy diet. The supposed benefits of a fibre-rich diet have been mandated via several agencies including the government, health professionals and the food industry; however, much of this supposed benefit is not supported by evidence. The "health halo" that surrounds plant fibre is likely because fibrous growing plants may be rich in both soluble and insoluble fibre, resistant starch, antioxidants, vitamins, water, electrolytes, omega 3 and 6 essential fatty acids, and phytochemicals. Because of the belief that fruit and vegetable consumption protects against colorectal cancers by virtue of its fibre content, there has been a series of lab-based trials of grain-based fibre and psyllium fibre in the secondary prevention of colorectal cancers. The protective effects of fibre in these trials, that is, where fibre is added to an otherwise adequate diet has failed to be demonstrated. The majority of studies supporting the benefits of dietary fibre on health outcomes such as obesity, heart disease and cancer, and that have informed our current guidelines, have been epidemiological by design, yielding (confounded) weak associations as evidence, rather than isolating fibre as being a causative factor (Bingham et al., 2003; Key, Allen, Spencer, & Travis, 2002)

When looking at the proposed benefits of fibre in the risk against colorectal cancer, several studies indicate that it simply does not have the beneficial effects that current guidelines suggest. One of these studies is a 16-year prospective cohort study conducted by Fuchs et al., (1999) who reported no evidence that dietary fibre on the whole reduces the risk of colorectal cancer. In this study fibre derived from fruit was associated with an appreciable reduction in risk (multivariate relative risk, 0.86; 95% confidence interval, 0.67-1.10), but the overall trend was not statistically significant (*P*=0.16). In contrast, a greater consumption of vegetable fibre was associated with a significant increase in the risk of colorectal cancer (multivariate relative risk, 1.35; 95 % confidence interval, 1.05-1.72; *P*=0.004). Furthermore, Park et al., (2005) conducted a pooled analysis of 13 prospective cohort studies which included 725 628 individuals (both male and female), and reported no association between dietary fibre and colorectal cancer once other dietary risk factors were accounted for.

In the argument for reduced recurrence of colorectal adenoma, several intervention studies have indicated that fibre has little to no protective effect. Jacobs et al., (2002) reported that neither fibre intake from a wheat bran supplement, nor total fibre intake, reduced the reoccurrence of colorectal adenoma in a clinical trial where participants were randomised to a cereal fibre supplement of either 13.5 g or 2.0 g/day. On the contrary, Bonithon-Kopp et al. (2000) found that psyllium supplementation increased recurrence of colorectal adenoma (odds ratio: 1.67 (95% confidence interval: 1.01-2.76, *P*=0.042)). In a Cochrane meta-analysis which included five randomised controlled trials (RCTs) using psyllium, bran, and a combination of mixed grain and vegetable-based fibre, Asano and McCleod (2002) found no evidence to indicate that increased dietary fibre intake will reduce the incidence or recurrence of adenomatous polyps within a two-to-four year period.

The cardiovascular outcomes of the DART trial are also supportive of the lack of benefit from fibre. This trial investigated the effects of advice to increase fibre intake from cereals in the secondary prevention of myocardial infarction. Burr et al. (1989) reported that subjects given advice on increasing dietary fibre had a slightly higher mortality than those who weren't; however, this was not a significant finding.

An argument can be made for grain-based fibre being detrimental for health from a

micronutrient bioavailability standpoint. Grain-based husks contain the anti-nutrient phytic acid, which has an effect on reducing the mineral availability of zinc, magnesium, iron and calcium in the body (Torre, Rodriguez, & Saura-Calixto, 1991). The issue of anti-nutrients is a well-established cause of malnutrition in the developing world where diets are high in unrefined cereals and low in animal products. In Western populations, the same effect is seen. Bach Kristensen et al., (2005) reported that the consumption of the recommended daily intake of fibre from fibre-rich wheat bread after four months resulted in an impairment of iron status in women with initially sufficient iron stores. Furthermore, reduction of the phytic acid concentration in the bread was not sufficient to maintain iron status in this group. Similarly, Knudsen et al., (1996) found (in a small, short-term experiment) that intestinal and urinary losses of the minerals zinc, copper and magnesium exceeded their fractional absorption in participants consuming a fibre-rich diet, thereby resulting in negative balances of these nutrients.

As we acknowledge its important role in providing fuel for various gut microbes and by extension short chain fatty acids for the host

It is not our intention to *discourage* the consumption of dietary fibre, particularly natural sources of soluble fibre, as we acknowledge its important role in providing fuel for various gut microbes and by extension, short chain fatty acids for the host, amongst other possible (as yet unsubstantiated) benefits (Hugenholtz, Mullaney, Kleerebezem, Smidt, & Rosendale, 2013). It is rather that we highlight firstly that the evidence for its protection against disease is not as convincing as the current guidelines portray. Secondly, that both soluble and insoluble fibre can be sourced from fruit and vegetables alone without the need to include a recommendation for the excessive consumption of wholegrain products. There are several other critical reasons addressed in this document as to why the consumption of excessive amounts of processed carbohydrate-based foods (which include wholegrain products) should be avoided. This, in conjunction with the fact that these foods provide anti-nutrients and poor overall nutrient-density compared with natural soluble fibre containing foods (fruit and vegetables) suggests that their continued specific endorsement at the quantities that currently exist may be more harmful than beneficial to public health.

Lastly, there are traditional cultures that enjoyed good health without eating any grains whatsoever; Maori, Pasifika, and all hunter-gatherer societies studied by anthropologists (Prior, Davidson, Salmond, & Czochanska, 1981). In recent times, members of these groups have enjoyed improved health when grains are removed from the diet and replaced by traditional foods. Traditional Chinese cooking, which makes good use of the whole animal, rather than “lean meat and poultry”, does not seem compatible with the proposed guidelines.

2c) Enjoy a variety of nutritious foods every day including some low-fat milk products and/or calcium-fortified milk alternatives

Whilst we agree that dairy foods are nutritious, we feel this guideline is in direct conflict with the scientific evidence that consumption of full-fat dairy products has been uniquely identified as a beneficial modifier of disease risk. Conjugated linoleic acid (CLA) and trans-palmitoleic acid, specifically present in dairy fat, have also been found to be inversely associated with diabetes incidence (Castro-Webb, Ruiz-Narváez, & Campos, 2012; Mozaffarian et al., 2013). Holmberg and colleagues (2009) found a strong protective effect against coronary heart disease when high fat dairy was consumed in combination with a daily intake of fruit and vegetables. This was not seen in those choosing to consume low-

fat dairy products. A protective effect was also found by Larsson and colleagues (2006) who found that women consuming more than four serves of high-fat dairy foods per day had a 41% reduced likelihood of colorectal cancer compared to those consuming less than one serve daily. Contrary to their hypothesis, Berkey and colleagues (2005) discovered that lower fat varieties of milk products (and not dairy fat) were associated with weight gain in their investigation of dairy consumption in close to 13,000 children. Finally a recent review of the literature by Kratz and colleagues (2013) concluded the recommendations for consuming low-fat dairy foods was in contrast to the observational evidence of a reduced cardiometabolic risk within typical dietary patterns.

On this basis, therefore, we submit that there is no scientific reason to believe that dairy fat of the high quality available in New Zealand presents such a risk to health that it should be removed from the diet or replaced with processed fats, as the Dietary Guidelines recommend. We also draw the Committee's attention to the reported associations between health benefits and dairy fat related to the most saturated of all animal fats in the diet.

2d) Enjoy a variety of nutritious foods every day including some legumes, nuts, seeds, fish, eggs, lean poultry or lean red meat*

We agree with the majority of this statement, although, as detailed below, we submit that there is no evidence (or negative evidence) for efficacy and long-term safety of low-fat diets.

3a) Choose and prepare foods and drinks with minimal fat, especially saturated fat; if you choose to add fat use plant based oils and spreads.

We draw attention to the paucity of statistical evidence linking either reduced fat or modified fat (including saturated fat) with disease end-points. For example, a Cochrane review (Hooper et al., 2011) of randomised studies of the effect of modified or reduced fat interventions on total and cardiovascular disease (CVD) mortality showed no overall effect of the diets on either outcome (total mortality: relative risk 0.98, 95% CI: 0.93-1.04; and for CVD mortality: relative risk: 0.94, 95% CI: 0.85-1.04). A small relative reduction in cardiovascular events was noted (pooled RR: 0.86, 95% CI: 0.77-0.96). These effects are relatively modest, and for the most objective outcomes (overall and CVD mortality), no association was reported. The inconsistency of the effect for the three similar outcomes is also noted. We conclude that this study does not provide strong evidence for population guidelines to reduce either saturated fat intake or total fat to reduce the incidence of CVD end-points. Other meta-analyses, similarly, find little statistical evidence linking modified saturated fat intake with CVD mortality (Mente, de Koning, Shannon, & Anand, 2009; Siri-Tarino, Sun, Hu, & Krauss, 2010). We believe a causal effect of this dietary intervention is unlikely if there is little statistical evidence of association between the exposure and disease.

Those who support the need to reduce saturated fat often discount negative summary studies and focus instead on analyses that report positive associations observed between fat-modifying diets and CHD end points. One study (Jakobsen et al., 2009), for example, which pooled a limited selection of cohort data for which individual level data was available, showed a positive association between replacing saturated fat with polyunsaturated fat in reducing total coronary disease events (pooled hazard ratio 0.69; 95% CI: 0.59, 0.81) and coronary disease mortality (pooled hazard ratio 0.57; 95% CI: 0.42 to 0.77). The findings were, however, inconsistent in that replacing monounsaturated fat with saturated, resulted in no association with coronary death, with a similar null-result

reported for replacing carbohydrate with saturated fat. If we limit our discussion to this single study, the findings raise the question of whether saturated fat is truly the causal exposure because, if saturated fat is the principal cause of cardiovascular disease, the nature of the replacing nutrient (carbohydrate, monounsaturated or polyunsaturated fat) should have little effect on disease risk. The results, to us, may be interpreted as polyunsaturated fat protecting individuals from developing disease. This paper describes researchers investigating exposure subgroups, rather than reporting overall pooled results consistent with the original hypothesis (that saturated fat causes coronary disease). This suggests post-hoc analysis and enthusiasm on the part of researchers to "prove a hypothesis" in the face of generally unsupportive statistical evidence. We are unclear as to why this one positive association is so widely reported when the overall picture from a range of systematic reviewers shows little support for such a statistical association.

The objection to the statistical approach used by Jackobsen et al. (beyond the weak associations produced) is twofold; firstly, interpreted this way, the result is a hypothesis, not a finding. No one in the cohort studies actually changed their diet, so we do not really know what the effect of any change would be. The RCTs conducted in the past to test this hypothesis did not produce conclusive results, but were suggestive of benefit from omega 3 fatty acids only (Ramsden et al., 2013).

Secondly, as stated by Mozaffarian et al.(2010), in a meta-analysis of fatty acid substitution RCTs, the substitution method *"cannot distinguish between potentially distinct benefits of increasing PUFA versus decreasing SFA."* This method, whether used in RCT design or cohort sub-group analysis, establishes an unnecessary contest between PUFAs, which are essential nutrients and likely to be protective through mechanisms including effects on blood clotting, inflammation, and endothelial function, and SFAs which are inessential sources of dietary energy. It ignores the possibility that similarly high intakes of SFA, monounsaturated fatty acids (MUFA) and mixed PUFAs together (proportions in which these nutrients are likely to have appeared in the diet during human evolutionary history) may be harmless or beneficial.

The meta-analysis by Skeaff and Miller (2009) found that higher intakes of total fat and saturated fat were not significantly associated with CHD in cohort studies, but that various substitutions of PUFA for SFA had beneficial associations in RCTs. However, the strength of results from RCT meta-analysis is highly dependent on selection criteria; inclusion of the Finnish Hospital study (Turpeinen, Pekkarinen, Miettinen, Elosuo, & Paavilainen, 1979), with its unusual "revolving door" methodology and confounding drug use, increases the likelihood of findings favourable to PUFA substitution, while adding the newly recovered data from the Sydney Diet Heart Study has the opposite effect (Ramsden, et al., 2013).

Furthermore, it is possible to interpret the "substitution" data in more ways than one. Jakobsen and colleagues (2009) predicted, from cohort studies analysed in this way, that substituting PUFA for SFA would reduce the risk of CHD deaths. However, substituting carbohydrate for SFA would increase the risk of CHD deaths, especially in women, and substituting MUFA for SFA would increase the risk of coronary events, but not deaths. A logical inference from this finding is that saturated fat should not replace PUFA in the diet, but should instead replace both carbohydrate and MUFA. If this proposal seems outrageous, it is no more so than interpreting the data in favour of reducing saturated fat.

It seems a serious failing, from a public health perspective, that findings regarding all-

cause mortality, or other specific causes of mortality apart from CHD, are neglected in most of the fat substitution analyses under discussion. The null finding by Hooper et al. (2011) for total mortality, in a paper which concludes in favour of substituting PUFA for SFA, deserves comment, because the overall mortality statistic is a weighted average of the effect of an intervention on a disease specific endpoint, and the effect of an intervention on other diseases. Total mortality is also the endpoint least prone to error and manipulation, so that the association between intervention and overall mortality is likely to be less biased than for disease-specific mortality endpoints. If an intervention reduces cardiovascular disease (CVD) death, and statistical power is adequate, then it should also reduce overall mortality, if the intervention has a neutral effect on death from other causes.

The method that Jakobsen et al. (2009) use is based on the *a priori* assumption that dietary SFA is harmful, and that the proportion of energy intake from SFA needs to be reduced. It thus supplies a circular argument that reinforces its own starting bias. There is also an unfortunate tendency to combine omega-3 long-chain PUFA in with other PUFAs to which it is not in fact equivalent, and which can abrogate the benefits of omega-3 long-chain fatty acids experimentally (Madsen & Kristiansen, 2012).

The evidence against saturated fat, such as it is, can be interpreted in more than one way, and, we submit, the parsimonious hypothesis should be, that "essential fatty acids are essential".

3b) Choose and prepare foods and drinks: low in salt (sodium); if using salt, choose iodised salt

The dietary recommendation to 'choose and prepare foods that are low in salt (sodium)' is based on the use of blood pressure as a surrogate for cardiovascular health. Indeed adequate intakes (AI) and the tolerable Upper Limit (UL) for sodium as set by the Institutes of Medicine of the United States National Academies (2005) and endorsed by the Ministry of Health (2006) recommendations are based upon this correlation. Reducing salt intake reduces blood pressure by between 1 and 3.5% (Graudal, Hubeck-Graudal, & Jurgens, 2011), however the evidence linking salt (sodium) reduction with improved mortality and morbidity is lacking and is insufficient to translate to public health recommendations. The evidence suggests that:

1) Reducing salt intake has no effect on population morbidity or mortality prevalence;
2) Low salt intakes are negatively associated with health outcomes in some population groups;
3) Population health guidelines that are not underpinned by evidence may serve to confuse end users further, thus reducing compliance with (legitimate and scientifically robust) guidelines; and
4) Reducing salt intakes further may negatively affect iodine status.

Reducing sodium intake has no effect on mortality nor morbidity

A 2011 meta-analysis of RCTs of at least 6 months did not find evidence for reduced mortality or CVD mortality, and concluded that there was no evidence available to support dietary advice to reduce salt intake. In addition, they noted an *increase* in all-cause mortality in those with heart failure who were advised to reduce their intake (Taylor, Ashton, Moxham, Hooper, & Ebrahim, 2011).

Although not supporting that low sodium intakes were positively correlated with morbidity or mortality in general, the Institute of Medicine of the National Academies *Sodium Intake in Populations: Assessment of Evidence* (2013) noted that the evidence suggests that outcomes for those with congestive heart failure are worsened by reductions in sodium. This group suggested a risk of adverse health outcomes associated with sodium intake levels in ranges approximating 1,500 to 2,300 mg per day in other disease-specific population subgroups, specifically those with diabetes, chronic kidney disease (CKD), or pre-existing CVD(Medicine, 2013)(Medicine, 2013)(Medicine, 2013)(Medicine, 2013), and noted no significant correlation between improved health outcomes and reductions in dietary sodium.

Current sodium intakes are safe

Mortality and morbidity are increased at both high and low levels of sodium intake (Alderman & Cohen, 2012; Graudal, Jürgens, Baslund, & Alderman, 2014), suggesting a 'U-curve' of morbidity related to extremes of intake (consistent with normal outcome curves for deficiencies/toxicities of other nutrients). The range within which no discernible health effects are seen lies between 2,645 and 4,945 mg (Graudal, et al., 2014) or as high as 6000mg (Alderman & Cohen, 2012).

The average intake of sodium in New Zealand has been estimated at 3900mg per day (McLean, Williams, Mann, & Parnell, 2012), a level well within the range indicated as having no effect (positive or negative) on mortality and morbidity and so the recommendation to reduce sodium intake is in our opinion unnecessary.

Further reductions in salt intake may increase iodine deficiency

We recognise the important role that iodised salt has played on reducing iodine deficiency and goitre in New Zealand. Dietary exposure to iodine has steadily decreased since 1982 (B. M. Thomson, Vannoort, & Haslemore, 2008). Thomson (2004) in a review of selenium and iodine status in New Zealand, found that iodine levels have been falling since the 1980's, and this is correlated with clinical measures of thyroid status, and that public health interventions to reduce salt intake may further reduce iodine status.

3c) Choose and prepare foods: with little or no added sugar.

We support this recommendation. There are data supporting the reduction of sugar in the diet including the research from the Nurses' Health Study analysed by Liu and colleagues (2000) which showed that women who consumed diets with a high glycaemic load (increased blood glucose excursions associated with intake of sweets or highly processed starches and sweets) had an increased CHD risk, with those in the highest quintile having a >2-fold risk during 10 years of follow-up.

This evidence is further corroborated by the recent study by Yang and colleagues (2014). These researchers found a 2.75-fold increased risk of CHD in persons consuming 25% or more of calories as added sugar, compared to those consuming 10% or less. The strength of this association at extreme intakes gives confidence that smaller effects seen at lower intakes are also likely to be valid, and that the recommendation to avoid added sugar is sound.

However, the evidence to support a high carbohydrate, low fat diet in the prevention and treatment of chronic disease is limited. While some evidence does exist, favourable

outcomes are evident only when these diets are compared to control group(s) consuming the standard industrial food diet, and often with a multicomponent intervention (e.g., parallel stress reduction and exercise components). When head-to-head comparisons are made to the types of eating patterns referenced above the carbohydrate-restricted diets confer better outcomes in the short and medium term.

Firstly, there is a strong argument that carbohydrates *per se* are not an essential nutrient (Westman, 2002). It is also likely that carbohydrate in the proportions recommended by the Dietary Guidelines resembles a dietary composition unlike that which most ancient humans evolved and subsisted on (mostly free of chronic disease, with high median life expectancies (Gurven & Kaplan, 2007)). In fact, anthropological evidence shows these diets to be relatively low in carbohydrate and high in fat depending on geographical location. However, few would deny that fruits and vegetables, especially non-starchy vegetables are a vital source of essential vitamins, minerals and other micronutrients. But the contention whether high carbohydrate regimes should be recommended remains, especially when the risks associated with hyperinsulinaemia are considered. In summary, when the body becomes resistant to insulin's actions, more insulin is secreted to compensate and restore glucose homeostasis (Weir & Bonner-Weir, 2004). This resultant hyperinsulinaemia is considered a key contributor to several different pathophysiologies including inflammation, increased production of reactive oxidative species (ROS), insulin-like growth factor-1 (IGF-1) and triglycerides, and decreased nitric oxide production (Ceriello & Motz, 2004; Giovannucci et al., 2010; Matafome, Santos-Silva, Sena, & Seiça, 2013). Furthermore, hyperinsulinaemia itself contributes to insulin resistance, thereby exacerbating via a positive feedback loop. Combined, these factors damage DNA, and can cause fatty liver disease, Alzheimer's disease, type 2 diabetes, cancer, and endothelial dysfunction resulting in (but not limited to), renal, hepatic and all forms of cardio- and cerebro-vascular disease (Bourdel-Marchasson, Lapre, Laksir, & Puget, 2010; Craft, 2009; Stout, 1990).

Carbohydrate restriction is supported by sufficient evidence to be considered as a therapeutic option for the primary or adjunctive treatment of fatty liver disease (Tendler et al., 2007); type 1 diabetes (Nielsen, Gando, Joensson, & Paulsson, 2012); type 2 diabetes (Yancy, Foy, Chalecki, Vernon, & Westman, 2005); cancer (Fine et al., 2012); and cognitive impairment (Krikorian et al., 2012).

Evidence suggests that carbohydrate restriction is likely superior to unrestricted carbohydrate, low-fat diets for improving cardiometabolic markers (Ebbeling et al., 2012; McAuley et al., 2006; Shai, et al., 2008). It should be noted that LDL-cholesterol may incur a transient increase with carbohydrate restriction. This may now be of little consequence as undifferentiated LDL, with respect to particle size or count, is no longer considered to have the greatest impact on cardiac risk; especially when compared to triglycerides, HDL-cholesterol and especially the triglyceride: HDL ratio (Sikaris, 2014).

An objection regarding low carbohydrate diets is that they are not known to be safe in the long term. We believe this logic to be misleading and fallacious on the two grounds. The first is that there is good evidence that humans have existed (chronic) disease free, with reasonable median life expectancies for most of human history on such diets (Eaton, Cordain, & Lindeberg, 2002). Humans in traditional lifestyles eating this way do well. Second, there is no reason to believe from a biological and mechanistic point of view that these types of diets provide any long term health risk given the medium term

improvements in metabolic markers and lack of nutrient deficiency.

To steer the public away from diets known to confer good metabolic health and towards diets known to produce, on average, inferior results is something the National Dietary Guidelines should not do. We contend that the current guidelines support a diet that will produce chronic hyperinsulinaemia in those who are insulin resistant. Thus, those most at risk of metabolic disease are most likely to be adversely affected by high carbohydrate diets, even of the low glycemic index type described by the dietary guidelines. More work does need to be done to fully elucidate this contention.

4. Make water your first choice for drinks.

We agree with this recommendation.

5. Buy, prepare, cook and store food to ensure food safety.

Whilst our team has no expertise in this area, we agree with the consumer Food Safety guidelines published by the Ministry of Primary Industries. As such, we regard the food safety recommendations in this guideline redundant.

6. If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant.

We agree with this recommendation.

Summary

Overall, we submit that the proposed dietary guidelines, which currently detail a diet eaten mainly by European, university educated professionals and the worried well, should instead be flexible enough to reflect the variety of healthy and nutritious dietary patterns possible in a multicultural society.

Appendix A: An alternative set of dietary guideline for New Zealanders

The real food guidelines
Real food for real people, based on real evidence

1. Enjoy nutritious foods everyday including plenty of fresh vegetables and fruit.
2. Buy and prepare food from whole unprocessed sources of dairy, nuts, seeds, eggs, meat, fish and poultry
3. Keep sugar, added sugars, and processed foods to a minimum in all foods and drinks.
4. If you drink alcohol, keep your intake low. Don't drink if you are pregnant or planning to become pregnant.
5. Prepare, cook, and eat minimally processed traditional foods with family, friends, and your community
6. Discretionary calories (energy foods) should:
   a) Favour minimally refined grains and legumes, properly prepared, over refined or processed versions, and boiled or baked potatoes, kumara or taro over deep fried or processed potato fries and chips.
   b) Favour traditional oils, fats and spreads over refined and processed versions.

Appendix B: The lipid hypothesis; an obsolete explanation for a dubious association

Despite the negative statistical evidence of association between saturated fat intake and cardiovascular disease, the link is often supported with reference to the link between saturated fat intake and low density lipoprotein (LDL) cholesterol concentration. It is believed that LDL cholesterol is the dominant mechanism by which dietary fats exert their purported harms and benefits, even when randomised and observational studies show no overall association between saturated fat intake and disease risk.

Thus, substituting MUFA for SFA either lowers, or has no effect on, LDL, but Jakobsen et al. (2009) report that this substitution will increase CHD risk. SFA elevates LDL, at least in the short term, but has no association with CHD risk (except when SFA intake is creatively reconceptualised by factoring in a corresponding reduction in the intake of PUFA, especially omega 3 long chain fatty acids. In RCTs, substituting PUFA for SFA has lowered LDL while increasing CVD death rates (e.g. Sydney Diet Heart Study), or lowered CVD mortality while leaving LDL unchanged (Lyon Diet Heart Study).

In the words of the well-known medical statistician, Austin Bradford-Hill, "What is biologically plausible depends upon the biological knowledge of the day." The theory developed in the mid-20th century, that saturated fat causes heart disease because it elevates LDL cholesterol (the lipid hypothesis), is not consistent with today's epidemiological evidence, and is also outdated in terms of current knowledge of cholesterol transport. LDL can now be distinguished by (amongst other things) particle size and number, and LDL particle size and number correspond more closely to CHD risk than total LDL or total cholesterol, and are influenced by both carbohydrate and fat intake, e.g. as reported by Siri and Krauss (2005).

Appendix C: Letter of criticism to Professor Schofield's (and team) view on current dietary guidelines

NB: Removed as requested from author.

References

Alderman, M. H., & Cohen, H. W. (2012). Dietary Sodium Intake and Cardiovascular Mortality: Controversy Resolved? *American Journal of Hypertension, 25*(7), 727-734. doi: http://dx.doi.org/10.1038/ajh.2012.52

Asano, T., & McLeod, R. S. (2002). Dietary fibre for the prevention of colorectal adenomas and carcinomas. *Cochrane Database Syst Rev*(2), CD003430. doi: 10.1002/14651858.cd003430

Bach Kristensen, M., Tetens, I., Alstrup Jorgensen, A. B., Dal Thomsen, A., Milman, N., Hels, O., . . . Hansen, M. (2005). A decrease in iron status in young healthy women after long-term daily consumption of the recommended intake of fibre-rich wheat bread. *Eur J Nutr, 44*(6), 334-340. doi: 10.1007/s00394-004-0529-4

Bingham, S. A., Day, N. E., Luben, R., Ferrari, P., Slimani, N., Norat, T., . . . Riboli, E. (2003). Dietary fibre in food and protection against colorectal cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC): an observational study. *Lancet, 361*(9368), 1496-1501.

Bonithon-Kopp, C., Kronborg, O., Giacosa, A., Rath, U., & Faivre, J. (2000). Calcium and fibre supplementation in prevention of colorectal adenoma recurrence: a randomised intervention trial. European Cancer Prevention Organisation Study Group. *Lancet, 356*(9238), 1300-1306.

Bourdel-Marchasson, I., Lapre, E., Laksir, H., & Puget, E. (2010). Insulin resistance, diabetes and cognitive function: Consequences for preventative strategies. *Diabetes & Metabolism, 36*(3), 173-181. doi: doi.org/10.1016/j.diabet.2010.03.001

Burr, M. L., Fehily, A. M., Gilbert, J. F., Rogers, S., Holliday, R. M., Sweetnam, P. M., . . . Deadman, N. M. (1989). Effects of changes in fat, fish, and fibre intakes on death and myocardial reinfarction: diet and reinfarction trial (DART). *Lancet, 2*(8666), 757-761.

Castro-Webb, N., Ruiz-Narváez, E. A., & Campos, H. (2012). Cross-sectional study of conjugated linoleic acid in adipose tissue and risk of diabetes. *The American journal of clinical nutrition, 96*(1), 175-181.

Ceriello, A., & Motz, E. (2004). Is oxidative stress the pathogenic mechanism underlying insulin resistance, diabetes, and cardiovascular disease? The common soil hypothesis revisited. *Arteriosclerosis, Thrombosis, and Vascular Biology, 24*(5), 816-823. doi: 10.1161/01.atv.0000122852.22604.78

Craft, S. (2009). The role of metabolic disorders in Alzheimer disease and vascular dementia: Two roads converged. *Archives of Neurology, 66*(3), 300-305. doi: 10.1001/archneurol.2009.27

Eaton, S. B., Cordain, L., & Lindeberg, S. (2002). Evolutionary health promotion: a consideration of common counterarguments. *Prev Med, 34*(2), 119-123. doi: 10.1006/pmed.2001.0966

Ebbeling, C. B., Swain, J. F., Feldman, H. A., Wong, W., Hachey, D. L., Garcia-Lago, E., & Ludwig, D. S. (2012). Effects of dietary composition on energy expenditure during weight-loss maintenance. *JAMA, 307*(24), 2627-2634. doi: 10.1001/jama.2012.6607

Fine, E. J., Segal-Isaacson, C., Feinman, R. D., Herszkopf, S., Romano, M. C., Tomuta, N., . . . Sparano, J. A. (2012). Targeting insulin inhibition as a metabolic therapy in advanced cancer: A pilot safety and feasibility dietary trial in 10 patients. *Nutrition*.

Fuchs, C. S., Giovannucci, E. L., Colditz, G. A., Hunter, D. J., Stampfer, M. J., Rosner, B., . . . Willett, W. C. (1999). Dietary fiber and the risk of colorectal cancer and adenoma in women. *New England Journal of Medicine, 340*(3), 169-176. doi: doi:10.1056/NEJM199901213400301

Giovannucci, E., Harlan, D. M., Archer, M. C., Bergenstal, R. M., Gapstur, S. M., Habel, L. A., . . . Yee, D. (2010). Diabetes and cancer: A consensus report. *CA: A Cancer Journal for Clinicians, 60*(4), 207-221. doi: 10.3322/caac.20078

Graudal, N., Hubeck-Graudal, T., & Jurgens, G. (2011). Effects of low sodium diet versus high sodium diet on blood pressure, renin, aldosterone, catecholamines, cholesterol, and triglyceride. *Cochrane Database Syst Rev, 11*.

Graudal, N., Jürgens, G., Baslund, B., & Alderman, M. H. (2014). Compared With Usual Sodium Intake, Low- and Excessive-Sodium Diets Are Associated With Increased Mortality: A Meta-Analysis. *American Journal of Hypertension*. doi: 10.1093/ajh/hpu028

Gurven, M., & Kaplan, H. (2007). Longevity among hunter‐gatherers: a cross‐cultural examination. *Population and Development Review, 33*(2), 321-365.

Holmberg, S., Thelin, A., & Stiernström, E.-L. (2009). Food Choices and Coronary Heart Disease: A Population Based Cohort Study of Rural Swedish Men with 12 Years of Follow-up. *International Journal of Environmental Research and Public Health, 6*(10), 2626-2638.

Hooper, L., Summerbell, C. D., Thompson, R., Sills, D., Roberts, F. G., Moore, H., & Davey Smith, G. (2011). Reduced or modified dietary fat for preventing cardiovascular disease. *Cochrane Database Syst Rev*(7), CD002137. doi: 10.1002/14651858.CD002137.pub2

Hugenholtz, F., Mullaney, J. A., Kleerebezem, M., Smidt, H., & Rosendale, D. I. (2013). Modulation of the microbial fermentation in the gut by fermentable carbohydrates. *Bioactive Carbohydrates and Dietary Fibre, 2*(2), 133-142. doi: http://dx.doi.org/10.1016/j.bcdf.2013.09.008

Institute of Medicine of the National Academies. (2005). Dietary reference intakes for water, potassium, sodium, chloride and sulphate. Washington, D.C.

Institute of Medicine of the National Academies. (2013). Sodium intake in populations: Assessment of evidence. Washington, D.C.

Jacobs, E. T., Giuliano, A. R., Roe, D. J., Guillen-Rodriguez, J. M., Hess, L. M., Alberts, D. S., & Martinez, M. E. (2002). Intake of supplemental and total fiber and risk of colorectal adenoma recurrence in the wheat bran fiber trial. *Cancer Epidemiol Biomarkers Prev, 11*(9), 906-914.

Jakobsen, M. U., O'Reilly, E. J., Heitmann, B. L., Pereira, M. A., Balter, K., Fraser, G. E., . . . Ascherio, A. (2009). Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies. *Am J Clin Nutr, 89*(5), 1425-1432. doi: 10.3945/ajcn.2008.27124

Key, T. J., Allen, N. E., Spencer, E. A., & Travis, R. C. (2002). The effect of diet on risk of cancer. *Lancet, 360*(9336), 861-868. doi: 10.1016/s0140-6736(02)09958-0

Knudsen, E., Sandstrom, B., & Solgaard, P. (1996). Zinc, copper and magnesium absorption from a fibre-rich diet. *J Trace Elem Med Biol, 10*(2), 68-76. doi: 10.1016/s0946-672x(96)80014-9

Kratz, M., Baars, T., & Guyenet, S. (2013). The relationship between high-fat dairy consumption and obesity, cardiovascular, and metabolic disease. *Eur J Nutr, 52*(1), 1-24. doi: 10.1007/s00394-012-0418-1

Krikorian, R., Shidler, M. D., Dangelo, K., Couch, S. C., Benoit, S. C., & Clegg, D. J. (2012). Dietary ketosis enhances memory in mild cognitive impairment. *Neurobiology of Aging, 33*(2), 425.e419-425.e427.

Larsson, S. C., Bergkvist, L., Rutegård, J., Giovannucci, E., & Wolk, A. (2006). Calcium and dairy food intakes are inversely associated with colorectal cancer risk in the Cohort of Swedish Men. *The American Journal of Clinical Nutrition, 83*(3), 667-673.

Liu, S., Willet, W. C., Stampfer, M. J., Hu, F. B., Franz, M., Sampson, L., . . . Manson, J. E. (2000). A prospective study of dietary glycemic load, carbohydrate intake,

and risk of coronary heart disease in US women. *Am J Clin Nutr, 71*, 1455-1461.

Madsen, L., & Kristiansen, K. (2012). Of mice and men.

Matafome, P., Santos-Silva, D., Sena, C. M., & Seiça, R. (2013). Common mechanisms of dysfunctional adipose tissue and obesity- related cancer. *Diabetes/Metabolism Research and Reviews*. doi: 10.1002/dmrr.2395

McAuley, K. A., Smith, K. J., Taylor, R. W., McLay, R. T., Williams, S. M., & Mann, J. I. (2006). Long-term effects of popular dietary approaches on weight loss and features of insulin resistance. [Article]. *International Journal of Obesity, 30*(2), 342-349. doi: 10.1038/sj.ijo.0803075

McLean, R., Williams, S., Mann, J., & Parnell, W. (2012). 1051 Estimates of New Zealand Population Sodium Intake: Use of Spot Urine in the 2008/09 Adult Nutrition Survey. *Journal of Hypertension, 30*, e306 310.1097/1001.hjh.0000420510.0000493854.ca.

Medicine, I. o. (2013). *Sodium Intake in Populations: Assessment of Evidence*. Washington DC. USA: National Academies Press.

Mente, A., de Koning, L., Shannon, H. S., & Anand, S. S. (2009). A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease. *Arch Intern Med, 169*(7), 659-669. doi: 10.1001/archinternmed.2009.38

Mozaffarian, D., de Oliveira Otto, M. C., Lemaitre, R. N., Fretts, A. M., Hotamisligil, G., Tsai, M. Y., . . . Nettleton, J. A. (2013). trans-Palmitoleic acid, other dairy fat biomarkers, and incident diabetes: the

Multi-Ethnic Study of Atherosclerosis (MESA). *The American journal of clinical nutrition, 97*(4), 854-861.

Mozaffarian, D., Micha, R., & Wallace, S. (2010). Effects on coronary heart disease of increasing polyunsaturated fat in place of saturated fat: a systematic review and meta-analysis of randomized controlled trials. *PLoS Med, 7*(3), e1000252. doi: 10.1371/journal.pmed.1000252

Nielsen, J. V., Gando, C., Joensson, E., & Paulsson, C. (2012). Low carbohydrate diet in type 1 diabetes, long-term improvement and adherence: A clinical audit. *Diabetology & metabolic syndrome, 4*(1), 23.

Nordmann, A. J., Nordmann, A., Briel, M., Keller, U., Yancy, W. S., Jr., Brehm, B. J., & Bucher, H. C. (2006). Effects of low-carbohydrate vs low-fat diets on weight loss and cardiovascular risk factors: a meta-analysis of randomized controlled trials. *Arch Intern Med, 166*(3), 285-293. doi: 10.1001/archinte.166.3.285

Park, Y., Hunter, D. J., Spiegelman, D., Bergkvist, L., Berrino, F., van den Brandt, P. A., . . . Smith-Warner, S. A. (2005). Dietary fiber intake and risk of colorectal cancer: a pooled analysis of prospective cohort studies. *JAMA, 294*(22), 2849-2857. doi: 10.1001/jama.294.22.2849

Prior, I. A., Davidson, F., Salmond, C. E., & Czochanska, Z. (1981). Cholesterol, coconuts, and diet on Polynesian atolls: a natural experiment: the Pukapuka and Tokelau island studies. *The American journal of clinical nutrition, 34*(8), 1552-1561.

Ramsden, C. E., Zamora, D., Leelarthaepin, B., Majchrzak-Hong, S. F., Faurot, K. R., Suchindran, C. M., . . . Hibbeln, J. R. (2013). Use of dietary linoleic acid for secondary prevention of coronary heart disease and death: evaluation of recovered data from the Sydney Diet Heart Study and updated meta-analysis. *BMJ, 346*. doi: 10.1136/bmj.e8707

Shai, I., Schwarzfuchs, D., Henkin, Y., Shahar, D. R., Witkow, S., Greenberg, I., . . . Stampfer, M. J. (2008). Weight loss with a low-carbohydrate, mediterranean, or low-fat diet. *New England Journal of Medicine, 359*(3), 229-241. doi: doi:10.1056/NEJMoa0708681

Sikaris, K. (2014). *Cholesterol vs fat vs glucose*. Paper presented at the The why and how of low carb eating, Auckland.

Siri-Tarino, P. W., Sun, Q., Hu, F. B., & Krauss, R. M. (2010). Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. *The American journal of clinical nutrition, 91*(3), 535-546. doi: 10.3945/ajcn.2009.27725

Siri, P. W., & Krauss, R. M. (2005). Influence of dietary carbohydrate and fat on LDL and HDL particle distributions. *Curr Atheroscler Rep, 7*(6), 455-459.

Skeaff, C. M., & Miller, J. (2009). Dietary fat and coronary heart disease: summary of evidence from prospective cohort and randomised controlled trials. [Meta-Analysis]. *Annals of Nutrition & Metabolism, 55*(1-3), 173-201. doi: 10.1159/000229002

Stout, R. W. (1990). Insulin and atheroma: 20-yr perspective. *Diabetes Care, 13*(6), 631-654. doi: 10.2337/diacare.13.6.631

Taylor, R. S., Ashton, K. E., Moxham, T., Hooper, L., & Ebrahim, S. (2011). Reduced Dietary Salt for the Prevention of Cardiovascular Disease: A Meta-Analysis of Randomized Controlled Trials (Cochrane Review). *American Journal of Hypertension, 24*(8), 843-853. doi: 10.1038/ajh.2011.115

Tendler, D., Lin, S., Yancy, W. S., Jr., Mavropoulos, J., Sylvestre, P., Rockey, D. C., & Westman, E. C. (2007). The Effect of a Low-Carbohydrate, Ketogenic Diet on Nonalcoholic Fatty Liver Disease: A Pilot Study. *Digestive Diseases and Sciences, 52*(2), 589-593. doi: http://dx.doi.org/10.1007/s10620-006-9433-5

Thomson, B. M., Vannoort, R. W., & Haslemore, R. M. (2008). Dietary exposure and trends of exposure to nutrient elements iodine, iron, selenium and sodium from the 2003–4 New Zealand Total Diet Survey. *British journal of nutrition, 99*(03), 614-625.

Thomson, C. D. (2004). Selenium and iodine intakes and status in New Zealand and Australia. *British Journal of Nutrition, 91*(05), 661-672.

Torre, M., Rodriguez, A. R., & Saura-Calixto, F. (1991). Effects of dietary fiber and phytic acid on mineral availability. *Crit Rev Food Sci Nutr, 30*(1), 1-22. doi: 10.1080/10408399109527545

Turpeinen, O., Pekkarinen, M., Miettinen, M., Elosuo, R., & Paavilainen, E. (1979). Dietary prevention of coronary heart disease: the Finnish Mental Hospital Study. *International Journal of Epidemiology, 8*(2), 99-118.

Weir, G. C., & Bonner-Weir, S. (2004). Five stages of evolving beta-cell dysfunction during progression to diabetes. *Diabetes, 53*(suppl 3), S16-S21.

Westman, E. C. (2002). Is dietary carbohydrate essential for human nutrition? *The American Journal of Clinical Nutrition, 75*(5), 951-953.

Willett, W. C., & Leibel, R. L. (2002). Dietary fat is not a major determinant of body fat. *Am J Med, 113 Suppl 9B*, 47S-59S.

Yancy, W., Foy, M., Chalecki, A., Vernon, M., & Westman, E. C. (2005). A low-carbohydrate, ketogenic diet to treat type 2 diabetes. *Nutrition & Metabolism, 2*(1), 34.

Yang, Q., Zhang, Z., Gregg, E. W., Flanders, W. D., Merritt, R., & Hu, F. B. (2014). Added sugar intake and cardiovascular diseases mortality among us adults. *JAMA Intern Med*. doi: 10.1001/jamainternmed.2013.13563

HUMAN POTENTIAL CENTRE
AN AUT UNIVERSITY RESEARCH CENTRE

Response to Ministry of Health's Saturated Fat query May 2014

Professor Grant Schofield PhD
Professor of Public Health, Director Human Potential Centre, AUT University
Dr Caryn Zinn PhD
NZ Registered Dietician. Senior lecturer Human Potential Centre, AUT University
Dr Nigel Harris PhD**,** BRmgmt
Senior lecturer, Human Potential Centre, AUT University
Dr Mikki Williden PhD
Registered Nutritionist, Senior lecturer Human Potential Centre, AUT University
Catherine Crofts MPS M.Phil
Research Assistant, Human Potential Centre, AUT University
Dr Simon Thornley BHB, MBChB, MPH (Hons), FAFPHM.
Professional Teaching Fellow & Research Fellow, Section of Epidemiology & Biostatistics, University of Auckland
Cliff Harvey ND
Holistic Performance Nutrition
George D. Henderson
Research Assistant, Human Potential Centre, AUT University

For further discussion please contact:
Professor Grant Schofield
Human Potential Centre, AUT University
grant.schofield@aut.ac.nz
Telephone: 09-929169
Mobile: 021-481489

Preamble

We are enclosing extra research and information as requested by the Ministry on Wednesday May 21st 2014. The Ministry requested us to provide "*Any evidence showing that eating diets high in saturated fat were safe and beneficial to health*".

While there was plenty of information about lack of harm (safety) in our original document, we have further elucidated this in the accompanying document. In this document we provide a definition of saturated fat, followed by a contextual discussion on both the safety and the benefit of consuming a higher intake of saturated fat, with the provision of a supplementary reading list detailing this evidence. Two key papers accompany this document: i. a recently published New Zealand Medical Journal piece (Appendix 1) written by members of our team on exactly that issue for your consideration, and ii. a recent well-constructed review on dietary fats and health, written by Glen Lawrence. (Appendix 2)

Thank you again for the opportunity to have input into the development of these new NZ dietary guidelines.

Grant Schofield
Professor of Public Health
Director Human Potential Centre
AUT University

Response to the "Saturated Fat safety" query

1. Definition

It is interesting how "saturated fat" has come to be chosen as a class of food. In fact, saturated fat (SFA) is not a discrete food in the sense that sugar, for example, is. The term is used to describe a heterogeneous collection of dietary fatty acids which have, as their common feature, an alkane hydrocarbon chain.

Animal fats (excepting those from fish) supply a narrower range of saturated fats than vegetable fats, ranging from 30-51%, with dairy as an outlier at 60%. Dairy has an additional content of medium-chain and short-chain fatty acids. This is compared to a range of 6-91% for vegetable fats. This distinction is also true for monounsaturated (MUFA) and polyunsaturated fatty acids (PUFA). Animal fats are relatively balanced fats in that they contain MUFA, SFA, and PUFA in even proportions or within narrow ranges; vegetable oils less so.

In other words, anyone eating a diet of whole plants and animals, a diet which we support, and which has good evidence for conferring good health, will end up eating PUFA, MUFA and SFA. How practicable it is to specifically avoid the SFA component in a wholefood, or minimally refined food, context, and whether such avoidance will in fact promote human health beyond the overall health benefits of eating such a diet, is in question.

2. Safety

A question to be considered is whether "lack of harm" and "safety" are in fact interchangeable terms. We contend that the historical presence of SFA in the diet as naturally occurring fats, and extensively study over several decades with no evidence of harm, is therefore evidence of their safety in the diet.

We draw on lines of logic and scientific evidence from several fields including anthropology, randomised-controlled trials, epidemiology, and biochemistry. In the context of this evidence one of the key misconstrued issues lies in the ambivalent interpretation of the lipid fractions, total cholesterol (TC) and LDL cholesterol (LCLc, a sum which is a calculation from the measured lipid fractions), and their impact on atherosclerosis. In the traditional sense, 'harm' is inferred under conditions of elevated serum TC and LDLc, arising from high intakes of dietary SFA. Momentum gathered from the Framingham Heart Study which reported that high TC was a major risk factor for coronary heart disease (CHD) has largely resulted in a global movement to decrease TC, and therefore reduce risk of CHD. The other side of the argument is that while dietary SFA may indeed elevate TC and LCLc in some individuals, it also tends to elevate HDLc, evidence from correlations is weak or inconsistent, and in some populations LDLc has protective correlations with CHD (Ravnskov, 2003). At the heart of this issue, while elevated LCLc is susceptible to

lipid peroxidation, evidence for the role of SFA in this mechanism is lacking. It is rather the PUFA, linoleic acid that makes LDLc more susceptible to lipid peroxidation. Oxidised lipoproteins are taken up in greater quantities by scavenger LDL receptors on macrophages and vascular endothelial cells, which is thought to initiate the process of atherosclerotic plaque development. While it is not the intention of this piece to delve into the intricacies of biochemistry relating to atherosclerosis, we refer you to a recent paper by Lawrence (2013), which details these concepts and is worthy of scrutiny (see Appendix 2).

Extraordinary claims require extraordinary proof;

We find it is an extraordinary idea that the fats that have been preferentially made and stored in the human body and used for fuel for as long as humans have existed (and for a very long time before that) should *in themselves* be harmful when consumed in the diet.

We contend that proof of this claim has never been forthcoming, and we have been rushed into acting on this diet-heart (lipid) theory on the basis of enthusiasm, prejudice, and weak and contradictory evidence.

Where should the burden of proof lie? Should it be with those who accept that a diet relatively high in fat that comes from traditionally consumed animal fat (including seafood) and other fats from nuts and seeds is our default diet? Or should it instead be with those who have sought to replace this naturally occurring fat with novel, highly processed manufactured fats and fat products, or other novel foods? We contend that the weight of scientific evidence supports our perspective.

Safety of very high saturated fat intakes in traditional diets

Prior et al. (1981) observed that Atoll dwellers from both Pukapuka and Tokelau consumed diets very high in saturated fat from coconut but low in refined carbohydrate. Tokelauans obtained a much higher percentage of energy from coconut than the Pukapukans, 63% compared with 34%. Serum cholesterol levels were 35 to 40 mg higher in Tokelauans than in Pukapukans. Vascular disease was uncommon in both populations and there was no evidence of the high saturated fat intake having a harmful effect in the context of a diet very low in refined carbohydrate. Similar evidence across a range of traditional cultures can be seen in several cultures from the Inuit in the Arctic Circle to the Masai in Africa. All of these groups were consuming diets high in fat including saturated fat, yet remained free of the burden of modern chronic disease.

Identification of regional variations in CVD mortality in India from 1958-1963 from 1.15 million male railroad workers aged 18-55 years (Malhotra, 1967) shows the northern Indian men had 7 times lower mortality, despite a 19 times higher fat intake made up almost exclusively from animal and dairy fats, when compared to a southern Indian cohort. The southern Indian cohort relied almost exclusively on PUFA seed oils.

While none of these studies provide conclusive "proof" of safety, and suffer from the ecological fallacy, they do allow a triangulation of the evidence which is consistent with the known epidemiology, trial results, and plausible biological mechanisms. The lipid hypothesis does not enjoy such consistency.

Safety of high vs. low saturated fat intakes in modern populations;

A number of meta-analyses in recent years have found no significant association between extreme quartiles of saturated fat intake and relative risk of either CVD, CHD or total mortality (Chowdhury et al., 2014; Siri-Tarino, Sun, Hu, & Krauss, 2010a). This indicates that the statistical evidence linking reduced or modified saturated fat intake and these conditions is not strong. In fact, from the most comprehensive summary of the evidence we could find, intake of saturated fat showed no association with overall mortality (Hooper et al., 2011). Our recent NZMJ discussion (Thornley, Henderson, & Schofield, 2014) is attached in Appendix 1. Further to this, traditional Indian diets use ghee (clarified butter) as a cooking oil, which supplies 20% energy from SFA. The replacement of this with oils that are high in linoleic acid (an omega-6 fat) and lower in SFA (5.6% SFA) because of concerns of the high SFA content of the diet has been associated with the rising rates of diabetes and CVD in India. It has been suggested that this exacerbates an already imbalanced omega-6 to omega-3 ratio (Raheja, Sadikot, Phatak, & Rao, 1993).

3. Benefits

There are likely no foods or 'super-foods' which in isolation, greatly and reliably prevent cancer or heart disease. Even the benefit from eating fish is a relatively small reduction in these diseases. It is dietary patterns that exert the greatest beneficial effects on health outcomes and no one particular dietary constituent.

There are, however, some foods or nutrients that increase disease risk. Sugar, refined grains, processed meats and manufactured trans-fats are those identified with increasing harm.

Studies which aim to establish whether diets high in saturated fat (in isolation, as a single changed nutrient variable) are beneficial to health are few and far between. However, we believe that various lines of evidence point in this direction. For example, diets which are based on restricting starch and sugar intake are often high in both total fat, and saturated fat. Some randomised controlled trials which compare restriction of digestible carbohydrate with low energy approaches show improved indices of metabolic health, glucose control, and weight loss in the carbohydrate-restricted arm (Shai et al., 2008; Westman et al., 2007). These interventional studies, along with the observational studies from free living populations in the Pacific, strongly suggest that increasing fat intake (either saturated or unsaturated) in the context of a carbohydrate-restricted diet is likely to improve long term health.

In support of this dietary approach of restricting starch and sugar while liberalising fat intake, several cohort studies and meta-analyses of cohort studies show increased risk of disease in individuals who eat higher intakes of sugar, and higher intakes of

refined grains (Liu et al., 2000; Radhika, Van Dam, Sudha, Ganesan, & Mohan, 2009; Yang et al., 2014)

Therefore, replacing foods identified with harm (i.e. sugar and refined carbohydrate) with those that are not strongly identified with harm (SFA) should be productive of benefit (Siri-Tarino, Sun, Hu, & Krauss, 2010b). If we want to reduce sugar and refined carbohydrate consumption, for example, it helps if there is **a safe and palatable energy source such as fat in its place**.

Furthermore, the common diet-related conditions of obesity and non-insulin dependent diabetes are characterised by metabolic and hormonal dysfunctions promoting increased appetite. Nutritionally adequate and palatable diets that normalise appetite have the potential to decrease energy intake and resolve or mitigate these conditions. When appetite is normalised by the restriction of carbohydrate, the diet may be high in fat, represented as a percentage of total energy intake, yet supply no greater total amount of fat than it did before, because the diet no longer supplies the fats hidden in baked goods, processed foods, and deep-fried starches (Stock & Yudkin, 1970).

From a public health perspective, New Zealanders drink too much alcohol. It has long been considered an established fact in the field of alcoholism research that diets high in polyunsaturated fat promote liver disease in the presence of alcohol, and that diets high in saturated and monounsaturated fats, but relatively low in polyunsaturated fatty acids, slow or prevent the development of alcoholic liver disease (French, 1995; Mezey, 1998; Nanji et al., 1995).

We believe the evidence taken together shows that diets which are restricted in sugar and high-glycemic index starch, replaced with fat, are likely to result in long term health benefits. These diets should emphasise intake of fats from a variety of sources, mainly from whole foods, as well as protein from a range of whole foods. Although we believe that butter and unprocessed red meat are unlikely to cause disease, it does not mean that we advocate selecting these foods preferentially and in unlimited quantities, neglecting whole food from other plant or animal sources.

4. Supplementary reading list: Evidence for safety and benefits of higher saturated fat intakes

Diets higher in saturated fats are safer than diets high in carbohydrate:

Siri-Tarino, P. W. et al. (2010). Saturated fat, carbohydrate, and cardiovascular disease. The American Journal of Clinical Nutrition 91(3):502–9, http://pmid.us/20089734.

Mozaffarian, D. et al. (2004). Dietary fats, carbohydrate, and progression of coronary atherosclerosis in postmenopausal women. The American Journal of Clinical Nutrition 80(5):1175–84. PMC1270002. NIHMS2818.

Diets higher in saturated fats are safer than diets high in linoleic acid:

Gillman, M.W. et al. (1997). Inverse association of dietary fat with development of ischemic stroke in men. JAMA 278(24):2145–50, doi:10.1001/jama.1997.03550240035030.

Iso, H. et al. (2001). Prospective study of fat and protein intake and risk of intraparenchymal hemorrhage in women. Circulation. 103: 856-863 doi: 10.1161/01.CIR.103.6.856

French, S. (1995) Rationale for therapy for alcoholic liver disease. Comment on Gastroenterology 109(2):547-54. PMID: 7615214 http://download.journals.elsevierhealth.com/pdfs/journals/0016-5085/PII0016508595903542.pdf

Mozaffarian, D. et al. (2010). Trans-palmitoleic acid, metabolic risk factors, and new-onset diabetes in US adults. Ann Intern Med. 153(12): 790–799. doi: 10.1059/0003-4819-153-12-201012210-00005

Mozaffarian D. et al. (2013). Trans-palmitoleic acid, other dairy fat biomarkers, and incident diabetes: the Multi-Ethnic Study of Atherosclerosis (MESA). Am J Clin Nutr. 97(4):854-61. doi: 10.3945/ajcn.112.045468.

Nanji AA et al. (1995) Dietary saturated fatty acids: a novel treatment for alcoholic liver disease. Gastroenterology. 109(2):547-54. doi: org/10.1016/0016-5085(95)90344-5

Ramsden, C.E. et al. (2013) Use of dietary linoleic acid for secondary prevention of coronary heart disease and death: evaluation of recovered data from the Sydney Diet Heart Study and updated meta-analysis. BMJ. Feb 4;346:e8707. doi: 10.1136/bmj.e8707.

Ravnskov, U. (1998) The questionable role of saturated and polyunsaturated fatty acids in cardiovascular disease. J Clin Epidemiol. 51(6):443-60. doi:10.1016/S0895-4356(98)00018-3

Reheja et al. (1993). Significance of the n-6/n-3 ratio for insulin action in diabetes. Annals of the New York Academy of Sciences, 683: 258–271. doi: 10.1111/j.1749-6632.1993.tb35715.x

Romestaing, C. (2007). Long term highly saturated fat diet does not induce NASH in Wistar rats. Nutr Metab (Lond). 4: 4. doi: 10.1186/1743-7075-4-4

Seddon JM et al. (2001). Dietary fat and risk for advanced age-related macular degeneration. Arch Ophthalmol. 119(8):1191-9. PMID: 11483088

Seddon JM et al. (2003) Progression of age-related macular degeneration: association with dietary fat, transunsaturated fat, nuts, and fish intake. Arch Ophthalmol. 121(12):1728-37. PMID: 14662593

Shapira, N. (2007) Israeli 'cancer shift' over heart disease mortality may be led by greater risk in women with high intake of n-6 fatty acids. Eur J Cancer Prev. 16(5):486-94. doi: 10.1097/CEJ.0b013e3280145b6d

Tionneland, A. et al. (2009). Linoleic acid, a dietary n–6 polyunsaturated fatty acid, and the aetiology of ulcerative colitis: a nested case-control study within a European prospective cohort study. Gut. 58(12):1606-11. doi: 10.1136/gut.2008.169078

Yam D. et al, (1996). Diet and disease--the Israeli paradox: possible dangers of a high omega-6 polyunsaturated fatty acid diet. Isr J Med Sci. 32(11):1134-43. PMID: 896009

Yamagishi K et al. (2010). Dietary intake of saturated fatty acids and mortality from cardiovascular disease in Japanese: the Japan Collaborative Cohort Study for Evaluation of Cancer Risk Study. The American Journal of Clinical Nutrition 92(4):759–65, doi: 10.3945/ajcn.2009.29146

Diets high in saturated medium-chain fatty acids may be protective

Nagao K, Yanagita T. (2010) Medium-chain fatty acids: functional lipids for the prevention and treatment of the metabolic syndrome. Pharmacological Research. 61(3), 208-12.

References

Chowdhury, R., Warnakula, S., Kunutsor, S., Crowe, F., Ward, H. A., Johnson, L., . . . Thompson, S. G. (2014). Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk: A Systematic Review and Meta-analysis. *Annals of Internal Medicine, 160*(6), 398-406-406.

French, S. W. (1995). Rationale for therapy for alcoholic liver disease. *Gastroenterology, 109*(2), 617-620.

Hooper, L., Summerbell, C. D., Thompson, R., Sills, D., Roberts, F. G., Moore, H., & Davey Smith, G. (2011). Reduced or modified dietary fat for preventing cardiovascular disease. *Cochrane Database of Systematic Reviews*(7), CD002137. doi:10.1002/14651858.CD002137.pub2

Lawrence, G. D. (2013). Dietary fats and health: dietary recommendations in the context of scientific evidence. *Advances in Nutrition: An International Review Journal, 4*(3), 294-302.

Liu, S., Willet, W. C., Stampfer, M. J., Hu, F. B., Franz, M., Sampson, L., . . . Manson, J. E. (2000). A prospective study of dietary glycemic load, carbohydrate intake, and risk of coronary heart disease in US women. *Am J Clin Nutr, 71*, 1455-1461.

Malhotra, S. (1967). Epidemiology of ischaemic heart disease in India with special reference to causation. *British Heart Journal, 29*(6), 895.

Mezey, E. (1998). Dietary fat and alcoholic liver disease. *Hepatology, 28*(4), 901-905.

Nanji, A. A., Hossein Sadrzadeh, S., Yang, E. K., Fogt, F., Meydani, M., & Dannenberg, A. J. (1995). Dietary saturated fatty acids: a novel treatment for alcoholic liver disease. *Gastroenterology, 109*(2), 547-554.

Prior, I. A., Davidson, F., Salmond, C. E., & Czochanska, Z. (1981). Cholesterol, coconuts, and diet on Polynesian atolls: a natural experiment: the Pukapuka and Tokelau island studies. *The American journal of clinical nutrition, 34*(8), 1552-1561.

Radhika, G., Van Dam, R. M., Sudha, V., Ganesan, A., & Mohan, V. (2009). Refined grain consumption and the metabolic syndrome in urban Asian Indians (Chennai Urban Rural Epidemiology Study 57). *Metabolism: Clinical and Experimental, 58*(5), 675-681.

Raheja, B. S., Sadikot, S. M., Phatak, R. B., & Rao, M. B. (1993). Significance of the n‐6/n‐3 ratio for insulin action in diabetes. *Annals of the New York Academy of Sciences, 683*(1), 258-271.

Ravnskov, U. (2003). High cholesterol may protect against infections and atherosclerosis. *QJM, 96*(12), 927-934.

Shai, I., Schwarzfuchs, D., Henkin, Y., Shahar, D. R., Witkow, S., Greenberg, I., . . . Stampfer, M. J. (2008). Weight loss with a low-carbohydrate, mediterranean, or low-fat diet. *New England Journal of Medicine, 359*(3), 229-241. doi:doi:10.1056/NEJMoa0708681

Siri-Tarino, P. W., Sun, Q., Hu, F. B., & Krauss, R. M. (2010a). Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. *The American journal of clinical nutrition, 91*(3), 535-546. doi:10.3945/ajcn.2009.27725

Siri-Tarino, P. W., Sun, Q., Hu, F. B., & Krauss, R. M. (2010b). Saturated fat, carbohydrate, and cardiovascular disease. *The American journal of clinical nutrition, 91*(3), 502-509. doi:10.3945/ajcn.2008.26285

Stock, A. L., & Yudkin, J. (1970). Nutrient intake of subjects on low carbohydrate diet used in treatment of obesity. *The American journal of clinical nutrition, 23*(7), 948-952.

Thornley, S., Henderson, G., & Schofield, G. (2014). Chewing the saturated fat: should we or shouldn't we? *New Zealand Medical Journal, 127*(1394).

Westman, E. C., Feinman, R. D., Mavropoulos, J. C., Vernon, M. C., Volek, J. S., Wortman, J. A., . . . Phinney, S. D. (2007). Low-carbohydrate nutrition and metabolism. *The American journal of clinical nutrition, 86*(2), 276-284.

Yang, Q., Zhang, Z., Gregg, E. W., Flanders, W. D., Merritt, R., & Hu, F. B. (2014). Added sugar intake and cardiovascular diseases mortality among us adults. *JAMA Intern Med*. doi:10.1001/jamainternmed.2013.13563

Appendix 1: New Zealand Medical Journal letter

THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Chewing the saturated fat: should we or shouldn't we?

We respond to an *NZMJ* editorial by Te Morenga and colleagues about the issue of saturated fat.[1] The authors call for quiet, after the link between saturated fat intake and cardiovascular disease (CVD) was questioned.

The editorial authors attack the validity of a recent meta-analysis by Chowdhury of cohort and trial studies which showed no significant association between saturated fat intake, or biomarkers thereof, and CVD.[2] Instead, the editorial authors assert that saturated fat causes CVD, with support from another meta-analysis of cohort studies by Jakobsen which contains individual participant data.[3]

The editorial raises a number of issues. When should statistical evidence that negates a hypothesis be believed, and the conviction overturned? If there are conflicting meta-analyses evaluating the evidence for a hypothesis, which should be selected? Clearly, with saturated fat and its influence on CVD, it is possible to prefer a summary study which supports one's point of view. Less subjectively, the quality of one study over another may be ranked.

Bradford-Hill's causal criteria are useful to apply to the evidence in question. Briefly, these principles suggest that an association is more likely to be causal if there is consistent evidence from different studies, the association is strong, a dose-response association is evident, and experimental randomised trial data supports the hypothesis. Temporality, analogy and biological plausibility are other considerations.

We believe the hypothesis that saturated fat causes cardiovascular disease fails at the first criterion. Summaries of the experimental evidence do not show a consistent association between saturated fat restriction (or substitution) and mortality endpoints.

If saturated fat is the strongest dietary factor that causes CVD, it would be expected that replacement with other types of fat would lead to reduced incidence. The Jakobsen study does not show consistent evidence of benefit from saturated fat avoidance.[3] Rather, only one of the subgroup analyses returns a positive association. Similarly, if saturated fat reduces CVD without adverse effects on other outcomes, we would expect overall mortality to be reduced.

Death is measured with less error than any other disease-specific outcomes. Focus on overall mortality avoids the risk of concluding that an intervention improves one endpoint, but, in reality, is offset by harm to another. For example, a treatment may reduce CVD but increase cancer incidence, so that the effect on overall mortality is neutral. This is possible in the Jakobsen study, since only CVD endpoints are reported.

A number of meta-analyses now support the findings of Chowdhury,[2] showing little backing for the idea that substituting saturated fat with other types reduces CVD.[4–9] A Cochrane review of randomised studies, designed to test the hypothesis that saturated fat influences CVD, showed no association between treatment arm and overall mortality (pooled relative risk 0.98, 95%CI: 0.93–1.04, 71,790 participants, 4292 deaths).[6]

NZMJ 23 May 2014, Vol 127 No 1394; ISSN 1175 8716 Page 94
URL: http://journal.nzma.org.nz/journal/127-1394/6134/

With the high number of participants and deaths reported, a large effect of the intervention is unlikely to be missed. The funnel plot for this analysis showed some evidence of publication bias. That is that small studies which showed harm from saturated fat replacement were unlikely to be published. The reported pooled effect is, therefore, likely to overestimate the benefit of avoiding saturated fat.

So, we conclude, that randomised trial data, which is superior to the observational evidence offered by Jakobsen, does not support either limiting or altering saturated fat intake to improve survival. We also consider that this Cochrane review is less likely to be biased than the surrogate endpoint (low density lipoprotein cholesterol) and ecological studies referred to by the editorial authors. In an editorial that claims to present "the totality of the evidence", we find this omission striking.

The editorial authors argue that the Jakobsen study[3] should be preferred over that by Chowdhury,[2] even though the latter includes randomised studies. Experimental trials are generally considered less biased than those which observe cohorts, due to the randomisation which balances confounders between the treated and control arms.

Other studies support the lack of statistical association between altering saturated fat intake, both from randomised and observational designs.[4,5] One comparative meta-analysis ranks the statistical link between saturated fat and CVD amongst the poorest of a range of dietary factors.[5]

We ask ourselves, "How much more evidence is needed before saturated-fat-based interventions are abandoned?" Popper stated that the hallmark of the scientific method is that a hypothesis is possible to falsify, should it lack supporting evidence.

In the absence of a strong indication of harm, we believe the public should be left to chew the saturated fat, and concern themselves with avoiding dietary factors which consistently cause ill health.[10]

Competing interests and funding: Nil.

Simon Thornley
Public Health Physician
Section of Epidemiology and Biostatistics
The University of Auckland
s.thornley@auckland.ac.nz

George Henderson
Research Associate
Auckland University of Technology, The Human Potential Centre
Auckland

Grant Schofield
Professor of Public Health
Auckland University of Technology, The Human Potential Centre
Auckland

NZMJ 23 May 2014, Vol 127 No 1394; ISSN 1175 8716 Page 95
URL: http://journal.nzma.org.nz/journal/127-1394/6134/ ©NZMA

Appendix 2: Dietary Fats and Health: Dietary Recommendations in the context of Scientific Evidence.

REVIEW

AN Advances in Nutrition An International Review Journal

Dietary Fats and Health: Dietary Recommendations in the Context of Scientific Evidence[1]

Glen D. Lawrence*
Department of Chemistry and Biochemistry, Long Island University, Brooklyn, NY

ABSTRACT

Although early studies showed that saturated fat diets with very low levels of PUFAs increase serum cholesterol, whereas other studies showed high serum cholesterol increased the risk of coronary artery disease (CAD), the evidence of dietary saturated fats increasing CAD or causing premature death was weak. Over the years, data revealed that dietary saturated fatty acids (SFAs) are not associated with CAD and other adverse health effects or at worst are weakly associated in some analyses when other contributing factors may be overlooked. Several recent analyses indicate that SFAs, particularly in dairy products and coconut oil, can improve health. The evidence of ω6 polyunsaturated fatty acids (PUFAs) promoting inflammation and augmenting many diseases continues to grow, whereas ω3 PUFAs seem to counter these adverse effects. The replacement of saturated fats in the diet with carbohydrates, especially sugars, has resulted in increased obesity and its associated health complications. Well-established mechanisms have been proposed for the adverse health effects of some alternative or replacement nutrients, such as simple carbohydrates and PUFAs. The focus on dietary manipulation of serum cholesterol may be moot in view of numerous other factors that increase the risk of heart disease. The adverse health effects that have been associated with saturated fats in the past are most likely due to factors other than SFAs, which are discussed here. This review calls for a rational reevaluation of existing dietary recommendations that focus on minimizing dietary SFAs, for which mechanisms for adverse health effects are lacking. *Adv. Nutr.* 4: 294–302, 2013.

Introduction

Since the Framingham Heart Study reported that high serum cholesterol was a major risk factor for coronary heart disease (1), there has been an aggressive campaign in the medical community to decrease serum cholesterol. It has been a widely accepted belief that dietary saturated fats and dietary cholesterol cause an increase in serum total cholesterol, as well as LDL-cholesterol (LDL-C)[2] and thereby increase the risk of heart disease if consumed (2). Over the years, it became clear that high levels of LDL circulating in the blood are susceptible to lipid peroxidation, which results in the oxidized LDL being scavenged by macrophages lining certain arteries, particularly around the heart, leading to atherosclerosis (3). Although this mechanism provides a role for high serum LDL-C causing atherosclerosis, evidence of the involvement of saturated fats is lacking, even though it is well established that a diet high in saturated fat increases serum cholesterol and a diet high in polyunsaturated oil decreases serum cholesterol (4,5). In fact, PUFAs are the components that are oxidized and generate antigenic substances that are recognized by immune cells for clearance of oxidized LDL in atherogenesis (6–8).

Numerous reports and reviews in recent years have begun to call the perceived pernicious effects of dietary saturated fatty acids (SFAs) into question. The purpose of this review is to summarize the scientific understanding as it relates to dietary fats in health and disease, particularly with regard to the innocuous nature of SFAs and the physiological effects that have implicated PUFAs in numerous disorders and diseases. The role of dietary fats in cardiovascular disease (CVD) and many other diseases is complex, yet there is a powerful inertia that has allowed the saturated fat doctrine to endure.

Dietary fatty acids and serum cholesterol

Dietary fat studies in the mid-20th century stressed the relationship of dietary SFAs and PUFAs to serum cholesterol levels with an aim toward decreasing the likelihood of the development of coronary artery disease (CAD) and premature death (4,5). Once lipoprotein fractions were separated in the blood, it became evident that LDL and VLDL were

[1] Author disclosure: G. D. Lawrence, no conflicts of interest.
[2] Abbreviations used: apo B, apolipoprotein B-100; CAD, coronary artery disease; CVD, cardiovascular disease; FH, familial hypercholesterolemia; HDL-C, HDL cholesterol; HFCS, high fructose corn syrup; LDL-C, LDL cholesterol; Lp(a), lipoprotein(a); PON1, paraoxonase 1; SFA, saturated fatty acid; SREBP, sterol regulatory element binding protein.
* To whom correspondence should be addressed. E-mail: lawrence@liu.edu.

 Adv. Nutr. 4: 294–302, 2013; doi:10.3945/an.113.003657.

17th April 2014

PO Box 22-114,
Christchurch 8142
New Zealand
0800-66-88-11 (+64-3-3736-390)
enz@exercisenz.org.nz
www.exercisenz.org.nz

Document 1E

Exercise Association of New Zealand

Representing the Exercise & Fitness Industry

Feedback on proposed key healthy eating and physical activity messages (guidelines statements) for adult New Zealanders.

Firstly, thank you for the opportunity to provide feedback on the proposed guidelines. We believe that in the case of the physical activity guidelines, they are a significant improvement, and while, in our opinion, the nutrition guidelines still need significant work, they are a step in the right direction.

The feedback was complied by ExerciseNZ's Scientific Advisory Panel, headed by Dr Nigel Harris. It has also been reviewed by Stephen Gacsal, Registrar of the New Zealand Register of Exercise Professionals (REPs).

I have attached a detailed commentary on each of the physical activity guidelines, which outlines our feedback and proposed changes in some detail, with the key elements being:

- A move from time based exercise to intensity, especially for weight loss. This is well supported by research as outlined in the attachment. We are very pleased that the concept of exercise intensity has been incorporated into this guidelines, but we believe this needs to be emphasised more.
- Changing the wording in Guideline 4 to be consistent with research. Our concern here is that at present it mentions activities that may not provide the benefits that the guideline is trying to achieve. The concept of *resistance training* should be highlighted.

For the nutrition guidelines, our concerns is that while it is a step in the right direction, they are still in the most part based on out-dated principles that are no longer used by most exercise professionals, and many nutrition experts, specifically:

- There is no reference to eating 'real food' as opposed to processed items. If this concept was added it would indirectly reinforce the concerns around sugar, as well as clarifying that unprocessed saturated fats can play a part of a healthy diet.
- One of the central messages is still a 'low fat high carbohydrate' focus, which is inconsistent with research on both healthy eating and weight loss. Furthermore the messages that all saturated fat should be minimised is not evidence based.

As mentioned on the phone when we spoke several weeks ago, our biggest concern in the nutrition area is that if guidelines come out that are inconsistent with current practice, then exercise professionals will simply ignore them, and as a result there will be mixed messages to the public. There are over 2,200 registered exercise professionals in New Zealand, and they directly deal with over half a million kiwis on a regular basis, and therefore have a huge impact on both the wellness of New Zealanders, and specifically the messages they receive around physical activity and nutrition. We would very much like to work with you so that the guidelines and the messages exercise professionals put out are at least on the same page.

It should be noted that it is well understood that detailed dietary advice is not the domain of exercise professionals. However, since it is well researched that for a combination of diet and exercise is the most effective in managing weight, exercise professionals should, and do, give out basic nutritional advice on healthy eating and weight loss. Those that are registered with the NZ Register of Exercise Professionals (REPs) are required to only use advice that is based on evidence based practice, and we would like to work with you to ensure that their messages, and yours are consistent.

As an industry, we very much value the work that the ministry does, and in particular the consultative approach to developing guidelines, especially in recent times. We would like to continue to work with you so that there is consistency of message as much as possible.

Richard Beddie
Chief Executive

HUMAN POTENTIAL CENTRE
AN AUT UNIVERSITY RESEARCH CENTRE

Authors:

Dr Nigel Harris PhD, BRmgmt
Professor Grant Schofield PhD, Director & Professor of Public Health
Lisa Mackay PGradDipHSc, BSR
Kate White MHSc (Hons), BSR, BBus

Thank you for the opportunity to make comment on the draft physical activity guidelines as presented below. We would value the chance to discuss and contribute further.

Draft Activity Guideline Statements:

1. Sit less, move more! Reduce sedentary behaviour and break up long periods of sitting.

2. Do at least 150 minutes (2 ½ hours) of moderate-intensity or 75 minutes (1¼ hours) of vigorous-intensity physical activity spread throughout the week.

3. For weight management and extra health benefits, aim to do at least 300 minutes (5 hours) of moderate- or 150 minutes (2 ½ hours) of vigorous-intensity physical activity spread throughout the week.

4. Include some muscle- and bone-strengthening activities on at least two days per week.

5. If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount.

For further discussion please contact:

Dr Nigel Harris
nigel.harris@aut.ac.nz
Telephone: 09-921999 Extension 7301
s 9(2)(a)

Guideline 1: Sitting and sedentary behaviours

The inclusion of the guideline specifically around reduction of total sitting time is important. The evidence is consistent in that movement is essential to health and wellbeing. Given the ubiquity of workplace sedentariness, we suggest also including the recommendation of trying a standing desk in the workplace. Specialist equipment is not requisite. Spare coffee tables or basically constructed desktop tables function very effectively. Standing desks could offer an expedient option towards the reduction of total sitting time and the associated improvements in metabolic health.

We simply suggest the inclusion of the phrase "try a standing desk" within the proposed longer guideline, perhaps fitting well after the point on sitting a lot at work.

Guidelines 2 and 3: Duration and exercise intensity

It is good to see the inclusion of intensity as a potent component of general physical activity. More intense physical activity confers health benefits beyond those of simply moving more at lower intensities, and exercise-induced improvements in metabolic conditions such as insulin resistance are influenced to a greater extent by exercise intensity than duration [1].

Hence we think that intensity could be more concisely offered in the draft guidelines.

Given that perceived time poverty is a perceived barrier to exercise, (empirically and anecdotally) [2] providing specific yet simple advice on modalities to achieve increased intensity could be included. So-called high-intensity intermittent training is a time-efficient and well-tolerated method to improve cardio-metabolic health in a range of symptomatic and asymptomatic populations [3]. There is also good evidence that a small number of brief bursts of higher intensity activity are effective and tolerable [4]. The range of brief intermittent protocols that have been proven in well designed randomized controlled trials to be at least as effective as longer duration steady state exercise could be specifically but simply communicated. It is reasonably conceivable that a public health message mandating the efficacy and time efficiency of such a modality could serve to expedite the acceptance of exercise to those who consider themselves time poor. That is, those who are overwhelmed by the perceived magnitude of the time commitment needed within current recommendations may perhaps be more likely to participate in exercise if the stated requisite time is less. It would seem people who don't currently adhere to the recommended minimum 30 minutes of continuous exercise are very unlikely to ever commit to even greater total weekly duration. A new approach is needed.

Such information could be kept palatable to a lay public in line with other exercise guidelines. The recommendation would remove the need to communicate total time commitments, and rather focus on achieving consistent general activity, augmented with some form of vigorous exercise and resistance training. The proviso of requisite medical clearance if any pathology is known or suspected would remain.

A major objection we have around the guidelines are the time-based recommendations positioned for weight loss / weight loss maintenance

The time-based activity recommendations assume that greater total exercise duration is a legitimate and independent strategy for reducing weight. Evidence does not support this, at least evidence that would be considered robust enough to make public health recommendations. We agree that there is evidence that adding exercise to weight loss programs is likely to provide some extra benefit over diet only weight loss programs (see Wu et al. [5] for a meta-analytic review). However, exercise as an independent factor in weight

loss is less convincing. For example in a systematic review and meta-analysis of 14 RCTS using 6-12 months exposure to aerobic exercise Thorogood et al. [6] concluded "Our results show that isolated aerobic exercise is not an effective weight loss therapy in these patients. Isolated aerobic exercise provides modest benefits to blood pressure and lipid levels and may still be an effective weight loss therapy in conjunction with diets".

The complex interplay between physical activity, insulin and other hormonal (including leptin) sensitivity and weight is complex. What is likely is that there are considerable variations in how individuals respond to exercise and macronutrient profiles in appetite control, the regulation of physical activity and so forth. It is possible that exercise contributes to appetite regulation [7] although the mechanisms are less clear. As a simple "energy in energy out" hypothesis, the biological data support the case for a more complex system where low physical activity may itself be the outcome of metabolic ill health rather than a direct and independent cause in the first instance. Much more work is needed to understand this complexity.

We therefore contest that the data are not yet robust enough to suggest an independent and time-based goal for weight loss and weight loss maintenance for the public. Instead it might be plausible to note that physical activity contributes to successful weight loss and weight loss maintenance over and above diet only approach.

There are however, epidemiologic, cross-sectional, and prospective studies which show a hypothetical role for physical activity in weight-loss maintenance. Analysis of prospective trials show a plausible dose-response relationship between physical activity and weight maintenance [8]. Whether this can be inferred to also cause weight loss is unclear. The RCT evidence of exercise only interventions is limited (see above). Methodological issues such as the self-report and self-selection bias on the U.S. based National Weight Control registry database confound our confidence in the public message of total exercise duration being fundamental to fat loss. The ACSM's 2009 position statement on appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults acknowledges the limitations in current research [9], but proceeds to recommend a dose response relationship between total physical activity duration and weight control. Conceivably the public interpretation of 'moderate intensity' may be an underlying issue. The 3–5.9 METS range represents approximately 12-13 on a 6-20 rating of perceived exertion scale (fairly light to somewhat hard), or ~64-76% of age predicted heart rate maximum. Performing consistent and substantive duration low level activity at ~64% HR max is arguably a much more palatable and achievable target than 76% HR max where typically some intentional structured activity (such as a steady hard walk) may be needed. Given the acknowledged effectiveness of interruptions to sedentariness and intermittently accrued total activity, it may be that targeting simple increased general PA, rather than communicating the moderate intensity mantra is needed. In other words, plenty of purposeful and mindful general activity threaded through day-to-day life, then add some degree of structure and intensity for a brief but potent dose of exercise to augment general activity. Individuals who prefer to engage in exercise at the higher end of the moderate intensity spectrum will of course experience positive benefits too, but we expect such individuals are not the key targets of the public health recommendations.

***We propose a more innovative, and perhaps timely interpretation of the time-based physical activity guidelines*.** We do so on the basis that the current time-based guidelines do not match any known objective measures of physical activity.

Relying on self-reported epidemiology which is fundamentally flawed as an accurate measure of human movement has the potential to render the time-based guidelines meaningless and expose the underlying issues with this measurement paradigm.

Our suggestion to replace Guidelines 2 and 3:

Moving is essential to human health, even low intensity activities as part of your everyday life count. The more activity you can incorporate into your day the better.

Extra benefits for health and wellbeing can be achieved with a small amount of more structured exercise that should include some higher intensity and resistance type training. For example, try 1 minute of exercise that you find is quite intense, to the point where you are breathing very hard, then do 1 minute of very light exercise such as a very slow walk. Repeat that a few times in a row.*

Regular steady exercise such as brisk walking or jogging also provide extra health benefits in addition to regular movement and activity.

Activity and exercise as recommended above, when combined with good nutrition, is most effective for weight loss and general health.

**If you have, or suspect you might have a medical condition that may be affected by harder exercise consult your GP first*

Guideline 4: Resistance training

The scope of muscle and bone strengthening modalities are a little misguiding in our opinion. Position statements and guidelines such as the American College of Sports Medicine (ACSM) 2011 pronouncement on the quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults for example [10], allocate the highest category of supporting evidence to the efficacy of resistance training on a broad range of health and metabolic outcomes. The guidelines then provide very specific parameters for resistance training as a modality, centered on structured, progressive, loaded training.

We acknowledge that 'resistance training' is a modality that may be performed in a variety of settings, but disagree that some of the currently listed activities within the guidelines such as swimming, certain forms of yoga, certain forms of pilates, or indeed many forms of 'aerobics' constitute effective muscle and bone strengthening options. That is, they probably do not meet minimum threshold loading for adequate training induced musculoskeletal adaptations. Great exercise options for sure, and it's good to communicate the varied context in which exercise can be enjoyed, but in our opinion these guidelines compromise the message for what constitutes effective stimuli towards the intended musculoskeletal adaptations associated with this recommendation.

We understand that some sectors of the general public may conceivably perceive structured resistance exercise as stigmatic, expensive, intimidating or simply not necessary for health. Resistance training need not cost, nor does it have to be conducted in a fitness centre. It is encouraging to see increasing prevalence of outdoor exercise equipment in public settings for example. There are also many home-based, or local environment options. We do strongly encourage the public to seek qualified advice from a Registered Exercise Professional for the safest and most effective way to achieve recommended resistance training guidelines; some structure and supervision is highly preferable.

Hence, we recommend that Guideline 4 be worded similar to:

Include some muscle- and bone-strengthening activities once or twice a week.

Muscle and bone strengthening activities help greatly with your general health and prevention of diseases such as diabetes, and are important for keeping your body strong for life activities, and reducing the risk of falling or injury.

Strengthen your muscles and bones with resistance activities such as resistance training in a fitness centre, bodyweight exercises at a park or home, walking up and down hills or stairs, and heavy gardening.

Guideline 5: Physical activity

We agree with this guideline.

References

1. Janssen, I. and R. Ross, *Vigorous intensity physical activity is related to the metabolic syndrome independent of the physical activity dose.* International Journal of Epidemiology, 2012. **41**(4): p. 1132-1140.
2. Trost, S.G., et al., *Correlates of adults' participation in physical activity: Review and update.* Medicine and Science in Sports and Exercise, 2002. **34**(12): p. 1996-2001.
3. Bird, S.R. and J.A. Hawley, *Exercise and type 2 diabetes: New prescription for an old problem.* Maturitas, 2012. **72**(4): p. 311-316.
4. Metcalfe, R.S., et al., *Towards the minimal amount of exercise for improving metabolic health: Beneficial effects of reduced-exertion high-intensity interval training.* European Journal of Applied Physiology, 2012. **112**(7): p. 2767-2775.
5. Wu, T., et al., *Long-term effectiveness of diet-plus-exercise interventions vs. diet-only interventions for weight loss: A meta-analysis.* Obesity Reviews, 2009. **10**(3): p. 313-323.
6. Thorogood, A., et al., *Isolated aerobic exercise and weight loss: A systematic review and meta-analysis of randomized controlled trials.* The American Journal of Medicine, 2011. **124**(8): p. 747-755.
7. Martins, C., L. Morgan, and H. Truby, *A review of the effects of exercise on appetite regulation: An obesity perspective.* International Journal of Obesity, 2008. **32**(9): p. 1337-1347.
8. Catenacci, V.A. and H.R. Wyatt, *The role of physical activity in producing and maintaining weight loss.* Nature Clinical Practice Endocrinology and Metabolism, 2007. **3**(7): p. 518-529.
9. Donnelly, J.E., et al., *American College of Sports Medicine Position Stand. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults.* Medicine and Science in Sports and Exercise, 2009. **41**(2): p. 459-471.
10. Garber, C.E., et al., *Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise.* Medicine and Science in Sports and Exercise, 2011. **43**(7): p. 1334-1359.

DRAFT ACTIVITY GUIDELINE STATEMENTS

1. Sit less, move more! Reduce sedentary behaviour and break up long periods of sitting.
2. Do at least 150 minutes (2 ½ hours) of moderate-intensity or 75 minutes (1¼ hours) of vigorous-intensity physical activity spread throughout the week.
3. For weight management and extra health benefits, aim to do at least 300 minutes (5 hours) of moderate- or 150 minutes (2 ½ hours) of vigorous-intensity physical activity spread throughout the week.
4. Include some muscle- and bone-strengthening activities on at least two days per week.
5. If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount.

Draft Activity Guidelines Statements 2014 – including 'why' and 'how'

1. Reduce sedentary behaviour and break up long periods of sitting (sit less, move more).

- Sitting less can help you live healthier and longer.
  - *Stand up and move regularly throughout the day, at least every hour.*
  - *If you are watching television, get up during the ad breaks.*
  - *If you sit a lot at work, get into the habit of getting up and moving at least every hour.*
  - *See standing and moving as an opportunity, not an inconvenience.*

2. Do at least 150 minutes (2 ½ hours) of moderate-intensity or 75 minutes (1 ¼ hour) of vigorous-intensity physical activity spread throughout the week.

- Moderate- and vigorous-intensity activities are great for the heart, lungs, and overall fitness and wellbeing. Examples of these activities can be found in Table X
  - *Moderate-intensity activities cause a slight but noticeable increase in breathing and heart rate.*
  - *Vigorous-intensity activities significantly increase breathing and heart rate.*
  - *You can achieve this by doing 30 minutes of moderate-intensity, or 15 minutes of vigorous-intensity physical activity on five days per week.*
  - *If you have been physically inactive for some time, are just starting out, or have certain health conditions you may wish to consult a health practitioner or physical activity specialist to ensure your safety before you start being physically active.*

3. Aim to do at least 300 minutes (5 hours) of moderate-intensity or 150 minutes (2 ½ hours) of vigorous-intensity of physical activity for extra health benefits and to manage your weight.

- If you already meet the guidelines, increase the amount of physical activity you do for extra health benefits.
  - *Double the recommended amount of time being active to reduce weight.*
  - *Increase the intensity of your activity for other health benefits including*

4. Include some muscle- and bone-strengthening activities on at least two days per week.

- Muscle and bone strengthening activities are important for keeping your body strong, lifting and carrying, and reducing the risk of falling or injury.
  - *Strengthen your muscles and bones with resistance activities such as walking up hills or stairs, yoga, Pilates, swimming, aerobics, heavy gardening or weight lifting.*

5. If you currently do no physical activity, start by doing some activity, and then build up to the recommended amount.

- Doing something is better than doing nothing.
  - *Walk or cycle to work, the marae or church, play actively with the children, meet friends for a walk, do active jobs around the house.*
  - *Build the activities into your daily routine that you are likely to stick to!*
  - *Consider joining a gym or sports club.*
  - *Set yourself goals to achieve.*

- Being physically active with others is good for your overall wellbeing and can motivate you to stay active.
  - *Being physically active with whānau is good for the hinengāro (mental and emotional wellbeing) of tangata.*
  - *Do a variety of activities with whānau and friends that you enjoy and want to keep doing.*