Tackling Diet-related Disease in New Zealand
- *the need, the evidence, the priorities*

Registration: 8.45 am } Tuesday 4th September 2018

Nordmeyer Lecture Theatre, University of Otago Wellington, 23a Mein St, Newtown

A collaboration between the DIET Programme (NIHI, University of Auckland), INFORMAS (University of Auckland), and the BODE^3 Programme (University of Otago, Wellington). Co-sponsored by the Healthier Lives National Science Challenge.

DIET, BODE^3 and INFORMAS were/are all funded by HRC

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DIET Dietary Interventions: Evidence & Translation

bode^3

INFORMAS Benchmarking food environments

University of Otago Te Whare Wānanga o Otāgo New Zealand

The University of Auckland Te Whare Wānanga o Tāmaki Makaurau New Zealand

National Science Challenges

Healthier Lives He Oranga Hauora

SPEAKERS

Professor Cliona Ni Mhurchu

Dietary Interventions: Evidence and Translation (DIET Programme), University of Auckland

Cliona is Professor of Population Nutrition at the National Institute for Health Innovation, University of Auckland. She is Director of the HRC-funded DIET programme, which evaluates the impact of population-level diet interventions and policies, including food taxes/subsidies, front-of-pack nutrition labels, healthier food reformulation, and marketing of unhealthy food to children. Cliona is also Principal Investigator of OL@-OR@, a project to co-design and evaluate a health promoting mHealth programme for Māori and Pasifika, and Deputy Director of the Healthier Lives National Science Challenge.

Professor Tony Blakely

Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3), University of Otago, Wellington

Tony is an epidemiologist. His research covers a range of topic areas intersecting with methodological advancements.

Since 2010, he directs the HRC-funded Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3). This programme builds infrastructure (e.g. linked routine datasets) and capacity (e.g. epidemiological and economic decision modelling) to rapidly assess the health impact and cost effectiveness of a range of preventative and cancer control interventions – and examine their equity impacts. In 2016-2021 BODE^3 is modelling a range of preventive interventions, under three objectives: 1) dietary and physical activity interventions; 2) interventions stratified by absolute CVD risk; and 3) comparing the impact of multiple interventions on timing of health gains and costs (savings), productivity and welfare cost implications, and morbidity impacts – especially around the retirement age.

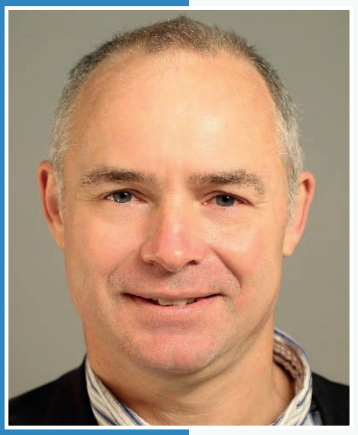
Tony also has research interests in nutrition (e.g. a large randomised trial of price discounts and personalised education – the SHOP study) and health services. Cutting across all Tony's research is a strong focus and interest in epidemiological and quantitative research methodologies (e.g. causal mediation analysis, simulation modelling). He teaches short courses in epidemiological methods. Tony has published approximately 300 peer reviewed journal articles. As of 2016, Tony also holds an appointment at the Melbourne School of Population and Global Health, Melbourne University.

Professor Boyd Swinburn

Population Nutrition and Global Health, University of Auckland
Alfred Deakin Professor, Global Obesity Centre, Deakin University, Melbourne
Co-Chair of World Obesity Policy & Prevention section

Boyd, MBChB, MD, FRACP, FNZCPHM trained as an endocrinologist and has conducted research in metabolic, clinical and public health aspects of obesity. His major research interests are centred on community and policy actions to prevent childhood and adolescent obesity, and reduce, what he has coined, 'obesogenic' environments. He is currently leading an initiative (www.informas.org) to monitor and benchmark food environments internationally.

He established WHO's first Collaborating Centre on Obesity Prevention at Deakin University in 2003, led two Lancet Series on Obesity and co-chairs the Lancet Commission on Obesity. He has been an advisor on many government committees, WHO Consultations, and large scientific studies internationally.



Professor Richard Edwards

Department of Public Health, University of Otago, Wellington

Richard is a Professor of Public Health at the Department of Public Health, University of Otago, Wellington. He trained initially in medicine and public health. His research focuses on tobacco control policy aiming to help achieve NZ's Smokefree 2025 goal.

He is co-Director of the ASPIRE 2025 research collaboration and leads the HRC funded New Zealand arm of the International Tobacco Control Evaluation project.

Professor Jim Mann

University of Otago

Jim Mann, CNZM, PhD, DM, FRACP, FRSNZ has been Professor in Medicine and Human Nutrition at the University of Otago and Consultant Physician (Endocrinology) in Dunedin Hospital for the past 30 years. Previously he lectured at the University of Oxford and was a Physician in the Radcliffe Infirmary.

He is Director of the World Health Organisation (WHO) Collaborating Centre for Human Nutrition, the Healthier Lives National Science Challenge and the New Zealand-China Non Communicable Diseases Research Collaboration Centre and; co-Director of the Edgar Diabetes and Obesity Research Centre (EDOR). He is principal investigator for the Riddet Institute, a national Centre of Research Excellence at Massey University.

His clinical work has mainly been in the field of diabetes and cardiovascular disease. His research has principally related to epidemiological and nutritional aspects with a special interest in diabetes prevention. He has been author and co-author of over 300 publications and has written and edited textbooks and popular books.

He has been involved with national and international, government and non-governmental organisations (including the WHO, the European Association for the Study of Diabetes and the World Cancer Research Fund) in guideline development relating to diabetes, cardiovascular disease, cancer and nutrition. He has chaired a range of professional organisations and advisory groups to the Ministry of Health and NGOs in New Zealand.

He is a Fellow of the Royal Society of New Zealand and has been awarded the Hercus Medal of the Royal Society and the University of Otago Distinguished Research Medal. He was appointed a Companion of New Zealand Order of Merit for services to Medicine and medical research.

Dr Cristina Cleghorn

Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3), University of Otago, Wellington

Cristina is a Senior Research Fellow in the Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3) at the University of Otago, Wellington. Cristina models the effectiveness and cost effectiveness of a variety of dietary and obesity reduction interventions. These range from targeted behavioural interventions to population level reformulation and tax interventions. Cristina also has research interests in environmental sustainability, physical activity and tobacco control.

Cristina's background is in nutrition research. She completed her PhD at Leeds University in the UK investigating the relationships between agrobiodiversity, dietary diversity and nutritional status in Tanzania. Prior to her PhD, Cristina had been working as a Research Fellow in the Nutritional Epidemiology Group at the University of Leeds on a number of obesity prevention and dietary improvement interventions in both children and adults. She completed her undergraduate degree and Masters of Science in Human Nutrition at the University of Otago.

Dr Helen Eyles

Dietary Interventions: Evidence and Translation (DIET Programme), University of Auckland

Helen is a Senior Research Fellow at the National Institute for Health Innovation, University of Auckland. She is the Principle Investigator of Nutritrack, a proprietary database of packaged foods available for sale at major New Zealand supermarkets and fast food restaurants.

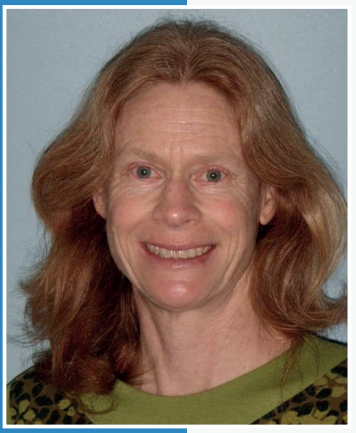
Helen's research focuses on interventions and policies to improve population nutrition including healthier food reformulation, food pricing, and front-of-pack nutrition labels. Her research interests and experience also include children's nutrition, mobile health interventions, use of sales data to monitor population dietary intakes, and strategies to reduce sodium intake and increase potassium intake in New Zealand population groups.

Simon Kenny

Head of Communications, McDonald's Restaurants (NZ) Ltd

Simon started with McDonald's as Head of Communications in April 2011. He has responsibility for all aspects of McDonald's external and internal communications in New Zealand and also manages McDonald's social media, sponsorships and customer services team. In addition, Simon has responsibility for one of the business' growth platforms, which focuses on trust and reputation. Simon is currently the chair for the council of the Association of New Zealand Advertisers.

Simon joined McDonald's from New Zealand sportswear brand Orca, where he was Marketing Manager for four years, looking after the brand's global marketing and communications activities. Prior to this, Simon was an Account Director at public relations consultancy Network PR, primarily working for corporate clients. Simon has also spent time in London working in the communications team for one of the world's largest asset managers - Barclays Global Investors, and in marketing and communications roles at European Motor Distributors, the New Zealand importer of Audi, Volkswagen and Porsche. Simon has Bachelor of Communications Studies from AUT.



Dr Sally Mackay

School of Population Health, University of Auckland

Sally is a Registered Nutritionist who recently completed a PhD at the University of Auckland on the INFORMAS methodology of monitoring food prices over time. She is currently working as a research fellow to monitor the healthiness of the packaged food supply. She is interested in reformulation of packaged foods, food affordability, monitoring food companies commitments to health and monitoring the wider food environment. Sally has previously worked as a public health nutritionist for a wide range of organisations.

Dr Nhung Nghiem

Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3), University of Otago, Wellington

Nhung is an economist and a modeller with the Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3) research group. Nhung has research interests in quantitative methods for health care, such as simulation and optimisation. Her research covers cardiovascular and non-communicable diseases modelling, cost-effectiveness analyses of preventive interventions, health inequalities, and food demand analysis. Nhung also has experience in analysing health and social administrative data at an individual-level, ie, Health Tracker and Integrated Data Infrastructure (IDI).

Professor Louise Signal

Health Promotion & Policy Research Unit, University of Otago, Wellington

Louise is a Director of the Health Promotion and Policy Research Unit at the University of Otago, Wellington. Louise's research focuses on identifying and addressing environmental determinants of health and has a strong focus on addressing inequities, particularly for Māori, Pacific and low-income communities.

Her work includes obesity prevention, addressing harm from alcohol and gambling and tackling inequities in cancer treatment. Louise is Principal Investigator on Kids'Cam, research that used automated cameras to study the world in which children live. Kids'Cam is part of the HRC-funded DIET programme. Currently there are 16 projects underway or completed using the New Zealand data. Louise is currently leading similar research in Tonga in collaboration with Dr Viliami Puloka and the Tongan Government.

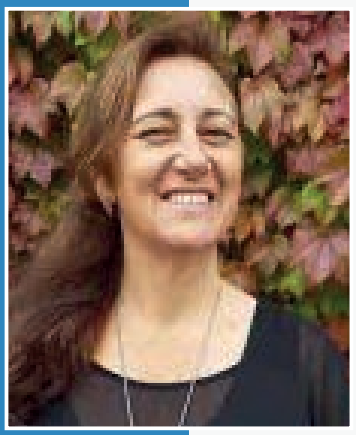
Dr Lisa Te Morenga

School of Health, Victoria University of Wellington

Lisa Te Morenga (Ngapuhi, Ngāti Whātua, Te Rarawa) is Senior Lecturer Māori Health and Nutrition in the School of Health. She completed a PhD in Human Nutrition in 2010 at the University of Otago and continued as a senior research fellow in the Department of Human Nutrition and Associate Dean Māori in the Division of Sciences until 2018.

She is a principal investigator with Edgar Diabetes and Obesity Research at the University of Otago and an associate investigator with the Riddet Institute – a National Centre of Research Excellence food material science, novel food processing, human nutrition and gastrointestinal biology and Ngā Pae o te Māramatanga - New Zealand's Māori Centre of Research Excellence.

Lisa's research interests involve the role of diet in the treatment and prevention of obesity, the metabolic syndrome, diabetes and cardiovascular disease. She has a special interest in the relationship between nutrition and hauora (Māori health). Lisa's primary motivation is to undertake research that is of direct benefit to Māori and thus focuses on the role of nutrition in the development of preventable diseases that inflict a particularly high health burden on the Maori community.



Megan Tunks

Kaiwhakahaere Matua or CEO, Toi Tangata

Kia Ora Koutou

Megan Tunks (Te Whānau-a-Apanui, Te Whakatōhea) is the Kaiwhakahaere Matua or CEO of Te Hotu Manawa Māori Trust trading as Toi Tangata.

Toi Tangata is a small national Māori Not for Profit Health Provider (based in West Auckland) with a particular focus on Nutrition and Physical activity. Key activities for Toi Tangata include workforce development/training, communication tools and resources, strategic relationships, leadership and research partnerships.

Megan joined Toi Tangata early last year. She has a long background in Māori public health, planning and funding and workforce development. Megan previously held roles at the Health Promotion Agency, Waitemata and Auckland District Health Boards, Hapai Te Hauora Tapui Ltd, the Health Promotion Forum, the Ministry of Health and Whariki Research Group.

Megan is also undertaking part time study around Emerging Disruptive Technology with Techfutures which is a partnership organisation to the Mind Lab.

Professor Nick Wilson

Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE^3), University of Otago, Wellington

Nick is a Professor of Public Health at the University of Otago, Wellington. He is a Co-Director of the BODE^3 Programme which does epidemiological/health economic modelling of the impact of preventive interventions. His particular research interests are in tobacco control, major dietary interventions (eg, sodium reduction), and infectious disease control.

ABSTRACTS

Diet and the burden of disease

Presenter: Professor Jim Mann, Healthier Lives National Science Challenge; Edgar Diabetes & Obesity Research (EDOR); University of Otago, Dunedin, New Zealand

Nutritional factors are causally related to diseases which are leading contributors to health loss in New Zealand. A high body mass index (BMI) and specific dietary attributes (low consumption of fruit and vegetables, whole grains, dietary fibre, some unsaturated fatty acids and calcium; high consumption of sodium, red meat, trans fat and sugar) appear to account for around 20% of total health loss measured as disability adjusted life years (DALYs).

Despite some encouraging recent trends, rates of diet related disease remain high and are major contributors to inequity of health outcomes in New Zealand. Diabetes rates continue to escalate. There is convincing evidence that dietary changes can profoundly reduce risk but population based initiatives will be required to facilitate their implementation.

Diet and the burden of disease – a Māori perspective

Presenter: Dr Lisa Te Morenga, Edgar Diabetes & Obesity Research (EDOR); Healthier Lives National Science Challenge; Riddet Centre of Research Excellence; Victoria University of Wellington, New Zealand

Māori have a right to the same levels of health and wellbeing as all New Zealanders and these rights are enshrined in the Treaty of Waitangi. However significant disparities in non-communicable disease morbidity and mortality exist between Māori and non-Māori, for which obesity is a major risk factor. Māori communities have higher exposure to the determinants of obesity including lower incomes, higher rates of unemployment, high and increasing levels of food insecurity, exposure to unhealthier food environments, reduced access to healthier foods and consequently poor quality diets.

Addressing the dietary factors that predispose Māori populations to obesity-related non-communicable has an important role in reducing these health inequities. However we must move the focus away from stigmatizing Māori for making poor dietary choices that result in obesity. The continued reliance on programmes focused on nutrition education puts all the responsibility for obesity on individuals and communities and tends to increase socioeconomic inequalities in obesity. Instead we need greater Government focus on addressing the historically-driven social determinants of health and creating healthier food environments (e.g. junk food marketing restrictions, healthy food policies in schools).

It is also essential that intervention strategies addressing obesity-related illness amongst Māori are development in full partnership with Māori communities.

The Need: Monitoring the healthiness of New Zealand food environments

Presenter: Professor Boyd Swinburn, School of Population Health, University of Auckland, Auckland, New Zealand

Purpose: Obesity and unhealthy diets are the biggest cause of health loss in New Zealand and monitoring the healthiness of food environments and policies is an essential prevention strategy. This HRC-funded study measured the healthiness of multiple components of food environments and related policies and actions by government and the food industry.

Methods: 15 protocols were used to measure: degree of implementation of food policies by government; the commitments and transparency to healthier food environments by major food companies; food composition; food labelling; food promotion to children through different media; food provision in schools; food prices for healthier and less healthy foods, meals, diets; food retail in communities and in-store food environments in supermarkets.

Results: The New Zealand food environment was, in general, unhealthy. The Government and food industries had substantial distance to go to achieve international best practice for their policies and actions. In relation to food environments for children, school food was still high in unhealthy foods and beverages and unhealthy food marketing targeting children was still very common. On the positive side, District Health Boards have made very good progress towards healthier food environments and the takeaway meals cost more than their equivalent, healthier, home-cooked and home-assembled meals. Food swamps with high densities of fast food outlets are more common in more deprived communities.

Key message(s): Unhealthy and inequitable food environments are major contributors to New Zealand's preventable health burden and health inequalities, especially for obesity and diabetes. Priority policies include expanding the DHB healthy food policy to schools and early childhood education centres, restricting unhealthy food marketing to children, a structured reformulation program for sugar and salt, and a tax on sugary drinks. Ongoing monitoring is essential.

The Evidence: Evaluating the effectiveness of dietary interventions

Presenter: Professor Cliona Ni Mhurchu, National Institute for Health Innovation, University of Auckland, Auckland, New Zealand

Purpose: Unhealthy diet is the leading preventable risk for poor health in New Zealand. DIET is a 5-year research programme generating evidence on the most effective and cost-efficient ways to improve population diets and health in order to inform national and international policies. Over the past five years (2013-2018), our team has undertaken world-leading research on front-of-pack nutrition labels, food taxes/subsidies, the composition of New Zealand packaged and fast foods, and children's exposure to food marketing.

Methods: Evaluating the effectiveness of potential new food policy interventions is challenging so we used innovative technologies to measure current population diets and simulate the effects of new policies in the real world. The DIET programme developed and used rich databases of food composition, labelling and household purchases; a customised labelling smartphone app; a virtual supermarket; and automated wearable cameras to measure dietary determinants and test the effects of potential new policies on food purchasing behaviour.

Key message(s):

(1) Front-of-pack nutrition labels appear to have no significant effect on population food purchases but may influence industry to create healthier foods
(2) Taxing foods based on their salt, saturated fat and sugar contents leads to healthier consumer food purchases
(3) A government-led New Zealand food reformulation programme is feasible and could lead to meaningful improvements in population diets
(4) New Zealand children are exposed frequently, across multiple settings, to the marketing of unhealthy foods, showing that current voluntary standards do not protect our children sufficiently

The Priorities: BODE^3 estimation of intervention impacts on health outcomes

Presenter: Professor Tony Blakely, Director BODE^3 Programme, University of Otago, Wellington, New Zealand

Purpose: Burden of disease studies describe health loss, and randomized trials can tell us the magnitude of impact of an intervention on a proximal outcome like blood pressure, but neither tell us the medium to long term health gains in a way we can compare across interventions. The Burden of Disease Epidemiology Equity and Cost Effectiveness programme (BODE^3) aims to estimate health gains, costs, and cost-effectiveness of preventive interventions – including dietary interventions – to inform policy making and future research prioritisation.

Methods: We take data from many sources, e.g.: rich NZ data on disease epidemiology and costs; nutrition survey data; price elasticities that quantify responsiveness to price changes in food; and, of course, intervention effect sizes from (preferably) randomized trials. We then simulate the New Zealand population over the remainder of their lifetimes under business as usual (BAU), and layer over this an intervention like reducing serving size. The simulation outputs the difference in quality adjusted life years (QALYs) and health system costs between the intervention and BAU. We then compare these gains and costs to other interventions using tools like the BODE^3 interactive league table.

Key message(s):

(1) Dietary interventions have massive variation in impact on QALYs, from a few 100 (e.g. dietary counselling in primary care) to several 100s of thousands (e.g. substituting potassium chloride for sodium chloride in foods)
(2) Many preventive interventions are cost saving to the health system
(3) Generalizing:
    a. population-wide interventions (e.g. food reformulation) tend to have greater impact than targeted or personalized interventions (e.g. dietary counselling)
    b. health gains and costs tend to start within years of an intervention, but for preventive interventions often take decades to reap full benefits
(4) There is genuine and large uncertainty in such modelling, but when impacts differ by an order of magnitude, we are confident in their ranking

Packaged foods in New Zealand: INFORMAS monitoring results

Presenter: Dr Sally Mackay, School of Population Health, University of Auckland, Auckland, New Zealand

The INFORMAS food composition module was implemented in New Zealand to assess the healthiness of the packaged food supply using Nutritrack data on over 13, 000 packaged foods. A range of food classifications systems was used: Health Star Rating, NOVA (degree of processing), WHO nutrient profile model, NZ Food and Beverage Classification System. The New Zealand packaged food supply is largely unhealthy with many foods not permitted to be marketed to children. Monitoring has the potential to drive positive changes in the nutrient composition of processed foods. Monitoring of changes to the healthiness of the food supply will continue with annual 'State of the Food Supply' reports planned for New Zealand and Australia.

Healthier reformulation of processed foods: policy opportunities

Presenter: Dr Helen Eyles, National Institute for Health Innovation, University of Auckland, Auckland, New Zealand

Purpose: Healthier reformulation of processed foods is an effective and equitable intervention for improving the diets of New Zealanders (NZers). This presentation will cover three important policy opportunities for inclusion in a New Zealand reformulation programme: standardised targets for the portion size and nutrient content of New Zealand fast foods, a salt reduction model for New Zealand, and a sugar reduction campaign focused on children's foods.

Methods: Changes over time in the serve size, energy and sodium contents of fast foods sold at major New Zealand chains were examined in the annual Nutritrack food composition database. Nutritrack data for supermarket products were linked with household food purchasing data from the Nielsen Homescan market research panel to calculate sales-weighted sodium values and category-based reduction targets for food manufacturers. Linked Nutritrack and Homescan sales data will also be used to calculate sales-weighted manufacturer targets to reduce the sugar contents and serve size of processed foods and beverages commonly consumed by New Zealand children.

Results: The serve size and energy density of New Zealand fast food products increased significantly between 2012 and 2016, with reductions in sodium being off-set by increases in serve size. A 36% reduction in the sodium content of packaged foods combined with a 40% reduction in discretionary salt use and the sodium content of foods consumed away from the home would reduce total population salt intake in New Zealand by 35%, thus meeting the World Health Organization (WHO) target. A sugar reduction campaign similar to the one currently underway in the United Kingdom would help reduce sugar intakes and obesity in New Zealand children and adults.

Key message(s): Healthier reformulation of New Zealand processed foods is feasible. Focusing a New Zealand reformulation programme on the serve size, sodium and sugar contents of processed foods aligns with WHO recommendations, will improve dietary intakes and health in New Zealand, and is likely to be equitable.

Estimated impact of interventions to reduce salt and sugar consumption in New Zealand

Presenter: Professor Nick Wilson and Dr Cristina Cleghorn, BODE^3, Department of Public Health, University of Otago, Wellington, New Zealand

Background: Diets high in sodium and in sugar are major risk factors for health loss identified in the Global Burden of Disease Study. Many countries are now using regulations or taxes to reduce dietary intakes of these components. We therefore aimed to model health gains and costs (savings) of preventive interventions to reduce the dietary intakes of these components in the New Zealand population.

Methods: A Markov macro-simulation model was used to estimate QALYs gained and net health system costs for 30 sodium reduction and 7 sugar reduction interventions, discounted at 3% per annum. The model was populated with detailed individual-level administrative disease and cost data. Results were included in the BODE^3 online interactive league table.

Results: The most effective sodium reduction intervention was where most (59%) of the sodium in processed foods was replaced by potassium and magnesium salts. This intervention gained 294,000 QALYs over the remaining lifetime of the cohort (95% UI: 238,000 to 359,000; 0.13 QALY per 35+ year old). Such salt substitution also produced the highest net cost-savings of NZ$ 1.5 billion (95% UI: NZ$ 1.1 to 2.0 billion). Another 28 sodium reduction intervention were also cost-saving (and the remaining one was still cost-effective). All interventions generated relatively larger per capita QALYs for Māori vs non-Māori.

Modelling the theoretical intervention where all New Zealanders immediately meet the WHO guidelines of reducing dietary free sugars to <10% or 5% of total energy intake generated 1,007,000 and 623,000 QALYs respectively. Out of the modelled interventions that could help New Zealand achieve the WHO guidelines, the sugar tax produced the greatest reductions of sugar intake and QALY gains followed by sugar reformulation of high sugar foods, SSB single serve size reductions and an SSB tax. All interventions were cost saving, generating up to NZ$ 6.5 billion for the sugar tax.

Key message(s): The benefits from this modelling are consistent with the international literature, with potentially large health gains and cost savings possible from sodium and sugar reduction interventions. Policy-makers have a wide range of interventions to select from, including ones that focus more on protecting children (eg, sugary drinks) and which would involve minimal risk of consumer and industry resistance (eg, reductions of sodium in very salty sauces).

Food labelling in New Zealand: Results from the INFORMAS study

Presenter: Professor Boyd Swinburn, School of Population Health, University of Auckland, Auckand, New Zealand

Purpose: Food claims for health and/or nutrition benefits are common on packaged foods and beverages and are potentially misleading. These studies analysed the extent of food claims on packaged foods.

Methods: Nutrient Profiling Scoring Criterion was used to classify 7526 packaged products as healthier or less healthy and health and nutrition claims on the packages were categorised according to the INFORMAS taxonomy. A more detailed study was also conducted on all breakfast cereals (n=247) which included analyses by whether promotional characters were present and whether the cereals were targeting children.

Results: The majority (69%) of claims were on healthier foods with 45% of healthier foods carrying nutrition claims and 23% carrying health claims. However, the comparable figures for less healthy foods were 26% and 7%. On breakfast cereals classified as less healthy, 65% had nutrition claims and 17% had health claims. 'Cereals for kids' tended to be less healthy and feature promotional characters more prominently.

Key message(s): Food claims, especially nutrition claims, are very common including on about a third of unhealthy foods. This is likely to be confusing for consumers who are seeking healthier choices. Regulations on health claims needs to be extended to include nutrition claims in addition to other policies such as structured reformulation and marketing restrictions which extend to packaging promotions such as using cartoon characters on unhealthy 'cereals for kids'.

Effects of interpretive nutrition labels on consumer food purchases: the Starlight randomised, controlled trial

Presenter: Professor Cliona Ni Mhurchu, National Institute for Health Innovation, University of Auckland, Auckland, New Zealand

Purpose: Nutrition labelling is a prominent policy tool to promote healthy eating. We evaluated the effects of two interpretive nutrition labels, compared with a non-interpretive label, on the healthiness of consumer food purchases.

Methods: In a parallel-group, randomised controlled trial, we enrolled regular household shoppers across New Zealand who owned smartphones and were aged 18+ years. Eligible participants were randomly assigned (1:1:1) to receive either Traffic Light Labels (TLL), Health Star Rating labels (HSR), or control (Nutrition Information Panel (NIP)). Smartphone technology allowed participants to scan barcodes of packaged foods and receive allocated labels on their phone screen.

Results: 1357 eligible shoppers were randomly assigned to TLL (n=459), HSR (n=443) or NIP (n=455). At the relatively low level of label use observed in this trial, neither TLL nor HSR had a significant effect on the healthiness of packaged food purchases, compared with NIP. However, participants assigned to interpretive labels were significantly more likely to find them useful and easy to understand, and frequent TLL and HSR users had significantly healthier food purchases than frequent NIP users.

Key message(s): In a randomised controlled trial, interpretive nutrition labels had no significant effect on consumer food purchases, though regular use of interpretive labels may result in healthier food purchases.

Effects of interpretive nutrition labels on food reformulation: the Health Star Rating system

Presenter: Professor Cliona Ni Mhurchu, National Institute for Health Innovation, University of Auckland, Auckland, New Zealand

Purpose: Interpretive, front-of-pack (FOP) nutrition labels may encourage reformulation of packaged foods. We aimed to evaluate the effects of the Health Star Rating (HSR) voluntary interpretive FOP labelling system on food reformulation in New Zealand.

Methods: Annual surveys of packaged food and beverage labelling and composition were undertaken in supermarkets before and after adoption of HSR i.e., 2014 to 2018. Outcomes assessed were HSR uptake by food group; star ratings of products displaying a HSR label; nutritional composition of products displaying HSR compared with non-HSR products; and the composition of products displaying HSR labels in 2018 compared with their composition prior to introduction of HSR.

Results: In 2018, four years after adoption of the voluntary system, 21% of eligible packaged food and beverage products surveyed (n = 2,997/14,318) displayed HSR labels. The highest rates of uptake were for packaged fruit and vegetables, cereals and cereal products, and non-alcoholic beverages. Three quarters (76.5%) of products displaying HSR star graphic labels had ratings of 3.0 to 5.0 stars. Analysis of the composition of products available in 2018 that were also available in 2014 (prior to adoption of HSR) showed some evidence of healthier product reformulation of HSR-labelled products relative to non-HSR products with respect to sodium. However, reformulation differences between HSR and non-HSR foods were small and not statistically significant when weighted by household food purchase volumes.

Key message(s):

(1) Voluntary uptake of HSR system is very slow
(2) Display of HSR labels appears to be biased towards already healthier products
(3) There is some evidence of healthier product reformulation of HSR-labelled products relative to non-HSR products but it does not translate into healthier food purchases

Food marketing to children in New Zealand: Results from the INFORMAS studies

Presenter: Professor Boyd Swinburn, School of Population Health, University of Auckland, Auckland, New Zealand

Purpose: WHO recommends restrictions are placed on the marketing of unhealthy foods to children, although in New Zealand there are no government regulations on this, only an industry designed and managed code of practice. This set of INFORMAS studies analysed food marketing to children through multiple media: television, magazines, company websites and Facebook, social media, outdoor advertising around schools, sports sponsorship, and food package promotions.

Results: Television: Over two-thirds of food ads were for unhealthy foods. On average, there were more than 9 unhealthy food ads per hour with 88% being in children's peak viewing times and about one third containing a premium offer and one-third containing a promotional character. Magazines: Most food ads (72%) in teen-targeted magazines were for unhealthy foods compared with 42% for women's magazines popular with teens. Websites: Of the 70 food company websites analysed, 20 were specifically targeted at

children and a wide range of sophisticated marketing techniques were used including advercation (87%), viral marketing (64%), cookies (54%), and promotional characters (39%). Facebook: Popular food brands used promotional strategies (41%) and premium offers (34%) to appeal to children. Outdoor advertising: About two-thirds of urban schools had at least one convenience store and/or at least one fast food outlet within 800m of the school gates. These outlets were closer to low decile schools than high decile schools. Sports clubs: 9.6% of the sponsors of clubs popular with children were for foods or beverages.

Key message(s): Children are being heavily targeted through many media platforms for promotions for unhealthy foods. The self-regulatory code is too weak and too narrowly defined to reduce the volume and power of unhealthy food marketing to children and adolescents.

Children's everyday exposure to food marketing: a wearable camera study

Presenter: Professor Louise Signal, Health Promotion & Policy Research Unit, University of Otago, Wellington, New Zealand

Purpose: This paper reports on innovative research, Kids'Cam, in which children wore cameras to examine the frequency and nature of everyday exposure to food marketing across multiple media and settings.

Methods: Kids'Cam was a cross-sectional study of 168 children (mean age 12.6 years) in the Wellington region. Each child wore a wearable camera on four consecutive days, capturing images automatically every seven seconds. Images were manually coded as either recommended (core) or not recommended (non-core) to be marketed to children by setting, marketing medium, and product category. Images in convenience stores and supermarkets were excluded as marketing examples were considered too numerous to count.

Results: On average, children were exposed to non-core food marketing 27.3 times a day (95% CI 24.8, 30.1) across all settings. This was more than twice their average exposure to core food marketing (12.3 per day, 95% CI 8.7, 17.4). Most non-core exposures occurred at home (33%), in public spaces (30%) and at school (19%). Food packaging was the predominant marketing medium (74% and 64% for core and non-core foods) followed by signs (21% and 28% for core and non-core). Sugary drinks, fast food, confectionary and snack foods were the most commonly encountered noncore foods marketed.

Key message(s): Children in this study were frequently exposed, in multiple settings, to marketing of non-core foods not recommended to be marketed to children. The study provides further evidence of the need for urgent action to reduce children's exposure to marketing of unhealthy foods, and suggests the settings and media in which to act. Such action is necessary if the Commission on Ending Childhood Obesity's vision is to be achieved.

Food prices in New Zealand: INFORMAS monitoring results

Presenter: Dr Sally Mackay, School of Population Health, University of Auckland, Auckland, New Zealand

The INFORMAS food prices module was implemented in New Zealand to compare the relative price and affordability of healthy compared to current (less healthy) diets, meals and foods. Foods in the Food Price Index increased over a ten-year period but there was no difference in the rate of change for foods categorised as healthy or less healthy.

The cost of home-made and home-assembled meals was lower than or similar to the cost of takeaway meals when the cost of preparation and waiting time was considered. Healthy diets on average cost more than the current (less healthy) diets but there was a lot of overlap. Affordability of both healthy and current diets was low for low-income households. Trends in food prices over time will continue to be monitored using the Food Price Index.

Setting the scene internationally on food price policies, mostly taxes & subsidies

Presenter: Professor Nick Wilson, Co-Director BODE^3 Programme, University of Otago, Wellington, New Zealand

Aim: To provide an overview of international developments and evidence concerning food price policies, particularly taxes and subsidies.

Methods: Examination of recent literature reviews and for sugar-sweetened beverages (SSBs), a meta-analysis to SSB taxes (of 18 studies in nine jurisdictions).

Results: There are 30+ jurisdictions that have now implemented SSB taxes. These include 8 OECD countries (Chile, Estonia, France, Ireland, Mexico, Norway, Portugal, UK). Another 8 sub-national jurisdictions in the OECD also have these taxes (mainly US cities). The evidence for these taxes reducing consumption is now strong (systematic review and meta-analysis by Teng et al, submitted). Furthermore, these taxes tend to increase bottled water purchases. There are now some identified enabling factors for SSB tax adoption (eg, having a clear health goal and hypothecation to health/education). Counter-arguments against SSB taxes include the political opportunity cost (given often robust opposition from commercial interests).

Three OECD countries have other food taxes ie, Mexico (junk food), Hungary (selected high sugar and salt products), and Norway (sugar). There is some supportive evidence from modelling and also from the Mexican experience. Similarly for food subsidies, there is some favourable modelling evidence, especially when combined with taxes. Applied food subsidises for pregnant or postnatal women is typically associated with a 10-20% increased intake of targeted foods/nutrients (14 studies, mainly USA). Also a meta-analysis of 22 studies suggests that a 10% decrease in price increases consumption of healthful foods by 12%.

Key message(s):

(1) Sugar-sweetened beverage (SSB) taxes – are effective in reducing SSB consumption (and switching to water) and are increasingly popular internationally

(2) Other food taxes – do have some supportive evidence but are less popular than SSB taxes

(3) Food subsidies – have supportive evidence but the focus has tended to be on targeted populations

A virtual supermarket experiment and consumer response to price changes

Presenter: Dr Nhung Nghiem, BODE^3, Department of Public Health, University of Otago, Wellington, New Zealand

Food price elasticities (PE) are essential for evaluating the impacts of food taxes and subsidies. A PE gives the expected percentage change in purchasing for a food when its own price changes, or when the price of another food changes. It is this latter component, so-called cross-PEs that capture substitution effects, that are difficult to estimate yet important for net health impacts.

Existing econometric estimates of food PEs are often poor, being based on single observational data sets without much variation in prices and failing to utilise prior information. In this study, we blended experimental purchasing data from a Virtual Supermarket Experiment and previous PE results from observational data studies using a Bayesian framework to estimate the PE matrix for a large set of foods. The outputted posterior Marshallian PE matrices, with small cross-price elasticities between foods theoretically unlikely to be complements or substitutes, have face validity.

Key message(s): We developed a novel Bayesian approach incorporating information from previous price elasticity matrices, and experimental data from a Virtual Supermarket, to estimate a food demand system. The outputted posterior price elasticity matrices, with small cross-price elasticities between foods theoretically unlikely to be complements or substitutes, have face validity.

Changing food prices: Effects on food and nutrient purchases, and health gain (QALYs)

Presenter: Professor Tony Blakely, Director BODE^3 Programme, University of Otago, Wellington, New Zealand

Purpose: Leveraging off our virtual supermarket (VS) study and extensive previous research on changes in food price on health, we are now estimating nutrient and quality-adjusted life-year (QALY) impacts of various taxes and subsidies: fruit and vegetable (F&V) subsidy (20%), sugar-sweetened beverage (SSB) tax (20% or 40%), saturated fat (SAFA) tax ($2/100g or $4/100g), salt tax ($0.02/100mg or $0.04/100mg sodium), and sugar tax ($0.40/100g or $0.80/100g).

Methods and results: Regression analyses of the VS data were used to estimate changes in nutrient purchasing, and price elasticities have been propagated through the BODE^3 simulation model.
Nutrients: The salt, sugar and SAFA taxes all statistically significantly improved the overall dietary health score, and reduced purchasing of the target nutrient of concern. Results for SSBs were imprecise, mixed, but generally in the predicted pro-health direction. The F&V subsidy increased F&V purchasing.
Health gain (QALYs): Early results for sugar, salt and SAFA taxes, and targeted SSB taxes, demonstrate substantial QALY gains.

Key message(s):

(1) From multiple analytical perspectives, food taxes and subsidies in a New Zealand virtual supermarket suggest mostly healthy impacts

(2) Specifically:
- Results for SSB taxes were mixed but were generally pro-health
- Sodium, salt and sugar taxes produce similar positive impacts

(3) Strength: This is innovative world leading research

(4) Limitation: Quantitative estimating of net health impact of food taxes and subsidies through modelling is challenging, and all results need to be considered in terms of their uncertainty