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Action to prevent obesity and reduce its impact across the life course

Evidence Review

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145 Macquarie Street, Sydney NSW 2000, Australia
Telephone +61 2 9256 5444 | Facsimile +61 2 9251 7476 | Email policy@racp.edu.au

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Professor Boyd Swinburn (Chair) – Endocrinology and Public Health Medicine

Professor Adrian Bauman – Public Health Medicine

Professor Chris Bullen – Public Health Medicine

Dr Teuila Percival – Paediatrics and Child Health

Dr Jin Russell – Paediatrics and Child Health

Dr Robyn Toomath – Endocrinology and General Medicine

Dr Pat Tuohy – Paediatrics and Child Health

“Appendix 1: Rationale for a sugary drinks tax” was authored by Dr Simon Thornley – Public Health Medicine

Supported by the following past and present RACP staff

Patrick Tobin, Director, Policy and Advocacy

Lisa Docherty, Manager Fellowship Relations NZ

Louise Hardy, Manager, Policy and Advocacy

Claire Celia, Senior Policy Officer

Harriet Wild, Senior Policy and Advocacy Officer NZ

The Royal Australasian College of Physicians (RACP) is committed to action to prevent obesity and reduce its impact across the life course.

Introduction

Why is the RACP concerned?

Unhealthy diets are major contributors to obesity, diabetes, dental caries, cardiovascular diseases, mental health conditions and many cancers – the very diseases which fill our hospital beds and general practice clinics and swamp the health budget. Physicians and paediatricians see patients and families every day who are struggling with obesity and related health conditions. They understand that these conditions are influenced by unhealthy diets^a b and low physical activity driven by the obesogenic environment^c we live in¹.

Since 1980, obesity rates have nearly doubled in Australia and New Zealand. In 1980, 15 per cent of Australian adults over 20 years and 14.6 per cent of New Zealand adults over 20 years had obesity; by 2014/15, obesity rates for adults over 18 years of age had increased to 28 per cent in Australia. In New Zealand, rates for adults aged 18 years and over had increased to 32 per cent by 2016/17. Trends are replicated for children and young people under 20 years: In Australia in 1980, 3.5 per cent of children had obesity, increasing to 7 per cent in 2013. In New Zealand, 4.5 per cent of children had obesity in 1980, doubling to more than 9 per cent in 2013² 3 4. Despite the increasing rates of obesity in our societies and a greater strength of evidence for interventions, successive governments in Australia and New Zealand have yet to implement comprehensive actions across society to reduce obesogenic environments and their underlying societal determinants. While some steps have been taken, there is a lack of urgency in implementing World Health Organization (WHO)-recommended policies and actions, including

- The 2010 Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children⁵
- Implementation of a tax on sugar-sweetened beverages⁶

a Unhealthy diets are high in free sugars, refined carbohydrates, saturated fats, trans-fats and salt. A healthy diet includes a variety of vegetables, fruit, wholegrain cereals, lean meats, poultry, or substitutes, fish, some dairy products, and water. World Health Organization. Healthy diet. Fact Sheet No.394. Geneva: World Health Organization; 2015. Available from <http://www.who.int/mediacentre/factsheets/fs394/en/>. Accessed 17 January 2018.

b The Working Party acknowledges the diversity of perspectives and divergent interpretations of the evidence available, particularly in nutritional epidemiology and nutritional practice. While the debate continues on the health impacts of some specific nutrients, there was Working Party consensus that the quality and quantity of people's diets was of utmost importance to their health and wellbeing and that the primary challenge is to implement the evidence-informed nutrition recommendations for policy and action from the World Health Organization.

c The obesogenic environment can be defined as "the sum of influences that the surroundings, opportunities or conditions of life have on promoting obesity in individuals or populations."

- Healthy food service policies implemented in publicly-funded settings, especially early childhood centres, schools and government departments

Physicians and paediatricians see that there is a role for the RACP and other health professional organisations and specialty societies to become more active in prevention and reduction of the prevalence of obesity.

Obesity affects people across the life course and creates enormous health burdens

Obesity is a common factor in many long-term health conditions, many of which start in fetal life or childhood. For example, a fetus exposed to excessive glucose in utero due to maternal gestational diabetes is at risk of excessive weight gain and developing metabolic syndrome in adulthood^{7 8}. In New Zealand, high body mass index (BMI) has overtaken tobacco as a risk factor attributable to health loss: higher BMI accounts for 9.2 per cent of all health loss, compared to 8.7 percent for tobacco⁹. In Australia, higher BMI is attributable to 7 per cent of health loss, greater than the risk associated with alcohol, physical inactivity and high blood pressure¹⁰.

People who develop obesity as children are more likely to be obese as adults. Children with obesity are more likely to have:

- Obstructive sleep apnoea¹¹
- Abnormal lipid profiles¹²
- Symptoms of metabolic syndrome, such as impaired glucose tolerance and high blood pressure at a younger age¹²
- More musculoskeletal problems¹³
- Asthma¹²
- Mental health conditions¹⁴
- Experienced bullying, weight bias and discrimination¹⁵
- Experienced trauma^{16 17}
- Experienced one or more Adverse Events in childhood, including violence, abuse or neglect¹⁸.

Adults with obesity are at greater risk of experiencing poorer mental health outcomes, weight bias or stigma in education, employment or socially¹⁹. Adults with persistent obesity are at greater risk of developing a range of noncommunicable diseases (NCDs), including:

- Type 2 diabetes mellitus (T2DM)²⁰
- Several common types of cancer²¹
- Cardiovascular diseases¹³
- Obstructive sleep apnoea²¹
- Reproductive difficulties¹⁴.

What is obesity?

Obesity, especially morbid obesity, is a chronic disease with multiple health consequences²⁰. It is a condition of excess of body fat accumulation which, at a population level, is measured by the body mass index (BMI, weight in kilograms divided by height in metres squared)¹³. Under WHO definitions for adults, a BMI of 30 kg/m² or greater is generally considered obese and 25kg/m² or greater is considered overweight, although in the literature, overweight is often defined as falling between 25 and 30 kg/m²¹²²². Other measurements, such as waist circumference and metabolic markers can be used with BMI to better assess an individual's level of risk in developing noncommunicable diseases such as diabetes and cardiovascular disease²¹.

For children, the WHO defines overweight and obesity for 0-5-year-olds as weight-for-height greater than two and three standard deviations above the Childhood Growth Standards median respectively, and for children 6-19 years as BMI-for-age greater than one and two standard deviations above the median²². The New Zealand Ministry of Health has adopted the WHO definition for children aged 0-5 years and recently published clinical guidance which recommends the clinicians use the WHO standard for children aged 6-19 years²³. Although all Australian states and territories have adopted the WHO Standards for children aged 0-2 years, none of the state, territory or federal governments in Australia has fully accepted and applied the WHO standards for children aged 3-19 years to date²⁴²⁵.

The management of obesity and its co-morbidities is highly complementary to public health efforts to prevent obesity and address its underlying societal determinants. Greater action is required at all levels to reduce the individual and population burdens of obesity.

What are the drivers of obesity?

Obesity is a condition caused and sustained by people, with their inherent biological, psychological, social and economic susceptibilities, interacting with obesogenic environments such as food environments dominated by unhealthy foods and transport environments dominated by cars. The resulting behaviours, such as the passive overconsumption of unhealthy foods and beverages, low physical activity and sedentary lifestyles, lead to accumulated unhealthy weight gain over years and decades. The underlying drivers which create obesogenic environments are similar to the underlying drivers of many health conditions including infectious diseases, noncommunicable diseases, mental health, and injuries. These are called the social or societal determinants of health and they are embedded within the political, commercial, economic and socio-cultural systems of society. They are manifest through social conditions such as poverty levels, income inequalities, poor housing, and low educational attainment.

Genetic predisposition

While the obesity epidemic is the result of changes in the nutrition and physical activity environments, some individuals are more susceptible to these changes than others²⁶. Epidemiological studies demonstrate that obesity is genetically influenced, but not determined. A meta-analysis of twin studies, family studies and adoption studies published in the journal *Behavioural Genetics* in 1997 encompassed data from 25,000 twin pairs and 50,000 other family members. Structural equation model showed matched weights in 74 per cent of identical twins, 32 per cent of non-identical twins and 25 per cent of

other siblings²⁷. The authors concluded ‘genetic factors play a significant role in the causes of individual differences in relative body weight and human adiposity’²⁷. However, these large attributions of genetic contribution are not supported by genome-wide association studies, because the sum total of all the known genetic variants linked to BMI explains only a few percent of the variance in BMI²⁸. Personalised treatments based on genetic information are not appropriate for most patients with obesity, reinforcing the need for population approaches that are likely to benefit all²⁹.

What can be done: Implementing specific obesity prevention policies and addressing the societal determinants of health

Obesity is a multifactorial problem and the causes are deeply embedded in our societal structures which means that there are no simple solutions. However, there are many opportunities to tackle obesity at individual, community and population levels. While some of the opportunities to act are within the reach of people and their families, cross-sectoral actions are needed to create a whole of society approach to reducing obesity and its related inequalities. The health sector can play many important roles in reducing the burden of obesity and, for obesity prevention, this largely involves advocating for stronger government-led policies and actions. The sector can actively support the implementation of specific policies and actions, as recommended by authoritative bodies such as WHO, to create healthier food and physical activity environments for the prevention of obesity. The sector can also advocate for action to address the deeper, underlying societal drivers of health and disease. The main areas for action are outlined below.

Marketing to children

The widespread advertising, marketing, availability and access to foods and non-alcoholic beverages linked with unhealthy diets are strongly associated with increases in obesity rates – and childhood obesity in particular^{14 30 31 32}. As they grow, children gain greater familiarity with products and how they are advertised. This influences their preferences, purchasing behaviour and consumption patterns, their nutritional knowledge, and diet-related health, which in turn are reinforced and sustained by an obesogenic environment^{1 30 33 34}.

The WHO states that the effectiveness of marketing is a function of exposure and power: the overarching goal of policy action should be to reduce children and young people’s *exposure* to advertising material and reduce the *power* of such advertising and marketing materials for unhealthy diets⁵. Understanding the impact of exposure to and power of advertising in relation to children is essential, particularly when children’s cognitive development is considered. Children under eight years are not fully aware of the persuasive intent of food marketing, and tend to accept advertising as truthful and accurate, and while older children and adolescents may understand that advertising is designed to sell products, they may not be able to interpret these messages critically^{5 35 36}.

The expansion of the media landscape to encompass digital and online spaces as well as television and print has resulted in greater global reach for multinational food and beverage brands. Where ‘traditional’ forms of media such as television and print used marketing and advertising to communicate on a population level, the internet and new media environments are delivering new (often young) consumers interactive marketing messages via increasingly individualised and tailored social media

advertising. These are often participatory, such as advergames (where the product is part of an online game), or provide a return on engagement for the user, such as vouchers, special offers, or competitions^{37 38 39 40}.

Children and young people are spending more time engaged with screen-based media and technology for recreation, education, and communication, and many from a very young age. Patterns of media use have changed and evolved over time: in 1970, children began watching television regularly at four years old; in 2018, many children will begin interacting with screen-based devices by six months of age. One cross-sectional study found that by age four, 75 per cent of the children in the study cohort had their own digital device^{41 42}. In New Zealand, sedentary leisure activities are often screen-based (television, internet, streaming services, video or computer games) and popular among children: for example, 50 per cent of New Zealand children aged 5-14 watched two or more hours of television each day⁴³. The Obesity Policy Coalition's "Tipping the Scales" consensus statement noted that in Australia, the average child will see around 35 hours of food advertising per year, and more than 50 per cent of this will be marketing unhealthy foods and beverages⁴⁴.

Children and young people are spending more time viewing screen-based media – and are exposed to more advertising material – than they are engaged in physical activity. A 2012 survey of New Zealand secondary school students found that 28 per cent watched television and 20 per cent played computer games for more than three hours per day, and only 10 per cent of students (14 per cent of boys and 6 per cent of girls) met the recommendation of 60 minutes of moderate to vigorous physical activity per day, as part of physical activity guidelines⁴⁵. Similar figures are reported for Australian children and young people, with those aged 5-17 years spending over 2 hours (136 minutes) engaged in screen-based media per day. Around three-quarters of young people 15-17 years old had a screen based console (television, video games or computer) in their bedrooms. Older children tend to have longer daily screen times and less physical activity than younger children⁴⁶.

In New Zealand and Australia, advertising and marketing communications to children are largely self-regulated, guided by standards and codes of practice, such as the new Children and Young People's Advertising Code effective in New Zealand from October 2017^{47 48}. WHO and other organizations note that statutory regulation of advertising to children is the only regulatory process which effectively recognises government's responsibility to protect the rights and interests of children, under the United Nations Declaration on the Rights of the Child^{35 49}.

Fiscal policies

Sugary drinks, defined as any beverage that contains free sugars, have been directly linked to weight gain and obesity⁵⁰. Many countries and regions including Mexico, France, Belgium, have already implemented a tax on sugary drinks whilst other countries including the UK, Ireland and Portugal will be rolling out a tax in 2018⁵¹. The evidence to date has shown that taxes on sugary drinks are an effective mechanism to reduce consumption of these drinks and encourage manufacturers to reformulate their products. In addition, modelling studies^{52 53} and data from Mexico⁵⁴ and the city of Berkeley in California⁵⁵ have shown that the health of lower income populations, who tend to spend a higher proportion of their income on sugary drinks, would derive the most health benefit from a sugary drinks tax. The equity impacts of the tax can also be improved by ensuring that the revenues generated are invested in facilitating access to fresh healthy foods and culturally and linguistically tailored initiatives to benefit lower income populations. The Lancet Taskforce on NCDs and Economics has also

shown that the larger financial burden placed on lower-income households by the implementation of fiscal policies designed to reduce consumption of products such as sugary drinks, can be mitigated through proactive health equity policies which improve health outcomes⁵⁶. **Appendix 1: Rationale for a sugary drinks tax on Australia and New Zealand** provides more detailed information on the evidence to date as well as the benefits and detriments for lower income populations.

Food literacy and food labelling

The reciprocal relationship between the supply and marketing of products and people's purchasing of such products is being sustained by commercial drivers and insufficient government and societal action on nutrition education and creating healthier food environments^{14 31 57}. In Australia currently, about 36 per cent of a family's energy intake and 50 per cent of household food costs are from products associated with unhealthy diets⁵⁸. Although the role of energy density in promoting higher energy intakes has been known for some time, the evidence implicating dietary sugar, especially as sugar-sweetened beverages, in obesity has grown considerably in recent years^{59 60 61}. The WHO now recommends that less than 5 per cent of daily energy intake should come from added sugars (less than 6 teaspoons)⁶². Both Australia and New Zealand have diet and physical activity guidelines which have only been weakly implemented to educate the public about healthy choices. In particular, there is considerable confusion about what constitutes a healthy diet and this confusion is fuelled by commercial marketing and nutrition claims, media focus on diet controversies, a multitude of fad diets and popular diet books, and the absence of investment in nutrition education and social marketing by the government. Increasing food literacy needs to be a priority for both Australia and New Zealand.

Labelling products using simple language and easily interpretable graphics is another mechanism for increasing food literacy by communicating a products' nutrient profile and therefore relative healthiness. The Health Star Rating System (HSR System) is a voluntary front-of-pack labelling system adopted by Australia and New Zealand in 2014 to assist consumers in comparing packaged foods within categories, for example, breakfast cereals⁶³. The HSR System uses a nutrient profiling system to assign a star rating to score food products between ½ a star (least healthy) and 5 stars (most healthy), with higher protein, fibre, and whole vegetables and fruit giving higher star ratings, and higher energy density, saturated fat, total sugars, and sodium giving lower star ratings. While no cut off point has been determined to assess the 'healthiness' of a product displaying the HSR, the New Zealand Ministry of Health healthy food and drink policy suggests "healthy core foods with a 3.5 star-rating can be confidently promoted in public settings as healthier choices"⁶⁴.

The RACP supports the ongoing revision of the current HSR System to ensure this mechanism is reliable, evidence-based and trusted by consumers⁶⁵. Central to the effectiveness of the HSR system is its algorithm which needs to give an accurate representation of a product's nutritional profile, especially in relation to sugar content. The RACP supports implementing mandatory HSR labelling in New Zealand and Australia by 2019.

Healthy food service policies

Healthy food service policies, which limit the availability and access to unhealthy diets are one way that all services, organisations and businesses can promote healthy environments and healthy choices^{66 67}. New Zealand has made some progress on implementing healthy food service policies in health settings such as hospitals, but little progress in implementing a consistent healthy food and beverage service policy and nutrition standards in education settings^{68 69}.

The situation is somewhat reversed in Australia, where food service policies are present in schools, but there is less consistent progress in public institutions, including hospitals, and the private sector across the States and Territories⁷⁰. For more information on the recent food environment policy indexes in Australia and New Zealand, see **Appendix 2: Food Environment Policy Index**.

In 2016 the New Zealand Ministry of Health implemented a healthy food and beverage service policy for all District Health Board (DHB) hospital campuses and clinics following a ban on the sale of sugar-sweetened beverages from these sites in 2015^{64 71}. The policy recognises hospitals and clinics are health-promoting environments, and food and drinks available within these sites should support the health and wellbeing of hospital staff, patients and visitors. The policy uses a traffic light system to broadly categorise foods and beverages into green, amber and red. Foods and beverages in the Red Category (the category denoting products high in added sugars, refined carbohydrates, salt and saturated fat) are not permitted, and sites where red category foods such as confectionery are still available are required to phase the availability of these items within two years. In addition to the traffic light system, pre-packaged foods available must have a minimum Health Star Rating of 3.5; and the policy introduces a minimum 55 per cent threshold for green category foods to be predominantly available in food services, including cafeterias, catering, vending machines and retailers⁶⁴. To date, the policy is yet to be evaluated.

The New Zealand Ministry of Education, supported by the Ministry of Health, has called for all schools to introduce water-only, or healthy drink policies (water or plain, unsweetened milk)⁷². A snapshot survey of primary and secondary schools in the Wellington region shows variation in levels of policy design and implementation. Most schools (75 per cent) were actively considering, in the implementation process, or already practicing water-only policies; a minority of 15 per cent were not considering water-only policies⁷³. In contrast, a snapshot of schools in the Bay of Plenty and Lakes DHB regions showed that 75 per cent of students have sugary drinks available for purchase at school, with flavoured milk and fruit juices being the most prevalent. While no primary or intermediate schools had sugary soft drinks (fizzy drinks) available for purchase, more than 60 per cent of secondary schools still had these products available for purchase⁷⁴. In relation to food products, Ministry of Health data shows that while 69 per cent of schools have 'healthy food options' for purchase, 8 per cent of schools receive food industry sponsorship, including from fast food companies⁷⁵.

In Australia, healthy food service policies are applied at state level, meaning policies are not consistent nationally. The 2016 Australian Food Environments Policy Index identified that all States and Territories had policies for healthy food provision, but various levels of implementation, monitoring and support. For example, school healthy food service policies are well supported and monitored at the individual State and Territory level, but not at a Federal level, and may not cover private education institutions or early childhood settings. In addition, the Index assessed healthy food service policies in public and private sector institutions and workplaces such as hospitals as low. Recommendations to implement healthy food service policies in all government departments and settings, and expand to the private sector, are specified for the majority of Australian States and Territories⁷⁰.

The RACP recommends all education providers in Australia and New Zealand, particularly early childhood education centres, primary and secondary schools implement consistent healthy food and drink service policies which promote and enable healthy diets, including for school-based events and sponsorship. Emphasis on healthy food environments should be reflected in the curriculum, particularly in food technology, physical activity and health. Public and private sector employers should also

introduce healthy food service guidelines for cafeterias, catering, vending machines and retailers to support staff health and wellbeing. Policies should be regularly monitored and evaluated at the national or federal level.

Community food retail environments

The availability, access and affordability of unhealthy diets is associated with greater prevalence of obesity. Analyses of retail food environments in New Zealand communities and the proximity of fast food, takeaway and convenience stores to schools reveals an association between the numbers of food retailers and neighbourhood socioeconomic deprivation^{76 77}. In the study of New Zealand schools, investigators found more than 60 per cent of urban schools had a fast food, takeaway or convenience store within 800m, and a significant positive association between the number of retail food outlets (including dairies and convenience stores, bakeries, service stations, takeaway and fast food outlets) and communities with greater levels of neighbourhood deprivation^{76 77}. An Australian-based study examined the relationship between the numbers of healthy and unhealthy food retailers, the density of these outlets and self-reported household fruit and vegetable purchasing. The authors concluded that households purchasing greater quantities of fruits and vegetables were located in areas where the density of healthy food retailers was greater⁷⁸.

A health and wellbeing principle as part of decision-making processes in planning and zoning would allow for greater consideration for the health and wellbeing of local communities; not only how development may adversely impact health and wellbeing, but how regulation, consultation and engagement with communities may work for wider health promotion in neighbourhoods.

Access to green spaces

When urban green space is unsafe or inaccessible, there are fewer opportunities for citizens of all ages to be physically active and less sedentary, and engage in recreational play, exercise, or take advantage of natural surroundings. Reviews of the evidence show an association between safe, accessible green space and higher physical and mental health, with lower rates of overweight and obesity, noncommunicable diseases, and less stress^{79 80}. One review on the relationship between green space and obesity-related health indicators found the majority of studies reported a positive association, though this relationship is potentially confounded by factors such as age, socioeconomic status and how green spaces are used. Positive associations have been reported for several specific groups, including children, older people, women and people with disabilities⁸¹.

- For pregnant women, exposure to green space can have benefits for fetal development and lead to healthier birth weight, as well as positive influences on cognitive and fine motor skills development during childhood, which can contribute to maintaining a healthy and physically active lifestyle through the life course^{80 82 83}.
- Some studies have found access to high quality, local green space beneficial for older people, who are more likely to be more dependent on their immediate community environment than a person of working age⁷⁹.

Providing universal access to green spaces for women and children, older people and people with disabilities by 2030 is a target for Sustainable Development Goal 11: Make cities inclusive, safe, resilient and sustainable⁸⁴.

Transport systems

Transport environments can have a significant impact on the drivers of overweight and obesity within a population. For example, greater levels of active transport (walking, cycling, public transport) may offset some of the adverse impacts of the consumption of energy-dense, cheap foods and beverages, while similarly high levels of passive and inactive transport via private car can amplify the effect of consuming these products⁸⁵. The evidence of the detrimental effect of physical inactivity is also increasing: the WHO found in 2008 that, globally, around 31 per cent of people aged 15 years and over (28 per cent men and 34 per cent women) were insufficiently active, and estimate around 3.2 million deaths annually are attributable to physical inactivity⁸⁶. Further, the Global Burden of Disease study found that physical inactivity accounted for 2.8 per cent of disability-adjusted life years lost (DALYs), and together with dietary risk factors collective accounted for 10 per cent of global DALYs in 2010. Physical inactivity is a contributing factor to several NCDs, including breast cancer, colon cancer, diabetes, ischaemic heart disease and ischaemic stroke⁸⁷.

In New Zealand and in Australia, the numbers of people commuting via active transport is minor compared to those travelling via car. In New Zealand in 2013, more than 70 per cent of workers travelled to work via car (private and company vehicle), with more than 65 per cent of commuters in Auckland using car transport rather than active transport options⁸⁸. In Australia, nearly two thirds of workers (over six million people) travelled to work via car, with more than 55 per cent of commuters in Sydney, Melbourne and Brisbane travelling via car⁸⁹.

Method of commuting has been shown to have an independent effect on objectively-measured BMI: a cross-sectional study using commuters aged between 40-69 years (a critical time period for age-related weight gain) who transitioned from car commuting at baseline to active transport (including public transport) modes at follow-up found this cohort had an average BMI decrease of 0.3 kg/m². For the cohort switching from active transport at baseline to car commuting, the study found an average BMI increase of 0.3 kg/m² at follow up. These findings show that the incidental physical activity associated with changing from sedentary or passive commuting to active transport modes could have a role in obesity prevention for people travelling to and from work or education^{90 91 92}.

Societal determinants of health

Underpinning obesogenic environments are the societal determinants of health. These are the political, economic, commercial and socio-cultural systems which create the conditions under which people live, businesses operate, wealth is distributed, governance decisions are made, commercial conflicts of interest in policy-making are managed, government spending is allocated, democratic institutions operate, education is financed and so on⁹³. These all have critical impacts on population health outcomes and the health sector has a role in ensuring that the policies and economic levers which influence these determinants promote health rather than ill-health, including obesity. Ideally, these would be best addressed by a Health in All Policies approach whereby government policies in non-health areas including education, finance, business, local government, transport, urban design and employment take into account their impact on health and explicitly seek to improve the health of New Zealanders and Australians⁹⁴. The co-benefits of addressing the underlying societal determinants of health are significant and will contribute to gains in workplace productivity, education outcomes, reduced prevalence of noncommunicable diseases, and improved health-related quality of life⁹⁵.

Recommendations to implement obesity prevention policies and address societal determinants of health

The RACP recommends New Zealand and Australia:

- Introduce regulations to restrict the marketing of unhealthy diets to children and young people
- Implement an effective tax on sugar-sweetened beverages to reduce consumption – and use the revenue thus generated to facilitate access to healthy diets and culturally relevant initiatives to improve health equity
- Revise the Health Star Rating system’s nutrient profiling algorithm to give stronger weight to sugar content, and by 2019 require that the labelling be mandatory to encourage consumers to choose healthier options and motivate food manufacturers to reformulate and develop healthier products
- Set targets for reducing mean population intakes of nutrients associated with unhealthy diets based on World Health Organization recommendations
- Introduce a health and wellbeing principle as part of local government decision-making when considering land use planning and zoning permissions
- Implement consistent healthy food and drink service policies which promote and enable healthy diets
- Implement a health-in-all-policies approach across government, including transportation and urban planning design, prioritising active transport and active recreation solutions

The RACP will:

- Seek the support of other Colleges and medical organisations for the RACP position statement
- In concert with other organisations, advocate for the above policies and for meaningful action to address the societal determinants of obesity and health more broadly in New Zealand and Australia at government, society and community levels

What can be done: Health system actions

End weight bias and stigmatisation

The health sector has a vital role in advocating for strong prevention measures; creating health systems which provide optimum care and support for patients and their families/whānau dealing with the problems of obesity; and providing leadership in reducing the consequences of weight bias. Weight bias is highly prevalent in society, including among health professionals, and this is very damaging to the mental, emotional and social wellbeing to people with obesity. Medical professionals have reported feeling ill-equipped to manage patients with obesity and obesity-related comorbidities and request more training in motivational interviewing and behavioural techniques^{96 97}. Medical professionals may also have concerns that mentioning a person's weight as a potential health risk during a consultation exposes them to perceptions of stigmatising by the patient. All health professionals should be encouraged to undertake training on weight bias and how to have sensitive conversations about weight.

One survey of physicians found that the categories of the 5A's of behavioural counselling (Assess, Advise, Agree, Assist and Arrange) were associated with particular attitude factors; for example, physicians with lower levels of competency in assessing risk in patients with obesity may have greater levels of uneasiness overall in treating and managing obesity⁹⁸. A survey of people with obesity and health care practitioners found that 65 per cent of health care practitioners stated that they believed their patients would be too embarrassed to bring up their weight in the consultation, and therefore did not ask. This contrasted with people with obesity, of whom only 15 per cent responded that they were too embarrassed to discuss their weight in a consultation with a health care practitioner. Proactive engagement from health care practitioners is cited as one potential pathway to addressing downstream barriers in access to treatment and support⁹⁹.

Health care professionals and health care environments should minimise bias when treating or managing the health care of people with obesity so that their dignity is respected and maintained, including training in lifting and transferring people with obesity safely¹⁰⁰. Hospitals, clinics, services and health care facilities must ensure size-appropriate furnishings, equipment, supplies and instruments are available and accessible, including scales, theatre tables, Zimmer frames, commodes, hoists, bed frames, pressure-relieving mattresses and seating¹⁰¹.

Actions at key points in the life course to address childhood obesity

Life course epidemiology understands human development through biological, psychosocial and behavioural processes, examining and tracking the impact of risk factors and protective factors on the development of chronic disease. The life course is a trajectory from conception through to death, and is sensitive to socioeconomic systems and social determinants. Factors affecting development can build up (accumulated risk); be time based (critical periods, latency periods); or relate to different biopsychosocial mechanisms (mediating and modifying factors)^{102 103}. Time-based critical periods within the life course posit that disease causation can be traced to exposures at specific time periods in development, "altering structures or functions of biological systems that without mediation or modification may precipitate disease later in life"¹⁰².

The WHO Commission on Ending Childhood Obesity identifies three critical periods in the life course where specific interventions can make the greatest gains in addressing childhood obesity: pre-conception and pregnancy; infancy and early childhood; and older childhood and adolescence¹⁴. Intervention during these periods in the life course to address childhood obesity can be aligned and embedded into other programmes to improve maternal, neonatal and child health, for example, improving maternal and infant nutrition, breastfeeding, and appropriate weaning.

Maternal obesity prior to conception and during pregnancy is recognised as an independent risk factor for adverse outcomes for mother and baby, and there is emerging evidence on the role of paternal obesity in childhood obesity outcomes¹⁰⁴. Obesity-related complications during pregnancy include gestational diabetes mellitus, hypertension, pre-eclampsia, thromboembolism, and induction and delivery by caesarean section^{105 106 107}. Babies exposed to maternal obesity or diabetes in utero are at greater risk of childhood obesity and metabolic syndrome as they grow up^{105 108}. Recognising the critical period of pregnancy in relation to longer term health outcomes for mother and baby, the WHO recommends that governments “integrate and strengthen guidance for noncommunicable disease prevention with current guidance for preconception and antenatal care, to reduce the risk of child obesity”¹⁴.

Current maternal guidance in New Zealand

The New Zealand Childhood Obesity Plan (2015) recognises maternal obesity as a significant risk factor for complications in pregnancy and longer-term outcomes for babies, and includes three health system actions to reduce the risks associated with maternal obesity¹⁰⁹:

Childhood Obesity Plan Action	Description
Guidance for healthy weight gain in pregnancy ¹⁰⁸ (published 2014)	Around 30 per cent of women of normal weight and 60 per cent of women with obesity gain more than the recommended weight during pregnancy. The guideline advises on nutrition and physical activity to support a healthy pregnancy.
Clinical guidelines for gestational diabetes screening ¹¹⁰ (published 2014)	The Ministry of Health estimates that the introduction of the guideline will lead to 600 more women being diagnosed with T2DM in early pregnancy and approximately 1200 more will be diagnosed with gestational diabetes.
Referrals to Green Prescription programme (GRx) for pregnant women at risk of gestational diabetes	A GRx for women at risk of gestational diabetes will provide additional support, information and resources on nutrition and physical activity to support a healthy pregnancy.

The Ministry of Health recommends all women are tested for gestational diabetes. The introduction of guidelines to screen for gestational diabetes in 2014 is a response to the need for evidence-based guidance on screening, diagnosis and management for gestational diabetes in New Zealand¹¹⁰. The National Women’s Clinical Report for 2016 shows that between 1991 and 2012 (prior to the introduction of the guideline), rates of gestational diabetes in women who gave birth at National Women’s Hospital

increased steadily, from less than 2 per cent in 1991 to over 10 per cent in 2012¹¹¹. Rates of gestational diabetes vary by ethnicity, with rates highest among Asian (8.1 per cent) Pasifika (7.2 per cent) and Middle Eastern, Latin American and African populations (7.5 per cent)¹¹⁰. A strong association between high BMI and increased risk of gestational diabetes is observed in the National Women's clinical report, and is summarised in the following table:

BMI classification of women with gestational diabetes, National Women's Hospital 2016¹¹¹

BMI range	Number of women with gestational diabetes (%)
Under 18.5	21 (7.4)
18.5-24.99	306 (7.6)
25-29.99	160 (10.0)
30-34.99	83 (12.5)
35-39.99	50 (14.0)
Over 40.0	34 (14.3)
Missing data	1 (1.1)

The guideline acknowledges that the evidence is not conclusive on a best practice screening and diagnosis tool for gestational diabetes, due to current differences in New Zealand and international literature. One observational study concluded that adding the glycated haemoglobin (HbA1c) screening to first antenatal blood tests offers a universal pregnancy screening, which the authors note is likely to benefit populations with high rates of undiagnosed T2DM and low rates of gestational diabetes later during pregnancy^{110 112}. Results from randomised trials, including the current Gestational Diabetes Mellitus Study of Diagnostic Thresholds (GEMS) will provide evidence on whether the current recommended blood glucose threshold is working for New Zealand women, or if it requires adjusting to a lower level¹¹³.

Current guidance to reduce childhood obesity in New Zealand

Childhood overweight and obesity has increased rapidly in developed and developing countries since the 1980s, including in New Zealand and Australia¹¹⁴. As previously stated, childhood obesity is a risk factor for adverse outcomes in physical and mental health and wellbeing in childhood, and for the early onset of risk factors for noncommunicable diseases in young adulthood^{12 13 14}.

The New Zealand Childhood Obesity Plan (now Programme) is a suite of 22 initiatives designed to target resources, provide additional support or implement population-level approaches (some ongoing, some time-limited). The Programme is multi-sectoral, with involvement across the Ministries of Health and Education, with some involvement from private and industry sectors, such as food, advertising and marketing.

The weight management guidelines for children and young people (updated as part of the Programme in 2016) use health literacy and cultural competence frameworks to promote communication and shared understanding, which is essential to reducing weight bias and stigma, and develop strategies which meet the needs of children, their families and whānau. Food, nutrition, physical activity and sleep are components of the Childhood Obesity Plan and subsequent Programme. Both the Plan and the Programme's greater emphasis on a holistic assessment of health and wellbeing is visible in the four indicator groups monitored to measure progress²³:

Indicator Group	Elements covered by the Indicator
More children are physically active	Sedentary activities and screen time; sleep duration; physical activity
More children eat well	Breastfeeding; fast food consumption; sugar-sweetened beverage consumption; fruit and vegetable intake
Children's living environments support physical activity and healthy living	Awareness of the Health Star Rating; active transport to and from school; bicycle use; water in schools
More children have improved health outcomes	BMI; gestational diabetes; raising healthy kids health target; birth weight

The Plan includes a measurement target, "Raising Healthy Kids", which aims to refer 95 per cent of four-year olds with obesity as identified at the B4 School Check (B4SC) to a health professional for clinical assessment and family-based nutrition, physical activity and lifestyle interventions¹¹⁵. The current referral rate for Quarter 4 (to June 2017) is 91 per cent across the four-year-old child population¹¹⁶. Referrals are reasonably consistent across ethnicity and neighbourhood deprivation. The target identifies children with obesity by BMI, using the 98th-centile of the WHO BMI reference values to define obesity. This classification system will be implemented in the New Zealand Health Survey in 2017/18 for children aged 5-14 years. The Health Survey has previously used the International Obesity Task Force (IOTF) cutoffs and the alignment with the Raising Healthy Kids target will enable greater consistency across childhood obesity data¹¹⁷.

The need for a single growth standard was highlighted by the WHO in 2007¹¹⁸:

- Monitoring, surveillance and reporting of child growth and development should be consistent
- The need to align with the WHO growth standards for children aged 2-5 years
- Comparability for childhood overweight and obesity prevalence across countries

The WHO growth standard for children from birth to 5 years shifted perceptions of child growth as it offered a standard for how children should grow, on average, in all countries, based on evidence and best practice (including breastfeeding, immunisation) rather than a descriptive measure of how children grew at a specific place and time¹¹⁹.

Using WHO growth standards in New Zealand for all children would ensure that the growth of children and young people is charted without regional variation, and enables parents, caregivers, family/whānau

and health practitioners to track child growth accurately, and engage in early intervention when necessary. The RACP recommends that regular weight and height measures at least every 12 months are recorded to calculate BMI, rather than health practitioners waiting until a child is visibly overweight²³.

Children and young people living with obesity must have access to funded, multidisciplinary treatment and management pathways, including specialist paediatric and adolescent medicine services, dietitian services, counselling services. Access to whānau-based services, such as Whānau Ora, or the Green Prescription (GRx) for Families may be effective to support sustainable changes and support parents, siblings and families/whānau achieve optimal health in the longer term.

Current maternal and childhood guidance to reduce and manage obesity in Australia

It is estimated that between 2000 and 2010, the rate of obesity in pregnancy had trebled in Australia¹²⁰. Obesity in pregnancy not only has significant impacts on the health system in terms of costs and support required but also increases the risk of difficulties in pregnancy and birth including miscarriages, still births and health complications for the newborns¹²¹. There are a range of resources addressing overweight and obesity in pregnancy available from Commonwealth, State and Territory Governments health departments in Australia; however, given the prevalence of overweight and obesity across the Australian population and the significant health complications for pregnant women and their babies, it is concerning that at present there is no nationally coordinated obesity strategy in Australia¹²².

The Perinatal Society of Australia and New Zealand has recently launched a position statement on pre-pregnancy obesity which the RACP has endorsed¹²³. This document sets out a number of key messages to address pre-pregnancy obesity including:

- Providing women with appropriate information on the importance of a healthy weight for themselves and future children
- Educating health professionals in providing information to women throughout their reproductive lifespan to ensure adequate sensitive counselling and referral to a weight reduction specialist if required
- Health professionals considering the complex drivers of obesity including social and environmental determinants when providing advice to women.
- Undertaking further research to identify appropriate public health messages and information for individual women to reduce pre-pregnancy obesity; to identify effective interventions to prevent weight retention after childbirth.

The Australian Government's Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia developed by the National Health and Medical Research Council (NHMRC) contains five key evidence-based messages for clinicians treating adolescents and children¹²⁴:

- Use BMI charts to monitor growth.
- Promote physical activity, dietary modification and healthy behaviours to families.
- Aim for weight maintenance rather than weight loss.
- Refer for further assessment and specialist assistance with lifestyle interventions if warranted.
- Encourage reduced sitting time

The RACP finds that together with nutrition and physical activity, adequate sleep is a key component to children's growth and development, and is important throughout the life course for health and wellbeing^{14 125 126}. Research has found a strong association between sleep patterns and duration and BMI, particularly for preschool children^{127 128}. Parents, caregivers, family and whānau should have equitable access to evidence-informed resources and information on nutrition (including breastfeeding) physical activity and sleep duration for newborns, preschool-aged children, older children and adolescents.

Weight management for adults

The goal of adult weight management should be to achieve a level of optimal level of health regardless of weight and manage treatable risk factors. Weight loss is difficult to achieve for many people with obesity, and even more difficult to sustain long-term¹²⁹. Every year, between 25 and 65 per cent of women and between 10 and 40 per cent of men will attempt dieting to lose weight. While some will achieve weight loss, this is rarely maintained in the longer term, as many will regain the weight lost, leading to further cycles of dieting: a pattern referred to as weight cycling, or yo-yo dieting^{130 131}. For people who experience cycles of intentional weight loss and unintentional weight regain, there may be positive consequences, such as improved blood pressure, blood glucose, and blood lipids during those periods of reduced weight but these need to be tempered by the potential negative consequences of a sense of failure in people who regain the weight they had lost and a metabolic profile which promotes further weight gain, such as a low resting metabolic rate^{119 132}.

Therefore, caution needs to be exercised before advising patients to invest substantial time, effort and often money in weight loss diets or pharmacological therapies. The clear evidence from all non-surgical weight loss programs is that, on average, the lost weight will be regained. This careful assessment of the positive and negative consequences of weight loss programs and caution in advising patients to go on them is not evident in current weight management guidelines in Australia or New Zealand. The overall goal of any treatment must be to optimise the health, including mental health, of the patient and this can goal is valid at any weight.

Existing clinical guidelines in Australia emphasise weight loss as the central goal of obesity management and include examples of some of the health benefits of achieving and sustaining weight loss of 5 per cent or more. Current clinical guidance in New Zealand encourages health professionals to build relationships with patients with obesity and look for nutrition, activity and behaviour interventions to make incremental, sustainable lifestyle changes. Revisions of current guidelines need to take a more cautionary approach towards automatically recommending weight loss diets and pharmacological therapies.

All people with obesity must be supported to optimise their health

People with overweight and obesity, particularly those who have experienced repeated unsuccessful attempts at weight loss or weight cycling must be supported by physicians and all health practitioners to achieve the most optimal level of health, irrespective of their weight. All health practitioners should

work with people to manage risk factors such as hypertension and conditions such as diabetes, sleep apnoea and metabolic syndrome under control.

Epidemiological studies have found that as age increases, average body weight gradually increases throughout young adulthood and middle age and this weight trajectory is also affected by the socioeconomic gradient and social determinants of health^{133 134}. Nutrition and physical activity interventions in the weight trajectory will, on average, result in weight loss, weight cycling or weight stability, though a minority of people will maintain sustained weight loss over time¹³⁴.

The RACP supports weight management strategies for all adults through the life course by regular and opportunistic monitoring of nutrition, physical activity, sleep, BMI and waist circumference to reduce the risk of developing noncommunicable diseases. For adults who are within normal and overweight BMI ranges, physicians should continue to monitor nutrition, physical activity, sleep, BMI and waist circumference to minimise age-related weight gain.

Management strategies should focus on:

- appropriate nutrition and physical activity advice with the goal to managing treatable risk factors, such as hypertension and diabetes
- Building understanding of the positive consequences of weight loss while acknowledging the potential for weight regain and weight cycling
- incorporate a respectful understanding of people's social, cultural, economic and whānau contexts
- regular monitoring of weight, nutrition and physical activity levels for all adults to ensure that weight management strategies can be implemented before people develop obesity

Where clinically indicated:

- People who meet the clinical criteria for bariatric surgery should be referred
- Pharmacological interventions (weight loss medications) could be considered for non-surgical weight loss support, particularly for people for whom weight cycling is an issue, though careful monitoring is recommended; assessment of risk factors

Current Australian Guidelines for overweight and obesity in adults

The Australian Government's current *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia* were developed in 2013 by the NHMRC¹²⁴. These guidelines are intended for use by clinicians and follow the '5As' framework for the provision of preventive care in primary care: Ask and Assess, Advise, Assist, Arrange as outlined in Table 1 below.

Clinical practice guidelines for the management of overweight and obesity in Australian adults: Recommendations for weight management in adults

Ask about and Assess weight

1. Use BMI to classify overweight or obesity in adults
2. For adults, use waist circumference, in addition to BMI, to refine assessment of risk of obesity-related co-morbidities
3. For adults who are overweight or obese, discuss readiness to change lifestyle behaviours

Advise adults about the health benefits of lifestyle change and weight loss

4. Adults who are overweight or obese can be strongly advised that modest weight loss reduces cardiovascular risk factors
5. Adults with pre-diabetes or diabetes can be strongly advised that the health benefits of modest weight loss include prevention, delayed progression or improved control of type 2 diabetes
6. Adults with kidney disease or sleep apnoea can be advised that improvements in these conditions are associated with a five per cent weight loss
7. Adults with musculoskeletal problems, gastro-oesophageal reflux or urinary incontinence can be advised that weight loss of five per cent or more may improve symptoms
8. Adults who are overweight or obese can be advised that quality of life, self-esteem and depression may improve with small amounts of weight loss

Advise adults to lose weight through lifestyle interventions

9. For adults who are overweight or obese, strongly recommend lifestyle change – including reduced energy intake, increased physical activity and measures to support behavioural change
10. For adults who are overweight or obese, design dietary interventions that produce a 2500 kilojoule per day energy deficit and tailor programs to the dietary preferences of the individual.
11. For adults who are overweight or obese, prescribe approximately 300 minutes of moderate intensity activity, or 150 minutes of vigorous activity, or an equivalent combination of moderate intensity and vigorous activities each week combined with reduced dietary intake.

Assist adults who require additional intensive intervention

12. For adults with BMI ≥ 30 kg/m², or adults with BMI ≥ 27 kg/m² and comorbidities, orlistat may be considered as an adjunct to lifestyle interventions, taking into account the individual situation

13. For adults with BMI > 40 kg/m², or adults with BMI > 35 kg/m² and comorbidities that may improve with weight loss, bariatric surgery may be considered, taking into account the individual situation.

Develop an appropriate weight loss program

14. For adults, include a self-management approach in weight management programs.
15. For active weight management in adults, **arrange** fortnightly review for the first 3 months and plan for continuing monitoring for at least 12 months, with additional intervention as required.

Long-term weight management

16. For adults who achieve initial weight loss, strongly recommend the adoption of specific strategies, appropriate to their individual situation, to minimise weight regain.

The accompanying Summary Guide outlines six key messages to promote obesity management for adults in primary care ¹³⁵:

1. Measure waist circumference in addition to calculating BMI
2. Discuss readiness to change lifestyle behaviours
3. Convey the message that even small amounts of weight loss improve health and wellbeing
4. Use multicomponent approaches — these work better than single interventions
5. Refer appropriately to assist people to make lifestyle changes or for further intervention
6. Support a self-management approach and provide ongoing monitoring

The Australian guidelines for overweight and obesity need to be revised to include the caution about the high chances of weight regain after a weight loss program and to incorporate new evidence that has emerged in the last 5 years, particularly regarding the management of treatable risk factors and controlling of noncommunicable disease risk factors.

Updates to guidelines should include explicit reference to direct and indirect weight bias experienced by people with obesity in their interactions with the health system, particularly the physical and built environment and in their relationships with health care practitioners. Hospitals, clinics and other health care providers must ensure the physical environment meets the needs of people with obesity and that all practitioners and multidisciplinary team members are competent in recognising and minimising bias and negative attitudes towards people with obesity.

Current New Zealand guidelines for weight management in adults

The most recent Ministry of Health clinical guidelines for weight management for New Zealand adults aged 15 years and over were released in November 2017. The guidelines use an adult weight management framework which seeks to (1) monitor; (2) assess; (3) manage; and (4) maintain contact and support¹³⁶.

The Food, Activity and Behaviour (FAB) model recommended in the guideline stresses that strategies for lifestyle changes need to be adapted to a person's lived reality, considering individual, whānau and community settings. Ensuring that a person's diet is nutritious, they are achieving moderate to vigorous physical activity regularly, and are getting enough sleep are the integral components of weight management, which are reinforced by behavioural support for sustained lifestyle changes. The Eating and Activity and Weight Management guidelines include suggested diet and activity exchanges: people can make incremental changes to their diets and physical activity levels, for example swapping sugar-sweetened beverages for water, and using the stairs instead of lifts and escalators^{136 137}.

Health practitioners are encouraged to build relationships with patients, respecting the patient's autonomy, minimising weight stigmatisation and bias, and collaborate in goal-setting activities. The guideline supports cultural competence by recommending clinicians:

- Build relationships on mutual trust to understand people's lived realities, including social determinants, cultural imperatives and socioeconomic circumstances
- Develop collaborative partnerships with Māori health providers, Whānau Ora providers, Pacific providers and other community-based organisations
- Use 'teach back' techniques during clinical consultations to ensure people understand what is being said¹³⁶

Pharmacotherapies for weight loss

The RACP finds that evidence of efficacy and safety in the long term use of weight loss medicines is limited. The short-term use of weight loss medicines must be carefully monitored, given the evidence of interaction, contraindication, and potential for harm^{124 136 138}. Other pharmaceuticals promising to 'treat' obesity are likely to enter the market in ensuing years. The RACP is concerned that their safety and efficacy are very carefully considered. For more information on weight loss medications approved for use in New Zealand and Australia, see **Appendix 3: Pharmacotherapies for weight loss**.

Community and commercial programmes

Commercial and community-based weight loss programmes are common globally. In New Zealand, publicly-funded programmes such as the Ministry of Health's Green Prescription programme and international commercial weight loss franchises including Weight Watchers and Jenny Craig are available. It is important for people beginning intensive weight loss programmes to maintain realistic expectations, and clinicians are encouraged to continue to support their patients beyond the programme's time limits.

New Zealand Green Prescription

Current guidelines recommend health practitioners refer people to weight management support services including the Green Prescription (GRx) programme. A GRx is written advice for people to increase their physical activity and improve their nutrition as part of health management. It is a non-surgical, multi-component intervention, involving regular meetings by phone or in person with a GRx support person, and focuses on motivating patients, goal-setting, discussing activity options and nutritional advice. The GRx and the GRx Active Families programmes are provided through regional sport and recreation services, and managed by DHBs¹³⁹. Results from the 2016 survey of the GRx

show that the majority of GRx were issued for weight issues (53 per cent), followed by hypertension/risk of stroke (25 per cent), back pain (22 per cent) arthritis (20 per cent) and stress (20 per cent)¹⁴⁰.

Findings from the NZ Health Survey show that 14.3 per cent of New Zealand adults experience unmet primary health care needs, with women more likely than men to have unmet primary health care (17.5 per cent compared to 10.9 per cent) due to cost¹⁴¹. Māori and Pasifika and those living in the most deprived areas are also more likely to have unmet primary health care needs; the over-representation of these groups in noncommunicable disease statistics has led some researchers to suggest that those who are more likely to benefit from the GRx programme are less likely to have access to it¹⁴².

Commercial weight loss programmes

While commercial weight loss programmes require a financial investment (costs of the programme and for some, costs of programme-branded food or meal replacements), there is evidence that people who took part in commercial programmes achieved greater weight loss at 12 months follow-up¹⁴³. People may benefit from these programmes, particularly the counselling and support provided to participants. Clinicians should advise people to maintain realistic expectations and understanding of the potential for some weight regain after the programme has ended.

A parallel, two-arm randomised trial for a very brief (30 seconds) intervention for obesity in primary care (free referral to a commercial weight loss programme) found that nearly twice as many (25 per cent) participants in the intervention group had lost 10 per cent of their bodyweight at 12 months follow-up compared to 14 per cent in the control group. Of the total participants, more than 80 per cent reported that the intervention was appropriate and helpful, while less than one per cent responded that the intervention was inappropriate and unhelpful¹⁴⁴. This study shows that, with appropriate primary care and community support systems in place, an opportunistic, very short intervention can be effective for people with obesity.

Provide equitable access to bariatric surgery for public hospital patients

Bariatric surgery as a treatment for morbid and severe obesity is increasing internationally, with more than half a million procedures performed in 2014, up from 468,609 in 2013^{145 146}. The most frequently-performed operations in 2014 were the sleeve gastrectomy (45.9 per cent), the Roux-en-Y gastric bypass (RYGB) (39.6 per cent), and laparoscopic adjustable gastric banding (LAGB) (7.4 per cent)¹⁴⁶. A systematic review and meta-analysis of randomised control trials of bariatric surgery compared to non-surgical treatment (such as improving diet and exercise, behavioural or lifestyle modification, pharmacotherapy) for obesity found greater percentage of excess body weight lost, higher rates of remission of T2DM and metabolic syndrome, reduced waist circumference and improved quality of life for participants who had undergone bariatric surgery versus the non-surgical group¹⁴⁷.

Bariatric surgery is also cost effective, as it reduces pressure on health systems, leads to improvements in productivity, and reduces premature mortality from comorbid conditions, such as T2DM^{148 149 150 151 152 153}. In New Zealand, the direct costs associated with obesity in 2004 were estimated to be \$460 million, and indirect costs \$370 million¹⁵⁴. In Australia, people with known diabetes had annual direct

healthcare costs of AUD\$4390 in 2004/5 – if a person had complications, the direct annual costs more than doubled to AUD\$9628 over the same time period¹⁵⁵. Bariatric surgery produces lifetime savings in healthcare spend, increased QALYS, and is less expensive than conventional therapies for T2DM. As with any surgical procedure, a degree of risk is involved, and the most common adverse events following bariatric surgery were found by one meta-analysis to be iron deficiency anemia (15 per cent) and reoperation (8 per cent)¹⁴⁷. A randomised clinical trial comparing outcomes between cohorts who received diet and physical activity advice and those who received surgery (either RYGB or LAGB) and advice reported no additional surgical interventions at one year of follow-up, and there were no LAGB removals or replacements¹⁵⁶. Evidence shows a return on investment in bariatric surgery for people with T2DM is between two and four years^{148 149}.

Clinical guidelines in New Zealand, Australia and in the United Kingdom state that bariatric surgery is not clinically indicated for adolescents under the age of 14 years^{101 124 136}. Young people with morbid or severe obesity must meet criteria to be eligible, including physical growth and development milestones; the presence of obesity-related co-morbidities; and the ability to give informed consent. A coordinated and ongoing multidisciplinary approach prior to and following surgery should include nutrition and physical activity interventions, pharmacotherapy and counselling¹⁵⁷.

Bariatric surgery in New Zealand

In New Zealand, around 900 bariatric surgeries are performed annually: half funded through the public health system and half through private health providers, with the most prevalent procedures (sleeve gastrectomy, RYGB and gastric banding) reflecting the international trends¹⁵⁸. New Zealand has recently introduced a registry for bariatric surgery, enabling patient outcomes to be compared, such as diabetes status and weight change, and measure any complications arising from the procedure¹⁵⁹.

Bariatric surgery in Australia

The Australian NHMRC's clinical practice guidelines published in 2013 states that for adults, "bariatric surgery is currently the most effective intervention for severe obesity"¹²⁴. While the total number of bariatric surgeries has been increasing since 2011-12, there remain large discrepancies in access to weight loss surgery for public and private patients in Australia. In 2014-15, 22,713 bariatric operations were carried out and of those, only 2,720 (12 per cent) were undertaken in public hospitals¹⁶⁰.

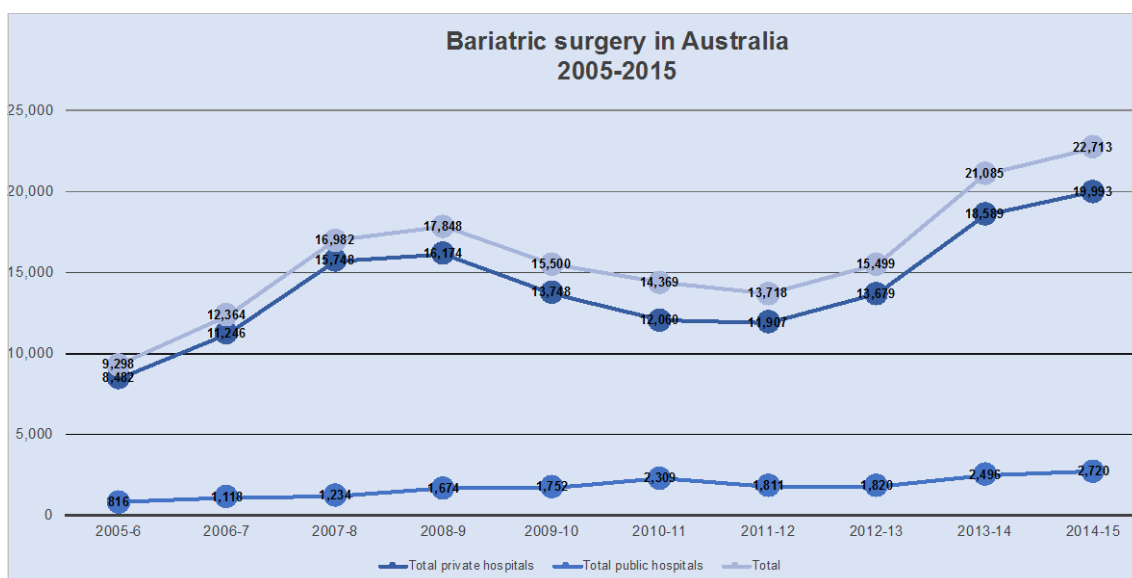


Figure 1: Bariatric Surgery in Australia 2005-15 – Source: Australian Institute of Health and Welfare, National Hospital Morbidity Database

In 2012, a prospective cohort study of over 49,000 Australians with obesity stated that their “findings suggest that bariatric surgery, a Medical Benefits Scheme-listed procedure, is currently largely available only to those who can afford private health insurance and the associated out-of-pocket costs, with poor access to these cost-effective procedures in the section of the population that is most in need” and that “continuing inequity in access is likely to exacerbate existing inequalities in obesity and related health problems”¹⁶¹.

Bariatric surgery is an effective intervention for the treatment of severe obesity. Patients who meet the criteria should be referred for assessment. Greater access to this intervention through the public health system in Australia and New Zealand will remove barriers to accessing surgery and reduce existing inequities in obesity-related noncommunicable disease.

Recommendations for health system actions

The RACP recommends governments in New Zealand and Australia:

- Introduce a consistent national growth standard for child development based on the World Health Organization standards
- Actively promote national dietary and activity guidelines
- Provide equitable access to bariatric surgery in public hospitals for all suitable patients who have severe obesity
- Promote monitoring of weight as a vital sign to prevent age-related weight gain

The RACP recommends the Federal Government of Australia:

- Develop, support, update and monitor comprehensive and consistent diet, physical activity and weight management guidelines for children, with a focus on critical periods in the life course (pre-conception, antenatal, infancy and early childhood)
- Revise clinical guidelines for weight management of adults to incorporate:
 - The evidence on the low likelihood of long-term efficacy and potential detrimental effects for repeated attempts at weight loss
 - An emphasis on the importance of optimising health and managing treatable risk factors at any weight
 - The need to ensure the physical environment meets the needs of people with obesity and minimise the direct and indirect impacts of weight bias in the health system

The RACP recommends the New Zealand government:

- Review the existing Childhood Obesity Plan with the intention to expand the Plan to include the WHO-recommended, effective interventions to reduce childhood obesity
- Supports, promotes, regularly updates and monitors the nutrition, weight management and physical activity guidelines for children, young people and adults

The RACP will:

- Encourage RACP members to support individual and family/whānau to optimise their health irrespective of weight through improved nutrition and physical activity, and ensure patient education is specific, actionable and achievable
- Advocate for: consistent, WHO standards for defining childhood obesity; greater promotion of nutrition and physical activity guidelines; revised management guidelines to take a more balanced approach to recommending weight loss for people with obesity; the inclusion of weight as a vital sign and; greater public access for bariatric surgery

Priority populations: Indigenous peoples who have experienced colonisation

Indigenous peoples who have experienced colonisation have poorer health outcomes across a range of health indicators than the non-Indigenous population. For example, the average life expectancy for the Indigenous peoples of Aotearoa New Zealand, Australia, Canada and the United States of America is lower than that of the non-Indigenous population, and Indigenous peoples will, on average, have fewer years of good health^{162 163 164 165}.

Māori, Aboriginal and Torres Strait Islanders have a disproportionately high burden of ill-health attributed to overweight and obesity compared to non-Indigenous populations, with the exception of Pasifika in New Zealand^{166 167}. As social and economic conditions changed through the twentieth century, Indigenous peoples began to migrate to urban centres for employment, increasing their exposure and access to processed foods high in sugar and salt, and reducing levels of physical activity^{168 169}. The poorer health outcomes experienced by Indigenous populations are strongly associated with the Social Determinants of Health which encompass the conditions under which people are born, grow, live, work and age (i.e. social, economic, political, cultural and physical circumstances), and are then compounded by the traumatic effects of colonisation. The de-territorialisation and alienation from land, and the imposition of social, cultural and economic structures upon Indigenous peoples was largely without consultation, consent or choice – as such, the unique status history, and the impact of legislative, regulatory or policy changes on Indigenous populations must be considered separately from generalised discussion¹⁷⁰.

Indigenous approaches and ways of being emphasise the wants and needs of the collective: reciprocity, kinship, and a sense of belonging inform the sense of self which is embedded within whānau relationships and the wider community¹⁷¹. Some evidence-based public health models to combat obesity have focused on a central assumption: that individual behaviour (framed as personal responsibility) is driven by an information deficit (if people had greater access to messaging around healthy lifestyles, they would apply this messaging for their own benefit)¹⁷². This biomedical model approach to obesity isolates people from their lived sociocultural and economic realities, and interprets “the sociocultural factors around food as relevant only in how they operate as a barrier or an enhancement to people achieving the ‘correct’ diet”¹⁷².

While policymakers have developed programmes and services which expand the biomedical model to a biopsychosocial model encompassing some elements of social and economic realities, these remain focused on the individual. This model has done little to achieve health equity for Indigenous populations, rather the focus on the individual/mainstream model of health and disease over the collective or whānau-based approach means the health gap between Indigenous and non-Indigenous Australians and New Zealanders has persisted. Aboriginal and Torres Strait Islander children are nearly twice as likely to be obese compared to their non-Indigenous counterparts; and in New Zealand, Māori children are one and a half times as likely to be obese compared to non-Māori children^{21 173}. The culture, practices and world-view of Indigenous peoples are marginalised within the mainstream discourse, meaning that solutions to public health issues such as obesity are homogenised, and do not incorporate Indigenous knowledge to inform action for groups which are adversely affected.

Australia: Aboriginal and Torres Strait Islander peoples

It has been estimated that obesity contributes 16 per cent of the health gap between Aboriginal and Torres Strait Islander peoples and the total Australian population¹⁷⁴. In the Northern Territory, the excess burden of obesity amongst Aboriginal and Torres Strait Islander peoples has been estimated to explain 1 to 3 years (9 to 17 per cent) of the life expectancy gap¹⁷⁵.

The National Aboriginal Community Controlled Health Organisation (NACCHO) finds that “the underlying causes of poor Indigenous health can be attributed to social and economic exclusion, unemployment, low income, poor housing and sanitation, poor education, and lack of adequate

nutrition”¹⁷⁶. Studies have attributed between one-third and one-half of the health gap between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians to differences in socio-economic status such as education, employment and income^{175 177 178}. Aboriginal and Torres Strait Islander peoples also have poorer access to health care services than the non-Indigenous Australian population¹⁷⁹.

The latest available data from the Australian Bureau of Statistics shows that obesity rates for Aboriginal and Torres Strait Islander males and females were significantly higher than the comparable rates for non-Indigenous people. For example, Aboriginal and Torres Strait Islander children aged 2-14 years were significantly more likely than non-Indigenous children to have obesity (10.2 per cent compared with 6.5 per cent); and in 2012-13, two-thirds (66 per cent) Aboriginal and Torres Strait Islander people aged 15 years and over were overweight (28.6 per cent) or obese (37.4 per cent), according to their BMI¹⁶⁷. Obesity is associated with risk factors for the main causes of morbidity and mortality among Aboriginal and Torres Strait Islander peoples. It impacts largely through diabetes (half of the obesity burden) and ischaemic heart disease (40 per cent)¹⁷⁴.

It is essential to situate the underlying causes of poorer health within a broader context of historical trauma and proscribed fragmentation in Australia where, until the late twentieth century, “Indigenous people have had little power to influence these factors and the public policy decisions that affect their lives and health”¹⁷⁶. Further, the “Commonwealth has only had the power to act in Indigenous affairs since 1967, and only recently has it generally been accepted that Indigenous people should have control over their own lives and enjoy the same rights as other Australians”¹⁶⁷. In addition, racism and discrimination towards Aboriginal and Torres Strait Islander peoples are widespread and this also impacts negatively on both their physical and mental health. As outlined in the Australian Government’s latest Aboriginal and Torres Strait Islander Health Performance Framework 2014 Report, “there are a number of pathways from racism to ill-health, including: reduced access to societal resources such as education, employment, housing and medical care; inequitable exposure to risk factors including stress and cortisol dysregulation affecting mental health (anxiety and depression); immune, endocrine, cardiovascular and other physiological systems; and injury from racially motivated assault”¹⁸⁰.

Programmes to improve the health of Aboriginal and Torres Strait Islander peoples: the Ngaanvatjarra Pitjantjatjara Yankunytjatjara Women’s Council Aboriginal Corporation

The Ngaanvatjarra Pitjantjatjara Yankunytjatjara Women’s Council (NPYWC) Aboriginal Corporation is an example of a successful and long-running community-led organisation which takes a holistic approach to improving the health and well-being of its communities through its Child Nutrition and Well-being Program amongst other initiatives. The NPYWC is a community-led organisation which was formed in 1980. It covers an area of 300,000 square kilometres in the tri-state region of the Northern Territory, South Australia and Western Australia. This area includes 26 remote Aboriginal communities and smaller homelands¹⁸¹.

To be effective, programs and initiatives aimed at improving the health of Aboriginal and Torres Strait Islander peoples need to be community-driven which entails “a ground-up approach to development which allows the space for Aboriginal communities and their representative organisations to devise, plan, implement and manage (including monitoring and evaluation) programs which they deem relevant to their particular needs”¹⁸².

In 1996, NPYWC established the Child Nutrition and Well-being Program. At the time, it received a six-month Commonwealth grant to teach young mothers to cook healthy meals for their children. The program is still active today although it now runs on a broader public health model which seeks to “address the wider social issues that affect child well-being and failure to thrive, such as domestic and family violence and Fetal Alcohol Spectrum Disorder as well as combining prevention and intervention strategies to offer practical health to clients¹⁸¹.”

The Child Nutrition and Well-being Program’s main components of case management, early intervention and prevention, and Intensive Family Support Service reflect the need to address these complex factors in a holistic and tailored way in order for the initiatives to be effective. In its work, NPYWC acknowledges and seeks to address the numerous factors that impact on the ability of parents feeding their children healthy and nutritious food including: “parents’ low educational attainment and therefore limited understanding of nutritional requirements, food labelling and household budgeting; and the often limited choices of reasonably-priced healthy food in remote stores, coupled with an increasing reliance on take-away or other convenience food with high fat, salt and or sugar content and little nutritional benefit”. The program has received several awards including State and National Winner Heart Foundation, for the Mai Wiru Stores Policy (with Nganampa Health Council Inc.) 2007; runner up, Outstanding Delivery in Child and Maternal Health: Excellence in Indigenous Health Awards, 2010¹⁸¹.

The Australian Indigenous HealthInfoNet website includes a searchable directory of both ongoing and completed programmes and projects that work to reduce the prevalence of overweight and obesity in Aboriginal and Torres Strait Islander communities across Australia.

Unfortunately, it is common for many projects and programmes to be hindered by a lack of sustained funding and capacity. In addition, a lack of evaluation inhibits long term extension and larger-scale roll-outs of successful programmes. Long term-funding directed at community-led organisations and programmes as well as routine monitoring and evaluation are essential to ensure the delivery of effective initiatives focused on improving the health and wellbeing of Aboriginal and Torres Strait Islander communities.

Aotearoa New Zealand: Māori

Around 15 per cent of New Zealand’s population identify as Māori¹⁸³. The 2016/17 update of the NZ Health Survey finds that the number of Māori adults (over 15 years) living with obesity is currently 50.2 per cent – a statistically significant increase of 8.6 percentage points since 2006/07¹⁶⁶. Health inequities persist between Māori and non-Māori: the two leading causes of relative health inequity between Māori and non-Māori are diabetes and cardiovascular disorders, where health loss is around twice as high for Māori than non-Māori^{168 184}. While obesity is relatively high across all ethnicities in New Zealand, Māori with obesity are more likely to develop comorbidities associated with high BMI and waist circumference than other ethnic groups, which has significant impacts on quality of life^{185 186}.

Hauora Māori

Te Ao Māori (the Māori world) understands health holistically (including individual, whānau, community levels) and can be interpreted through several models, such as Te Whare Tapa Wha (the four-sided

house) and Te Waka o Meihana, which builds on Te Whare Tapa Wha by incorporating elements of the clinical encounter and doctor-patient relationship to ensure a culturally safe patient journey^{187 188}.

Te Whare Tapa Wha is a model of Hauora Māori (Māori health) where four cornerstones of health become the four walls of a whare (house). The four cornerstones are of equal importance, and a person may become unwell when one of the four domains is missing or damaged. The four domains are taha tinana (physical health), taha wairua (spiritual health), taha whānau (family health) and taha hinengaro (mental health)¹⁸⁷. The inclusion of taha whānau highlights the need for health services and interventions to be responsive to whānau and community needs beyond those of an individual. The Meihana model builds on the integral significance of whānau for the patient by structuring the relationship as a double-hulled waka (canoe) on a voyage that can be influenced and affected by nga hau e wha (the four winds): experiences of marginalisation, racism, the legacies of colonisation and migration – factors which may impact the journey to health and wellbeing¹⁸⁸.

Whānau health and wellbeing is also encouraged by whakawhanaungatunga (relationship building and connectedness) between patients, whānau and health practitioners. Interventions using hauora Māori and incorporating tikanga Māori (cultural principles/traditions) approaches in the delivery of health services and interventions, such as whanaungatanga, rangatiratanga (self-determination), kotahitanga (collaboration and teamwork), kaitiakitanga (respect for resources) and manaakitanga (kindness and reciprocity) have been shown to have a positive impact on whānau and contribute to health gains for Māori¹⁸⁹.

PATU™ Aotearoa

PATU™ Aotearoa is a social enterprise and health intervention initiative designed to actively support whānau to improve physical activity and nutrition. The programme combines group exercise in the form of high intensity interval training (HIIT), nutrition and lifestyle education with te reo me ōna tikanga Māori (Māori language and traditions)¹⁴². PATU™ was developed with Ngati Kuhungunu in the Hawke's Bay, and the programme is now available in several centres in Aotearoa New Zealand with high Māori populations, including Kaikohe, Gisborne, Manurewa, Wairoa and Hastings¹⁹⁰. An evaluation of the pilot Hino Wero (Fat Challenge) found that whānau participating in the programme perceived PATU™ as a community: respondents described it as more than a gym, but an “urban marae” and a “positive gang” which encouraged whanaungatunga and built motivation among PATU™ whānau¹⁹¹. Outside of the HIIT sessions, whānau could participate in wananga (learning groups) and a Facebook group where they could share ideas and support each other. Results from the nine-week pilot study reported mean body weight loss of 2.9 per cent, mean BMI drop of 1.4 points and mean weight loss of 4.6kg¹⁴².

The PATU™ environment (both physical and virtual through social media) supports the idea that, for Māori, food and exercise recommendations would be better targeted in whānau and/or community context where advice can be applied directly to everyday lived realities¹⁷². PATU™ Aotearoa is an example of a health intervention to address physical inactivity and nutrition using kaupapa Māori and Hauora Māori models, with positive health benefits for individuals and whānau. Reductions in weight, BMI and body fat reduces people's risk of developing noncommunicable diseases, and as a community based initiative, it has an emphasis on whānau, connectedness and relationship-building to achieve goals.

Whānau Pakari

Whānau Pakari is a multidisciplinary intervention programme for children and adolescents with obesity in Taranaki, New Zealand. Whānau Pakari's programme included an unblinded randomised control trial of an intervention for whānau with children or adolescents with obesity: an intensive intervention group and a minimal intensity (control) group were assessed at baseline, 6 months and 12 months¹⁹². The trial targeted priority populations including tamariki and rangatahi Māori (Māori children and adolescents): the intervention cohort was predominantly Māori (45 per cent). The study incorporated a novel home-based and de-medicalised model which involved clinicians visiting whānau at home rather than attending a hospital-based clinic, enabling greater accessibility and responsiveness for the needs of whānau. Results showed both minimal and high-intensity models produced a modest improvement in BMI z-scores, cardiovascular fitness, psychological wellbeing and health-related quality of life at 12 months. The study authors noted that in the review of the intense intervention model, the incorporation of a Māori world view in the design and delivery of future interventions is critical to addressing lower retention levels for whānau¹⁹³.

Toi Tangata

Toi Tangata is a Māori agency which develops and delivers kaupapa Māori approaches to health, movement and nutrition. Current programmes include He Pī Ka Rere (a fledgling bird ready to fly), a kori (physical activity) and kai (nutrition) programme designed for delivery in Kohanga Reo (Māori immersion preschool) for tamariki under 5 years¹⁹⁴. Toi Tangata is working with researchers on the OI@ – Or@ (Ola – Ora, or “Health” in several Pasifika languages and Māori) project to develop a mobile application (mHealth tool) to reduce the prevalence of obesity, diabetes, cardiovascular disease. Toi Tangata has liaised with two Māori communities (Waiwhetu in Whanganui-a-Tara/Wellington and Te Hā Oranga (Ngāti Whātua) to co-design the application, a process which should be considered best practice when designing interventions for priority populations¹⁹⁵.

Priority populations: Pasifika

New Zealand and Australia are closely connected to Pacific Island nations through trade, migration, tourism, and development. In New Zealand, Pacific peoples are the fourth-largest ethnic group, behind the New Zealand European, Māori, and Asian populations; and they are also the youngest, with nearly 50 per cent of Pasifika in New Zealand under 20 years¹⁹⁶. In 2013, there were around 340,000 people of Pacific ethnicity in New Zealand – this is projected to increase to around 440-480,000 by 2025¹⁹⁷. The majority of Pasifika in New Zealand (nearly 93 per cent) live in the North Island, with 66 per cent living in Auckland and 12 per cent in the Wellington region. There were around 150,000 people of Pacific ethnicity (excluding Māori) living in Australia in 2011, less than 1 per cent of the total Australian population¹⁹⁸. Pasifika are a heterogeneous population, representing different nationalities, ethnicities and cultures including Samoan, Tongan, Niuean, Cook Islands Māori, Rarotongan, Tokelauan, and Fijian¹⁹⁹. Around 7 per cent of New Zealanders identified with at least one Pacific ethnicity in 2013 (stats NZ). The Ministry of Health's 'Ala Mo'ui: Pathways to Pacific Health and Wellbeing 2014-18 acknowledges this diversity, noting that “while Pacific ‘cultures’ share some similarities in principles and concepts, they each have specific and independent world views”. This diversity is also recognised by

using Āiga, kāinga, ‘anau, vuvale, kopu tangata, magafola (words for ‘family’ in different Pasifika languages) to emphasise the importance of collectivism in Pacific cultures²⁰⁰.

Pasifika have the highest rates of adult and childhood obesity in New Zealand: 68.7 per cent of adults aged over 15 years and 30 per cent of children aged 2-14 years are obese¹⁴¹. For Pasifika with obesity, 11 per cent of men and 21 per cent of women are categorised as class III (BMI greater than 40.0kg/m²): after adjusting for age and sex, Pasifika adults were more than five times as likely to have class III obesity compared to non-Pasifika adults. A high BMI and high waist circumference (WC) increases the risk of development of obesity-related co-morbidities such as cardiovascular disease and diabetes – around one in four New Zealand adults are at high risk due to high BMI and WC measures. For Pasifika adults, however, the risk is doubled to one in two²¹.

Interventions in Pacific countries and territories

In the ten countries with the greatest prevalence of obesity, nine are in the Pacific region²⁰¹. In response, several Pacific Island nations have taken a global lead in the implementation of excise and/or sales taxes on sugar-sweetened beverages, notably in countries where the consumption of these products is very high: Samoa in 1984, French Polynesia (2002), Niue (2009), Tonga (2013) and the Cook Islands (2014)²⁰². In addition to an SSB tax, many nations have introduced policies to limit or ban availability of SSBs in schools²⁰³. The tax amount varies, but tends to be higher in countries where there is a health rationale for introducing the tax (i.e. to reduce consumption), and in many cases, such as in Samoa, Nauru, Fiji and French Polynesia, bottled water is now cheaper than available SSBs²⁰⁴.

Research involving the Pasifika community

Research has previously focused on adult populations, particularly in the context of obesity related co-morbidities such as type 2 diabetes, stroke and cancer^{205 206 207}. There is a growing evidence base on children and adolescents (8 – 22 years), and Pasifika youth are a significant population (nearly 50 per cent of all Pacific peoples in New Zealand are under 20 years)^{208 209}. This is notable because young people aged 16 – 24 “have the independence and capacity to understand their own, as well as their families’ social realities” and could offer unique insights into addressing issues relating to their social and cultural environment, which could impact on pathways contributing to obesity.

Church has been cited by previous studies as an influential environment for Pasifika fanau to make effective lifestyle changes, although results have been mixed^{208 209}. The study by Dewes et al, which surveyed lifestyle behaviours in Pasifika adolescents who attended church compared to those who did not, found no significant differences between the two groups when SSB and takeaway consumption were examined²⁰⁸. While 66 per cent of Pasifika youth surveyed in the exploratory study by Tupai-Firestone et al reported that “their belief systems do not have an influence on the food they eat”, 30 per cent indicated an association between food and Pasifika culture, particularly around reciprocal exchange of food, and as part of church-based activities^{208 209}.

Interventions for Pasifika fanau

Despite the disproportionate burden of obesity-related disease in Pasifika, there are few interventions designed specifically for the Pacific community, and most weight loss interventions prioritise the individual rather than the collective. An intervention to reduce cardiovascular and diabetes risk in Maori and Pasifika populations identified the following strengths in designing meaningful interventions²¹⁰:

- Translating learning from other successful community-based behaviour change interventions, such as with smoking cessation
- Involve community health providers who have strong relationships and understanding of the populations they work with
- Incorporate cultural knowledge, practices and language

An example of a community-based initiative for Pasifika fanau health and wellbeing is the Faith-led Wellness Programme, a collaboration lead by the Pacific Health Service Hutt Valley with a cluster of six Pacific churches in Wainuomata and involving the Hutt Valley District Health Board. The Project Lead Candice Apelu notes that the emphasis for the programme is “less about weight loss and more on sustaining changes around exercise, having a good sleep, good nutrition and being well overall”²¹¹.

Programme	Goals	Initiatives implemented
Faith-led Wellness Lower Hutt, New Zealand	Working with Pasifika fanau to improve overall health and wellbeing through four domains: Faith, Food, Fitness and Family.	<ul style="list-style-type: none"> • Water-only policies introduced to churches • Sunday School menu changed from chips, lollies and fizzy drink to popcorn, fruits and water • Reducing portion sizes at church gatherings • Activities for congregation members, including fitness classes • Working with fruit and vegetable co-operatives to improve access to these foods

There is a need for greater collaboration between academic and research institutions and the Pasifika community in New Zealand and Australia to design, implement, evaluate and report on obesity, nutrition and physical activity interventions. Growing the evidence base and identifying effective initiatives and interventions will improve outcomes and health gains in the longer term.

Priority populations: People living on lower incomes

Obesity is an economic issue with marked socioeconomic gradients in obesity, independent of ethnicity. Individual, behavioural approaches to obesity do not encompass the upstream socioeconomic determinants, such as food insecurity, where a lack of money and resources hinders families’ abilities to have consistent access to a nutritious diet. Population-level analyses find a correlation between socioeconomic status and rates of obesity, with populations living in higher deprivation more likely to have obesity than those living in the least deprived areas^{31 212 213}. Revenue generated by the implementation of a sugar-sweetened beverage tax should facilitate access to healthy diets culturally relevant, community initiatives and improve health equity. Modelling in Australia and New Zealand and

evidence from the United States has shown that a tax on sugar-sweetened beverages reduces consumption and improves health outcomes, and is an effective, equitable population health policy.

Solutions to obesity are frequently framed as individual responsibility: people who do not take on messaging aimed at reducing calorie intake, consuming nutritious food and increasing physical activity are perceived as lazy and ill-disciplined¹⁷². Individual approaches to solving obesity do not encompass the upstream socioeconomic determinants, like food insecurity, where a lack of money and resources hinders families' abilities to have consistent access to a nutritious diet²¹⁴. While the switch from current diets to healthy diets need not cost more money, it does cost more time and effort to prepare meals from scratch rather than purchasing ready snacks and takeaways. People with less money to spend on food and less time to prepare food will tend to purchase foods and beverages that provide sufficient energy for the lowest cost for all family members, thus directing food choices towards more processed, energy-dense foods^{31 56}.

In New Zealand, socioeconomic disparities are most apparent for people with the highest levels of obesity: adults and children living in the most deprived areas (deprivation quintile 5) were four times more likely to have a BMI greater than 40.0kg/m² (adults) or 35.0kg/m² (children) than adults and children living in the least deprived areas²¹. In New Zealand, the Material Wellbeing Index includes seventeen indicators of material wellbeing to assess hardship; four of these indicators apply to food security (going without fresh fruit and vegetables; eating protein three or four times a week; economising on protein; and accessing food banks). In 2016, 14 per cent of children were in households which regularly went without or cut back on fresh fruit and vegetables, and 37 per cent of children were in households which reported purchasing cheaper cuts of meat "a lot" because money was needed for other essentials, such as rent or mortgage payments and utilities²¹⁵.

According to the latest Australian Bureau of Statistics data available, proportionally more women living in areas of most disadvantage were overweight or obese (63.8 per cent) compared with women living in areas of least disadvantage (47.7 per cent). However, this pattern was not observed for men with similar overweight or obese rates for those living in areas of most disadvantage (69 per cent) and those living in areas of least disadvantage (68.6 per cent). There are more stark differences by geographical locations where the level of overweight and obesity in adults varies according to geographical location and is highest in Inner regional and Outer regional and remote areas: "Around three quarters of men living in Inner regional (75 per cent) and Outer regional and remote (74 per cent) areas are overweight or obese compared with just over two thirds (68 per cent) of men living in major cities. For women, around two thirds of women living in Inner regional (63 per cent) and Outer regional and remote (69 per cent) areas are overweight or obese compared with just over half (53 per cent) who live in major cities"¹⁶⁷.

Priority populations: People with mental health conditions

There is robust evidence that people with mental health conditions have greater rates of physical comorbidities and are at greater risk of premature death than the general population^{216 217 218}. For people with mental health conditions, excess mortality attributed to noncommunicable diseases such as cardiovascular disease, cancers and type-2 diabetes has increased in recent decades, and shows this inequity with the general population continues to widen^{219 220}.

Obesity is common for people living with mental health conditions. People prescribed pharmacotherapies to treat mental health conditions may experience weight gain and metabolic disturbances which are common side-effects of psychoactive medications, including antipsychotics and antidepressants.²²¹ Prevalence of the metabolic syndrome among people with mental health conditions is estimated at two to three times that of the general population, and is particularly prevalent among people with schizophrenia²²². Nutrition, tobacco use and levels of physical activity are also factors. People with mental health conditions are more likely to have a high calorie, high fat diet which is low in fibre, and be physically inactive, while people consuming healthier foods and undertaking regular physical activity are more likely to score higher on mental health screening questionnaires^{217 219}. An assessment for the presence of eating disorders as an important part of treatment planning – where an eating disorder is undiagnosed, interventions and strategies for weight management and managing comorbid noncommunicable diseases can be less effective²²³. Advice about nutrition and physical activity that is specific, actionable and achievable must be included in consultations where psychoactive medications are prescribed.

In New Zealand, the rate of premature mortality (death from natural causes before age 65) is twice as high for people using mental health services compared to the general population. For people diagnosed with a psychotic disorder, it is three times as high²²⁴. The New Zealand Mental Health Survey found that people who had been diagnosed with any mental health condition were more likely to be overweight or obese than the general population: 55.2 per cent compared to 50.9 per cent in 2006²²⁵. Māori experience the highest levels of mental health conditions of any ethnic group; accounting for 27 per cent of all mental health users, despite representing 16 per cent of the NZ population. Te Rau Hinengaro, the 2006 National Mental Health Prevalence study, found that Māori were more likely to experience mental health conditions and comorbidities than non-Māori²²⁵.

According to the National Mental Health Commission, people living with a mental health condition in Australia are likely to die between 14 and 23 years earlier than the general population, twice as likely to have diabetes, respiratory disease and metabolic syndrome and “Aboriginal and Torres Strait Islander people are estimated to have ten years lower life expectancy than other Australians, with an even greater gap for those with mental illness”²²⁶.

Equally well: Improving physical health outcomes for people with mental health conditions and/or addiction

Health practitioners may attribute signs or symptoms of illness or disease to one condition, where in fact it may be strongly associated or caused by another long-term health condition. For people living with mental health conditions, the presentation or experience of physical symptoms is frequently misattributed by health practitioners to the person’s mental health condition, rather than being investigated as signs of a physical health condition. Subsequently, as treatment may be delayed or inadequate, this diagnostic overshadowing can contribute to the higher health inequalities experienced by people with mental health conditions. While the literature has posited a range of explanations for the inequalities and greater premature mortality experienced by people with mental health conditions, these are largely focused on exploring factors related to the patient, including current medication and behavioural factors. More recently, systemic disparities, including access to screening and treatment for physical health conditions for people with mental health conditions, have been explored as contributing factors²²⁷.

Reducing disparities in physical health outcomes and access to health care for people with mental health conditions and/or addiction is a priority in New Zealand and Australia through the Equally Well initiative, which aims to improve physical health outcomes for people who experience mental health conditions and/or addiction. The New Zealand Consensus Position Paper was launched in 2014, and is led by Te Pou o Whakaaro Nui, the national centre for mental health, addiction and disability workforce development²²⁸. In Australia, the Australian Government’s Mental Health Commission published the *Equally Well Consensus Statement on improving the physical health and wellbeing of people living with mental illness in Australia* in 2016²²⁶.

Equally Well Australia

The Australian consensus statement outlines six essential elements to guide health service organisations to provide better quality care to people with mental health conditions. These include taking a holistic, person-centred approach to physical, mental health and wellbeing; effective promotion, prevention and early intervention; care coordination and equity of access to health services²²⁶.

Equally Well Principle	Mention of obesity
Effective promotion, prevention and early intervention	<p>“Obesity (which may be related to medication treatment) is a major contributor to a number of common physical diseases including metabolic syndrome, diabetes and cardiovascular disease. People living with mental health conditions should receive tailored support for weight management programs as part of routine care.”</p> <p>A recent evaluation of an individualised intervention which provided nutrition and physical activity advice to young people with first episode psychosis found that weight gain associated with antipsychotic pharmacotherapies was attenuated in the group which received the advice²²⁹.</p>
Improved quality of health care	<p>“Assessments should consider the risk of developing conditions such as obesity, cardiovascular disease, respiratory illness, osteoporosis, diabetes and metabolic syndrome.”</p> <p>“Impacts of medication (both positive and negative) should be regularly assessed, and alternatives should be considered if a medication has a potential negative impact. People living with mental health conditions have a much higher risk of developing metabolic syndrome. Anyone prescribed antipsychotic medication should be given clear and understandable verbal and written information about the medication’s risks and benefits. Steps should be taken to limit side-effects such as obesity, cardiovascular disease and diabetes. People should be encouraged to have a support person and/or carer present during these discussions and be supported to make treatment decisions.”</p> <p>A holistic approach to optimising both mental and physical health should be taken, as evidence shows that having more than one</p>

	condition can mean suboptimal care of one or more of these conditions ²³⁰ .
Monitoring of progress towards improved physical health and wellbeing	<p>“Measure rates of smoking, alcohol use, obesity and diabetes in people living with mental health conditions.”</p> <p>Cardiometabolic monitoring in children and adolescents with mental health conditions receiving antipsychotic pharmacotherapies is an opportunity to alter the trajectory towards early onset of metabolic syndrome, type-2 diabetes or cardiovascular disease²³¹.</p>

Equally Well New Zealand

The Equally Well consensus position statement is the outcome of a comprehensive review of international and New Zealand evidence on the physical health of people who experience mental health conditions and/or addiction. Signatories to the New Zealand consensus paper “recognise there is an urgent need for coordinated action that will contribute to improved life expectancy and physical health” including reducing the impact of noncommunicable diseases (type 2 diabetes, metabolic syndrome, obesity and cardiovascular disease). The consensus position paper has identified the following principles to guide action as part of the Equally Well collaboration which outline that people who experience mental health conditions and/or addiction need²²⁸:

- To be identified as a priority group at a national policy level based on significant health risks and relatively poor physical health outcomes
- To have access to the same quality of care and treatment for physical illnesses, and to have a right to assessment, screening and monitoring for physical illnesses
- To be offered support to make the connection to how they are affected physically and guidance on personal goals and changes to enhance their physical wellbeing.

The Consensus Statements in New Zealand and Australia have been endorsed by the RACP as well as other health organisations including the Royal Australian College of General Practitioners, the Royal New Zealand College of General Practitioners and The Royal Australian & New Zealand College of Psychiatrists. State and Territory governments in Australia and District Health Boards in New Zealand are also signatories to their respective national consensus statements.

Recommendations to address obesity within priority populations

The RACP recommends governments in Australia and New Zealand:

- Implement regionally-appropriate actions to support and empower priority populations in New Zealand and Australia to address obesity at individual, family/whānau and community levels. These actions need to be designed, implemented and evaluated collaboratively with

communities and their leadership to ensure they are culturally centred and meet community needs.

The RACP will:

- Support where possible, community actions with and for priority populations

Summary and recommendations

Obesity, and particularly morbid obesity, is a disease contributing to adverse physical and mental health outcomes and wellbeing across the life course. Regulatory interventions at a population health level including the introduction of a tax on sugar-sweetened beverages, mandatory front-of-pack labelling and restrictions on advertising and marketing are evidence-informed actions to reduce obesity, particularly for children. Health system measures such as increasing equitable access to bariatric surgery will help people in Australia and New Zealand who are living with the debilitating impacts of obesity-related diseases. Increasing research, evaluation and monitoring of community-led initiatives and interventions will enable greater learning and allow for successful interventions to be expanded and developed, particularly for priority populations.

The global commercial, economic and environmental conditions which contribute to and sustain obesity can be mitigated by governments, civil society and industry collaborating to effect change through approaches such as Health in All Policies, commitment to the United Nations Sustainable Development Goals and prioritising health equity to address disparities in priority populations. When environments and communities promote and support nutrition and physical activity for all ages, rates of chronic conditions and noncommunicable diseases can be reduced, improving quality of life and leading to reductions in mortality.

RACP recommendations to address the economic, commercial and policy drivers of obesity

The RACP recommends governments in Australia and New Zealand:

- Introduce regulations to restrict the marketing of unhealthy diets to children and young people
- Implement an effective tax on sugar-sweetened beverages to reduce consumption – and use the revenue thus generated to facilitate access to healthy diets and culturally relevant initiatives to improve health equity
- Revise the Health Star Rating system’s nutrient profiling algorithm to give stronger weight to sugar content, and by 2019 require that the labelling be mandatory if there is not widespread uptake by then, to encourage consumers to choose healthier options and motivate food manufacturers to reformulate and develop healthier products

- Set targets for reducing mean population intakes of nutrients associated with unhealthy diets based on World Health Organization recommendations
- Introduce a health and wellbeing principle as part of local government decision-making when considering land use planning and zoning permissions
- Implement consistent healthy food and drink service policies which promote and enable healthy diets
- Implement a health-in-all-policies approach across government, including transportation and urban planning design, prioritising active transport and active recreation solutions

The RACP will:

- Seek the support of other Colleges and medical organisations for the RACP position paper
- In concert with other organisations, advocate for the above policies and for meaningful action to address the societal determinants of obesity and health more broadly in New Zealand and Australia at government, society and community levels

RACP recommendations for health system actions to address obesity

The RACP recommends governments in Australia and New Zealand:

- Introduce a consistent national growth standard for child development based on the World Health Organization standards
- Actively promote national dietary and activity guidelines
- Provide equitable access to bariatric surgery in public hospitals for all suitable patients who have severe obesity
- Promote monitoring weight as a vital sign to prevent age-related weight gain

The RACP recommends the Federal Government of Australia:

- Develop, support, update and monitor comprehensive and consistent diet, physical activity and weight management guidelines for children, with a focus on critical periods in the life course (pre-conception, antenatal, infancy and early childhood)
- Revise clinical guidelines for weight management of adults to incorporate:
 - The evidence on the low likelihood of long-term efficacy and potential detrimental effects for repeated attempts at weight loss
 - An emphasis on the importance of optimising health and managing treatable risk factors at any weight

- The need to ensure the physical environment meets the needs of people with obesity and minimise the direct and indirect impacts of weight bias in the health system

The RACP recommends New Zealand:

- Review the existing Childhood Obesity Plan with the intention to expand the Plan to include the WHO-recommended, effective interventions to reduce childhood obesity
- Supports, promotes, regularly updates and monitors the nutrition, weight management and physical activity guidelines for children, young people and adults

The RACP will:

- Encourage RACP members to support individual and family/whānau to optimise their health irrespective of weight through improved nutrition and physical activity, and ensure patient education is specific, actionable and achievable
- Advocate for: consistent, WHO standards for defining childhood obesity; greater promotion of nutrition and physical activity guidelines; revised management guidelines to take a more balanced approach to recommending weight loss for people with obesity; the inclusion of weight as a vital sign and; greater public access for bariatric surgery

RACP recommendations to address obesity within priority populations

The RACP recommends the governments of Australia and New Zealand:

- Implement regionally appropriate actions to support and empower priority populations in New Zealand and Australia to address obesity at individual, family/whānau and community levels. These actions need to be designed, implemented and evaluated collaboratively with communities and their leadership to ensure they are culturally centred and meet community needs.

The RACP will:

- Support where possible, community actions with and for priority populations

Appendix 1: Rationale for a tax on sugary drinks in Australia and New Zealand

This is a background document outlining some of the reasons for endorsing a sugary drinks tax, underpinning some of the recommendations made by the RACP Obesity Working Party.

What is a sugary drink?

A sugary drink is any beverage that contains free sugars. Free sugars refer to monosaccharides (such as glucose or fructose) and disaccharides (such as sucrose or table sugar) added to foods and drinks by the manufacturer, cook, or consumer, and sugars naturally present in honey, syrups, fruit juices, and fruit juice concentrates. The main categories of SSBs include soft-drinks (including sachet mixes), fruit juices, cordials, flavoured milks, energy and sports drinks. The definition excludes unflavoured or unsweetened milk.

What is a sugary drinks tax?

It is a tax or surcharge intended to increase the price of sugary drinks relative to other drinks. The aim of a sugar tax on sugary drinks is to discourage the consumption of unhealthy drinks which contribute to overweight and obesity as well as tooth decay and to offset the growing economic costs of obesity.

The rate of tax can be applied in different forms. These include by volume of the drink, as a proportion of the value of the goods (*ad valorem*), or by the nature of the drink (e.g. sugar content). The tax may be applied to only drinks that cross a certain threshold of sugar concentration or may be applied in a tiered fashion, where higher rates of taxation are applied to drinks with a greater concentration of sugar.

As outlined in the Grattan Institute's recent report on a sugary drinks tax many countries or regions including France, Belgium, Mexico, Finland, Fiji and the city of Berkeley in California have already implemented a tax on sugary drinks⁵¹. Both Ireland and the United Kingdom will implement tiered volumetric taxes on sugary drinks from 2018 whereby all sugary drinks containing over 5g/100ml of sugar will be taxed at GBP 0.18 per litre and those with total sugar content above 8g/100ml at GBP 0.24. There has already been some evidence from the UK that the tiered volumetric tax has led some large manufacturers to proactively reformulate their sugary drinks so they fall below the tax threshold²³²
²³³.

Why is a sugary drinks tax proposed?

Excess sugar intake is harmful to health

Sugary drinks have been considered a source of excess energy and through this mechanism they are thought to contribute to weight gain and obesity^{59 60 61}. More recently, sugar has been considered a source of concentrated fructose: excess fructose intake is consistently associated with the development of obesity, diabetes and insulin resistance in rodent studies²³⁴. Excess sugar intake, measured by

sugary drink intake or sugar or fructose intake, is consistently associated with a range of adverse health conditions in epidemiological research. These health conditions include:

- Weight gain^{235 236}
- Type two diabetes mellitus²³⁷
- Dental caries²³⁸
- Hypertension²³⁹
- Gout and hyperuricaemia²⁴⁰
- Cardiovascular disease²⁴¹
- Dyslipidaemia²⁴²

A systematic review and meta-analysis of 88 studies which looked into the association between the consumption of sugary drinks and intake of other nutrients and health status found “a clear and consistent association between soft drink consumption and increased energy intake” and noted that “given the multiple sources of energy in a typical diet, it is noteworthy that a single source of energy can have such a substantial impact on total energy intake”²⁴³. In addition to these health conditions, excess sugar in the diets of children is consistently associated with behavioural and developmental disturbance in observational studies²⁴⁴.

Average sugar intake is much higher than recommended

The World Health Organization has recommended that less than 5 per cent of daily energy intake should come from added sugars (less than six teaspoons for children and women, and nine for men)⁶².

In contrast, estimated daily intake of sugar in New Zealand from self-reported surveys is between 11 and 17 teaspoons per day²⁴⁵. These figures are likely to be under-estimated, and food disappearance data suggests a much higher average intake of about 40 teaspoons of sugar per day^{246 247}. In Australia, per capita sugary drink intake has increased from a mean of 47 litres per person per year in the late 1960s to 113 litres in the 1990s⁵². In New Zealand, almost one-fifth of the total sugar intake of New Zealand adults (17 per cent) comes from sugary drinks. Younger people derive a substantial proportion of their sugar intake from non-alcoholic beverages. Children aged 5 to 14 years derive about a quarter to a third of their sugar intake from sugary drinks⁵³.

Sugary drinks taxes show beneficial effects overseas

Recently, substantial sugary drinks taxes have been implemented in Mexico and in Berkeley, California. Early evaluations of the effect of these taxes suggest substantial declines in retail sales of sugary drinks. In Berkeley, eight months after the tax was implemented respondents reported consuming 21 per cent less sugary drinks, compared to baseline levels. This figure contrasted with a four per cent increase which occurred in comparison cities of Oakland and San Francisco⁵⁵. Initial results from Mexico report a 12 per cent reduction in sugary drink purchases compared to the pre-tax era⁵⁴. Reductions were most marked amongst households with the fewest resources (17 per cent decrease in sugary drink purchases).

Concern for increasing inequities following implementation of a sugary drinks tax

Modelling studies from Australia and New Zealand suggest that the effect of the tax is likely to reduce health inequalities^{52 53}. A recent study from Deakin University examined the effect on equity of a 20 per cent tax on sales of sugary drinks in Australia, by assessing potential cost-effectiveness, health gains and financial impacts, for different socioeconomic groups⁵¹. It concluded that: “this study demonstrates that from a 20% tax on SSBs [sugar sweetened beverages], the most health-adjusted life years [HALYs] gained and health care costs saved would accrue to the most disadvantaged quintiles in Australia. Whilst those in more disadvantaged areas would pay more SSB tax, the difference between areas is small. The equity of the tax could be further improved if the tax revenue were used to fund initiatives benefiting those with greater disadvantage.”⁵¹ The Lancet Taskforce on NCDs and Economics has also shown that the larger financial burden placed on lower-income households by the implementation of fiscal policies designed to reduce consumption of products such as sugary drinks, can be mitigated through proactive health equity policies which improve health outcomes⁵⁶.

The Consensus Statement on sugar-sweetened beverages produced by the Rethink Sugary Drink Campaign outlines that Australians of low socioeconomic status stand to derive the greatest benefit from reduced consumption of sugar sweetened beverages since they are disproportionately affected by higher rates of diet-related illnesses. Further, it indicates that research conducted to date suggests that young people, lower-income groups, and people with obesity are high-volume consumers of sugary drinks are likely to be more responsive to price increases. The statement concludes that “a sugar-sweetened beverages tax would be an equitable population policy to reduce consumption and improve weight and population health outcomes, particularly among those groups who are most at risk of harm”²⁴⁸.

A sugary drinks tax has wide public and health sector support in both New Zealand and Australia

Recent representative surveys of New Zealanders indicate consistent majority support for a sugary drinks tax, particularly if the revenue for the tax is set aside for funding obesity prevention programmes²⁴⁹. In addition to public support a wide alliance of health organisations have recently authored a policy brief endorsing a sugary drinks tax. At a political level, the Māori, Opportunities and Green Parties in New Zealand have expressed support for a sugary drinks tax. The results of an Australian survey of 1,511 adults published in 2012 showed that over two thirds of Australians support the introduction of a tax on sugary drinks tax if the revenue were used to reduce the cost of healthy foods²⁵⁰.

Public health organisations supporting the introduction of a tax on sugary drinks as part of a set of policies and interventions to reduce the impact of obesity include the WHO²⁵¹, the Australian Medical Association²⁵², New Zealand Medical Association²⁵³, Council of Presidents of Medical Colleges of Australia²⁵⁴, Public Health Association of Australia²⁵⁵, and the Australian Council of Social Services²⁵⁶.

Appendix 2: Food Environment Policy Index

The Food Environment Policy Index (Food-EPI) assesses the level of implementation of food environment policies and infrastructure support by governments (central government in New Zealand and federal and State-level government in Australia) to reduce the prevalence of obesity and diet-related noncommunicable diseases^{68 70}. The Food-EPI examines all factors acting on the food environment, from composition, labelling, marketing and retail to governance, monitoring and leadership. The tables below show the food provision policies, which assess progress on implementing healthy food environments in schools and public-funded facilities, and support and training for public and private sector employers.

Level of implementation



Food Environment Policy Index – Australia⁷⁰

Food provision policies	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Policies in schools promote health food choices	High	High	Medium	High	Medium	High	Medium	High
Policies in public settings promote healthy food choices	Medium	Medium	Medium	Medium	Low	Very little, if any	Medium	Medium
Support and training systems for public sector settings	Medium	High	Low	Medium	Low	Medium	High	Medium
Support and training for private companies	Medium	Medium	Low	Medium	Low	Medium	Medium	Medium

Food Environment Policy Index – New Zealand⁶⁸

Food provision policies	NZ
Policies in schools promote health food choices	Low
Policies in public settings promote healthy food choices	Low
Support and training systems for public sector settings	Medium
Support and training for private companies	Medium

Appendix 3: Pharmacotherapies for weight loss

The RACP finds that evidence of efficacy and safety in the long term use of weight loss medicines is limited^{138 257}. Pharmacotherapies should be prescribed only if clinically indicated and as an adjunct therapy in combination with nutrition and physical activity^{136 138}. The short-term use of weight loss medicines must be carefully monitored, given the evidence of interaction, contraindication, and potential for harm arising from use^{136 138 257}.

Orlistat (gastrointestinal lipase inhibitor; trade name Xenical) and Phentermine (sympathomimetic amine; trade name Duromine) are approved medications for weight loss in Australia and New Zealand^{124 136}. Liraglutide (glucagon-like peptide-1 receptor agonist; trade name Saxenda) was approved as a short-term adjunct for weight loss in Australia in 2016²⁵⁸. No weight loss medications are subsidised in New Zealand; and only Orlistat is subsidised in Australia for eligible people^{136 259}.

Australian and New Zealand clinical guidelines recommend pharmacotherapies as an intensive intervention in combination with nutrition (diet high in vegetables and fruit) and physical activity. Guidelines state pharmacotherapies may be a treatment option for obesity when a person has a BMI of greater than 30kg/m²; or 27kg/m² and significant comorbidity (sleep apnoea; type-2 diabetes)^{124 136}.

Orlistat has been shown to achieve moderate weight loss at 12 months, with improvements in some risk factors for cardiovascular disease (blood pressure, low-density-lipoprotein cholesterol)¹³⁸. Gastrointestinal side effects are commonly reported during the common treatment period (12 weeks), though people with type-2 diabetes did commonly experience hypoglycaemia²⁶⁰.

Liraglutide is a relatively new medicine available in Australia for the treatment of obesity, having been approved in 2016. Evidence as to its efficacy and safety, particularly when used for 12 months or longer is limited. As with other pharmacotherapies for treatment of obesity, Liraglutide is indicated for short-term use (12 weeks) in conjunction with a reduced caloric intake and increased physical activity. Long term data on the efficacy and safety of Liraglutide is limited, as is a comprehensive overview of precautions to its use. Adverse events reported from the clinical trials of Liraglutide were predominantly gastrointestinal, though breast neoplasia was reported in 0.6 per cent of the cohort receiving the medication, compared to 0.2 per cent of the placebo group²⁵⁸.

The RACP finds that the use of Phentermine carries an increased risk of significant harm and particular caution should be exercised in its prescription. Phentermine acts as an appetite suppressant, and is associated with serious side effects and harm including tachycardia, hypertension and insomnia¹³⁶. Phentermine has an extensive array of contraindications, including cardiovascular disease, hyperthyroidism, depression, and history of substance addiction. Failure to achieve a moderate weight loss of greater than five per cent body weight after 12 weeks of treatment is an indication to discontinue treatment²⁶¹. Other pharmaceuticals promising to 'treat' obesity are likely to enter the market in ensuing years. The RACP is concerned that their safety and efficacy are very carefully considered.

Kuputaka te Māori (Glossary of Māori terms)

Hauora – total health, being in a state of holistic wellness where all elements of health (spiritual, physical, mental and family) are in balance. The four elements cannot be separated.

Kaitiakitanga – Guardianship

Kaupapa Māori – Māori approach; incorporating the knowledge, skills, attitudes and values of Māori society

Kotahitanga – Unity and solidarity

Manaakitanga – kindness, generosity, support

Ora – health; to be healthy

Rangatahi – Young person; adolescent

Rangatiratanga – self determination

Taha Hinengaro – Mental health. The capacity to communicate, to think and to feel. This is about how we see ourselves in this universe, our interaction with that which is uniquely Māori and the perception that others have of us.

Taha Tinana – Physical health. The capacity for physical growth and development.

Taha Wairua – Spiritual health. Traditional Māori analysis of physical manifestations of illness will focus on the wairua or spirit, to determine whether damage here is a contributing factor

Taha Whānau – Family health. The capacity to belong, to care and to share where individuals are part of wider social systems. Understanding the importance of whānau and how whānau (family) can contribute to illness and assist in curing illness is fundamental to understanding Māori health issues.

Tamariki – Child, Children

Te Ao Māori – the Māori world

Te reo – Māori language

Te Waka o Meihana – The Canoe of Mason: a Māori model of health building on the foundations of te Whare Tapa Wha, expanding from the four components of health to include Taiao (the environment) and Iwi Katoa (services and systems).

Te Whare Tapa Wha – The four-sided house, a Māori model of health developed by Sir Professor Mason Durie

Tikanga Māori – Māori traditions

Whanaungatanga – kinship and connectedness; a relationship built through shared experiences and working together

References

- ¹ Lake A, Townshend T. Obesogenic environments: exploring the built and food environments. *J R Soc Promot Health*. 2006;126(6):262-7. Available from <http://journals.sagepub.com/doi/abs/10.1177/1466424006070487>. Accessed 9 March 2017.
- ² Global Burden of Disease 2013 Obesity Collaboration; Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C. Global, regional and national prevalence of overweight and obesity in children and adults 1980-2013: A systemic analysis. *Lancet* [Internet] 2014; 384(9945):766-781. Available from <https://www.ncbi.nlm.nih.gov/pubmed/24880830>. Accessed 10 March 2017.
- ³ Australian Institute of Health and Welfare. An interactive insight into overweight and obesity in Australia. [Internet]. Canberra: Australian Institute of Health and Welfare; 2017. Available from <https://www.aihw.gov.au/reports/overweight-obesity/interactive-insight-into-overweight-and-obesity/contents/how-many-people-are-overweight-or-obese>. Accessed 27 March 2018.
- ⁴ Ministry of Health. Obesity statistics. [Internet] Wellington: Ministry of Health; 2017. Available from <https://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/obesity-statistics>. Accessed 27 March 2018.
- ⁵ The set of recommendations on the marketing of foods and non-alcoholic beverages states that the overall objective of policy in this area should be to reduce the power of and the exposure of children and young people to the advertising and marketing of these products high in sugar, saturated fats, *trans*-fatty acids, or salt. World Health Organization. A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children. [Internet] 2012; Geneva: World Health Organization. Available from http://www.who.int/dietphysicalactivity/framework_marketing_food_to_children/en/. Accessed 10 March 2017.
- ⁶ World Health Organization. Fiscal policies for diet and prevention of noncommunicable diseases. Technical meeting report, 5-6 May 2015. [Internet] 2016; Geneva: World Health Organization. Available from <http://www.who.int/dietphysicalactivity/publications/fiscal-policies-diet-prevention/en/>. Accessed 7 August 2017.
- ⁷ Dabelea D. The predisposition to obesity and diabetes in the offspring of diabetic mothers. *Diabetes Care* [Internet] 2007; 30 Suppl 2:S169-74. Available from <https://www.ncbi.nlm.nih.gov/pubmed/17596467>. Accessed 9 March 2017.
- ⁸ Jahan-Mihan A, Rodriguez J, Christie C, Sadeghi M, Zerbe T. The role of maternal dietary proteins in development of metabolic syndrome in offspring. *Nutrients* [Internet] 2015;7(11):9185-9217. DOI: [10.3390/nu7115460](https://doi.org/10.3390/nu7115460). Accessed 9 March 2017.
- ⁹ Ministry of Health. Health loss in New Zealand 1990 2013: A report from the New Zealand burden of diseases, injuries and risk factors study. [Internet] Wellington: Ministry of Health; 2016. Available from <http://www.health.govt.nz/publication/health-loss-new-zealand-1990-2013>. Accessed 17 February 2017.

¹⁰ Australian Institute of Health and Welfare. Impact of overweight and obesity as a risk factor for chronic conditions [Internet] Canberra: Australian Institute of Health and Welfare; 2017. Available from <https://www.aihw.gov.au/reports/burden-of-disease/impact-of-overweight-and-obesity-as-a-risk-factor-for-chronic-conditions/contents/table-of-contents>. Accessed 20 October 2017.

¹¹ Paediatric Sleep Medicine Network, New Zealand Child and Youth Clinical Network, Paediatric Society of New Zealand and the Australasian Sleep Association. Guidelines for the assessment of sleep-disordered breathing in children. Wellington; Paediatric Society of New Zealand: 2015. Available from <https://www.starship.org.nz/for-health-professionals/new-zealand-child-and-youth-clinical-networks/paediatric-sleep-medicine-clinical-network/guidelines-for-the-assessment-of-sleep-disordered-breathing-in-children/>. Accessed 11 September 2017.

¹² Ministry of Health. Diseases and conditions: obesity. [Internet] Wellington: Ministry of Health; 2017 Available from <http://www.health.govt.nz/our-work/diseases-and-conditions/obesity>. Accessed 16 March 2017.

¹³ World Health Organization. Obesity and overweight fact sheet No. 311. [Internet] Geneva: World Health Organization; 2016. Available from <http://who.int/mediacentre/factsheets/fs311/en/>. Accessed 7 March 2017.

¹⁴ World Health Organization. Report of the Commission on Ending Childhood Obesity. [Internet] Geneva: World Health Organization; 2016. Available from <http://who.int/entity/end-childhood-obesity/publications/echo-report/en/index.html>. Accessed 8 March 2017.

¹⁵ "Weight bias can be defined as the inclination to form unreasonable judgements based on a person's weight. Weight bias is caused by a general belief that stigma and shame will cause people to lose weight or the belief that people fail to lose weight as a result of inadequate self-discipline or insufficient willpower." Washington RL. Childhood obesity: issues of weight bias. *Prev Chronic Dis* [Internet] 2011; 8(5):A94. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3181194/> Accessed 29 July 2017.

¹⁶ Fuller-Thomsen E, Sinclair D, Brennenstuhl S. Carrying the pain of abuse: gender-specific findings of the relationship between childhood physical abuse and obesity in adulthood. *Obes Facts* [Internet] 2013 6(4):325-36. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5644736/>. Accessed 13 April 2018.

¹⁷ Edmondson D, von Känel R. Posttraumatic stress disorder and cardiovascular disease. *Lancet Psychiatry* [Internet] 2017; 4(4):320-29. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5499153/>. Accessed 13 April 2018.

¹⁸ Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) study. *Am J Prev Med*. [Internet]. 1998; 14(4):245-58. Available from <https://www.ncbi.nlm.nih.gov/pubmed/9635069>. Accessed 27 March 2018.

¹⁹ Gortmaker SL, Must A, Perrin JM, Sobol AM, Deitz WH. Social and economic consequences of overweight in adolescence and young adulthood. *New Engl J Med* [Internet] 1993; 329:1008-12.

Available from <http://www.nejm.org/doi/full/10.1056/nejm199309303291406#t=article>. Accessed 31 July 2017

²⁰ Bray GA, Wilding JPH, Kim KK. Obesity: a chronic relapsing progressive disease process. *Obes Rev* [Internet] 2017;18(7):715-723. Available from <http://onlinelibrary.wiley.com/doi/10.1111/obr.12551/abstract;jsessionid=746AEC3BF7DDC05CF038D6BF70AB0E9F.f02t02>. Accessed 7 August 2017.

²¹ Ministry of Health. Understanding excess body weight. [Internet] Wellington: Ministry of Health; 2015. Available from <http://www.health.govt.nz/publication/understanding-excess-body-weight-new-zealand-health-survey>. Accessed 10 March 2017.

²² Body mass index (BMI) is an index of weight for height used to classify underweight, overweight and obesity in adults. BMI values are independent of age and sex; however, debate has continued over how BMI values can be applied in different populations and in particular, different ethnicities. Asian and Pacific populations have been highlighted as two ethnic groups for whom different cut-off points should be considered, given increasing evidence that associations between BMI, body fat percentage and body fat distribution differ across populations, and health risks associated with high BMI increase below the current WHO classification. The WHO recommended in 2004 that additional cut off points within the existing categories of underweight, normal weight, overweight and obese are used by all countries for reporting purposes and to facilitate international comparison. World Health Organization. BMI classification. [Internet] Geneva: World Health Organization; 2017. Available from http://apps.who.int/bmi/index.jsp?introPage=intro_3.html. Accessed 15 August 2017.

²³ Ministry of Health. Clinical guidelines for weight management in New Zealand children and young people. [Internet] Wellington: Ministry of Health; 2016. Available from <http://www.health.govt.nz/publication/clinical-guidelines-weight-management-new-zealand-children-and-young-people>. Accessed 24 March 2017.

²⁴ Raising Children Network Australia. Child growth charts. 2015; Raising Children Network. Available from http://raisingchildren.net.au/articles/what_is_growth.html. Accessed 4 April 2017.

²⁵ Australian Bureau of Statistics. Appendix 4: Classification of BMI for children. Australian Health Survey: User's Guide 2011-13. [Internet] Canberra: Australian Bureau of Statistics; 2013. Available from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/4363.0.55.001Appendix402011-13?opendocument&tabname=Notes&prodno=4363.0.55.001&issue=2011-13&num=&view>. Accessed 17 March 2017.

²⁶ Tyrell J, Wood AR, Ames RM, Yaghootkar H, Beaumont RN, Jones SE et al. Gene-obesogenic environment interactions in the UK Biobank study. *Int J Epidemiol* [Internet] 2017; 46(2):559-575. Available from <https://academic.oup.com/ije>. Accessed 27 August 2017.

²⁷ Maes HH, Neale MC, Eaves LJ. Genetic and environmental factors in relative body weight and human adiposity. *Behav Genet* [Internet] 1997; 27(4):325-51. Available from <https://www.ncbi.nlm.nih.gov/pubmed/28448500>. Accessed 27 August 2017.

-
- ²⁸ Bogardus C, Swinburn B. Obesity triggers: Sequencing the genome versus sequencing the environment. *Obesity* (Silver Spring) [Internet] 2017; 25(11):1861-1863. Available from <http://onlinelibrary.wiley.com/doi/10.1002/oby.21985/epdf>. Accessed 7 December 2017.
- ²⁹ Wardle J, Carnell S, Haworth CMA, Plomin R. Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment. *Am J Clin Nutr* [Internet] 2008; 87(2):398-404. Available from <http://ajcn.nutrition.org/content/87/2/398.long>. Accessed 27 August 2017.
- ³⁰ Heart Foundation. Advertising food to children background paper. [Internet]. Auckland: Heart Foundation; 2011. Available from <https://www.heartfoundation.org.nz/resources/advertising-food-to-children-background-paper>. Accessed 9 August 2017.
- ³¹ Roberto C, Swinburn B, Hawkes C, Huang TTK, Costa SA, Ashe M et al. Patchy progress on obesity prevention: emerging examples, entrenched barriers and new thinking. *Lancet* [Internet] 2015; 385(9985): 2400-409. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(14\)61744-X/fulltext#cesec40](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)61744-X/fulltext#cesec40). Accessed 10 March 2017.
- ³² Clough P, Destremau K. The wider social and economic costs of obesity – report commissioned by Social Policy Evaluation and Research Unit [Internet]. Wellington: New Zealand Institute of Economic Research and the Social Policy Evaluation and Research Unit; 2015. Available from <http://www.superu.govt.nz/costsofobesity>. Accessed 9 March 2017.
- ³³ Cairns G, Angus K, Hastings G, Caraher M. Systematic reviews of the evidence of the nature, extent and effects of food marketing to children. A retrospective summary. *Appetite* [Internet] 2013; 62:209-15. Accessed 10 March 2017.
- ³⁴ Birch LL, Fisher JO. Development of eating behaviours among children and adolescents. [Internet] *Paediatr*. 1998; 101(3 pt 2):539-49. Available from <https://www.ncbi.nlm.nih.gov/pubmed/12224660>. Accessed 16 August 2017.
- ³⁵ World Health Organization Regional Office for Europe. Tackling food marketing to children in a digital world: trans-disciplinary perspectives. [Internet] Denmark: World Health Organization Regional Office for Europe. Available from <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/publications/2016/tackling-food-marketing-to-children-in-a-digital-world-trans-disciplinary-perspectives.-childrens-rights,-evidence-of-impact,-methodological-challenges,-regulatory-options-and-policy-implications-for-the-who-european-region-2016>. Accessed 14 August 2017.
- ³⁶ Kelly B, Halford JCG, Boyland EJ, Chapman K, Bautista-Castaño I, Berg C et al. Television food advertising to children: a global perspective. *Am J Public Health* [Internet] 2010; 100(9):1730-36. Available from <http://ajph.aphapublications.org/doi/10.2105/AJPH.2009.179267>. Accessed 7 August 2017.
- ³⁷ Kelly B, Vandevijvere S, Freeman B, Jenkin G. New media but the same old tricks: food marketing to children in the digital age. *Curr Obes Rep* 2015; 4(1):37-45. Available from <https://link.springer.com/article/10.1007%2Fs13679-014-0128-5>. Accessed 8 March 2017.

-
- ³⁸ Boyland EJ, Whalen R. Food advertising to children and its effects on diet: review of recent prevalence and impact data. *Paediatr Diabetes* 2015; 16:331-37. Available from <http://onlinelibrary.wiley.com/doi/10.1111/pedi.12278/full>. Accessed 7 August 2017.
- ³⁹ Vandevijvere S, Sagar K, Kelly B, Swinburn B. Unhealthy food marketing to New Zealand children and young people through the internet. [Internet] *N Z Med J* 2017;130(1450). Available from: <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2017/vol-130-no-1450-17-february-2017/7157>. Accessed 15 August 2017.
- ⁴⁰ Harris JL, Speers SE, Schwartz MB, Brownell KD. US food company branded advergames on the Internet: children's exposure and effects on snack consumption. *J Children and Media*. 2012; 6(1):51-68. Available from <http://www.tandfonline.com/doi/abs/10.1080/17482798.2011.633405>. Accessed 14 August 2017.
- ⁴¹ Kabali HK, Irigoyen MM, Nunez-Davis R, Budacki JG, Mohanty SH, Leister KP, Bonner RL. Exposure and use of mobile media devices by young children. *Paediatrics* [Internet] 2015; 136(6):1044-50. Available from <https://www.ncbi.nlm.nih.gov/pubmed/26527548>. Accessed from 12 April 2018.
- ⁴² Reid Chassiakos YL, Radesky J, Christakis D, Moreno MA, Cross C. Children and adolescents and digital media. *Paediatrics* [Internet] 2016; 138(5): pii:e20162593. Available from <https://www.ncbi.nlm.nih.gov/pubmed/27940795>. Accessed 12 April 2018.
- ⁴³ Ministry of Health. Activity levels in New Zealand. 2016; Ministry of Health. Available from <http://www.health.govt.nz/your-health/healthy-living/food-and-physical-activity/physical-activity/activity-levels-new-zealand>. Accessed 14 August 2017.
- ⁴⁴ Obesity Policy Coalition. Tipping the scales: Australian obesity prevention consensus. [Internet] Melbourne: Obesity Policy Coalition; 2017. Available from <http://www.opc.org.au/what-we-do/tipping-the-scales>. Accessed 13 April 2018
- ⁴⁵ Clark TC, Fleming T, Bullen P, Denny S, Crengle S, Dyson B et al. Youth'12 overview: the health and wellbeing of New Zealand secondary school students in 2012. 2013; Auckland: The University of Auckland. Available from <https://www.fmhs.auckland.ac.nz/en/faculty/adolescent-health-research-group/publications-and-reports/overview-of-health-and-wellbeing-findings.html>. Accessed 14 August 2017.
- ⁴⁶ Australian Department of Health and Ageing. Research and Statistics – Education and Prevention: Physical activity and sedentary behaviour. [Internet] 2014; Australian Government Department of Health and Ageing. Available from <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-active-evidence.htm>. Accessed 9 August 2017.
- ⁴⁷ Advertising Standards Authority. Children and young people's advertising code. [Internet] Wellington: Advertising Standards Authority; 2017. Available from <http://www.asa.co.nz/codes/codes/new-children-young-peoples-advertising-code/>. Accessed 16 August 2017

-
- ⁴⁸ Australian Association of National Advertisers. Code for advertising and marketing communications to children. Self-regulation: codes. [Internet] Sydney: Australian Association of National Advertisers. Available from <http://aana.com.au/self-regulation/codes/>. Accessed 17 August 2017.
- ⁴⁹ Academy of Medical Royal Colleges. Measuring up: the medical profession's prescription for the nation's obesity crisis. [Internet] 2013; London: Academy of Medical Royal Colleges. Available from <http://www.aomrc.org.uk/publications/reports-guidance/measuring-up-0213/>. Accessed 11 August 2017
- ⁵⁰ Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health* [Internet] 2007; 97(4):667-75. Available from <http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2005.083782>. Accessed 16 August 2017.
- ⁵¹ Duckett S, Swerissen H, Wiltshire T. A sugary drinks tax: recovering the community costs of obesity [Internet]. Carlton, Victoria: Grattan Institute; 2016. Available from <https://grattan.edu.au/report/a-sugary-drinks-tax-recovering-the-community-costs/>. Accessed 16 August 2017.
- ⁵² Lal A, Mantilla-Herrera AM, Veerman L, et al. Modelled health benefits of a sugar-sweetened beverage tax across different socioeconomic groups in Australia: A cost-effectiveness and equity analysis. [Internet] *PLoS Med* 2017;14(6):e1002326. Available from <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002326>. Accessed 27 July 2017.
- ⁵³ Ni Mhurchu C, Eyles H, Genc M, et al. Twenty percent tax on fizzy drinks could save lives and generate millions in revenue for health programmes in New Zealand. [Internet] *NZ Med J* 2014;127(1389):92-5. Available from <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no.-1389/5989>. Accessed 27 July 2017.
- ⁵⁴ Colchero MA, Popkin BM, Rivera JA, et al. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. [Internet] *BMJ* 2016;352. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4986313/>. Accessed 27 July 2017.
- ⁵⁵ Falbe J, Thompson HR, Becker CM, et al. Impact of the Berkeley excise tax on sugar-sweetened beverage consumption. *Am J Public Health* 2016;106(10):1865-71. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5024386/>. Accessed 27 July 2017.
- ⁵⁶ Sassi F, Belloni F, Mirelman AJ, Suhrcke M, Thomas A, Salti N et al. Equity impacts of price policies to promote healthy behaviours. The Lancet Taskforce on NCDs and economics 4. *Lancet* [Internet] 2018; [epub ahead of print]. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)30531-2/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30531-2/fulltext). Accessed 23 April 2018.
- ⁵⁷ Baker P, Gill T, Friel S, Carey G, Kay A. Generating political priority for regulatory interventions targeting obesity prevention: an Australian case study. *Soc Sci Med* [Internet] 2017; 177:141-49. Available from <http://www.sciencedirect.com/science/article/pii/S0277953617300540?via%3Dihub>. Accessed 7 March 2017.

-
- ⁵⁸ Lee AJ, Kane S, Ramsey R, Good E, Dick M. Testing the price and affordability of healthy and current (unhealthy) diets and the potential impacts of policy change in Australia. *BMC Public Health* [Internet] 2016; 16:315. DOI: [10.1186/s12889-016-2996-y](https://doi.org/10.1186/s12889-016-2996-y). Accessed 9 March 2017.
- ⁵⁹ Ledikwe JH, Blanck HM, Khan LK, et al. Dietary energy density is associated with energy intake and weight status in US adults. *Am J Clin Nutr* [Internet] 2006;83(6):1362-68. Available from <http://ajcn.nutrition.org/content/83/6/1362.short>. Accessed 16 October 2017.
- ⁶⁰ Drewnowski A, Darmon N. The economics of obesity: dietary energy density and energy cost. *Am J Clin Nutr* [Internet] 2005; 82(1):265S-273S. Available from <http://ajcn.nutrition.org/content/82/1/265S.full?sid=d37b7f32-801a-4f36-8401-b847d699e427>. Accessed 14 November 2017.
- ⁶¹ Hu FB. Resolved: There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity related diseases. *Obes Rev* [Internet] 2013 14(8):606-619. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5325726/>. Accessed 14 November 2017.
- ⁶² World Health Organization. Sugars intake for adults and children guideline. [Internet]. Geneva: World Health Organization; 2015. Available from http://www.who.int/nutrition/publications/guidelines/sugars_intake/en/. Accessed 24 March 2017.
- ⁶³ Ni Mhurchu C, Mackenzie T, Vandevijvere S. Protecting New Zealand children from exposure to the marketing of unhealthy foods and drinks: a comparison of three nutrient profiling systems to classify foods. *N Z Med J* [Internet] 2016; 129(1441):41-53. Available from <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2016/vol-129-no-1441-9-september-2016/6998>. Accessed 31 August 2017.
- ⁶⁴ Ministry of Health. Healthy food and drink policy. [Internet]. Wellington: Ministry of Health; 2016. Available from <http://www.health.govt.nz/publication/national-healthy-food-and-drink-policy>. Accessed 15 August 2017.
- ⁶⁵ For further information, please refer to the RACP's August 2017 submission to the Five Year Review of the HSR System. Available from <https://www.racp.edu.au/docs/default-source/advocacy-library/racp-submission-review-of-the-health-star-rating-system.pdf>. Accessed 21 August 2017.
- ⁶⁶ American College of Cardiology. Planting a seed: heart-healthy food recommendations for hospitals. [Internet] Washington: American College of Cardiology Foundation; 2017. Available from <http://www.acc.org/membership/sections-and-councils/prevention-of-cardiovascular-disease-section/about-us/section-sub-groups/features/hospital-food-program>. Accessed 11 September 2017.
- ⁶⁷ Partnership for a healthier America. Hospital healthier food initiative. [Internet] Washington: Partnership for a healthier America; 2017. Available from <http://www.acc.org/membership/sections-and-councils/prevention-of-cardiovascular-disease-section/about-us/section-sub-groups/features/hospital-food-program>. Accessed 11 September 2017.
- ⁶⁸ Vandevijvere S, Mackay S, Swinburn B. Benchmarking food environments 2017: progress by the New Zealand government on implementing recommended food environment policies and priority

recommendations. [Internet] Auckland: The University of Auckland; 2017. Available from <https://www.fmhs.auckland.ac.nz/en/soph/global-health/projects/informas/modules2/food-provision11111111.html>. Accessed 17 August 2017.

⁶⁹ New Zealand Medical Association. Tackling Obesity policy briefing. [Internet] Wellington: New Zealand Medical Association; 2016. Available from https://www.nzma.org.nz/_data/assets/pdf_file/0005/52547/Taxes-on-Sugar-Sweetened-Beverages_December-2016.pdf. Accessed 23 March 2018.

⁷⁰ Australian Prevention Partnership Centre, Deakin University, INFORMAS. Policies for tackling obesity and creating healthier food environments: scorecard and recommendations for Australian governments. [Internet] Melbourne: Obesity Policy Coalition; 2017. Available from <http://www.opc.org.au/food-policy-index.aspx>. Accessed 17 August 2017.

⁷¹ Taylor C. Ministry sets deadline for DHB sugar ban. NZ Doctor online. [Internet] 2015 September 11. Available from <https://www.nzdoctor.co.nz/news/2015/september-2015/11/ministry-sets-deadline-for-dhb-sugar-ban.aspx>. Accessed 28 August 2017.

⁷² Ministry of Health. Ministry of Health encourages schools to adopt water-only policies. Media release, 22 March 2016 [Internet]. Available from <https://www.health.govt.nz/news-media/media-releases/ministry-health-encourages-schools-adopt-water-only-policies>. Accessed 30 January 2018.

⁷³ Regional Public Health. The 'water-only' status of Wellington region schools. [Internet] Wellington: Regional Public Health; 2016. Available from <http://www.rph.org.nz/resources/publications/the-water-only-status-of-wellington-schools.pdf>. Accessed 30 January 2018.

⁷⁴ Toi Te Ora Public Health Service. Drinks in schools report: a snapshot of the availability of sugary drinks in schools and kura in the Bay of Plenty and Lakes District Health Board areas. Tauranga: Toi Te Ora Public Health Service; 2016. Available from https://www.ttophs.govt.nz/sugary_drinks_education. Accessed 30 January 2018.

⁷⁵ Johnson M. Clear lessons to create healthy kiwi kids. Herald on Sunday 10 July 2016 [Internet]. Available from http://www.nzherald.co.nz/lifestyle/news/article.cfm?c_id=6&objectid=11671745. Accessed 30 January 2018.

⁷⁶ Sushil Z, Vandevijvere S, Exeter DJ, Swinburn B. Food swamps by area socioeconomic deprivation in New Zealand: A national study. *Int J Public Health* [Internet] 2017; 62:869-877. Available from <https://link.springer.com/article/10.1007%2Fs00038-017-0983-4>. Accessed 23 January 2018.

⁷⁷ Vandevijvere S, Sushil Z, Exeter DJ, Swinburn B. Obesogenic retail food environments around New Zealand schools: A national study. *Am J Prev Med* [Internet] 2016; 51(3):e57-66. Available from [http://www.ajpmonline.org/article/S0749-3797\(16\)30068-X/pdf](http://www.ajpmonline.org/article/S0749-3797(16)30068-X/pdf). Accessed 23 January 2018.

⁷⁸ Mason KE, Bentley RJ, Kavanaugh AM. Fruit and vegetable purchasing and the relative density of healthy and unhealthy food stores: evidence from an Australian multilevel study. *J Epidemiol Community Health* [Internet] 2013; 67:231-236. Available from <http://jech.bmj.com/content/67/3/231>. Accessed 23 January 2018.

-
- ⁷⁹ World Health Organization Regional Office for Europe. Urban green spaces and health: review of the evidence. [Internet] Copenhagen: World Health Organization; 2016. Available from <http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/publications/2016/urban-green-spaces-and-health-a-review-of-evidence-2016>. Accessed 15 August 2017.
- ⁸⁰ James P, Banay RF, Hart JE, Laden F. A review of the health benefits of greenness. *Curr Epidemiol Rep* [Internet] 2015; 2(2):131-42. Available from <https://www.ncbi.nlm.nih.gov/pubmed/26185745>
- ⁸¹ Lachowycz K, Jones AP. Green space and obesity: a systematic review of the evidence. *Obes Rev* [Internet] 2011; 12:e183-89. Available from <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-789X.2010.00827.x/full>. Accessed 15 August 2017.
- ⁸² Dzhambov AM, Dimitrova DD, Dimikatrova ED. Association between residential greenness and birth weight: systematic review and meta-analysis. *Urban For Urban Greening* [Internet] 2014; 13(4):621-29. Available from www.sciencedirect.com/science/article/pii/S1618866714000995. Accessed 16 August 2017.
- ⁸³ Strife S, Downey L. Childhood development and access to nature. *Organ Environ* [Internet] 2009; 22(1):99-122. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3162362/>. Accessed 15 August 2017.
- ⁸⁴ United Nations. Goal 11: Make cities inclusive, safe, resilient and sustainable. *Sustainable Development Goals: 17 Goals to Transform Our World*. [Internet] New York: United Nations Development Programme; 2015. Available from <http://www.un.org/sustainabledevelopment/cities/>. Accessed 15 August 2017.
- ⁸⁵ Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie M et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* [Internet] 2011; 378(9793):804-14. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)60813-1/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60813-1/fulltext). Accessed 8 March 2017.
- ⁸⁶ World Health Organization. *Physical inactivity: a global public health problem*. Geneva: World Health Organization; 2017. Available from http://www.who.int/dietphysicalactivity/factsheet_inactivity/en/. Accessed 16 August 2017
- ⁸⁷ Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* [Internet] 2012; 380(9859):2224-2260. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(12\)61766-8/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61766-8/fulltext)
- ⁸⁸ Statistics New Zealand. *2013 Census QuickStats about transport and communications: main means of travel to work*. Wellington: Statistics New Zealand; 2015. Available from <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-transport-comms/travel-to-work.aspx>. Accessed 14 August 2017.

-
- ⁸⁹ McCrindle. Getting to work [infographic] [Internet] 2014; McCrindle Blog. Available from <http://mccrindle.com.au/the-mccrindle-blog/getting-to-work-infographic>. Accessed 10 August 2017.
- ⁹⁰ Flint E, Webb E, Cummins S. Change in commute mode and body-mass index: prospective, longitudinal evidence from UK Biobank. *Lancet Pub Health*. [Internet] 2016; 1(2):e46-e55. Available from [http://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(16\)30006-8/fulltext](http://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(16)30006-8/fulltext). Accessed 10 August 2017.
- ⁹¹ Martin A, Panter J, Suhrcke M, Ogilvie D. Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey. *J Epidemiol Community Health* [Internet] 2015; 69(8):753-61. Available from <http://jech.bmj.com/content/69/8/753>. Accessed 11 August 2017.
- ⁹² Sallis JF. New evidence for the role of transportation in health. Comment. *Lancet Pub Health* [Internet] 2016; 1(2):e38-39. Available for <http://www.sciencedirect.com/science/article/pii/S2468266716300081>. Accessed 10 August 2017.
- ⁹³ Commission on Social Determinants of Health. Closing the gap in a generation: Health equity through action on the social determinants of health. Final report of the Commission on the Social Determinants of Health. Geneva: World Health Organization; 2008. Available from http://www.who.int/social_determinants/thecommission/finalreport/en/. Accessed 21 April 2018.
- ⁹⁴ The Royal Australasian College of Physicians. Health in All Policies Position Statement. [Internet] Sydney: The Royal Australasian College of Physicians; 2016. Available from: <https://www.racp.edu.au/docs/default-source/advocacy-library/health-in-all-policies-position-statement.pdf>. Accessed 2 August 2017.
- ⁹⁵ Giles-Corti B, Vernez-Moudon A, Reis R, Turrell G, Dannenberg AL, Badland H, et al. City planning and population health: a global challenge. *Lancet* [Internet] 2016; 388(10062):2912-2924. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)30066-6/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)30066-6/fulltext). Accessed 4 September 2017.
- ⁹⁶ Wake M, Campbell MW, Turner M, Price A, Sabin MA, Davis E et al. How training affects Australian paediatricians' management of obesity. *Arch Dis Child* [Internet] 2013; 98(1):3-8. Available from <http://adc.bmj.com/content/98/1/3.long>. Accessed 12 April 2017
- ⁹⁷ Vitolins MZ, Crandall S, Miller D, Ip E, Marion G, Spangler JG. Obesity educational interventions in US medical schools: a systematic review and identified gaps. *Teach Learn Med* [Internet] 2012; 24(3):267-72. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3811015/>. Accessed 12 April 2017.
- ⁹⁸ Jay M, Kalet A, Ark T, McMacken M, Messito MJ, Richter R. Physicians' attitudes about obesity and their associations with competency and specialty: a cross-sectional study. *BMC Health Serv Res* [Internet] 2009; 9:106. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705355/>. Accessed 15 September 2017.

-
- ⁹⁹ Kaplan LM, Golden A, Jinnett K, Kolotkin RL, Kyle TK, Look M et al. Perceptions of barriers to effective obesity care: results from the national ACTION study. *Obesity* (Silver Spring) [Internet] 2017; epub ahead of print. Available from <http://onlinelibrary.wiley.com/doi/10.1002/oby.22054/epdf>. Accessed 27 November 2017.
- ¹⁰⁰ Thomas SA, Lee-Fong M. Maintaining dignity of patients with morbid obesity in the hospital setting. *Bariatric Times* [Internet] 2010; 8(4):20-25. Available from <http://bariatrictimes.com/maintaining-dignity-of-patients-with-morbid-obesity-in-the-hospital-setting>. Accessed 15 September 2017.
- ¹⁰¹ National Institute of Health and Care Excellence. Surgical interventions. Obesity: identification, management and assessment. Clinical guideline CG189 [Internet]. London: National Institute of Health and Care Excellence; 2014. Available from <https://www.nice.org.uk/guidance/cg189/chapter/1-Recommendations#surgical-interventions>. Accessed 15 September 2017
- ¹⁰² Kuh D, Ben-Shlomo Y, Lynch J, Hallqvist J, Power C. Glossary: Life course epidemiology. *J Epidemiol Community Health* [Internet] 2003; 57:778-83. Available from <http://jech.bmj.com/content/57/10/778>. Accessed 28 August 2017.
- ¹⁰³ Hertzman C, Power C, Matthews S, Manor O. Using an interactive framework of society and life course to explain self-rated health in early adulthood. *So Sci Med* [Internet] 2001; 53(12):1575-1585. Available from <http://www.sciencedirect.com/science/article/pii/S0277953600004378>. Accessed 28 August 2017.
- ¹⁰⁴ McPherson NO, Fullston T, Aitken RJ, Lane M. Paternal obesity, interventions and mechanistic pathways to impaired health in offspring. *Ann Nutr Metab* [Internet] 2014; 64:231-8. Available from <https://www.karger.com/Article/Abstract/365026>. Accessed 29 August 2017.
- ¹⁰⁵ Guelinckx I, Devlieger R, Beckers K, Vansant G. Maternal obesity: pregnancy complications, gestational weight gain and nutrition. *Obes Rev* [Internet] 2008; (9):140-50. Available from <http://onlinelibrary.wiley.com/doi/10.1111/obr.12283/full>. Accessed 29 August 2017.
- ¹⁰⁶ Ramachenderan J, Bradford J, Mclean M. Maternal obesity and pregnancy complications: a review. *Aust N Z J Obstet Gynaecol* [Internet] 2008; 48(3):228-35. Available from <http://onlinelibrary.wiley.com/doi/10.1111/j.1479-828X.2008.00860.x/abstract>. Accessed 29 August 2017.
- ¹⁰⁷ Callaway LK, Chang AM, McIntyre HD, Prins JB. The prevalence and impact of overweight and obesity in an Australian obstetric population. *Med J Aust* [Internet] 2006; 184(2):56-59. Available from <https://www.ncbi.nlm.nih.gov/pubmed/16411868>. Accessed 28 August 2017
- ¹⁰⁸ Ministry of Health. Healthy weight gain during pregnancy [Internet] Wellington: Ministry of Health; 2014. Available from <http://www.health.govt.nz/your-health/healthy-living/food-and-physical-activity/healthy-eating/healthy-weight-gain-during-pregnancy>. Accessed 28 August 2017.
- ¹⁰⁹ Ministry of Health. Childhood Obesity Plan. [Internet] Wellington: Ministry of health; 2015. Available from <https://www.health.govt.nz/our-work/diseases-and-conditions/obesity/childhood-obesity-plan>. Accessed 28 August 2017.

¹¹⁰ Ministry of Health. Guidelines for screening for gestational diabetes [Internet] Wellington: Ministry of Health; 2014. Available from <http://www.health.govt.nz/publication/screening-diagnosis-and-management-gestational-diabetes-new-zealand-clinical-practice-guideline>. Accessed 28 August 2017.

¹¹¹ Auckland District Health Board. National Women's Clinical Report. [Internet] Auckland: Auckland District Health Board; 2016. Available from <http://nationalwomenshealth.adhb.govt.nz/health-professionals/annual-clinical-report/yearly-annual-clinical-reports>. Accessed 28 August 2017.

¹¹² Hughes RCE, Williman J, Gullam JE. Universal HbA1c measurement in early pregnancy to detect type two diabetes reduces ethnic disparities in antenatal diabetes screening: a population-based observational study. PLoS ONE [Internet] 2016; 11(6):e0156926. Available from <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0156926>. Accessed 30 August 2017.

¹¹³ Liggins Institute. GEMS study. [Internet, not dated]. Available from <http://www.liggins.auckland.ac.nz/en/for/thecomunity/gems-study.html>. Accessed 31 August 2017.

¹¹⁴ Flynn MAT, McNeil DA, Maloff B, Mutasingwa D, Wu M, Ford C et al. Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. *Obes Rev* [Internet] 7(Suppl 1):7-66. Available from <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-789X.2006.00242.x/abstract;jsessionid=42FE8CF465D6B4E2B6311E9DB9EDC63C.f02t03>. Accessed 28 August 2017.

¹¹⁵ The B4 School Check is a comprehensive needs assessment screening and education opportunity for children and their parents/caregivers. It is the final core health check of the Well Child Tamariki Ora programme, which monitors the health and development of children from 6 weeks to 5 years. Ministry of Health. Health targets: Raising healthy kids. [Internet] Wellington: Ministry of Health; 2016. Available from <http://www.health.govt.nz/new-zealand-health-system/health-targets/about-health-targets/health-targets-raising-healthy-kids>. Accessed 31 August 2017.

¹¹⁶ Ministry of Health. Health targets: How is my DHB performing? Quarter 4 (April-June) [Internet] Wellington: Ministry of Health; 2017. Available from <https://www.health.govt.nz/new-zealand-health-system/health-targets/how-my-dhb-performing/how-my-dhb-performing-2016-17>. Accessed 17 January 2018.

¹¹⁷ Ministry of Health. Children and young people living well and staying well: New Zealand childhood obesity programme baseline report 2016/17. [Internet] Wellington: Ministry of Health; 2017. Available from <https://www.health.govt.nz/publication/children-and-young-people-living-well-and-staying-well-new-zealand-childhood-obesity-programme>. Accessed 22 June 2017.

¹¹⁸ De Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents [Internet] *Bull World Health Organ* 2007;85(9):660-7. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2636412/>. Accessed 16 February 2016.

¹¹⁹ De Onis M, Onyango AW, Borghi E, Siyam A, Blossner M, Lutter C. Worldwide implementation of the WHO child growth standards. *Public Health Nutr* [Internet] 2012; 15(9):1603-10. Available from <https://www.cambridge.org/core/journals/public-health-nutrition/article/worldwide-implementation-of-the-who-child-growth-standards/F413605BFAB559159B434E029598BE58>. Accessed 30 August 2017.

¹²⁰ Australian Government Department of Health and Ageing, National Women's Health Policy 2010 [Internet]. Canberra: Department of Health and Ageing; 2013. Available from <http://www.health.gov.au/womenshealthpolicy>. Accessed 29 August 2017.

¹²¹ Callaway LK, Prins JB, Chang AM, McIntyre HD. The prevalence and impact of overweight and obesity in an Australian obstetric population. *Med J Aust* [Internet] 2006; 184(2):56-59. Available from <https://www.ncbi.nlm.nih.gov/pubmed/?term=16411868>. Accessed 29 August 2017.

¹²² See for example: the Health Direct website funded by the Commonwealth Government as well as the State and Territory governments, whose vision is to "be a key part of a quality Australian health system by helping consumers manage their own health through leveraging technology to enable timely access to health and related services" <https://about.healthdirect.gov.au/we-are-healthdirect-australia>; http://www.gethealthynsw.com.au/assets/pdf/resources/161412_Get_Healthy_in_Pregnancy_DL_Brochure_ART.pdf; <https://www.health.qld.gov.au/qcg/publications>; <http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/health+topics/health+topics+a+z/pregnancy>. All information retrieved on 23 August 2017.

¹²³ Perinatal Society of Australia and New Zealand. Position Statement on Pregnancy Obesity [Internet]. Available from <https://www.psanz.com.au/guidelines/>. Accessed 1 September 2017.

¹²⁴ National Health and Medical Research Council. Clinical practice guidelines for the management of overweight and obesity in adults. [Internet] Canberra: National Health and Medical Research Council; 2013. Available from <https://www.nhmrc.gov.au/guidelines-publications/n57>. Accessed 1 September 2017.

¹²⁵ Ministry of Health. Healthy living: food and physical activity: obesity. [Internet] Wellington: Ministry of Health; 2017. <http://www.health.govt.nz/your-health/healthy-living/food-and-physical-activity/obesity>. Accessed 11 September 2017.

¹²⁶ Royal Australasian College of Physicians. Early childhood position statement [forthcoming]. 2018.

¹²⁷ Bell JF, Zimmerman FJ. Shortened night-time sleep duration in early life and subsequent childhood obesity. *Arch Paediatr Adolesc Med* [Internet]. 2010;164(9):840-45. Available from <http://jamanetwork.com/journals/jamapediatrics/fullarticle/383686>. Accessed 11 September 2017.

¹²⁸ Miller AL, Lumeng JC, Le Bourgeois MK. Sleep patterns and obesity in childhood. *Curr Opin Endocrinol Diabetes Obes* [Internet] 2015; 22(1):41-47. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4437224/>. Accessed 11 September 2017.

¹²⁹ Elfhag K, Rössner S. Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obes Rev* [Internet] 2005;6:67-85. Available from <https://www.ncbi.nlm.nih.gov/pubmed/15655039>. Accessed 1 November 2017.

¹³⁰ Mild weight cycling is defined as a weight loss of >5kg once or twice with regain, with severe weight cycling being a weight loss of >10kg at least three times. Montani J-P, Schutz Y, Dulloo AG. Dieting and weight cycling as risk factors for cardiometabolic diseases: who is really at risk? *Obes Rev* [Internet] 2015;16:7-18. Available from <https://www.ncbi.nlm.nih.gov/pubmed/25614199>. Accessed 1 November 2017.

¹³¹ Field AE, Manson JE, Laird N, Williamson DF, Willett WC, Colditz GA. Weight cycling and the risk of developing type 2 diabetes among adult women in the United States. *Obes Res* [Internet] 2004; 12(2):267-74. Available from <http://onlinelibrary.wiley.com/doi/10.1038/oby.2004.34/abstract>. Accessed 15 November 2017.

¹³² Forthergill E, Guo J, Howard L, Kerns JC, Knuth NZ, Brychta R et al. Persistent metabolic adaptation 6 years after “The Biggest Loser” competition. *Obesity (Silver Spring)* [Internet] 2016; 24(8):1612-9. Available from <https://www.ncbi.nlm.nih.gov/pubmed/27136388>. Accessed 16 January 2018.

¹³³ Østbye T, Malhoutra R, Landerman LR. Body mass trajectories through adulthood: results from the National Longitudinal Survey of Youth 1979 cohort (1981-2006). *Int J Epidemiol* [Internet] 2011; 40(1):240-50. Available from <https://academic.oup.com/ije/article/40/1/240/659476#11431498>. Accessed 23 November 2017.

¹³⁴ Bosomworth NJ. The downside of weight loss: realistic intervention in body-weight trajectory. *Can Fam Physician* [Internet] 2012; 58:217-23. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3352786/>. Accessed 23 November 2017.

¹³⁵ National Health and Medical Research Council. Summary Guide for the Management of Overweight and Obesity in Primary Care [Internet]. Melbourne: National Health and Medical Research Council; 2013. Available from <https://www.nhmrc.gov.au/guidelines-publications/n57>. Accessed 1 September 2017.

¹³⁶ Ministry of Health. Clinical guidelines for weight management in New Zealand adults. Wellington: Ministry of Health; 2017. Available from <http://www.health.govt.nz/publication/clinical-guidelines-weight-management-new-zealand-adults>. Accessed 30 November 2017.

¹³⁷ Ministry of Health. Eating and Activity Guidelines for New Zealand Adults [Internet] Wellington: Ministry of Health. Available from <http://www.health.govt.nz/publication/eating-and-activity-guidelines-new-zealand-adults>. Accessed 30 August 2017.

¹³⁸ Yanovski SZ, Yanovski JA. Long term drug treatment for obesity: a systematic and clinical review. *JAMA* [Internet] 2014; 311(1): 74-86. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3928674/>. Accessed 25 April 2018

-
- ¹³⁹ Ministry of Health. Green prescriptions. [Internet] Wellington: Ministry of Health; 2016. Available from <http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions>. Accessed 22 August 2017.
- ¹⁴⁰ Sapere Research Limited. Green Prescription patient survey report. [Internet] Wellington: Sapere Research; 2016. Available from <http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions/green-prescription-research/green-prescription-patient-survey>. Accessed 5 September 2016.
- ¹⁴¹ Ministry of Health. New Zealand Health Survey: Annual update of key results 2016/17. Wellington: Ministry of Health; 2017. Available from <https://www.health.govt.nz/publication/annual-update-key-results-2016-17-new-zealand-health-survey>. Accessed 15 December 2017.
- ¹⁴² Forrest R, Taylor LA, Roberts J, Pearson M, Foxall D, Scott-Chapman S. PATU™: Fighting fit, fighting fat! The Hinu Wero approach. *AlterNative* [Internet] 2016; 12(3):282-297. Available from <http://journals.sagepub.com/doi/abs/10.20507/AlterNative.2016.12.3.6?journalCode=alna>. Accessed 15 November 2017.
- ¹⁴³ Gudzone KA, Doshi RS, Mehta AK, Chaudhry ZW, Jacobs DK, Vakil RM et al. Efficacy of commercial weight loss programmes: an updated systematic review. *Ann Intern Med* [Internet] 2015; 162(7):501-12. Available from <https://www.ncbi.nlm.nih.gov/pubmed/25844997>. Accessed 17 January 2018.
- ¹⁴⁴ Aveyard P, Lewis A, Tearne S, Hood K, Christian-Brown A, Adab P et al. Screening and brief intervention for obesity in primary care> a parallel, two-arm randomised trial. *Lancet* [Internet] 2016; 388(10059):2492-5000. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)31893-1/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31893-1/fulltext). Accessed 17 January 2018.
- ¹⁴⁵ Angrisani L, Santonicola A, Iovino P, Vitiello A, Zundel N, Buchwald H, Scopinaro N. Bariatric surgery and endoluminal procedures IFSO worldwide survey 2014. *Obes Surg* [Internet] 2017. Epub ahead of print. Available from <https://link.springer.com/article/10.1007%2Fs11695-017-2666-x>. Accessed 18 August 2017.
- ¹⁴⁶ Angrisani L, Santonicola A, Iovino P, Formisano G, Buchwald H, Scopinaro N. Bariatric surgery worldwide 2013. *Obes Surg* [Internet] 2015; 25(10):1822-32. Available from <https://link.springer.com/article/10.1007%2Fs11695-015-1657-z>. Accessed 18 August 2017.
- ¹⁴⁷ Gloy VL, Briel M, Bhatt DL, Kashyap SR, Schauer PR, Mingrone G et al. Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ* [Internet] 2013; 347:f5934. Available from <http://www.bmj.com/content/347/bmj.f5934.long>
- ¹⁴⁸ Dixon JB, Zimmet P, Alberti KG, Rubino F. bariatric Surgery: an IDF statement for obese Type 2 Diabetes. *Diab Med* [Internet] 2011; 28:628-42. Available from <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1464-5491.2011.03306.x>. Accessed 26 April 2018.
- ¹⁴⁹ Klein S, Ghosh A, Cremieux PY, Eapen S, McGavock TJ. Economic impact of the clinical benefits of bariatric surgery in diabetes patients with BMI ≥ 35 kg/m². *Obesity* [Internet] 2011; 19(3):581-87. Available from <https://onlinelibrary.wiley.com/doi/full/10.1038/oby.2010.199>. Accessed 26 April 2018.

¹⁵⁰ Sjöström, Lars, et al. "Effects of bariatric surgery on mortality in Swedish obese subjects." *New England journal of medicine* 357.8 (2007): 741-752. Available from: <http://www.nejm.org/doi/full/10.1056/NEJMoa066254>. Accessed 30 April 2018.

¹⁵¹ Colquitt JL, Pickett K, Loveman E, Frampton GK. Surgery for weight loss in adults. *Cochrane Database of Systematic Reviews* 2014, Issue 8. Art. No.: CD003641. DOI: 10.1002/14651858.CD003641.pub4. Available from: <http://cochranelibrary-wiley.com/doi/10.1002/14651858.CD003641.pub4/abstract;jsessionid=3A40F043FD4F5F9C37918C7C37408ED9.f04t04>. Accessed 30 April 2018.

¹⁵² O'Brien PE, Dixon JB, Laurie C, Skinner S, Proietto J, McNeil J, et al. Treatment of Mild to Moderate Obesity with Laparoscopic Adjustable Gastric Banding or an Intensive Medical Program: A Randomized Trial. *Ann Intern Med.* 2006;144:625–633. doi: 10.7326/0003-4819-144-9-200605020-00005. Available online: <http://annals.org/aim/article-abstract/722580/treatment-mild-moderate-obesity-laparoscopic-adjustable-gastric-banding-intensive-medical?volume=144&issue=9&page=625>. Accessed 30 April 2018.

¹⁵³ Chang S-H, Stoll CRT, Song J, Varela JE, Eagon CJ, Colditz GA. Bariatric surgery: an updated systematic review and meta-analysis, 2003–2012. *JAMA surgery.* 2014;149(3):275-287. doi:10.1001/jamasurg.2013.3654. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3962512/>. Accessed 30 April 2018.

¹⁵⁴ Ministry of Health. Report on New Zealand cost-of-illness studies on long-term conditions. Wellington: Ministry of Health; 2009. Available from <https://www.health.govt.nz/publication/report-new-zealand-cost-illness-studies-long-term-conditions>. Accessed 26 April 2018.

¹⁵⁵ Lee CM, Colaguiari R, Magliano DJ, Cameron AJ, Shaw P, Zimmet P et al. The cost of diabetes in adults in Australia. *Diabetes Res Clin Pract* [Internet] 2013; 99(3):385-90. Available from [https://www.diabetesresearchclinicalpractice.com/article/S0168-8227\(12\)00500-1/fulltext](https://www.diabetesresearchclinicalpractice.com/article/S0168-8227(12)00500-1/fulltext). Accessed 26 April 2018.

¹⁵⁶ Courcoulas AP, Belle SH, Neiberg RH, Pierson SK, Eagleton JK, Kalachian MA. Three-year outcomes of bariatric surgery versus lifestyle intervention for type 2 diabetes mellitus treatment: a randomised clinical trial. *JAMA* [Internet] 2015; 150(10):931-40. Available from <https://jamanetwork.com/journals/jamasurgery/fullarticle/2362353>. Accessed 27 April 2018.

¹⁵⁷ Australian and New Zealand Association of Paediatric Surgeons, Obesity Surgery Society of Australia and New Zealand, and The Royal Australasian College of Physicians. Recommendations for Bariatric Surgery in Adolescents in Australia and New Zealand [Internet] Sydney: Australian and New Zealand Association of Paediatric Surgeons, Obesity Surgery Society of Australia and New Zealand, The Royal Australasian College of Physicians; 2010. Available from <https://www.racp.edu.au/docs/default-source/advocacy-library/recommendations-for-bariatric-surgery-in-adolescents.pdf>. Accessed 1 September 2017.

-
- ¹⁵⁸ Kelly S, Flint R. New Zealand is far behind Australia in offering weight loss surgery. Editorial. *N Z Med J* [Internet] 2015; 128(1408). Available from <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1408/6408>
- ¹⁵⁹ Obesity Surgery Society of Australia and New Zealand. Bariatric surgery registry launches in New Zealand. Media release 2017. Available from <http://m.nzdoctor.co.nz/un-doctored/2017/july-2017/24/Bariatric-Surgery-Registry-launches-in-New-Zealand.aspx>
- ¹⁶⁰ Australian Institute of Health and Welfare. Weight loss surgery in Australia 2014-15: Australian hospital statistics. [Internet] Canberra: Australian Institute of Health and Welfare; 2017. Available from <http://www.aihw.gov.au/publication-detail/?id=60129559652>. Accessed 9 August 2017.
- ¹⁶¹ Korda, R. J., Joshy, G., Jorm, L. R., Butler, J. R., & Banks, E. (2012). Inequalities in bariatric surgery in Australia: findings from 49 364 obese participants in a prospective cohort study. *Med J Aust* [Internet] 197(11), 631-636.
- ¹⁶² Statistics New Zealand. New Zealand period life tables 2012-14 [Internet] Statistics New Zealand. Available from http://www.stats.govt.nz/browse_for_stats/health/life_expectancy/NZLifeTables_HOTP12-14/Commentary.aspx#oldest-ages-also-drive-maori. Accessed 7 August 2017.
- ¹⁶³ Statistics Canada. Life expectancy: gap in life expectancy projected to continue to decrease between Aboriginal people and the total Canadian population [Internet] Ottawa: Statistics Canada; 2015. Available from <http://www.statcan.gc.ca/pub/89-645-x/2010001/life-expectancy-esperance-vie-eng.htm>. Accessed 7 August 2017.
- ¹⁶⁴ Australian Institute of Health and Welfare. Life expectancy [Internet] Canberra: Australian Institute of Health and Welfare; 2017. Available from <http://www.aihw.gov.au/deaths/life-expectancy/>. Accessed 7 August 2017.
- ¹⁶⁵ United States Department of Health and Human Services. Indian Health Service: Disparities [Internet] Washington: United States Department of Health and Human Services; 2017. Available from <https://www.ihs.gov/newsroom/factsheets/disparities/>. Accessed 7 August 2017
- ¹⁶⁶ Ministry of Health. New Zealand Health Survey: Annual update of key results 2016/17. [Internet] Wellington: Ministry of Health; 2017. Available from <http://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/current-recent-surveys/new-zealand-health-survey>. Accessed 18 November 2017.
- ¹⁶⁷ Australian Bureau of Statistics. Australian Health Survey: Updated results 2011/12 – overweight and obesity. Available from <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/33C64022ABB5ECD5CA257B8200179437?opendocument>
- ¹⁶⁸ Theodore R, McLean R, Te Morenga L. Challenges to addressing obesity for Māori in Aotearoa/New Zealand. *Aust NZ J Public Health* [Internet] 2015;39(6):509-12. Available from <http://onlinelibrary.wiley.com/doi/10.1111/1753-6405.12418/full>. Accessed 7 August 2017.

-
- ¹⁶⁹ King M, Smith A, Gracey M. Indigenous health part 2: the underlying causes of the health gap. *Lancet* [Internet] 2009; 374(9683):76-85. Available from [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(09\)60827-8/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60827-8/fulltext). Accessed 8 August 2017.
- ¹⁷⁰ World Health Organization. Closing the gap in a generation: Health equity through the social determinants of health. Geneva: World Health Organization; 2008. Available from http://www.who.int/social_determinants/publications/en/. Accessed 4 August 2017.
- ¹⁷¹ Social Policy Evaluation and Research Unit. Families and whānau status report 2016. Wellington: Social Policy Evaluation and Research Unit; 2016. Available from http://www.superu.govt.nz/publication/families_whanau_report_2016. Accessed 4 August 2017.
- ¹⁷² Rodriguez L, George GR, McDonald B. An inconvenient truth: why evidence-based policies on obesity are failing Māori, Pasifika and the Anglo-working class. *Kōtuitui: N Z J Soc Sci* [Internet] 2017; 12(2): 192-204. Available from <http://www.tandfonline.com/doi/full/10.1080/1177083X.2017.1363059>. Accessed 1 November 2017.
- ¹⁷³ Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander Health Survey: First results, Australia 2012-13. Available from <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/A07BD8674C37D838CA257C2F001459FA?opendocument>. Accessed 4 August 2017.
- ¹⁷⁴ Vos T, Barker B, Begg S, Stanley L, and Lopez AD. Burden of disease and injury in Aboriginal and Torres Strait Islander Peoples: the Indigenous health gap. *International J Epidemiology* [Internet] 2009;38(2): 470-477. Available from <https://academic.oup.com/ije/article-lookup/doi/10.1093/ije/dyn240>. Accessed 4 August 2017.
- ¹⁷⁵ Zhao Y, Wright J, Begg S, and Guthridge S. Decomposing Indigenous life expectancy gap by risk factors: a life table analysis. *Popul Health Metr* [Internet] 2013;11(1):1. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3585166/>. Accessed 4 August 2017
- ¹⁷⁶ National Aboriginal Community Controlled Health Organisation (NACCHO). Aboriginal Health. [Internet] Canberra: National Aboriginal Community Controlled Health Organisation. Available from <http://www.naccho.org.au/about/aboriginal-health/>. Accessed 11 August 2017.
- ¹⁷⁷ Booth A, Carroll N. The health status of Indigenous and non-Indigenous Australians. [Internet] Canberra: Centre for Economic Policy Research, Australian National University; 2005. Available from <https://www.econstor.eu/bitstream/10419/21310/1/dp1534.pdf>. Accessed 4 August 2017.
- ¹⁷⁸ DSI Consulting and Benham D. An investigation of the effect of socio-economic factors on the Indigenous life expectancy gap. [Internet] DSI Consulting; 2009.
- ¹⁷⁹ The RACP is working to improve specialist access to Aboriginal and Torres Strait Islander peoples through a national Framework outlining a networked and systematic approach to help address the current issues that impact access to specialist medical care. Royal Australasian College of Physicians. Specialist Access Roundtable Consensus Statement. Sydney: Royal Australasian College of Physicians; 2014. Available from <https://www.racp.edu.au/docs/default-source/default-document->

[library/racp-specialist-access-roundtable-consensus-statement.pdf?sfvrsn=0](#). Accessed 11 August 2017

¹⁸⁰ Australian Government Department of the Prime Minister and Cabinet. Aboriginal and Torres Strait Islander Health Performance Framework 2014 Report. Racism and Discrimination. [Internet] Canberra: Australian Government Department of the Prime Minister and Cabinet; 2014. Available from <https://www.pmc.gov.au/sites/default/files/publications/indigenous/Health-Performance-Framework-2014/aboriginal-and-torres-strait-islander-health-performance-framework-2014-report/racism-and.html> Accessed 11 August 2017.

¹⁸¹ The Ngaanyatjarra Pitjantjatjara Yankunytjatjara Women's Council (NPYWC) Aboriginal Corporation website: <https://www.npywc.org.au/>. Accessed 6 December 2017

¹⁸² The Indigenous Development Effectiveness Initiative (IDEI) Team (2013), What conditions will enable indigenous-led development to thrive in Australia – A consolidation of international and domestic evidence and views of stakeholders as a resource for the design of the Indigenous Development Effectiveness Initiative (IDEI), A work in progress. An initiative supported by the Australian Government and World Vision. Available from: <https://www.worldvision.com.au/docs/default-source/publications/australia-and-the-pacific/what-conditions-will-enable-indigenous-led-development-to-thrive-in-australia-.pdf?sfvrsn=4>. Accessed 6 December 2017.

¹⁸³ Statistics New Zealand. New Zealand in profile 2015. [Internet] Wellington: Statistics New Zealand; 2015. Available from http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-in-profile-2015.aspx. Accessed 9 August 2017

¹⁸⁴ Ministry of Health. New Zealand Health Survey: the Health of New Zealand Adults. [Internet] Wellington: Ministry of Health; 2012. Available from <http://www.health.govt.nz/publication/health-new-zealand-adults-2011-12>. Accessed 9 August 2017

¹⁸⁵ Robson B, Harris R. (eds.) Hauora: Māori standards of health IV: a study of the years 2001-05. Wellington: Te Rōpū Rangahau Hauora a Eru Pomare University of Otago Wellington; 2007.

¹⁸⁶ Ministry of Health. Tatau kahukura: Māori health chart book 2015. Wellington: Ministry of Health; 2015.

¹⁸⁷ Ministry of Health. Māori health models: Te Whare Tapa Wha. <http://www.health.govt.nz/our-work/populations/maori-health/maori-health-models/maori-health-models-te-whare-tapa-wha>.

¹⁸⁸ Pitama S et al. Improving Māori health through clinical assessment: Waikare o te Waka o Meihana. N Z Med J <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-126-no-1393/viewpoint-pitama>. Accessed 13 November 2017.

¹⁸⁹ Williams M, Cairns S, Simmons D, Rush E. Face-to-face versus telephone delivery of the Green Prescription for Māori and New Zealand Europeans with type-2 diabetes mellitus: influence on participation and health outcomes. N Z Med J [Internet] 2017; 130(1465). Available from <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2017/vol-130-no-1465-10-november-2017/7410>. Accessed 13 November 2017.

-
- ¹⁹⁰ PATU Aotearoa. PATU locations. [Internet] www.patunz.com. Accessed 20 November 2017.
- ¹⁹¹ Forrest R, Stockdale-Frost A, Taylor L-A, Chapman S, Armstrong L. The PATU initiative as cultural praxis: Constructing tools to appropriately evaluate health and fitness programmes developed by and for Māori. Proceedings of the Population Health Congress; 2014 October 6-8; Auckland, New Zealand. Wellington: Public Health Association; 2014.
- ¹⁹² Anderson YC, Wynter LE, Treves KF, Grant CC, Stewart JM, Cave TL et al. Prevalence of comorbidities in obese New Zealand children and adolescents at enrolment in a community-based obesity programme. *J Paediatr Child Health* [Internet] 2016; 52(12):1099-1105. Available from <http://onlinelibrary.wiley.com/doi/10.1111/jpc.13315/abstract;jsessionid=A7E81FEB8E6808CE0CE24FA32D5A9D1F.f03t01>. Accessed 20 October 2017.
- ¹⁹³ Anderson YC, Wynter LE, Grant CC, Cave TL, Derraik JGB, Cutfield W et al. A novel home-based intervention for child and adolescent obesity: the results of the Whānau Pakari randomised controlled trial. *Obesity (Silver Spring)* [Internet] 2017; 25(11):1965-73. Available from <http://onlinelibrary.wiley.com/doi/10.1002/oby.21967/abstract>. Accessed 20 October 2017.
- ¹⁹⁴ Toi Tangata. Our mahi: He pī ka rare [Internet]. Auckland: Toi Tangata; 2017. Available from <http://toitangata.co.nz/our-mahi/he-pi-ka-rere/>. Accessed 24 January 2018.
- ¹⁹⁵ Te Morenga L, Pekepo C, Corrigan C, Matoe L, Mules R et al. Co-designing an mHealth tool in the New Zealand Māori community with a “Kaupapa Māori” approach. *AlterNative* [Internet] 2018; epub before print. Available from <http://journals.sagepub.com/doi/pdf/10.1177/1177180117753169>. Accessed 24 January 2018.
- ¹⁹⁶ Ministry for Pacific Peoples. Pacific people in New Zealand. Wellington: Ministry for Pacific Peoples; 2017. Available from <http://www.mpp.govt.nz/pacific-people-in-nz/>. Accessed 22 August 2017.
- ¹⁹⁷ Statistics New Zealand. National ethnic population projections: 2013 (base) to 2038 (update). [Internet]. Wellington: Statistics New Zealand; 2017. Available from http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalEthnicPopulationProjections_HOTP2013-2038.aspx. Accessed 8 September 2017.
- ¹⁹⁸ Ravulo J. Pacific communities in Australia. 2015; Sydney: University of Western Sydney. Available from https://www.westernsydney.edu.au/pathe/pathe/pacific_communities_in_australia_report
- ¹⁹⁹ Statistics New Zealand. 2013 Census ethnic group profiles. [Internet] Wellington: Statistics New Zealand; 2013. Available from http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/ethnic-profiles.aspx?request_value=24706#24706. Accessed 8 September 2017.
- ²⁰⁰ Ministry of Health. ‘Ala Mo’ui: Pathways to Pacific health and wellbeing 2014-18 [Internet] Wellington: Ministry of Health; 2014. Available from <http://www.health.govt.nz/publication/ala-moui-pathways-pacific-health-and-wellbeing-2014-2018>. Accessed 8 September 2017
- ²⁰¹ World Health Organization. Prevalence of obesity among adults ages 18+ 1975-2016 (age standardised estimate): both sexes, 2016 [Internet] Geneva: World Health Organization; 2016.

Available from http://gamapserv.who.int/gho/interactive_charts/ncd/risk_factors/obesity/atlas.html. Accessed 22 November 2017.

²⁰² McDonald A. Sugar-sweetened beverage tax in Pacific Island Countries and Territories: A discussion paper. New Caledonia: Secretariat of the Pacific Community' 2015. Available from https://www.researchgate.net/publication/320241204_Sugar-sweetened_beverage_tax_in_Pacific_Island_countries_and_territories_A_discussion_paper. Accessed 23 November 2017.

²⁰³ Snowdon W. Sugar-sweetened beverages in Pacific Island countries and territories: problems and solutions? *Pac Health Dia* [Internet] 2014; 20(1):43-46. Available from <https://pdfs.semanticscholar.org/7303/18e5622dfb53514043c4fbae22f6b573cb29.pdf>. Accessed 19 November 2017.

²⁰⁴ Thow A, Quested C, Juventin L, Kun R, Khan AN, Swinburn B. Taxing soft drinks in the Pacific: implementation lessons for health. *Health Promot Int* [Internet] 2011; 26(1):55-64. Available from <https://www.ncbi.nlm.nih.gov/pubmed/20739326>. Accessed 23 November 2017.

²⁰⁵ Robinson T, Simmons D, Scott D, Howard E, Pickering K, Cutfield R et al. Ethnic differences in Type 2 diabetes care and outcomes in Auckland: a multi-ethnic community in New Zealand. *N Z Med J* [Internet] 2006; 119(1235):22-32. Available from <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2000-2009/2006>. Accessed 24 November 2017.

²⁰⁶ Bonita R, Broad JB, Beaglehole R. Ethnic differences in stroke incidence and case fatality in Auckland, New Zealand. *Stroke* [Internet] 1997; 28:758-761. Available from <http://stroke.ahajournals.org/content/28/4/758.full>. Accessed 24 November 2017.

²⁰⁷ Meredith I, Safarti D, Ikeda T, Blakely T. Cancer in Pacific people in New Zealand. *Cancer Causes Control* [Internet] 2012; 23(7):1173-84. Available from <https://link.springer.com/article/10.1007%2Fs10552-012-9986-x>. Accessed 24 November 2017.

²⁰⁸ Dewes O, Scragg R, Raina Elley C. The association between church attendance and obesity-related lifestyle behaviours among New Zealand adolescents from different Pacific Island ethnic groups. *J Prim Health Care* [Internet] 2013; 5(4):290-300. Available from <http://www.rnzcgp.org.nz/jphc-december-2013/>. Accessed 21 November 2017.

²⁰⁹ Tupai-Firestone R, Tuisano H, Manukia M, Kaholokula K, Foilaki S, Kingi TK et al. Understanding Pasifika youth and the obesogenic environment, Auckland and Wellington, New Zealand. *N Z Med J* [Internet] 2016; 129 (1434):23-35. Available from <https://www.ncbi.nlm.nih.gov/pubmed/24294617>. Accessed 20 November 2017.

²¹⁰ Glover M, Kira A, Kira G, McRobbie H, Breier BH, Kruger R et al. An innovative team-based weight loss competition to reduce cardiovascular and diabetes risk among Māori and Pacific people: rationale and method for the study and its evaluation. *BMC Nutrition* [Internet] 2017; 3:78. Available from <https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-017-0199-2>. Accessed 23 November 2017.

-
- ²¹¹ Logan I. Health and Healing. Pacific Peoples Health [Internet] 2017; 12. Available from <http://www.pacificpeopleshealth.co.nz/healthandhealing>. Accessed 24 November 2017.
- ²¹² Zhang Q, Wang Y. Trends in the association between obesity and socioeconomic status in US adults 1971-2000. *Obes Res* [Internet] 2004; 12(10):1622-32. Available from <http://onlinelibrary.wiley.com/doi/10.1038/oby.2004.202/full>. Accessed 18 August 2017.
- ²¹³ Howel D, Stamp E, Chadwick TJ, Adamson AJ, White M. Are social inequalities widening in generalised and abdominal obesity and overweight among English adults? [Internet] *Plos One* 2013; 8(11): e79027. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3826717/>. Accessed 18 August 2017.
- ²¹⁴ Franklin B, Jones A, Love D, Puckett S, Macklin J, White-Means S. Exploring mediators of food insecurity and obesity: a review of recent literature. *J Community Health* [Internet] 2013; 37(1): 253-264. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3334290/>. Accessed 27 November 2017.
- ²¹⁵ Perry B. Non-Income Measures of Material Wellbeing 2016. [Internet] Wellington: Ministry of Social Development. Available from <http://thehub.superu.govt.nz/publication/material-wellbeing-new-zealand-households-trends-and-relativities-using-non-income>. 1 December 2017.
- ²¹⁶ Richardson CR, Faulkner G, McDevitt J, Skrinar GS, Hutchinson DS, Piette JD. Integrating psychical activity into mental health services for persons with serious mental illness. *Psychiatr Serv* [Internet] 2005; 56(3):324-31. Available from <https://www.ncbi.nlm.nih.gov/pubmed/15746508>. Accessed 25 August 2017.
- ²¹⁷ Brown S, Birtwistle J, Roe L, Thompson C. The unhealthy lifestyle of people with schizophrenia. *Psychol Med* [Internet] 1999; 29(3):697-701. Available from <https://www.ncbi.nlm.nih.gov/pubmed/10405091/>. Accessed 25 August 2017.
- ²¹⁸ Osborn DPJ. The poor physical health of people with a mental illness. *West J Med* [Internet] 2001; 175(5):329-332. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1071612/>. Accessed 25 August 2017.
- ²¹⁹ Das Munshi J, Ashworth M, Dewey ME, Gaughran F, Hull S, Margan C et al. Type 2 diabetes mellitus in people with severe mental illness: inequalities by ethnicity and age. Cross-sectional analysis of 588 408 records from the UK. *Diabet Med* [Internet] 2017; 34(7):916-924. Available from <https://www.ncbi.nlm.nih.gov/pubmed/27973692>. Accessed 25 August 2017.
- ²²⁰ Lawrence D, Kisely S, Pais J. The epidemiology of excess mortality in people with mental illness. *Can J Psychiatry* [Internet] 2010; 55(12):752-60. Available from <https://www.ncbi.nlm.nih.gov/pubmed/21172095>. Accessed 25 August 2017
- ²²¹ Faulkner G, Cohn T, Remington G. Interventions to reduce weight gain in schizophrenia. *Cochrane Database Syst Rev* [Internet] 2007; 24(1):CD005148. Available from <https://www.ncbi.nlm.nih.gov/pubmed/17253540>. Accessed 28 August 2017.

-
- ²²² De Hert M, Schreurs V, Vancampfort D, Van Winkel R. Metabolic syndrome in people with schizophrenia: a review. *World Psychiatry* [Internet] 2009; 8(1):15-22. Available from <http://onlinelibrary.wiley.com/doi/10.1002/j.2051-5545.2009.tb00199.x/full>. Accessed 28 August 2017.
- ²²³ Thomas JJ, Koh KA, Eddy KT, Hartmann AS, Murray HB, Gorman MJ. Do DSM-5 eating disorder criteria overpathologise normative eating patterns among individuals with obesity? *J. Obes.* [Internet]. 2014; epub June 26. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4098982/>. Accessed 27 March 2018.
- ²²⁴ Cunningham R, Peterson D, Sarfarti D, Stanley J, Collings S. Premature mortality in adults using New Zealand Psychiatric Services. *N Z Med J* [Internet] 2014; 127(1394):31-41. Available from <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no.-1394/6126>. Accessed 28 August 2017
- ²²⁵ Oakley-Browne M, Wells JE, Scott, KM Te rau hinengaro: The New Zealand mental health survey. [Internet] Wellington: Ministry of Health; 2006. Available from <http://www.health.govt.nz/publication/te-rau-hinengaro-new-zealand-mental-health-survey>
- ²²⁶ Australian Government National Mental Health Commission. Equally Well – Quality of Life – Equality in Life: Improving the physical health and wellbeing of people living with mental illness in Australia. [Internet] Canberra: Australian Government National Mental Health Commission; 2016. Available from <https://equallywell.org.au/wp-content/uploads/2017/03/Equally-Well-Consensus-Statement.pdf> Accessed 31 August 2017.
- ²²⁷ Shefer G, Henderson C, Howard LM, Murray J, Thornicroft G. Diagnostic overshadowing and other challenges involved in the diagnostic process of patients with mental illness who present in emergency departments with physical symptoms – A qualitative study. *PLoS ONE* [Internet] 2014; 9(11): e111682. <https://doi.org/10.1371/journal.pone.0111682>. Accessed 27 March 2018.
- ²²⁸ Te Pou o Te Whakaaro Nui. Equally Well: Take action to improve physical health outcomes for New Zealanders who experience mental illness and/or addiction. A consensus position paper [Internet] Auckland: Te Pou o Te Whakaaro Nui;2014. Available from <https://www.tepou.co.nz/initiatives/equally-well-physical-health/37>. Accessed 29 August 2017.
- ²²⁹ Curtis J, Watkins A, Rosenbaum S, Teasdale S, Kalucy M, Samaras K, Ward PB. Evaluating an individualized lifestyle and life skills intervention to prevent antipsychotic-induced weight gain in first-episode psychosis. [Internet] *Early Interv Psychiatry* 2016; 10(3):267-73. Available from <https://www.ncbi.nlm.nih.gov/pubmed/25721464>. Accessed 11 April 2018
- ²³⁰ Coughlan R, Lawrence D, Holman CDJ, Jablensky AV. Duty to Care: Physical illness in people with mental illness. [Internet] Perth: University of Western Australia; 2001. Available from <http://www.wanada.org.au/resources-and-publications/health-and-wellbeing.html> Accessed 11 April 2018.
- ²³¹ Eapen V, Shiers D, Curtis J. Bridging the gap from evidence to policy and practice: reducing the progression to metabolic syndrome for children and adolescents on antipsychotic medication. *Aust N Z J Psychiatry* [Internet] 2013; 47(5):435-42. Available from <http://journals.sagepub.com/doi/abs/10.1177/0004867412463169>. Accessed 11 April 2018.

-
- ²³² Bosley S. Tesco cuts sugar in own-brand drinks to avoid sugar tax [Internet] The Guardian 7 November 2016. Available from <https://www.theguardian.com/society/2016/nov/07/tesco-cuts-sugar-in-own-brand-drinks-to-avoid-sugar-tax>. Accessed 21 August 2017.
- ²³³ Jamie's Food Revolution. The soft drink industry's less sugary future: Lucozade Ribena Suntory's COO, Peter Harding, talks about the hurdles, rewards and future plans he has for reformulation and the industry. [Internet] Available from <http://www.jamiesfoodrevolution.org/news/the-soft-drink-industrys-less-sugary-future-lucozade-ribena-suntorys-coo-peter-harding-talks-about-the-hurdles-rewards-and-future-plans-he-has-for-reformulation-and-the-industry/>. Accessed 21 August 2017.
- ²³⁴ Tappy L, Lê K-A. Metabolic effects of fructose and the worldwide increase in obesity. *Physiol Rev* [Internet] 2010;90(1):23-46. Available from <http://www.physiology.org/doi/abs/10.1152/physrev.00019.2009>. Accessed 22 August 2017.
- ²³⁵ Ebbeling CB, Feldman HA, Osganian SK, et al. Effects of Decreasing Sugar-Sweetened Beverage Consumption on Body Weight in Adolescents: A Randomized, Controlled Pilot Study. *Pediatrics* [Internet] 2006;117(3):673-80. Available from <http://pediatrics.aappublications.org/content/117/3/673.short>. Accessed 22 August 2017.
- ²³⁶ Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. *Am J Clin Nutr* [Internet] 2006;84(2):274-88. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3210834/>. Accessed 22 August 2017
- ²³⁷ Malik VS, Popkin BM, Bray GA, et al. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. *Diabetes Care* [Internet] 2010;33(11):2477-83. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2963518/>. Accessed 21 August 2017.
- ²³⁸ Sheiham A, James WP. A new understanding of the relationship between sugars, dental caries and fluoride use: implications for limits on sugars consumption. *Public Health Nutr* [Internet] 2014;17(10):2176-84. Available from <https://www.ncbi.nlm.nih.gov/pubmed/24892213>. Accessed 20 August 2017
- ²³⁹ Cohen L, Curhan G, Forman J. Association of sweetened beverage intake with incident hypertension. *J Gen Intern Med* [Internet] 2012;27(9):1127-34. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3515007/>. Accessed 20 August 2017.
- ²⁴⁰ Choi HK, Curhan G. Soft drinks, fructose consumption, and the risk of gout in men: prospective cohort study. *BMJ* [Internet] 2008; 336(7639):309-12. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2234536/>. Accessed 20 August 2017.
- ²⁴¹ Yang Q, Zhang Z, Gregg EW, et al. Added sugar intake and cardiovascular diseases mortality among US adults. *JAMA Intern Med* [Internet] 2014;174(4):516-24. Available from <https://www.ncbi.nlm.nih.gov/pubmed/24493081>. Accessed 21 August 2017.
- ²⁴² Welsh JA, Sharma A, Abramson JL, et al. Caloric sweetener consumption and dyslipidemia among US adults. *JAMA* 2010;303(15):1490-7. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3045262/>. Accessed 16 August 2017.

-
- ²⁴³ Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health* [Internet]. 2007; 97(4):667-75. Available from <http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2005.083782>. Accessed 16 August 2017.
- ²⁴⁴ Thornley S, Sundborn G. The case to ban sugary food and drink from schools: these products are addictive, and kids will learn best without them. *Pac Health Dialog* 2014; 20(1):17-21.
- ²⁴⁵ Ministry of Health. NZ Food NZ Children: Key results of the 2002 National Children's Nutrition Survey. [Internet] Wellington: Ministry of Health; 2003. Available from <https://www.health.govt.nz/publication/nz-food-nz-children>. Accessed 17 August 2018.
- ²⁴⁶ Explanatory note: "Food availability (sometimes called food disappearance) reflects total annual food production, imports, and beginning stocks of commodities, subtracting exports, ending stocks, and non-food uses. The result is a proxy for foods actually consumed and is particularly useful for examining trends over time. Because these data are drawn from government and industry reports, they are free of the inaccuracies that occur in consumer survey estimates caused by poor memory, volitional skewing of responses, or difficulties in describing the components of foods made from several ingredients." Barnard, ND. Trends in food availability, 1909–2007. *Am J Clin Nutr* [Internet] 2010; 91(5):1530S-1536S. Available from <https://www.ncbi.nlm.nih.gov/pubmed/20335547>. Accessed 17 August 2017.
- ²⁴⁷ Karvetti RL, Knuts LR. Validity of the 24-hour dietary recall. *J Am Diet Assoc* [Internet] 1985; 85(11):1437-42. Accessed 21 August 2017.
- ²⁴⁸ Rethink Sugary Drink. Rethink Sugary Drink – Consensus Statement: Sugar-sweetened beverages. Endorsed by Cancer Council, Hearth Foundation, Diabetes Australia, Nutrition Australia, YMCA, Australian Dental Association, Dental Health Services Victoria and the Obesity Policy Coalition. [Internet]. Melbourne; Cancer Council of Victoria; 2015. Available from http://www.rethinksugarydrink.org.au/downloads/Consensus_position_statement.pdf. Accessed 26 July 2017.
- ²⁴⁹ Sundborn G, Thornley S, Lang B, et al. New Zealand's growing thirst for a sugar-sweetened beverage tax. *NZMJ* 2015;128(1422):80-2. Available from www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1422-25-september-2015/6673. Accessed 27 July 2017.
- ²⁵⁰ Morley B, Martin J, Niven P, Wakefield M. Public opinion on food-related obesity prevention policy initiatives. *Health Promot J Austr* [Internet] 2012; 23(2), 86-91. Available from <http://www.publish.csiro.au/HE/HE12086>. Accessed 27 July 2017.
- ²⁵¹ World Health Organization. Together let's beat NCDs: Taxes on sugary drinks: Why do it? Geneva: World Health Organization; 2016. Available from <http://apps.who.int/iris/bitstream/10665/250303/1/WHO-NMH-PND-16.5-eng.pdf> Accessed 26 July 2017.

²⁵² Australian Medical Association. Nutrition position statement. [Internet] Barton, Australian Capital Territory: Australian Medical Association; 2018. Available from <https://ama.com.au/position-statement/nutrition-2018>. Accessed 19 January 2018.

²⁵³ New Zealand Medical Association. Taxes on sugar-sweetened beverages position statement. [Internet] Wellington: New Zealand Medical Association; 2016. Available from https://www.nzma.org.nz/_data/assets/pdf_file/0005/52547/Taxes-on-Sugar-Sweetened-Beverages_December-2016.pdf. Accessed 23 March 2018.

²⁵⁴ Council of Presidents of Medical Colleges. Report and consensus statement for action. [Internet] Deakin, Australian Capital Territory; 2016. Available from <http://cpmc.edu.au/our-members/national-health-summit-on-obesity/>. Accessed 27 July 2017.

²⁵⁵ Public Health Association of Australia. Public Health Association of Australia 2017-18 pre-Budget submission. [Internet]. Deakin, Australian Capital Territory: Public Health Association of Australia; 2017. Available from <https://www.phaa.net.au/documents/item/1892>. Accessed 27 July 2017.

²⁵⁶ Note: The ACOSS Budget Statement 2017 proposes a volume-based ‘sugar tax’ on water-based drinks with added sugar (not including pure fruit juices) along similar lines of the proposed British tax on sugary drinks. Revenue from these reforms should be earmarked for preventive health and health promotion programs, including healthy eating and sports programs in schools, and a public subsidy for the transport of fresh food to remote areas. In remote Aboriginal and Torres Strait Islander communities a fresh food transport subsidy would be a direct, equitable and cost effective way to improve health. This could be modelled on a Canadian program, ‘Nutrition North America’. These reforms should be undertaken as part of a wider strategy to reduce harmful consumption of sugar including regulatory reform (especially to restrict advertising targeting children and improve the transparency of labelling of food and beverages, and restrictions on the financing of sporting and similar activities by producers), and health promotion campaigns.” Australian Council of Social Service. Budget priorities statement 2017-18. [Internet] Strawberry Hills, New South Wales: Australian Council of Social Service; 2017. Available from www.acoss.org.au/wp-content/uploads/2017/02/ACOSS_Budget-Priorities-Statement_2017-18-FINAL.pdf. Accessed 27 July 2017.

²⁵⁷ Padwal R, Li SK, Lau DC. Long-term pharmacotherapy for obesity and overweight. Cochrane Database Syst Rev [Internet] 2004; (3):CD004094. Available from <http://cochranelibrary-wiley.com/doi/10.1002/14651858.CD004094.pub2/full>. Accessed 25 April 2018.

²⁵⁸ Therapeutic Goods Administration. Saxenda™ (Liraglutide). Australian Public Assessment Report. [Internet] Canberra: Therapeutic Goods Administration; 2016. Available from <https://www.tga.gov.au/auspar/auspar-liraglutide>. Accessed 25 April 2018.

²⁵⁹ Pharmaceutical Benefits Scheme. Orlistat [Internet]. Available from <http://www.pbs.gov.au/medicine/item/4570m>. Accessed 25 April 2018.

²⁶⁰ Medsafe. New Zealand Data Sheet: Xenical™ Orlistat). [Internet] Wellington: Medsafe; updated November 2017. Available from <http://www.medsafe.govt.nz/profs/Datasheet/x/Xenicalcap.pdf>. Accessed 25 April 2018.

²⁶¹ Medsafe. New Zealand Data Sheet: Duromine™ (Phentermine). [Internet] Wellington: Medsafe; updated January 2018. Available from <http://www.medsafe.govt.nz/profs/datasheet/d/durominecap.pdf>. Accessed 25 April 2018

the 1990s, the number of people with a mental health problem has increased in the UK (Mental Health Act 1983, 1990).

There is a growing awareness of the need to improve the lives of people with mental health problems. The Department of Health (1999) has set out a vision of a new mental health system, which will be based on the following principles:

- (i) People with mental health problems should be treated as individuals, with their own needs and wishes.
- (ii) People with mental health problems should be given the opportunity to participate in decisions about their care.
- (iii) People with mental health problems should be given the opportunity to live in their own homes and communities.

There is a growing awareness of the need to improve the lives of people with mental health problems. The Department of Health (1999) has set out a vision of a new mental health system, which will be based on the following principles:

- (iv) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (v) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (vi) People with mental health problems should be given the opportunity to live in their own homes and communities.

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- (vii) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (viii) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (ix) People with mental health problems should be given the opportunity to live in their own homes and communities.

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- (x) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (xi) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (xii) People with mental health problems should be given the opportunity to live in their own homes and communities.

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- (xiii) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (xiv) People with mental health problems should be given the opportunity to live in their own homes and communities.
- (xv) People with mental health problems should be given the opportunity to live in their own homes and communities.

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