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MNZH MAKE NEW ZEALAND HEALTHY

Reverse the Chronic Disease Crisis.

THE PROBLEM: New Zealand's dietary guidelines have largely followed global convention, resulting in a decades-long consensus-based approach that has entrenched existing strategies while under-examining conflicting evidence and methodological limitations. This has contributed to a persistent under-emphasis on the role of nutrient-dense fats and proteins, despite their importance for satiety, metabolic regulation, and overall diet quality. While guidance has promoted fruit and vegetable intake, it has not adequately addressed the need for balanced macronutrient intake across fats, proteins, and carbohydrates.

At the same time, New Zealand is unusual in applying a 15% GST to nearly all foods, including basic healthy foods, during a period of rising food prices. This sits alongside a food environment in which ultra-processed foods (UPFs) remain relatively inexpensive.

Chronic disease reflects a departure from the body's normal state of health, arising from one or more underlying causes. Identifying and addressing these root causes is central to both prevention and treatment, even where medication plays an important role in managing a given condition.

Health plays a foundational role for individuals, society, business, and the nation. The underlying drivers of ill health are not specific to any one disease category, and our chronic disease crisis is not just an ageing problem. Children and young people are experiencing diet-related illness at earlier ages. Current dietary guidance and food-tax settings do not adequately support access to nutrient-dense whole foods, nor do they sufficiently discourage diets high in UPFs dominated by refined sugars and starches. These diets are typically low in essential micronutrients and key macronutrients, contributing to poor diet quality.

The result is a growing burden of metabolic dysfunction, including unstable blood glucose, elevated triglycerides, insulin dysregulation, and increased risk of diabetes, cardiovascular disease, systemic inflammation, and related neurological conditions.

UPFs now constitute a substantial proportion of dietary intake internationally. Estimates suggest they provide approximately 45–60% of total energy intake in countries such as Canada, the United Kingdom, and Australia, with the highest consumption among younger age groups. New Zealand data are limited, but available evidence indicates that UPFs contributed around 42–51% of total energy intake by age five, over a decade ago.

THE SOLUTION: A coordinated set of policy reforms that realign dietary guidance, food pricing, and the wider food environment to reduce exposure to refined carbohydrate-dominant ultra-processed foods, and improve access to nutrient-dense whole foods. Together, these measures address the systemic drivers of metabolic disease by reshaping the food environment.

1) Dietary Guideline Reform: A balanced whole food, macronutrient approach.
2) Fix Food Taxes. Current taxation is upside down. Let's fix it!
3) Restore Ka Ora, Ka Ako School Lunches in Low Decile Schools.
4) Food Marketing & Advertising: Reducing Exposure Without Burdening Users

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MNZH POLICY RECOMMENDATIONS

A Multipronged Approach to Work on all Levels

THE SOLUTION: MNZH's approach centres fiscal policy on metabolic disease prevention within an integrated framework spanning dietary guideline reform, school lunch provision, and advertising regulation. These interconnected policies align price signals, guidance, and the food environment to support a shift away from non-essential, carbohydrate-dominant ultra-processed foods and sugar-sweetened beverages, dietary patterns associated with high glycaemic load, excess energy intake, and the development of insulin resistance.

Diet and nutrition are foundational determinants of health, and poor diets or nutrient insufficiency can trigger cascading symptoms that undermine quality of life. For a metabolic health strategy to succeed, transformation must extend beyond clinical practice to governance systems, including research, science, agriculture and education. This is why MNZH's policy platform is wide-ranging: improving health outcomes requires a coordinated approach that reforms institutions and addresses the underlying drivers of poor human and environmental health in New Zealand today.

How can we achieve this? A multipronged approach.

1) Dietary Guideline Reform: A balanced whole food, macronutrient approach.
2) Fix Food Taxes. Current taxation is upside down. Let's fix it!
3) Restore Ka Ora Ka Ako School Lunches in Low Decile Schools.
4) Food Marketing & Advertising: Reducing Exposure Without Burdening Users

1) Dietary Guideline Reform: A balanced whole food, macronutrient approach.

***The Scientific Case for a Metabolic Approach*.** A substantial body of literature demonstrates that:

a. Diets high in refined carbohydrates and ultra-processed foods are associated with dysregulated glucose and insulin signalling, contributing to metabolic syndrome, type 2 diabetes, systemic inflammation and a host of other physical and brain-related conditions.
b. Total carbohydrate load and quality, not only free sugars, influence glycaemic control and downstream metabolic outcomes.
c. Adequate protein intake, including sufficient essential amino acids, supports satiety regulation, lean mass maintenance, and metabolic stability, and is critical during periods of growth, development, and pregnancy.
d. Evidence on dietary fats indicates that health effects are context-dependent, and that whole-food sources of fat cannot be equated with industrial trans fats.
e. Diet quality is more accurately captured by nutrient density and degree of processing, rather than isolated nutrient thresholds.
f. Emerging evidence indicates that ultra-processed foods may elicit addiction-like responses in some individuals, including craving, loss of control, and continued consumption despite harm.

Dietary Guideline Revision: Recommendations

It is recommended that dietary guidelines be revised to include the following:

(a) Refined carbohydrate reduction

i. Explicit guidance to reduce intake of refined carbohydrates, including refined starches and sugars to lower blood glucose levels and protect patients from elevated insulin levels;[1] [2]
ii. Recognition of glycaemic load and metabolic impact as relevant considerations.

(b) Macronutrient balance

i. Inclusion of guidance on adequate protein intake across the life course;
ii. Recognition of the role of whole-food dietary fats within healthy dietary patterns;
iii. Removal of implicit or explicit bias toward high-carbohydrate dietary patterns.

(c) Fat quality clarification

i. Clear distinction between industrial trans fats (to be avoided) and whole-food sources of dietary fat;
ii. Avoidance of blanket restrictions that conflate these categories.

(d) Nutrient density and adequacy

i. Prioritisation of nutrient-dense foods that provide essential nutrients in bioavailable forms;
ii. Recognition that caloric sufficiency alone does not ensure adequate nourishment, particularly for children, adolescents and pregnant women.

(e) Food processing guidance

i. Explicit recommendation to reduce consumption of non-essential ultra-processed foods, particularly those high in refined carbohydrates and added sugars;
ii. Recognition that low-to-moderate processing can be compatible with healthy diets, while ultra-processing is associated with poorer outcomes.

(f) Dietary pattern flexibility

i. Recognition of multiple evidence-based dietary approaches, including lower-carbohydrate patterns, particularly for individuals diagnosed with prediabetes, diabetes and cardiovascular risks, and younger populations with poor mental heath;
ii. Support for dietary patterns that reduce reliance on refined carbohydrate-dominant foods.

Standard of Evidence and Review. Guideline revision should be based on:

- ✓ transparent, systematic review of the full body of scientific literature, including mechanistic, clinical, epidemiological, and behavioural evidence;
- ✓ explicit consideration of areas of uncertainty and heterogeneity;
- ✓ independence from commercial or institutional conflicts of interest;

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[1] Unwin D, Haslam D, Livesey G (2016) It is the glycaemic response to, not the carbohydrate content of food that matters in diabetes and obesity: The glycaemic index revisited. Journal of Metabolic Health | Journal of Insulin Resistance: 1 (1)a8, DOI: 10.4102/jir.v1i1.8

[2] Unwin D, Delon C, Unwin J, et al. What predicts drug- free type 2 diabetes remission? Insights from an 8- year general practice service evaluation of a lower carbohydrate diet with weight loss. BMJ Nutrition, Prevention & Health 2023;0:e000544. doi:10.1136/bmjnph-2022-000544

- ✓ incorporation of integrated frameworks addressing nutrient density, processing, and behavioural drivers of diet.

Making Dietary Reform Work: Aligning Policy, Practice and Behaviour

The effectiveness of dietary guideline reform is contingent on its integration with complementary policy instruments that give effect to these principles in practice. MNZH's broader policy programme is designed to operationalise this integration across economic, clinical, and behavioural domains. Measures to improve affordability and access align fiscal and procurement systems with dietary guidance, correcting price signals that currently favour refined, carbohydrate-rich ultra-processed foods and ensuring that essential nutrient-dense foods are economically accessible across all population groups.

Clinical integration embeds dietary intervention within primary care as a first-line or adjunctive treatment for poor metabolic health, supported by health coaching and structured behavioural delivery models capable of achieving sustained change. In parallel, the incorporation of behavioural and addiction-informed approaches recognises that, for some individuals, exposure to ultra-processed foods produces reinforcement patterns that constrain autonomous dietary choice. This necessitates policy-supported access to interventions that extend beyond information provision, including structured dietary transitions, identification and management of trigger foods, and ongoing coaching and peer support. These intersecting policy measures, as set out across MNZH's programme of work, give practical effect to dietary guideline reform. Absent such alignment, guideline revision will be unlikely to deliver meaningful improvements in metabolic health outcomes at a population level.

2) Fix Food Taxes. Current taxation is upside down. Let's fix it!

This approach represents a targeted fiscal rebalancing that removes consumption taxes from nutrient-dense whole foods while applying corrective (Pigouvian) taxes to non-essential carbohydrate-rich ultra-processed foods and sugar-sweetened beverages, thereby restructuring relative prices to better align consumer incentives with long-term health outcomes.

The next generation of health taxes is moving beyond beverages alone toward industrially formulated discretionary foods, especially products high in free sugars, refined starches, energy density, trans fats, and other ingredients of concern, often sold as convenient, hyper-palatable, non-essential foods.

Internationally, the clearest precedent is the fiscal framework implemented in Mexico, which combines taxes on sugar-sweetened beverages with taxes on non-essential energy-dense foods. Evidence from this policy shows reductions in purchases of taxed products and substitution towards less processed foods.

Proposed Fiscal Framework: MNZH recommends a three-part fiscal reform, alongside broader food-environment regulation.

1. Remove GST from core staple foods. GST should be removed from a defined basket of minimally processed staple foods that support metabolically healthy diets. The exemption would apply to:

1. NOVA Group 1 foods (minimally processed foods)

2. NOVA Group 2 savoury culinary ingredients

3. selected NOVA Group 3 processed foods that are canned or bottled and minimally processed, but with no added sugar.

Eligible foods would include vegetables, fruit, legumes, eggs, plain dairy products, nuts and seeds, minimally processed oils, uncrumbed meat and poultry, and canned or frozen meat, vegetables and fruit without added sugar. Removing GST from these foods directly improves the affordability of nutrient-dense whole foods, particularly for lower-income households.

2. Introduce a sugar-sweetened beverage tax. A 20% excise tax on sugar-sweetened beverages should be implemented, consistent with modelling proposed by Nick Wilson and colleagues. The tax would apply to beverages containing added sugar, including soft drinks, energy drinks and sweetened juices. Sugar-sweetened beverages represent one of the largest sources of rapidly absorbed sugars in modern diets and are strongly associated with increased diabetes risk.

3. Introduce a junk-food excise on ultra-processed snack foods. A new excise tax should apply to non-essential carbohydrate-rich ultra-processed packaged foods, using an administratively simple threshold of ≥275 kcal per 100 g. This replicates the Mexican tax which was designed to lower the prevalence of diabetes. Products captured would include confectionery, industrial snack foods, packaged desserts and highly processed savoury snack products.

By targeting discretionary industrial foods rather than staple foods, the tax focuses on products most closely associated with modern metabolic disease.

Policy Design Principles. The proposed fiscal framework is guided by four principles:

a. Target discretionary ultra-processed foods: taxes apply to products strongly associated with metabolic disease risk (this does not include traditional cooking condiments).
b. Protect access to staple foods: GST removal improves the affordability of nutrient-dense foods.
c. Use simple administrative thresholds: energy density provides a clear and enforceable trigger for taxation.
d. Combine incentives and disincentives: fiscal measures both discourage ultra-processed foods and improve access to healthier foods.

Policy Impact

Removing GST from minimally processed foods while taxing sugar-sweetened beverages and carbohydrate-rich ultra-processed foods aligns fiscal policy with the dietary drivers of metabolic dysfunction and disease. By discouraging discretionary ultra-processed products and improving access to nutrient-dense foods, this framework directly targets the dietary patterns associated with the development of prediabetes, type 2 diabetes, fatty liver and high blood pressure.

3) Restore Ka Ora, Ka Ako School Lunches in Low Decile Schools.

The Ka Ora, Ka Ako programme should be restored and stabilised for the low-decile schools it was originally designed to serve, with a renewed emphasis on nutritional quality and minimally processed foods. Restoring the programme would:

- Improve nutrient intake among children in food-insecure households;
- Broaden dietary exposure and taste preferences for healthier foods;
- Reduce reliance on ultra-processed foods among children at higher risk of metabolic dysfunction and disease; and
- Support healthier long-term dietary patterns and metabolic health.

Ensuring reliable access to nutritious school meals is an effective public-health intervention for improving child nutrition and reducing health inequalities. A strengthened Ka Ora, Ka Ako programme would restore an important policy instrument for improving diet quality and supporting the long-term metabolic health of New Zealand children.

Funding cuts had resulted in a less nutritious programme replacing the Ka Ora, Ka Ako programme, based on lack of evidence. Critics from the public-health and nutrition research community highlighted that the revised centralised meal model reduced food quality, meal variety and nutritional adequacy. Concerns raised included evidence of lower protein content, reduced fresh food components and increased reliance on processed foods and that this change undermined the programme's original objectives by prioritising cost savings over nutritional adequacy and diet quality.

4) Food Marketing & Advertising: Reducing Exposure Without Burdening Users

Children exposed daily to pervasive advertising across television, digital platforms, schools, and community environments, particularly in lower socioeconomic areas, and New Zealand reviews consistently demonstrate that voluntary industry codes (self-regulation) have been ineffective in limiting unhealthy food marketing.

Reviews of the evidence consistently recommend statutory, enforceable restrictions across all media and settings, including digital advertising, sponsorship, and environments where children gather. Approaches in digital environments must place responsibility on systems and intermediaries, platforms, advertisers, and data brokers, rather than on individuals to verify their age. By regulating exposure at source and across environments, it reduces the likelihood that children encounter marketing for products associated with poor metabolic health, while avoiding privacy risks and compliance burdens associated with user identification.

The foods most heavily promoted are ultra-processed products high in refined carbohydrates and sugars, those most closely associated with metabolic disease, including insulin resistance and type 2 diabetes.

However, current regulatory approaches often rely on broad nutrient thresholds, including salt and saturated fat, rather than targeting the primary dietary drivers of metabolic dysfunction and disease. Aligning advertising restrictions with a revised metabolic health framework, focused on reducing exposure to refined carbohydrate-dense, ultra-processed foods, would strengthen policy coherence and more directly address the underlying causes of diabetes and metabolic syndrome.

Policy should move from regulating advertising aimed at children to regulating advertising children are exposed to. This shift recognises that most exposure occurs outside narrowly defined 'child-

directed' advertising and requires a whole-environment approach to reduce cumulative exposure to unhealthy food marketing.

A comprehensive regulatory framework should apply across the following domains:

Outdoor and public spaces. Prohibit advertising of sugar-sweetened beverages and ultra-processed foods in publicly owned or controlled environments, including billboards, public transport, and within defined zones around schools, playgrounds, and sports facilities.

Broadcast media (television and radio). Introduce time-based restrictions prohibiting advertising of in-scope products during periods of high child exposure (e.g. 6am–9pm), capturing family viewing and listening hours rather than relying on programme classification.

Retail environments (including convenience stores). Regulate retail settings as sites of promotional exposure by restricting exterior advertising (e.g. window signage), limiting prominent in-store placement (e.g. checkouts and end-of-aisle displays), and applying additional controls in proximity to schools.

Sponsorship and brand exposure. Restrict the promotion and branding of in-scope products in settings associated with children and young people, including in-school material, equipment and infrastructure, sports events and community activities.

These measures should be underpinned by statutory regulation, supported by clear product definitions (e.g. nutrient profiling), independent monitoring, and enforceable compliance mechanisms. The objective is to reduce overall exposure to unhealthy food marketing across the environments in which children live, learn, and play.

Digital and Cross-Platform Marketing: Reducing Exposure Without Burdening Users

Children are exposed to advertising material and sponsor-aligned messaging across digital and cross-platform environments, including via social media, video platforms, apps, and programmatic advertising systems. Regulation should not depend on proving user age through identification, which is intrusive, unevenly effective, and places an unreasonable burden on consumers. Instead, a default exposure-reduction approach should be adopted.

i. Platform-level restrictions. Prohibit the advertising of sugar-sweetened beverages and ultra-processed foods on platforms, services, or content streams where children are reasonably likely to be present. This shifts responsibility to platforms and advertisers to manage exposure, rather than requiring individual age verification.
ii. Ban on targeted marketing to minors. Prohibit behavioural and interest-based targeting of in-scope products to users inferred or known to be under 18, including the use of profiling, tracking, or look-alike audiences.
iii. Content and placement controls. Restrict advertising adjacent to, or embedded within, content that has substantial child or mixed-age audiences, including influencer marketing, advergames, and branded content. Treat such formats as advertising regardless of disclosure labels.
iv. Time- and audience-based safeguards. Where appropriate, apply time-based restrictions to digital broadcast equivalents (e.g. streaming platforms) and require platforms to designate and enforce child- and family-safe environments free from such advertising.

v. Retail-linked digital promotion. Restrict location-based and proximity marketing (e.g. mobile ads triggered near schools or convenience stores) for in-scope products.
vi. Transparency and accountability. Require platforms and advertisers to provide auditable data on ad placements, targeting criteria, and exposure metrics, enabling independent monitoring and enforcement.

BACKGROUND TO THIS POLICY

A multipronged approach to correct a chronic, long-term health crisis. Over time, diet-related harms become embedded across generations as everyday habits are shaped by a powerful mix of influences. Cheap, highly palatable carbohydrate-rich ultra-processed foods are widely available and heavily marketed, while more nutrient-dense options are often harder to access or afford. These patterns are reinforced within families and social environments, where eating behaviours are learned, normalised, and passed on. Together, these forces create self-reinforcing cycles that make unhealthy dietary patterns increasingly entrenched and difficult to change.

Few New Zealand policy proposals explicitly address the role of ultra-processed foods and refined carbohydrate exposure in driving hyperinsulinemia, hypertriglyceridemia and insulin resistance.

New Zealand's food-policy literature has largely focused on reducing salt, sugar and saturated fat within a conventional public-health nutrition framework but evidence suggests that salt and saturated fat are unlikely to be the primary drivers of the observed metabolic patterns. They do not directly address the metabolic mechanisms driving the rapid rise in prediabetes and type 2 diabetes and the associated cardiovascular, including blood pressure risk.

When diets are dominated by refined carbohydrates, especially foods made from refined starches and sugar-sweetened beverages, the body is consistently exposed to rapid rises in blood glucose. In response, the pancreas releases large amounts of insulin to bring glucose down. When this happens day after day, insulin levels remain persistently high (hyperinsulinaemia), and the body becomes less responsive to it (insulin resistance). At the same time, excess glucose is converted in the liver into fat, raising triglyceride levels in the blood and leading to fat accumulation in the liver (fatty liver).

This combination, high insulin, high triglycerides, and fat deposition, disrupts normal metabolism and makes it progressively harder to regulate blood sugar, increasing the risk for type 2 diabetes. Elevated insulin also affects the kidneys and blood vessels, promoting salt retention and vascular changes that raise blood pressure. Over time, this creates a reinforcing cycle in which high-carbohydrate, ultra-processed dietary patterns drive metabolic dysfunction across multiple systems, rather than a single isolated condition.

Legacy dietary guidance has tended to emphasise increased fruit and vegetable consumption while paying comparatively little attention to the affordability of nutrient-dense protein and fat foods, such as eggs, meat, dairy, nuts and minimally processed oils and their role in satiation. These foods play an important role in metabolically supportive diets and can reduce reliance on refined sugars and starches.

Over time, poor diets become woven into the fabric of everyday life across generations, shaped by media, social environments, and family habits, and reinforced by the widespread availability of cheap, highly refined foods with addictive potential. Food price strongly influences dietary choice, particularly among lower-income households. New Zealand modelling indicates that healthy diets are often more expensive than less healthy diets, and that fiscal measures are most effective when taxes are paired with affordability measures, however, targeted fiscal rebalancing through corrective taxation is one piece of the puzzle.

The lever for change concerns not only what people eat but how the underlying problems are framed. Recent experimental research demonstrates that public attitudes toward ultra-processed foods can be significantly shifted by framing them in terms of industry manipulation and product addictiveness, rather than individual choice. This research showed that messages highlighting how products are engineered and marketed to drive consumption were more effective than health-focused or individual responsibility narratives, and did so without increasing weight stigma. [3]

These findings mirror the trajectory of tobacco control, where reframing the issue as one of corporate practices rather than personal behaviour proved critical to policy change. Importantly, even brief exposure to such messaging was sufficient to shift attitudes, suggesting that current public understanding remains highly malleable. However, changes in attitudes did not immediately translate into increased support for regulatory policies, indicating that communication strategies must be sustained and integrated with broader policy reform. This evidence supports a shift in dietary and public health frameworks toward recognising the role of industry practices, product design, and behavioural reinforcement in shaping consumption patterns.

The interacting issues explain why chronic illness has continued to worsen with younger populations being diagnosed earlier than older generations. Long-term gains in metabolic and brain health necessitates a coordinated policy response: reforming dietary guidelines to support metabolic health; restructuring price signals so healthy foods are more affordable and unhealthy foods more costly; ensuring low-decile schools provide metabolically healthy meals; and strengthening restrictions on unhealthy food advertising.

However, the multipronged approach in this paper is strategically designed to work with a range of other measures, to deal with this chronic, or ‘wicked’ problem.

[1] NOT IN ISOLATION. AN INTEGRATED APPROACH TO HEALTH REFORM

This policy *[1] Reverse the Chronic Disease Crisis: Reform Dietary Guidelines & Fix Food Taxes,* is designed to operate alongside complementary policy levers. Together, these measures address long-standing regulatory approaches across the health, regulatory, and science systems that have limited the ability of public health agencies and practitioners to respond to the rapid rise in preventable, environmentally mediated chronic illness.

Current positions held by Ministry of Health agencies, including narrowly framed regulation, outdated scientific assumptions, and misleading guidelines, have not kept pace with 21st-century

[3] Good KE, Parnarouskis L, Cummings JR, Gearhardt AN (2025). Adapting anti-tobacco messages to ultraprocessed foods: message framing's impact on attitudes toward the food industry. Obesity. 33(5):903-914. DOI: 10.1002/oby.24272

evidence. The Ministry of Health agencies and public-sector scientists lack resourcing to investigate emerging drivers of disease and update their positions, further 'locking-in' agency cultures on what may be formally recognised as 'guidance' and 'best practice'. As a result, the dietary determinants of reversible chronic conditions remain under-recognised and the problems of multiple medication, when prescribed for these often reversible conditions remains largely unrecognised. Even where they are acknowledged, current frameworks do not adequately support practitioners to act, as the outdated and restrictive guidelines limit the application of nutrition-based interventions in clinical care and expose practitioners to investigation by the Medical Council of New Zealand.

Metabolic Health: Eight System Failures

Several institutional features act together to undermine New Zealand's ability to address the chronic disease burden.

First, the Pae Ora (Healthy Futures) Act 2022 establishes a prevention-focused framework but does not explicitly recognise nutrition, diet, nutrient sufficiency, or metabolic health as determinants requiring systematic attention. While pharmaceuticals are clearly defined and supported, there is no equivalent requirement to identify or address dietary drivers of disease.

Second, the Medicines Act 1981 creates a regulatory environment in which nutrients may be classified as medicines when therapeutic claims are made, despite their fundamental biological roles in metabolic regulation and immune function. This framing has had a chilling effect on communication about the systemic benefits of nutrients.

Third, medical education recognises nutrients as essential cofactors in metabolic pathways, but clinical practice remains oriented toward pharmacological management. As a result, many practitioners are less equipped to apply nutrition in addressing metabolic dysfunction.

Fourth, dietary guidelines are primarily designed to prevent deficiency rather than optimise metabolic or neurological health. Intake thresholds reflect minimum requirements, while upper limits are often interpreted as toxicity thresholds despite complex nutrient interactions and confounded evidence in some cases.

Fifth, New Zealand lacks a dedicated national research capability in nutrition and metabolic health. Policymaking continues to rely heavily on older evidence frameworks, with limited integration of advances in systems biology, metabolomics, and nutritional epidemiology.

Sixth, the professional regulatory environment has become more cautious. Increased scrutiny may discourage clinicians from engaging with emerging evidence on nutrition and metabolic health.

Seventh, policy analysis risks becoming self-reinforcing. Regulatory assessments have not consistently addressed nutrient interactions, cumulative exposures, or confounding factors, and there is limited evaluation of multimorbidity, polypharmacy, and adverse drug burdens. This creates a risk that nutrient risks are overstated while pharmaceutical risks are underexamined.

Eighth, the pharmaceutical funding model reinforces downstream treatment. Pharmac funds discrete medicines for defined conditions but has limited mechanisms to support preventive, nutrition-based approaches that operate across systems and over longer timeframes.

Integration with MNZH's Broader Policy Framework

The policy proposals across this document operate in conjunction with wider reforms aimed at addressing the systemic drivers of metabolic dysfunction and disease. These wider reforms are designed to support chronic disease reversal from the individual patient, to the practitioner, across education and the wider spectrum of New Zealand.

Clinical integration (Policy 2):

Healthcare practitioners are supported to identify and address the underlying drivers of multimorbidity, including metabolic dysregulation and inflammation. Expanded metabolic screening enables a more complete assessment of patient health, while supporting a shift toward nutrition-based interventions that move beyond deficiency correction to optimisation. Metabolic dysfunction affects neurocognitive function, endocrine balance, immune response, mitochondrial activity, and inflammation, explaining the clustering of chronic and brain-related conditions.

Nutrition as foundational care (Policy 3):

Patients and clinicians are supported to recognise nutrition not only as a means of preventing deficiency, but as a core determinant of optimal health and recovery.

Regulatory and funding alignment (Policy 4):

Current pharmaceutical funding structures favour single-product interventions and do not adequately support nutrient-based approaches. This creates barriers for interventions that rely on multi-nutrient or dietary strategies, despite strong safety profiles and biological necessity.

Regulatory reform (Policy 5):

Greater recognition is required of the biological role of nutrients and the limitations of applying pharmaceutical-style evidentiary standards to nutrition. Nutrients operate across complex, interdependent pathways, and policy frameworks should reflect this.

Together, these measures support community-led change, enabling individuals and families to transition away from diets high in heavily refined, carbohydrate-rich food and toward accessible, nourishing whole foods. By strengthening local networks, improving access to knowledge and infrastructure, and aligning clinical and regulatory systems, this policy addresses both the biological and social determinants of metabolic health.

[2] RECIPE FOR SICKNESS: SUGAR BEVERAGES & ULTRAPROCESSED FOODS

Adequate nutrition is best understood not through single nutrients or food categories, but through the combined lens of nutrient density and food processing, within culturally appropriate dietary patterns. Energy dense foods can be nutrient rich (such as nuts and cheeses) and nutrient poor (potato chips and desserts). However simply focussing on energy density, ie. Calories can be misleading, as this may indicate a risk for obesity, but it cannot address the wider risk of metabolic syndrome, and the problem of what drives excess calorie consumption. People do not tend to over-eat on cheese and nuts, but they do over-eat potato chips and desserts.

Questions surrounding what is in the food, what drives chronic consumption beyond healthy intakes, what leads to people not selecting healthy foods are all key topics that need to be addressed

The rise in metabolic disease, including obesity has occurred alongside increased consumption of highly refined, industrially produced, carbohydrate-dense foods.[4] These products typically contain refined starches, added sugars, industrial seed oils, and chemically modified ingredients designed to enhance flavour, texture and palatability. Common examples include breakfast cereals, bread and baked goods, takeaway foods, noodles, pasta and pizza. In combination with sugar-sweetened beverages, these dietary patterns are associated with earlier and more frequent diagnoses of metabolic syndrome, a clinical cluster characterised by insulin resistance, elevated blood glucose, raised triglycerides, low HDL cholesterol, central adiposity, and increased risk of type 2 diabetes and cardiovascular disease.[5] [6]

While these foods are often consumed to 'fill tummies', there is only so much refined carbohydrate products that can be of nutritional benefit. Often, these high-carbohydrate products displace nutrient dense products, resulting in reduced intake of key macronutrients (fats, proteins and carbohydrates) and micronutrients (vitamins, minerals, amino acids etc).[7]

The Prevalence of Ultraprocessed Foods in Modern Diets

A large challenge has revolved around how to define food categories. The NOVA framework was first described by Monteiro et al. in 2010.[8] The NOVA framework distinguished unprocessed or minimally processed foods, processed culinary ingredients, processed foods, and ultra-processed products. In the original formulation, ultra-processed foods (UPFs) were industrial formulations made largely from extracted or modified substances, often with cosmetic additives, designed to be convenient, hyper-palatable, profitable, and capable of displacing less processed foods.

Later papers sharpened the definition, emphasising the prevalence of ingredients rarely used in home kitchens, cosmetic additives, and industrial purposes such as long shelf life, emphatic branding, and overconsumption.[9] [10] [11]

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[4] Dicken SJ, Jassil FC, Brown A. et al. (2025). Ultraprocessed or minimally processed diets following healthy dietary guidelines on weight and cardiometabolic health: a randomized, crossover trial. Nat Med. 31(10):3297-3308. DOI:10.1038/s41591-025-03842-0

[5] Zhang B, Shi H, Cai W, Yang B and Xiu W (2025) Metabolic syndrome in children and adolescents: definitions, epidemiology, pathophysiology, interventions, and challenges. Front. Endocrinol. 16:1512642. doi: 10.3389/fendo.2025.1512642

[6] Wentzel A, Mabhida SE, Ndlovu M, et al. Prevalence of metabolic syndrome in children and adolescents with obesity: a systematic review and meta-analysis. Obesity (Silver Spring). 2025;33(1):12-32. doi:10.1002/oby.24159

[7] Martini D, Godos J, Bonaccio M. et al. (2021). Ultra-Processed Foods and Nutritional Dietary Profile: A Meta Analysis of Nationally Representative Samples. Nutrients, 13, 3390. DOI: 10.3390/nu13103390

[8] Monteiro CA, Levy RB, Claro RM, *et al.* 2010. A new classification of foods based on the extent and purpose of their processing. Cad. Saúde Pública 26 (11) • Nov 2010 • https://doi.org/10.1590/S0102-311X2010001100005

[9] Monteiro, C.A., Moubarac, J.-.-C., Cannon, G., Ng, S.W. and Popkin, B. (2013), Ultra-processed products: global dominance. Obes Rev, 14: 21-28. https://doi.org/10.1111/obr.12107

[10] Monteiro CA, Cannon G, Levy RB, Moubarac JC, Louzada ML, Rauber F, Khandpur N, Cediel G, Neri D, Martinez-Steele E, Baraldi LG, Jaime PC. Ultra-processed foods: what they are and how to identify them. Public Health Nutr. 2019 Apr;22(5):936

[11] Monteiro CA, Cannon G, Moubarac JC, et al. (2018). The UN decade of nutrition, the NOVA food classification and the trouble with ultra-processing. Public Health Nutr. 21:5–17. DOI: 10.1017/S1368980017000234.

National dietary analyses consistently show that UPFs now dominate energy intake across several high-income countries, particularly among younger populations.

- In the United States, nationally representative NHANES analyses indicate that UPFs account for around 57–60% of total dietary energy in adults, while among youth aged 2–19 years the proportion has risen to approximately 67% of energy intake.[12] [13] [14] In Canada, national survey analyses report that UPFs provide about 45–48% of total energy intake overall, rising to around 50% among adults aged 19–30 years.[15] [16]

- Evidence from New Zealand is limited. One study could be identified, cohort analyse in early childhood that indicated that UPFs already contribute around 42–51% of total energy intake by age five, suggesting that high-UPF dietary patterns may be established early in life.[17]

- In Australia, analyses of the National Nutrition and Physical Activity Survey show that UPFs contribute around 38.8% of energy intake in adults overall, but approximately 44.7% among young adults aged 19–30, while adolescent intake exceeds 50% of total energy.[18] [19]

- In the United Kingdom, analyses of the National Diet and Nutrition Survey report that UPFs provide around 53% of total energy intake overall, with 18–29-year-olds consuming roughly 58% of calories from UPFs, and more recent analyses of adolescents indicating intakes approaching 66% of total dietary energy.[20] [21]

Taken together, these studies indicate that between roughly 40% and two-thirds of dietary energy in these countries is now derived from UPFs, which drive excessive sugar intake[22], with the highest

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[12] Baraldi LG, Martinez Steele E, Canella DS, et alConsumption of ultra-processed foods and associated sociodemographic factors in the USA between 2007 and 2012: evidence from a nationally representative cross-sectional studyBMJ Open 2018;8:e020574. doi: 10.1136/bmjopen-2017-020574

[13] Juul F, Parekh N, Martinez-Steele *et al* 2022. Ultra-processed food consumption among US adults from 2001 to 2018. The American Journal of Clinical Nutrition 115(1); 211-221, DOI: 10.1093/ajcn/nqab305

[14] Wang L, Martínez Steele E, Du M, et al. Trends in Consumption of Ultraprocessed Foods Among US Youths Aged 2-19 Years, 1999-2018. JAMA. 2021;326(6):519–530. doi:10.1001/jama.2021.10238

[15] Polsky, Jane Y; Moubarac, Jean-Claude; Garriguet, Didier. Health Reports 31(11);3-15. DOI:10.25318/82-003-x202001100001-eng

[16] Hamel V, Polsky JY, Nardocci M, *et al*. 2025. Who is consuming ultra-processed food in Canada? A cross-sectional analysis of the 2018/2019 International Food Policy Study. Applied Physiology, Nutrition, and Metabolism. 50: 1-13. https://doi.org/10.1139/apnm-2024-0218

[17] Fangupo L, Haszard JJ, Taylor BJ *et al* 2021. Ultra-Processed Food Intake and Associations With Demographic Factors in Young New Zealand Children. Journal of the Academy of Nutrition and Dietetics, 121(2);305-313. https://doi.org/10.1016/j.jand.2020.08.088

[18] Machado, P.P., Steele, E.M., Levy, R.B. et al. Ultra-processed food consumption and obesity in the Australian adult population. Nutr. Diabetes 10, 39 (2020). https://doi.org/10.1038/s41387-020-00141-0

[19] Marchese L, Livingstone KM, Woods JL, Wingrove K, Machado P. Ultra-processed food consumption, socio-demographics and diet quality in Australian adults. Public Health Nutrition. 2022;25(1):94-104. doi:10.1017/S1368980021003967

[20] Adams, J., White, M. Characterisation of UK diets according to degree of food processing and associations with socio-demographics and obesity: cross-sectional analysis of UK National Diet and Nutrition Survey (2008–12). Int J Behav Nutr Phys Act 12, 160 (2015). https://doi.org/10.1186/s12966-015-0317-y

[21] Chavez-Ugalde, I.Y., de Vocht, F., Jago, R. et al. Ultra-processed food consumption in UK adolescents: distribution, trends, and sociodemographic correlates using the National Diet and Nutrition Survey 2008/09 to 2018/19. Eur J Nutr 63, 2709–2723 (2024). https://doi.org/10.1007/s00394-024-03458-z

[22] Machado, P.P., Steele, E.M., Louzada, M.L.C. et al. Ultra-processed food consumption drives excessive free sugar intake among all age groups in Australia. Eur J Nutr 59, 2783–2792 (2020). https://doi.org/10.1007/s00394-019-02125-y

levels consistently observed in children, adolescents, and young adults, raising concerns about long-term metabolic and nutritional health trajectories.

Food Addiction as a Driver of Metabolic Syndrome

The concept of 'food addiction' has developed from a contested hypothesis into a structured and increasingly operationalised field of research and clinical practice. The combination of fat and refined carbohydrates in industrially formulated UPFs can result in the 'downregulation of dopamine receptors, binge eating, and willingness to obtain these foods despite negative consequences'.[23] [24]

Foundational work by Ashley Gearhardt and colleagues has been central to this shift, providing a formal framework for identifying addiction-like patterns of eating using criteria derived from substance use disorders. The development of the Yale Food Addiction Scale (YFAS), and its subsequent refinement (YFAS 2.0), enabled the translation of addiction constructs, such as craving, loss of control, continued use despite harm, and functional impairment, into measurable clinical and research instruments. Importantly, this framework allows for graded severity (mild, moderate, severe), aligning food-related behaviours with established diagnostic approaches, akin to diagnostic approaches for 'drugs of abuse' in addiction science.[25] [26]

Subsequent work in this field has increasingly focused on the role of UPFs as the most plausible drivers of addictive-like consumption patterns. These foods, typically characterised by combinations of refined carbohydrates, added fats, and engineered palatability, are argued to engage neurobiological reward systems in ways analogous to other addictive substances.[27] This represents a conceptual shift away from 'food' in general, toward a more precise identification of specific food environments and product classes associated with compulsive consumption. The emerging literature has therefore begun to align the study of diet with established models of addiction, while retaining appropriate scientific caution regarding heterogeneity of response and causality.[28] [29] [30]

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[23] Gearhardt AN, & Schulte EM. (2021). Is Food Addictive? A Review of the Science. Annu Rev Nutr. 41:387-410. DOI: 10.1146/annurev-nutr-110420-111710. Page 398.

[24] Burrows T, Kay-Lambkin F, Purser K et al (2018). Food addiction and associations with mental health symptoms: a systematic review with meta-analysis. Journal of Human Nutrition and Dietetics, 31(4)544-572. DOI: 10.1111/jhn.12532

[25] Lennerz B, Lennerz JK. (2017) Food Addiction, High-Glycemic-Index Carbohydrates, and Obesity. Clin Chem. 2018 Jan;64(1):64-71. DOI: 10.1373/clinchem.2017.273532.

[26] Unwin J, Giaever H, Avena N, Kennedy C, Painschab M and LaFata EM (2025) Toward consensus: using the Delphi method to form an international expert consensus statement on ultra-processed food addiction. Front. Psychiatry 16:1542905. DOI: 10.3389/fpsyt.2025.1542905

[27] Gearhardt AN., and Loch LK (2024) Assessment of Food Addiction: A DSM-5 Update, in Ashley N. Gearhardt, and others (eds), Food & Addiction: A Comprehensive Handbook, 2nd edn (New York, 2024; online edn, Oxford Academic, 19 Sept. 2024), DOI: 10.1093/oso/9780190671051.003.0001,

[28] Freire WB, Tello BB Guerrón P. (2025) Validation of NOVA 27 ultra-processed food screener: adaptation and performance in Ecuador. Public Health Nutrition. 28(1):e105. doi:10.1017/S1368980025100475

[29] Gearhardt, A. N., Bueno, N. B., DiFeliceantonio, A. G., et al. (2023). Social, clinical, and policy implications of ultra processed food addiction. BMJ, 383. DOI: 10.1136/bmj-2023-075354

[30] Schulte, E.M., Avena, N.M., & Gearhardt, A.N. (2015). Which foods may be addictive? The roles of processing, fat and glycemic load. PLOS ONE, 10(2): e0117959. DOI:10.1371/journal. pone.0117959.

Parallel to these academic developments, clinicians such as Dr Jen Unwin and colleagues have translated food addiction concepts into practical treatment frameworks. This builds on earlier UK general-practice work, where a clinical model using low-carbohydrate dietary approaches was developed to support the reversal of prediabetes and type 2 diabetes.[31] [32] The Unwin clinic has since become a well-documented case study of this approach in practice, demonstrating reductions in diabetes prevalence, patient remission, and substantial decreases in prescribing rates and associated drug expenditure.[33] [34] [35]

These models typically adopt a biopsychosocial approach, combining psychoeducation, behavioural support, and, where appropriate, dietary strategies that reduce exposure to highly processed, high-glycaemic foods.[36] Interventions often include structured support for individuals experiencing loss of control over consumption, and may incorporate elements analogous to addiction recovery models, including peer support and relapse prevention. Emerging longitudinal evidence suggests that such approaches can lead to sustained reductions in addictive-like eating behaviours and improvements in mental well-being over extended follow-up periods.

Recent work has also contributed to the development of clinical consensus and treatment paradigms, recognising that for a subset of individuals, patterns of consumption of UPFs may be more appropriately understood within an addiction framework than within conventional models of 'lifestyle choice'. This has implications for clinical classification, patient engagement, and the design of effective interventions, particularly where standard dietary advice has proven insufficient.

Moving towards Low-Carbohydrate Approaches for Health Protection

Low-carbohydrate dietary approaches have been recognised in the scientific literature for over a decade as a viable strategy for improving glycaemic control and reducing risk factors associated with type 2 diabetes.[37] Early clinical and public-health contributions emphasised the addictive potential of the refined carbohydrate category,[38] with *Very low-carbohydrate diets in the management of diabetes revisited* by Schofield et al (2016), highlighting the physiological rationale

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[31] Unwin D and Unwin J. (2014). Low-carbohydrate diet to achieve weight loss and improve HbA1c in type 2 diabetes and pre-diabetes: experience from one general practice. Practical Diabetes 2014:31;2:76-79. DOI: 10.1002/pdi.1835

[32] Brown A, McArdle P, Taplin J, Unwin D, Unwin, J, et al. (2022). Dietary strategies for remission of type 2 diabetes: A narrative review. J Hum Nutr Diet. 35:165–178.

[33] Unwin D, Khalid AA, Unwin J, et al. (2020). Insights from a general practice service evaluation supporting a lower carbohydrate diet in patients with type 2 diabetes mellitus and prediabetes: a secondary analysis of routine clinic data including HbA1c, weight and prescribing over 6 years. BMJ Nutrition, Prevention & Health 2020;3:e000072. doi:10.1136/bmjnph-2020-000072

[34] Unwin D, Unwin J, Crocombe D et al, (2021). Renal function in patients following a low-carbohydrate diet for type 2 diabetes: a review of the literature and analysis of routine clinical data from a primary care service over 7 years. Current Opinion in Endocrinology & Diabetes and Obesity 28(5):469-479, DOI: 10.1097/MED.0000000000000658

[35] Unwin D, Delon C, Unwin J, et al. What predicts drug- free type 2 diabetes remission? Insights from an 8- year general practice service evaluation of a lower carbohydrate diet with weight loss. BMJ Nutrition, Prevention & Health 2023;0:e000544. doi:10.1136/bmjnph-2022-000544

[36] Unwin J, Delon C, Giæver H, Kennedy C, et al. (2022). Low-carbohydrate and psychoeducational programs show promise for the treatment of ultra-processed food addiction. Front. Psychiatry 13:1005523. DOI: 10.3389/fpsyt.2022.1005523

[37] Feinman RD, Pogozelski WK, Astrup A et al. (2015). Dietary carbohydrate restriction as the first approach in diabetes management: Critical review and evidence base. Nutrition, 31:1-13. DOI: /10.1016/j.nut.2018.12.002

[38] Thornley, S, McRobbie H. (2011). Sickly Sweet: Sugar, Refined Carbohydrate, Addiction and Global Obesity (Nutrition and Diet Research Progress). Nova Novinka.

and emerging evidence for carbohydrate restriction in diabetes management.[39] Since then, larger systematic reviews and meta-analyses of randomised controlled trials have consistently reported improvements in HbA1c, triglycerides, and, in some cases, medication reduction among individuals following lower-carbohydrate diets. These findings have contributed to a growing international evidence base recognising carbohydrate reduction as a legitimate therapeutic option, particularly for individuals with insulin resistance and established metabolic disease.

Despite this, there has been limited systematic evaluation or uptake of these approaches within New Zealand's public health and guideline frameworks. National dietary guidance continues to emphasise increased consumption of fruit and vegetables as the primary indicator of a 'healthy diet', while providing comparatively little direction on macronutrient balance, protein adequacy, or the role of whole-food fats. This creates a policy gap in which dietary strategies with demonstrated metabolic benefits are not meaningfully incorporated into prevention or treatment pathways, and where the nutritional dimensions of physiological impairment, inflammation and metabolic disease risk remain only partially addressed within official guidance.

Within the New Zealand context, research led by Caryn Zinn and colleagues has demonstrated the feasibility of implementing health-coaching-based, carbohydrate-reduction models within primary care settings.[40] While not explicitly framed as food-addiction treatment, these models incorporate key elements consistent with addiction-informed approaches, including behavioural support, dietary restructuring away from refined and UPFs, and ongoing patient engagement. Qualitative and real-world evaluations indicate that such approaches are acceptable to patients and can support improvements in metabolic health and dietary behaviours. These findings are directly relevant to policy discussions, as they demonstrate that structured, non-pharmaceutical interventions can be operationalised within existing health systems.

Taken together, the literature now supports a coherent, though still evolving, position: a subset of dietary patterns, particularly those characterised by high intake of UPFs rich in refined carbohydrates and fats, may produce addiction-like responses in some individuals. The field has progressed to the point where both validated measurement tools and clinically applicable intervention models are available. This has clear implications for public health policy, which has not yet systematically incorporated addiction frameworks into dietary guidance, prevention strategies, or treatment pathways.[41] [42] [43]

Ketogenic and lower-carbohydrate dietary approaches are increasingly occupying a treatment gap within current health systems, particularly for individuals whose conditions are driven by persistent dysregulation of glucose and insulin. In practice, these approaches support a transition

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[39] Schofield G, Henderson G, Thornley S, Crofts C. (2016) Very low-carbohydrate diets in the management of diabetes revisited. NZMJ, 129:1432. ISSN 1175-8716.

[40] Zinn C, Campbell JL, Fraser L. et al. (2025) Carbohydrate Reduction and a Holistic Model of Care in Diabetes Management: Insights from a Retrospective Multi-Year Audit in New Zealand. Nutrients.17(24):3953.

[41] 1 Abar L, Steele EM, Lee SK, Kahle L, Moore SC, et al. (2025) Identification and validation of poly-metabolite scores for diets high in ultra-processed food: An observational study and post-hoc randomized controlled crossover-feeding trial. PLOS Medicine 22(5): e1004560. DOI: 10.1371/journal.pmed.1004560

[42] Saner E, Kalayjian T, Buchanan L et al. (2025) TOWARD: a metabolic health intervention that improves food addiction and binge eating symptoms. Front. Psychiatry. Vol.16. DOI: 10.3389/fpsyt.2025.1612551

[43] Louzada MLC, Gabe KT. (2025) Nova food classification system: a contribution from Brazilian epidemiology. Rev Bras Epidemiol. 28: e250027. DOI:1590/1980-549720250027

away from carbohydrate-dominant, refined and ultra-processed dietary patterns toward whole foods with greater emphasis on protein and fat, thereby removing addictive drivers, reducing glycaemic load and stabilising metabolic function.[44] [45] [46]

This is especially significant for people diagnosed with prediabetes and type 2 diabetes, where conventional management often centres on monitoring and pharmacotherapy rather than sustained dietary change capable of improving or reversing underlying metabolic dysfunction. Emerging clinical and real-world evidence indicates that carbohydrate-reduction strategies can improve glycaemic control, reduce triglycerides, and reduce medication dependency.[47]

'Prediabetes' and type 2 diabetes mellitis (T2DM) result in the same underlying metabolic health risks, albeit at different points along a continuum. Reflecting this, Zinn has recently suggested that prediabetes be reframed as early type 2 diabetes, recognising that the risk profile and pathophysiology are already established and that earlier recognition of the metabolic risk outcomes, may increase the potential for early, decisive interventions that prevent descent into T2DM).[48]

From a policy perspective, failure to recognise the potential for addictive-like responses to UPFs risks underestimating both the drivers of overconsumption and the limitations of conventional dietary advice. Incorporating an addiction-informed lens does not require abandoning existing nutritional frameworks, but rather expanding them to account for behavioural, neurobiological, and environmental determinants of diet. This is particularly relevant in the context of rising metabolic disease, where repeated exposure to highly palatable, refined, and industrially formulated foods may contribute to persistent dysregulation of appetite, glucose metabolism, and energy balance.

In this context, there is a strong case for integrating food addiction concepts into guideline development, clinical practice, and health system design, including consideration of behavioural support models, health coaching, and population-level interventions that reduce exposure to UPFs. Such an approach would align dietary policy more closely with emerging scientific understanding and provide a more comprehensive framework for addressing both metabolic and mental health outcomes.

[3] DIETARY FATS, STUDY CONFOUNDING & THE IMPLICATION FOR SATIETY

Debate surrounding the role of dietary fat in metabolic disease has been shaped by several decades of research, much of which initially focused on reducing saturated fat intake to prevent cardiovascular disease. However, a key methodological issue in early nutrition trials was the

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[44] Sethi Dalai S, Sinha A, Gearhardt A. (2020). Low carbohydrate ketogenic therapy as a metabolic treatment for binge eating and ultraprocessed food addiction. Curr Opin Endocrinol Diabetes Obes. 27:275–82. DOI: 10.1097/MED.0000000000000571

[45] Baylie T, Ayelgn T, Tiruneh M, Tefsa KH (2024). Effect of Ketogenic Diet on Obesity and Other Metabolic Disorders: Narrative Review. Diabetes, Metabolic Syndrome and Obesity, 17:1391–1401, DOI: 10.2147/DMSO.S447659

[46] Nojek P, Zawół M, Zimonczyk M, et al. (2024) Ketogenic diet and metabolic health: A review of its impact on type 2 diabetes and obesity. Analysis of research on the ketogenic diet in the context of treating metabolic disorders. J Educ Health Sport. 2024;71:55923. DOI: 10.12775/JEHS.2024.71.55923.

[47] Davies MJ, Aroda VR, Collins BS, et al. (2022) Management of Hyperglycemia in Type 2 Diabetes, 2022. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care. 2022 Nov 1;45(11):2753-2786. DOI: 10.2337/dci22-0034.

[48] Zinn C. (2025). Zinn C. Prediabetes is pre-nothing: Call it early type 2 diabetes. J. Metab. Health. 8(1):a132. DOI: 10.4102/jmh.v8i1.132

frequent conflation of saturated fats with industrial trans fats, particularly during the mid-20th century when partially hydrogenated oils were widely used in processed foods. Because many studies did not adequately distinguish between these two classes of fat, their metabolic effects were often analysed together, complicating interpretation of results and contributing to long-standing controversy in dietary guidance.

Industrial trans fats, produced through partial hydrogenation of vegetable oils, are now well established as harmful. They increase low-density lipoprotein (LDL) cholesterol, reduce high-density lipoprotein (HDL) cholesterol, promote systemic inflammation, and increase cardiovascular risk. A major review of the evidence concluded that trans-fat intake is associated with a significantly increased risk of coronary heart disease and mortality.[49]

Because partially hydrogenated fats were widely present in margarines and processed foods during the period when many dietary fat trials were conducted, some early dietary interventions that attempted to replace saturated fat with vegetable oils inadvertently replaced one fat type with industrial trans-fat–containing products, obscuring the distinct metabolic effects of each.

Subsequent research has clarified that the health effects of dietary fats depend strongly on fat type and degree of processing. Reviews examining whole-food dietary patterns consistently show that fats naturally present in minimally processed foods, including olive oil, nuts, seeds, dairy products, fish and unrefined plant oils, can play beneficial roles in metabolic health. These foods contain combinations of monounsaturated and polyunsaturated fatty acids, fat-soluble vitamins and bioactive compounds that influence lipid metabolism, inflammation, endothelial function and insulin sensitivity.

One of the most influential dietary pattern trials illustrating this point is the PREDIMED study, which examined a Mediterranean diet supplemented with extra-virgin olive oil or nuts. Participants consuming these diets experienced significant reductions in cardiovascular events compared with those following a low-fat control diet, demonstrating that dietary patterns relatively rich in minimally processed fats can support metabolic and cardiovascular health.[50]

Dietary fats play a central role in satiety and energy regulation. Fats slow gastric emptying and stimulate the release of satiety hormones such as cholecystokinin (CCK), peptide YY (PYY) and glucagon-like peptide-1 (GLP-1), which signal fullness to the brain and reduce subsequent food intake. Because fats are energy-dense and metabolically stable, meals containing adequate fat tend to sustain satiety for longer periods compared with rapidly digested refined carbohydrates that can drive fluctuations in blood glucose and hunger. Fats also support the absorption of fat-soluble vitamins (A, D, E and K) and contribute to hormonal and cellular membrane integrity. When incorporated within whole-food dietary patterns, particularly alongside sufficient protein, dietary

[49] Mozaffarian D., Katan M., Ascherio A., Stampfer M., Willett W. (2006). Trans fatty acids and cardiovascular disease. New England Journal of Medicine. DOI: 10.1056/NEJMra054035

[50] Estruch R, Ros E, Salas-Salvadó J *et al.* 2018. Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts. NEJM, 378:e34, DOI: 10.1056/NEJMoa1800389

fats help stabilise appetite and reduce the likelihood of overeating driven by rapid hunger rebound.[51]

The metabolic implications of fat consumption are therefore increasingly understood within the context of overall dietary patterns rather than isolated macronutrients. Diets characterised by minimally processed fats and oils, such as those typical of Mediterranean dietary patterns, are associated with improved cardiometabolic outcomes, while diets high in industrial trans fats and refined carbohydrate-rich processed foods are linked to poorer metabolic health.

Recent developments in dietary guideline reviews illustrate how this scientific debate is evolving. In the 2025–2026 scientific evidence review informing the United States Dietary Guidelines, the advisory committee's assessment of the contemporary literature concluded that evidence directly linking saturated fat intake with cardiovascular disease outcomes was not consistent or conclusive when examined independently of broader dietary patterns and that reduction of saturated below 10% of energy lacked any robust scientific basis.

Overall, the RCT evidence does not provide causal support for reducing saturated fat below 10% of energy or replacing saturated fat with linoleic acid–rich oils to prevent CHD or death.' [52]

Nevertheless, despite this updated interpretation of the evidence, the final dietary guidelines retained the long-standing recommendation, originating in earlier guidelines including the 2020 edition, that saturated fat intake should remain below approximately 10% of total energy intake.[53] This outcome reflects the continued influence of legacy policy frameworks within dietary guidance even as interpretations of the underlying scientific evidence evolve.

From a policy perspective, the evidence now suggests that dietary guidance focusing solely on reducing total fat intake may oversimplify the relationship between dietary fat and metabolic health. The effects of fats depend strongly on fat type, processing methods, and the broader dietary context in which they are consumed. Emphasising minimally processed foods containing naturally occurring fats, while continuing to restrict industrial trans fats and highly processed foods, may better reflect current understanding of diet quality, metabolic regulation and satiety.

[4] HIGHLY PROCESSED FOODS: DILUTING MACRO & MICRONUTRIENT INTAKES

Poor dietary intakes dominated by cheap, high refined carbohydrate, including ultraprocessed food (UPF) intakes can create a situation sometimes referred to as 'hidden hunger', where individuals consume sufficient or excessive calories but still experience micronutrient and/or protein insufficiency. Mechanistically, several factors contribute to the reduced nutrient density of ultra-processed diets:

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[51] Hall KD, Ayuketah A, Brychta R, *et al*. 2019. Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain: An Inpatient Randomized Controlled Trial of Ad Libitum Food Intake. Cell Metab. 2019 Jul 2;30(1):67-77.e3. doi: 10.1016/j.cmet.2019.05.008.

[52] Department of Health & Human Services and the Food and Drug Administration U.S.A. Scientific Foundation for the Dietary Guidelines for Americans, 2025–2030. Report 508. Chapter 5. Fats and Oils. Page 34. https://cdn.realfood.gov/Scientific%20Report_508.pdf

[53] Department of Health & Human Services and the Food and Drug Administration U.S.A. Dietary Guidelines For Americanshttps://cdn.realfood.gov/DGA.pdf

- Replacement of whole foods (vegetables, fruit, legumes, meat, dairy) with refined ingredients.
- Industrial processing that removes natural micronutrients and fibre.
- High caloric density, allowing excess energy intake without adequate micronutrient or protein intake.
- Low dietary diversity, reducing the range of nutrients consumed.

Micronutrient Dilution

A growing body of nutrition research indicates that diets high in UPFs are associated with reduced micronutrient intake and lower overall diet quality, even when total caloric intake is adequate. UPFs are typically industrial formulations made largely from refined ingredients and additives, often containing high levels of sugar, refined starches, fats, and salt but relatively low levels of fibre, protein, and essential micronutrients.

The scientific literature increasingly recognises that diets high in UPFs can produce a 'nutrient dilution'[54] effect, whereby large amounts of dietary energy are consumed without adequate intake of essential vitamins and minerals. This occurs because UPFs tend to displace nutrient-dense whole foods while contributing energy from refined ingredients. As a result, individuals may consume sufficient or excessive calories while still experiencing micronutrient insufficiency, a phenomenon sometimes referred to as 'hidden hunger'.[55]

One of the most cited analyses of the nutrient profile of ultra-processed diets was conducted by Louzada et al.,2015, who examined the relationship between UPF consumption and micronutrient content in the diet. The study found that increasing consumption of UPFs was inversely associated with the dietary content of multiple essential micronutrients, including vitamin B12, vitamin D, vitamin E, niacin, pyridoxine, copper, iron, phosphorus, magnesium, selenium, and zinc. In many cases, the micronutrient content of UPFs was less than half that found in minimally processed foods.[56]

A cross-sectional analysis examining dietary diversity and UPF consumption in Australia reported a significant negative association between the proportion of energy derived from UPFs and overall micronutrient intake, including reductions in vitamins A, C, E, B9, and B12, as well as minerals such as zinc, calcium, magnesium, potassium, and iron. The authors concluded that diets with higher UPF consumption are systematically less nutrient-dense, even after adjusting for socioeconomic and demographic factors.[57]

Broader reviews of the UPF literature reach similar conclusions. Narrative and umbrella reviews note that UPFs tend to be high in energy density but low in micronutrients and fibre, meaning that

[54] Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, Moubarac JC, Cannon G, Monteiro CA. Impact of ultra-processed foods on micronutrient content in the Brazilian diet. Rev Saude Publica. 2015;49:45. doi: 10.1590/S0034-8910.2015049006211.
[55] Martini D, Godos J, Bonaccio M. et al. (2021). Ultra-Processed Foods and Nutritional Dietary Profile: A Meta Analysis of Nationally Representative Samples. Nutrients, 13, 3390. DOI: 10.3390/nu13103390
[56] Louzada ML, *et al.* 2015. Impact of ultra-processed foods on micronutrient content in the Brazilian diet.
[57] Houshialsadat Z, Cediel G, Sattamini I, Scrinis G, Machado P. Ultra-processed foods, dietary diversity and micronutrient intakes in the Australian population. Eur J Nutr. 2024 Feb;63(1):135-144. doi: 10.1007/s00394-023-03245-2

large proportions of dietary energy can be consumed without meeting nutritional requirements. This 'nutrient dilution' effect is increasingly recognised as a mechanism linking UPF consumption with dietary inadequacy, metabolic disease, and poorer health outcomes.[58] [59]

Protein Dilution & the Protein Leverage Hypothesis

Public health discussions of obesity and metabolic disease have traditionally centred on total caloric intake. However, a growing body of research suggests that calorie-focused models alone may be insufficient to explain patterns of overeating if dietary composition, particularly protein adequacy, is not considered. If individuals have a biological drive to achieve a minimum intake of protein and essential amino acids, then diets that are relatively low in protein density may lead people to consume more total calories in order to meet protein needs. In this context, excess energy intake may be a consequence of inadequate protein density rather than its primary cause.

A substantial body of nutritional science now examines this concept through the Protein Leverage Hypothesis (PLH). First articulated by Simpson and Raubenheimer (2005), the hypothesis proposes that humans regulate protein intake more tightly than other macronutrients, meaning that when the proportion of protein in the diet declines relative to carbohydrates and fats, individuals tend to increase total food intake to reach a physiological protein target. This compensatory behaviour may result in excess calorie consumption, particularly in modern food environments where many foods are energy-dense but relatively low in protein.[60]

Subsequent experimental, theoretical and population research has provided support for this initial framework, and subsequent reviews by Raubenheimer and Simpson (2023) across human and animal studies showing that protein intake tends to remain relatively stable across different dietary patterns, even when the proportions of carbohydrate and fat vary widely. When protein density falls, individuals often compensate by consuming more total calories until protein requirements are met. This phenomenon suggests that protein appetite acts as a regulatory signal within broader appetite control systems, influencing food intake and energy balance.[61]

The concept has become particularly relevant in the context of modern dietary patterns characterised by high consumption of UPFs. Analyses of national dietary data have shown that diets with higher proportions of UPFs tend to contain lower protein density and higher energy density, creating conditions in which protein becomes diluted relative to total caloric intake. For example, Martinez Steele et al. (2018) analysed US national dietary survey data and found that as the proportion of energy derived from UPFs increased, the proportion of dietary protein decreased while overall energy intake rose. Importantly, absolute protein intake remained relatively stable,

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[58] Elizabeth L, Machado P, Zinöcker M, Baker P, Lawrence M. Ultra-Processed Foods and Health Outcomes: A Narrative Review. Nutrients. 2020 Jun 30;12(7):1955. doi: 10.3390/nu12071955.

[59] Dai S, Wellens J, Yang N *et al.* 2024.Ultra-processed foods and human health: An umbrella review and updated meta-analyses of observational evidence. Clinical Nutrition, 43(6):1386-1394. DOI: 10.1016/j.clnu.2024.04.016

[60] Simpson, S.J. and Raubenheimer, D. (2005), Obesity: the protein leverage hypothesis. Obesity Reviews, 6: 133-142. https://doi.org/10.1111/j.1467-789X.2005.00178.x

[61] Raubenheimer, Stephen J. Simpson; Protein appetite as an integrator in the obesity system: the protein leverage hypothesis. Philos Trans R Soc Lond B Biol Sci 23 October 2023; 378 (1888): 20220212. https://doi.org/10.1098/rstb.2022.0212

suggesting that individuals increased total food consumption in order to maintain protein intake despite lower protein density in the diet.[62]

Population-level evidence consistent with protein leverage has also been reported in cohort studies. Saner et al. (2023) examined dietary patterns in children and adolescents and found that diets lower in protein proportion were associated with higher overall energy intake, again consistent with the hypothesis that individuals increase food intake when protein is diluted within the diet.[63]

Mechanistically, several interacting biological pathways may explain this phenomenon. Protein provides essential amino acids required for tissue maintenance, enzyme function, immune activity and neurotransmitter synthesis, and the body appears to maintain a relatively stable target intake of these substrates. When dietary protein concentration is reduced, appetite regulation systems, including hormonal signals related to satiety and nutrient sensing, may drive increased food intake to meet protein requirements. At the same time, UPFs tend to be highly palatable, energy-dense and low in fibre, which can weaken normal satiety signals and further promote excess energy consumption. The interaction between protein appetite regulation and the sensory and metabolic properties of UPFs may therefore create conditions that favour overconsumption.

This framework also interacts with broader evidence on nutrient dilution and diet quality. Diets dominated by UPFs frequently displace nutrient-dense foods such as vegetables, fruits, legumes, dairy products, eggs and minimally processed meats. As a result, both protein density and micronutrient density may decline simultaneously, potentially contributing to metabolic dysfunction, fatigue, and other health outcomes despite adequate or excessive caloric intake.

From a policy perspective, the protein leverage hypothesis suggests that dietary composition, not simply calorie quantity, plays an important role in appetite regulation and metabolic health. Public health strategies that focus solely on reducing caloric intake without addressing diet quality, protein adequacy and the prevalence of UPFs may therefore overlook an important driver of energy imbalance. While the hypothesis does not imply that very high protein diets are necessary or desirable, it highlights the importance of maintaining sufficient protein density within balanced, minimally processed diets to support satiety and metabolic regulation.

However, low-income populations face a layered nutritional challenge in modern food environments. Economic constraints often limit access to higher-quality protein sources such as fresh meat, fish, eggs, dairy, and legumes, while cheaper food options are disproportionately ultra-processed, energy-dense and relatively low in protein density. This creates conditions consistent with the protein dilution phenomenon, in which individuals may consume greater total energy in order to meet protein requirements.

At the same time, UPFs are engineered to be highly palatable and rapidly rewarding, activating dopaminergic reward pathways that can promote repeated consumption. When these foods are also the most affordable and accessible dietary option, low-income populations may become

[62] Martínez Steele E, Raubenheimer D, Simpson SJ, Baraldi LG, Monteiro CA. Ultra-processed foods, protein leverage and energy intake in the USA. Public Health Nutrition. 2018;21(1):114-124. doi:10.1017/S1368980017001574
[63] Saner, C., Senior, A.M., Zhang, H. et al. Evidence for protein leverage in a general population sample of children and adolescents. Eur J Clin Nutr 77, 652–659 (2023). https://doi.org/10.1038/s41430-023-01276-w

disproportionately exposed to diets that combine low nutrient density, low protein density and high reward value, contributing to both metabolic risk and persistent hunger despite adequate or excessive caloric intake.

Overall, the protein leverage literature provides a biologically plausible mechanism linking modern dietary patterns, particularly those high in UPFs, with increased energy intake and metabolic disease risk. In this context, addressing protein dilution alongside broader nutrient dilution in modern food systems may be an important component of strategies aimed at improving metabolic health and dietary quality at the population level.

New Scholarship: Framework for Adequate Nourishment

Recent scholarship by Juul, Starck and Leroy reflects an important bridging effort within nutrition science and public-health policy, moving beyond reductionist nutrient-based models toward more integrated frameworks that better capture the real-world drivers of metabolic disease. Collectively, these authors contribute to a developing paradigm that recognises diet as a function of nutrient density, food processing, affordability, and dietary patterns, rather than isolated nutrients such as fat, sugar or calories.

Leroy et al. (2025) provide one of the clearest conceptual syntheses, proposing that adequate nourishment must be understood through the combined lens of nutrient density and degree of processing, within culturally appropriate dietary contexts. This framework directly addresses a key limitation of existing dietary guidance: the failure to ensure sufficient intake of bioavailable nutrients while simultaneously limiting exposure to UPFs. In doing so, it offers a structure capable of engaging with the physiological drivers of metabolic syndrome, including dysregulated glucose and insulin signalling associated with diets high in refined carbohydrates and low in nutrient-dense foods. [64]

Juul and colleagues extend this shift by situating UPFs within broader policy and systems contexts, highlighting the need to move beyond binary classifications toward more nuanced, actionable frameworks. Their work underscores that ultra-processed foods are not merely nutritionally inferior, but are embedded within food systems that promote overconsumption and displace more nutritionally adequate options. This has direct relevance to metabolic health, as diets dominated by ultra-processed, carbohydrate-dense foods are strongly associated with obesity, insulin resistance and type 2 diabetes.[65]

Starck and colleagues contribute a complementary dimension by integrating nutrient density with cost and accessibility, demonstrating that healthier, nutrient-dense dietary patterns are often more expensive and less accessible than ultra-processed alternatives. This highlights a critical structural driver of metabolic disease: populations at greatest risk are also those most exposed to low-cost, refined-carbohydrate foods that promote glycaemic instability and long-term metabolic

[64] Leroy L, Beal T, de Mûelenaere N, et al. (2025). A framework for adequate nourishment: balancing nutrient density and food processing levels within the context of culturally and regionally appropriate diets. Animal Frontiers. 15(1): 10–23, DOI:10.1093/af/vfae032

[65] Juul F., & Bere E. (2024). Ultra-processed foods – a scoping review for Nordic Nutrition Recommendations 2023. Food & Nutrition Research, 68. https://doi.org/10.29219/fnr.v68.10616

dysfunction. Their work reinforces the need for policy frameworks that account for economic constraints alongside nutritional quality.[66]

Taken together, these contributions represent a substantive advance toward a metabolically informed dietary paradigm, one that better reflects the combined effects of food composition, processing, and accessibility on chronic disease risk.

However, an important limitation across this body of work is the relative absence of explicit engagement with macronutrient balance, particularly the role of protein adequacy and whole-food fats in supporting a shift away from refined carbohydrate-dominant diets. While Leroy et al. implicitly recognise that adequate nourishment depends on access to nutrient-dense foods, often rich in high-quality protein and associated micronutrients, this is not consistently translated into explicit guidance on macronutrient composition. Juul and Starck similarly highlight the importance of reducing UPFs and improving nutrient density, yet do not directly address the role of protein sufficiency or dietary fat in metabolic regulation. As a result, the literature does not fully articulate the macronutrient rebalancing required to reduce glycaemic load and support metabolic health.

A second limitation is the limited engagement with the addictive potential of UPFs. While these authors acknowledge overconsumption and poor dietary patterns, they do not typically frame these behaviours within an addiction model, nor do they address the neurobiological and behavioural mechanisms, such as craving, loss of control, and reinforcement, that may drive persistent consumption of refined, highly palatable foods. Without recognising these dynamics, policy frameworks risk underestimating the difficulty individuals face in modifying dietary behaviour and may over-rely on information-based or choice-based interventions.

In this context, the work of Juul, Starck and Leroy can be understood as laying the foundation for a more comprehensive approach to dietary policy, one that addresses the structural, nutritional and metabolic drivers of diabetes and metabolic syndrome. The next step is to extend this framework to incorporate both macronutrient balance and behavioural realities, including the role of protein and fat in dietary adequacy and the influence of addictive-like responses to UPFs.

[5] DIETARY GUIDELINE REFORM: METABOLIC HEALTH AT THE HEART

Current dietary guidance in Aotearoa New Zealand does not adequately reflect contemporary scientific evidence on metabolic health. These findings are reflected across epidemiological studies, clinical trials, and via mechanistic studies. Recent integrative frameworks further emphasise that adequate nourishment depends on access to nutrient-dense foods providing bioavailable nutrients, often including foods rich in high-quality protein and associated micronutrients. This is particularly important for children, adolescents, pregnant women, and other vulnerable populations.

[66] Starck CS, Blumfield M, Keighley T, Marshall S, Petocz P, Inan-Eroglu E, Abbott K, Cassettari T, Ali A, Wham C, et al. Nutrient Dense, Low-Cost Foods Can Improve the Affordability and Quality of the New Zealand Diet—A Substitution Modeling Study. International Journal of Environmental Research and Public Health. 2021; 18(15):7950. https://doi.org/10.3390/ijerph18157950

Dietary Guidelines have followed global patterns where epidemiological literature has been emphasised, but it's been reviewed without paying attention to contradictory science and issues of confounding. Reform of dietary guidance is necessary to ensure that public-health policy reflects current scientific understanding of metabolic health and human behaviour. A framework that recognises refined carbohydrate load, protein adequacy, fat quality, nutrient density, food processing, and behavioural drivers, including addiction-like responses, will better support prevention, reduce multimorbidity, and improve population health outcomes.

While existing guidelines emphasise fruit and vegetable intake and reduction of free sugars, they do not sufficiently address:

- the cumulative metabolic effects of refined carbohydrates (including refined starches);
- the role of protein adequacy and amino acid sufficiency, particularly across the life course;
- the distinction between industrial trans fats and whole-food sources of dietary fat, including saturated fat;
- the importance of nutrient density and bioavailability and dietary adequacy in supporting physiological function;
- the behavioural and environmental drivers of dietary patterns, including the potential for addiction-like responses to ultra-processed foods.

As a result, the current framework does not fully meet the standard of best available evidence, nor does it adequately account for population-level metabolic, nutritional and behavioural risk.

***The Scientific Case for a Metabolic Approach*.** A substantial body of literature demonstrates that:

g. Diets high in refined carbohydrates and UPFs are associated with dysregulated glucose and insulin signalling, contributing to metabolic syndrome, type 2 diabetes, and related multimorbidity.
h. Total carbohydrate load and quality, not only free sugars, influence glycaemic control and downstream metabolic outcomes.
i. Adequate protein intake, including sufficient essential amino acids, supports satiety regulation, lean mass maintenance, and metabolic stability, and is critical during periods of growth, development, and pregnancy.
j. Evidence on dietary fats indicates that health effects are context-dependent, and that whole-food sources of fat cannot be equated with industrial trans fats.
k. Diet quality is more accurately captured by nutrient density and degree of processing, rather than isolated nutrient thresholds.
l. Emerging evidence indicates that UPFs may elicit addiction-like responses in some individuals, including craving, loss of control, and continued consumption despite harm.

***Risk Assessment Considerations*.** Under standard public-health and regulatory principles, dietary guidance should incorporate in order to prevent a systemic underestimation of both metabolic and nutritional risks from exposure to inadequate diets by age, gender and developmental stage.:

- ✓ Nutrient adequacy risk: potential for diets to be energy-sufficient yet deficient in essential nutrients and amino acids.

- ✓ Aggregate exposure: total intake of refined carbohydrates across the diet, not limited to sugars;
- ✓ Cumulative effects: long-term metabolic dysregulation arising from sustained dietary patterns;
- ✓ Sensitive populations: including children, adolescents, pregnant women, and populations with higher prevalence of insulin resistance;
- ✓ Heterogeneity of response: recognition that metabolic and behavioural responses to diet vary across individuals and population groups;
- ✓ Substitution effects: explicit consideration of what replaces reduced nutrients (e.g. refined carbohydrates replacing healthy dietary fats);
- ✓ Behavioural reinforcement: recognition that certain food environments promote repeated consumption through reward-driven mechanisms.

Failure to incorporate these considerations risks systematic underestimation of both metabolic and behavioural risk.

Equity Considerations. There is clear evidence that Māori and Pacific populations experience:

- earlier onset of metabolic disease;[67]
- higher prevalence of multimorbidity;[68] [69]
- greater prevalence of food insecurity and exposure to environments dominated by low-cost, refined-carbohydrate, UPFs.[70] [71]

In addition, evidence indicates that nutrient-dense foods, often including protein-rich options, are often less affordable and less accessible than ultra-processed alternatives. This contributes to dietary patterns that are both metabolically adverse and nutritionally inadequate. These same environments may disproportionately expose populations to foods that promote addiction-like consumption patterns, further compounding health inequities.

A guideline framework that does not address refined carbohydrate load, nutrient adequacy (including protein sufficiency), affordability, and behavioural drivers may therefore perpetuate or exacerbate inequities, contrary to Te Tiriti obligations and public-health equity principles.

Regulatory and Policy Implications. Dietary guidelines underpin national nutrition policy and public-health messaging; clinical practice; procurement standards (e.g. school food programmes), health promotion and prevention strategies and public health interventions.

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[67] Mazahery H, Gammon CS, Lawgun D, Conlon CA, Beck KL, von Hurst PR. (2021). Pre-diabetes prevalence and associated factors in New Zealand school children: a cross-sectional study. N Z Med J. 2021 Mar 12;134(1531):76-90.
[68] Head A, Fleming K, Kypridemos C, et al. (2021). Multimorbidity: the case for prevention. J Epidemiol Community Health 2021;75:242–244. DOI:10.1136/jech-2020-214301
[69] Blakely T, Kvizhinadze G, Atkinson J, Dieleman J, Clarke P. (2019). Health system costs for individual and comorbid noncommunicable diseases: An analysis of publicly funded health events from New Zealand. PLoS Med.
[70] Reynolds D, Mirosa M, Campbell H, (2020). Food and vulnerability in Aotearoa/New Zealand: A review and theoretical reframing of food insecurity, income and neoliberalism. New Zealand Sociology 35:1;123-152. DOI: 10.3316/INFORMIT.219515053019306
[71] Ministry of Health (2019). Household Food Insecurity Among Children in New Zealand. https://www.health.govt.nz/publications/household-food-insecurity-among-children-new-zealand-health-survey

Recent literature demonstrates that effective guidance must integrate:

- ✓ nutrient density and adequacy (Leroy et al 2025)[72];
- ✓ food processing and exposure environments (Juul & Bere 2024[73]);
- ✓ affordability and access (Starck et al 2021[74]).

However, these frameworks have not been fully translated into explicit macronutrient guidance, particularly regarding protein adequacy and the role of fats, limiting their effectiveness in addressing metabolic disease.

[6] THREE-PART FISCAL REFORM: GST 'OFF', JUNK FOOD TAX 'ON'

The removal of GST from minimally processed foods alongside the introduction of selective taxes on sugar-sweetened beverages and energy-dense ultra-processed snack foods represents a rebalancing of relative prices through targeted fiscal instruments, aligning fiscal policy with the dietary drivers of metabolic disease.

MNZH's approach combines two complementary tools: the removal of a broad consumption tax on merit goods, functioning as a subsidy or tax exemption to correct the under-consumption of nutrient-dense whole foods; and the imposition of selective excise (Pigouvian[75]) taxes on demerit goods to internalise the wider social and economic costs associated with ultra-processed food consumption, including healthcare expenditure and productivity loss.

By discouraging discretionary ultra-processed products and improving access to nutrient-dense foods, this framework directly targets the dietary patterns associated with the development of prediabetes and type 2 diabetes. Food price is a strong determinant of dietary choice, particularly among lower-income households. New Zealand modelling indicates that healthier diets are often more expensive than less healthy alternatives, and that fiscal measures are most effective when taxation is paired with affordability interventions. [76] [77] [78] [79]

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[72] Leroy L, Beal T, de Mûelenaere N, et al. (2025). A framework for adequate nourishment: balancing nutrient density and food processing levels within the context of culturally and regionally appropriate diets. Animal Frontiers. 15(1): 10–23, DOI:10.1093/af/vfae032

[73] Juul F., & Bere E. (2024). Ultra-processed foods – a scoping review for Nordic Nutrition Recommendations 2023. Food & Nutrition Research, 68. https://doi.org/10.29219/fnr.v68.10616

[74] Starck CS, Blumfield M, Keighley T, Marshall S, Petocz P, Inan-Eroglu E, Abbott K, Cassettari T, Ali A, Wham C, et al. Nutrient Dense, Low-Cost Foods Can Improve the Affordability and Quality of the New Zealand Diet—A Substitution Modeling Study. International Journal of Environmental Research and Public Health. 2021; 18(15):7950. https://doi.org/10.3390/ijerph18157950

[75] A Pigouvian tax is a tax imposed on goods or activities whose market price does not fully reflect the social costs they generate. In the health context, that means using taxation to reduce the consumption of products linked to obesity, diabetes, cardiovascular disease, dental disease, and lost productivity. The health system costs of these diseases are externalised through greater costs to the health system and in lost productivity.

[76] Mackay S, Buch T, Vandevijvere S, Goodwin R, Korohina E, Funaki-Tahifote M, Lee A, Swinburn B. Cost and Affordability of Diets Modelled on Current Eating Patterns and on Dietary Guidelines, for New Zealand Total Population, Māori and Pacific Households. Int J Environ Res Public Health. 2018 Jun 13;15(6):1255. doi: 10.3390/ijerph15061255.

[77] Darmon N, Drewnowski A. Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: a systematic review and analysis. Nutr Rev. 2015 Oct;73(10):643-60. doi: 10.1093/nutrit/nuv027.

[78] Andreyeva T, Marple K, Moore TE, Powell LM. Evaluation of Economic and Health Outcomes Associated With Food Taxes and Subsidies: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022;5(6):e2214371. doi:10.1001/jamanetworkopen.2022.14371

[79] Vatsa P, Renwick A. Food prices in New Zealand: implications for feeding people better. J R Soc N Z. 2024 Jun 19;55(6):2305-2318. doi: 10.1080/03036758.

MNZH's recommendations diverge from current WHO dietary guidance, which continues to classify saturated fat and salt as nutrients to limit in order to reduce cardiovascular disease risk. However, the evidentiary basis linking saturated fat intake directly to cardiovascular disease has been increasingly debated, with critiques noting the potential for dietary confounding and limitations in observational study design, including insufficient differentiation between food sources and overall dietary patterns. While this debate remains ongoing, it is important to recognise that very high salt intake may pose specific risks for certain populations, particularly individuals with long-term diabetes, where renal impairment can reduce the body's capacity to regulate sodium balance.

1. Remove GST from core staple foods. GST should be removed from a defined basket of minimally processed staple foods that support metabolically healthy diets. The exemption would apply to:

i. NOVA Group 1 foods (minimally processed foods)

ii. NOVA Group 2 savoury culinary ingredients

iii. selected NOVA Group 3 processed foods that are canned or bottled and minimally processed, but with no added sugar.

2. Introduce a sugar-sweetened beverage tax. A 20% excise tax on sugar-sweetened beverages should be implemented, consistent with modelling proposed by Nick Wilson and colleagues. [80]

3. Introduce a junk-food excise on ultra-processed snack foods. A new excise tax should apply to non-essential energy-dense ultra-processed packaged foods, using an administratively simple threshold of ≥275 kcal per 100 g. This replicates the Mexican tax which was designed to lower the prevalence of diabetes. Products captured would include confectionery, industrial snack foods, packaged desserts and highly processed savoury snack products.

By targeting discretionary industrial foods rather than staple foods, the tax focuses on products most closely associated with modern metabolic disease.

The proposed fiscal framework is guided by four principles:

1) Target discretionary UPFs: taxes apply to products strongly associated with metabolic disease risk.

2) Protect access to staple foods: GST removal improves the affordability of nutrient-dense foods.

3) Use simple administrative thresholds: energy density provides a clear and enforceable trigger for taxation.

4) Combine incentives and disincentives: fiscal measures both discourage UPFs and improve access to healthier foods.

[80] Wilson N, Te Morenga L, Mackay S et al 2020. Food taxes and subsidies to protect health: relevance to Aotearoa New Zealand. NZMJ 13 March 2020, Vol 133 No 1511. ISSN 1175-8716

Remove GST from core staple foods.

Tax policy is a major structural determinant of diet affordability in New Zealand. Removing GST from minimally processed foods would align New Zealand with most comparable high-income countries while improving access to healthier diets. New Zealand is unusual in applying a 15% Goods and Services Tax (GST) to almost all foods, including fresh fruit, vegetables, eggs, meat and other minimally processed foods. By contrast, many comparable jurisdictions, including Australia and the United Kingdom, apply zero-rating or reduced VAT rates to basic foods, lowering the retail price of staple foods relative to discretionary products. [81] [82]

Cross-country modelling using the DIETCOST framework provides one of the clearest analyses of diet affordability in New Zealand compared with a closely related food system such as Australia. DIETCOST studies model the cost of diets consistent with dietary guidelines and compare them with current dietary patterns using identical nutritional and household assumptions. New Zealand analyses found that diets consistent with healthy-eating guidance were 8.5–15.6% more expensive than current diets when energy intake was equalised, reflecting the higher cost of foods such as fresh fruit and vegetables, minimally processed proteins, and nutrient-dense whole foods.

These foods, including fresh meat, fish, eggs, dairy, vegetables and fruit, are generally more expensive per calorie than refined starches, added sugars and ultra-processed snack foods. The modelling also showed that households reliant on minimum wages or income support would need to allocate a large share of disposable income to food, indicating structural affordability constraints in purchasing minimally processed diets. These findings are consistent with international research showing that healthier diets often cost more because they rely on fresh produce, healthy fats and protein-rich foods, whereas lower-cost diets tend to rely on refined carbohydrates and highly processed foods.

Removing GST from minimally processed foods would reduce this cost differential and improve diet affordability, particularly for lower-income households. DIETCOST modelling indicates that GST exemption for healthier foods would lower the price of healthier diets relative to current diets.

(b) Sugar Tax on Sugar Sweetened Beverages

An increasingly robust body of evidence highlights that sugar sweetened beverage SSB taxes work through the following mechanisms: they raise prices, reduce purchases or sales of taxed beverages, and often encourage reformulation. A 2022 systematic review and meta-analysis in JAMA Network Open found that implemented SSB taxes were associated with 82% pass-through into prices and about 15% lower sales of taxed beverages, with no negative employment effects identified in the reviewed studies.[83]

Mexico is the best known early national case: after the 2014 taxes on SSBs and non-essential energy-dense foods, a 2025 evaluation found average purchase reductions of 7.0% for taxed foods

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[81] Mackay S, Buch T, Vandevijvere S, Goodwin R, Korohina E, Funaki-Tahifote M, Lee A, Swinburn B. Cost and Affordability of Diets Modelled on Current Eating Patterns and on Dietary Guidelines, for New Zealand Total Population, Māori and Pacific Households. Int J Environ Res Public Health. 2018 Jun 13;15(6):1255. doi: 10.3390/ijerph15061255.

[82] Vandevijvere S. *et al* 2018. Modelling the cost differential between healthy and current diets.

[83] Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM. Outcomes Following Taxation of Sugar-Sweetened Beverages: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276.

and 4.4% for taxed SSBs over four years, with untaxed beverages rising. Mexico has retained and, more recently, moved to strengthen this policy direction.[84] The United Kingdom's Soft Drinks Industry Levy is notable because it appears to have worked strongly through reformulation rather than only reduced demand; WHO explicitly cites tiered taxes as encouraging manufacturers to reduce sugar content, and the UK has become a standard example of that mechanism.[85]

South Africa's Health Promotion Levy has also shown reductions in sugary drink acquisition and sugar purchased, especially in lower-income settings, while recent work continues to find meaningful effects on consumption.[86] WHO reported that by July 2024 at least 116 countries had some national excise tax on at least one type of SSB.[87]

(c) Taxes on Energy-Dense, Non-Essential Foods

The next generation of health taxes is moving beyond beverages alone toward industrially formulated discretionary foods, especially products high in free sugars, refined starches, energy density, trans fats, and other ingredients of concern, often sold as convenient, hyper-palatable, non-essential foods. This class of industrial snack and convenience products are strongly associated with poorer diet quality and chronic disease risk. WHO's 2024 guideline strongly recommends for taxes on sugar-sweetened beverages and a conditional recommendation for taxing foods that do not contribute to a healthy diet.[88] [89]

Mexico's tax on non-essential energy-dense foods is particularly relevant. The Mexican tax was introduced explicitly in response to the country's severe burden of obesity and type-2 diabetes. Mexico has one of the highest diabetes prevalence rates in the OECD, and prior to the reform a substantial share of dietary calories came from sugary drinks and packaged snack foods.

The Mexican government implemented a suite of measures in 2014, including both a sugar-sweetened beverage tax and an excise tax on discretionary energy-dense foods, incorporated into the Special Tax on Production and Services (IEPS). The food tax applies to non-essential foods exceeding 275 kcal per 100 g, a category largely composed of packaged snacks, sweets, desserts, and other highly processed products. Early and subsequent evaluations using national household purchase data found reductions of approximately 5–7 % in purchases of taxed foods within the

[84] García-Chávez CG, Barrientos-Gutierrez T, Ng SW, Rivera JA, Colchero MA. Changes in sugar-sweetened beverages and non-essential energy-dense food purchases overall and by type before and after the implementation of taxes in Mexico: repeated cross-sectional national surveys (2008-2018). BMJ Public Health. 2025 May 30;3(1):e001524. doi: 10.1136/bmjph-2024-001524.
[85] WHO (2024). Fiscal policies to promote healthy diets: WHO guideline. WHO recommendation on taxation of beverages. https://www.ncbi.nlm.nih.gov/books/NBK604743/
[86] Ross A, Swart EC, Frank T, Lowery CM, Ng SW. South Africa's Health Promotion Levy on Pricing and Acquisition of Beverages in Local Spazas and Supermarkets. Public Health Nutr. 2022 Mar 7;25(5):1-26. doi: 10.1017/S1368980022000507.
[87] Global report on the use of sugar-sweetened beverage taxes, 2025. Geneva: World Health Organization; 2025. Licence: CC BY-NC-SA 3.0 IGO.
[88] Fiscal policies to promote healthy diets: WHO guideline. Geneva: World Health Organization; 2024. Licence: CC BY-NC-SA 3.0 IGO
[89] Food taxes for a healthy diet: time for action. Copenhagen: WHO Regional Office for Europe; 2025. Licence: CC BY-NC-SA 3.0 IGO.

first two years, with the largest reductions observed among lower-income households and among households previously consuming large quantities of these products. [90] [91] [92] [93]

While the long-term effects on obesity and diabetes require longer observation periods, the Mexican experience has become one of the most widely studied natural experiments demonstrating that fiscal policy can shift consumption patterns of energy-dense discretionary foods. More recent analysis of Mexico suggests that the original 8% tax rate likely improved prices and purchases but was probably too low to maximise health gains, and affordability analyses indicate taxed products can remain quite accessible over time. Mexico has therefore increasingly combined fiscal measures with a broader policy package, especially front-of-pack warning labels and related food-environment regulation, rather than relying on tax alone.[94]

Other fiscal models have emerged, including Hungary's Public Health Product Tax and more recent measures introduced in Colombia. These policies largely operate through nutrient-threshold frameworks, taxing foods that exceed levels of sugar, salt, or other ingredients. From the perspective of diabetes prevention, this nutrient-threshold approach may be less directly aligned with the core dietary drivers of metabolic disease.

The Mexican experience also illustrates several broader lessons emerging from the literature on food taxation. First, fiscal measures appear to be most effective when they target discretionary industrial foods rather than staple foods. Taxes directed at products widely recognised as snack foods or desserts, such as confectionery, chips, pastries, and similar products, are easier for consumers to understand and politically easier to justify. By contrast, taxes applied to staple foods risk unintended nutritional and equity consequences. Mexico's explicit distinction between non-essential discretionary foods and basic dietary staples helped maintain political feasibility while directing the tax toward foods most strongly associated with excess caloric intake.

Second, energy density provides a relatively simple and administratively practical proxy for identifying foods associated with metabolic risk. Mexico's threshold of 275 kcal per 100 g captures many of the highly processed snack foods that dominate modern food environments without requiring complex classification systems. While the concept of UPFs has become increasingly influential in the academic literature, translating processing classifications into tax law can be difficult. Energy-density thresholds therefore offer a pragmatic mechanism that broadly captures the same class of discretionary foods, particularly those characterised by refined carbohydrates, added sugars, and high caloric content, while remaining straightforward to administer.

Third, the evidence suggests that fiscal measures are most effective when applied in combination with taxes on sugar-sweetened beverages. Beverages represent a major source of added sugars,

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[90] Batis C, Rivera JA, Popkin BM, Taillie LS. First-Year Evaluation of Mexico's Tax on Nonessential Energy-Dense Foods: An Observational Study. PLoS Med. 2016 Jul 5;13(7):e1002057. doi: 10.1371/journal.pmed.1002057.
[91] Gračner T, Kapinos KA, Gertler PJ 2022. Associations of a national tax on non-essential high calorie foods with changes in consumer prices. Food Policy 06: 102193. DOI: 10.1016/j.foodpol.2021.102193
[92] Taille LS, Rivera JA, Popkin BM, Batis C. 2017. Do high vs. low purchasers respond differently to a nonessential energy-dense food tax? Two-year evaluation of Mexico's 8% nonessential food tax. Preventive Medicine. 105, S37-S42. DOI: 10.1016/j.ypmed.2017.07.009
[93] Pan American Health Organization. Ultra-processed food and drink products in Latin America: Sales, sources, nutrient profiles, and policy implications. Washington, D.C.: PAHO; 2019
[94] Pan American Health Organization. Special report. The role of regulatory policies on unhealthy commodities to prevent and control noncommunicable diseases in the Americas. Rev Panam Salud Publica 50, 2026 | https://journal.paho.org, https://doi.org/10.26633/RPSP.2026.11

while snack foods contribute large quantities of refined carbohydrates and energy density. Mexico's simultaneous implementation of beverage and discretionary food taxes therefore addresses two of the most significant dietary contributors to metabolic disease. International reviews of health taxation consistently conclude that this combination produces larger shifts in purchasing behaviour than single-product taxes alone.

Finally, the literature highlights the importance of embedding food taxes within a broader policy framework addressing the food environment. Fiscal measures can reduce consumption and encourage reformulation, but they are most effective when combined with complementary policies such as front-of-pack labelling, marketing restrictions aimed at children, and public health campaigns promoting minimally processed foods. In this context, fiscal measures serve not as a standalone intervention but as one component of a broader strategy to reshape the food environment in ways that support metabolic health.

[7] REINSTATE ORIGINAL KA ORA KA AKO SCHOOL LUNCH PROGRAMME FOR TARGETED SCHOOLS

The Ka Ora, Ka Ako Healthy School Lunches programme was established to address food insecurity among children in low-income communities while improving the nutritional quality of school meals. The programme targeted schools serving the most disadvantaged populations and reached more than 200,000 students. Its primary public-health purpose was not simply to reduce hunger but to improve the nutritional environment for children whose diets are often constrained by food affordability and access.

Children growing up in low-income households face a disproportionate risk of diet-related metabolic disease. Food affordability pressures often lead families to rely more heavily on refined starches, added sugars, and inexpensive ultra-processed foods (UPFs). These dietary patterns are associated with higher rates of childhood obesity, insulin resistance, and early onset type 2 diabetes, particularly among populations already experiencing health inequities. School food programmes therefore serve an important metabolic-health function by providing regular access to nutrient-dense meals containing adequate protein, fibre, vitamins and minerals, while reducing reliance on highly processed foods.

Research examining the Ka Ora, Ka Ako programme by the Public Health Communication Centre[95] [96] [97] and Kahurangi Dey[98] highlighted several benefits beyond food security. Evaluations reported that school lunches increased exposure to vegetables, legumes, whole foods and diverse meal

[95] McKelvie-Sebileau P, Railton R. (March 21, 2024). Evidence for free school lunches: The impact of hunger on learning. Evidence for free school lunches: Are they worth investing in?. https://www.phcc.org.nz/briefing/evidence-free-school-lunches-impact-hunger-learning?

[96] Mejia Toro C, Swinburn B (March 25, 2024). Evidence for free school lunches: Are they worth investing in? Evidence for free school lunches: Are they worth investing in? https://www.phcc.org.nz/briefing/evidence-free-school-lunches-are-they-worth-investing

[97] Garton K, Glassey R, Tipene-Leach D. (March 18). Evidence for free school lunches: The bigger picture benefits. Public Health Communication Centre. https://www.phcc.org.nz/briefing/evidence-free-school-lunches-bigger-picture-benefits

[98] Dey, KJ. (2025). Health by Stealth, Lifting the Load, and Just Food: The influence of Ka Ora, Ka Ako on the lives of whānau. A thesis submitted to the Victoria University of Wellington in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

types, helping broaden children's taste preferences and dietary familiarity. This exposure is particularly important for younger children, as repeated exposure to healthier foods during school years is known to shape long-term dietary preferences. For children whose home diets may be constrained by affordability or limited food variety, school meals can play a significant role in normalising healthier foods and improving diet quality over time.[99] [100]

These nutritional benefits are especially relevant for metabolic health. Diets rich in vegetables, legumes, protein foods and minimally processed ingredients provide nutrients that support stable glucose metabolism, satiety and overall metabolic regulation. Conversely, diets dominated by refined carbohydrates and ultra-processed snack foods are associated with higher glycaemic loads and increased metabolic risk. By providing balanced meals built around minimally processed ingredients, the programme helped establish healthier dietary patterns during a critical developmental period.

Public-health researchers have also raised concerns about subsequent changes to the programme. Critics from the public-health and nutrition research community have argued that the revised centralised meal model risks reducing food quality, meal variety and nutritional adequacy. Concerns raised include the potential for lower protein content, reduced fresh food components and increased reliance on processed foods in order to reduce programme costs. Nutrition experts have warned that such changes may undermine the programme's original objectives by prioritising cost savings over nutritional adequacy and diet quality.

School meal programmes internationally are increasingly recognised as a key policy tool for improving children's nutrition and reducing diet-related health inequities. Beyond addressing hunger, they provide an opportunity to shape dietary habits, expose children to healthier foods, and support metabolic health during childhood.

Policy Recommendation

The Ka Ora, Ka Ako programme should be restored and stabilised for the low-decile schools it was originally designed to serve, with a renewed emphasis on nutritional quality and minimally processed foods. Restoring the programme would:

- improve nutrient intake among children in food-insecure households
- broaden dietary exposure and taste preferences for healthier foods
- reduce reliance on UPFs among children at higher risk of metabolic disease
- support healthier long-term dietary patterns and metabolic health.

Ensuring reliable access to nutritious school meals is an effective public-health intervention for improving child nutrition and reducing health inequalities. A strengthened Ka Ora, Ka Ako programme would restore an important policy instrument for improving diet quality and supporting the long-term metabolic health of New Zealand children.

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[99] Daniel, C. (2016). Economic constraints on taste formation and the true cost of healthy eating. Social Science & Medicine 148:34e41, /10.1016/j.socscimed.2015.11.025.

[100] Fielding-Singh, Priya (2017). A Taste of Inequality: Food's Symbolic Value across the Socioeconomic Spectrum. Sociological Science, 4: 424-448. DOI: 10.15195/v4.a17

[8] ADVERTISING RESTRICTIONS FOLLOWING GUIDELINE REVISION

New Zealand research on food marketing to children is consistent in documenting high levels of exposure to unhealthy food advertising and identifying limitations in current regulatory approaches, while generally supporting stronger protections.

Vandevijvere & Swinburn (NZMJ, 2015) examined the policy landscape and concluded that existing self-regulatory arrangements were insufficient to protect children from exposure to unhealthy food marketing. They argued that more comprehensive approaches should be considered, including statutory restrictions across multiple media and settings, supported by nutrient profiling and monitoring.[101]

Signal and colleagues (2010s–early 2020s), across a series of studies, documented that unhealthy food marketing in New Zealand is widespread across television, outdoor environments, and digital platforms, and that exposure is often higher in socioeconomically disadvantaged areas. Their work shows that marketing is embedded in everyday settings, including near schools and along common travel routes. Studies incorporating children's perspectives report that young people are aware of and influenced by this marketing and, in some cases, support reductions in exposure and greater promotion of healthier foods.[102] [103] [104] [105]

Evaluations of the Advertising Standards Authority (ASA) codes (late 2010s–2020s) have found that, while the codes establish principles for responsible advertising, substantial volumes of unhealthy food marketing remain outside their effective scope, particularly where advertising is not explicitly classified as targeting children. These analyses highlight limitations in definitions, coverage, and enforcement, and suggest that self-regulation alone may not achieve the intended level of protection.

A 2025 systematic narrative review of New Zealand evidence (Frost et al. 2025) found that children's exposure to unhealthy food and drink marketing is ubiquitous and linked to dietary preferences and consumption. The authors conclude that improving child health requires greater restriction of such marketing through enforceable legislation.[106]

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[101] Vandevijvere S, Swinburn B. (2015). Getting serious about protecting New Zealand children against unhealthy food marketing. NZMJ, 3 July 2015, Vol 128 No 1417. https://nzmj.org.nz/media/pages/journal/vol-128-no-1417/getting-serious-about-protecting-new-zealand-children-against-unhealthy-food-marketing/6c2288c993-1696473899/getting-serious-about-protecting-new-zealand-children-against-unhealthy-food-marketing.pdf

[102] Signal LN, Stanley J, Smith M, Barr MB, et al. (2017). Children's everyday exposure to food marketing: an objective analysis using wearable cameras. Int J Behav Nutr Phys Act. 2017 Oct 8;14(1):137. doi: 10.1186/s12966-017-0570-3.

[103] McKerchar C, Smith M, Gage R, et al. (2020). Kids in a Candy Store: An Objective Analysis of Children's Interactions with Food in Convenience Stores. Nutrients. 2020 Jul 18;12(7):2143. doi: 10.3390/nu12072143.

[104] Watkins L, Gagge R, Smith M, et al. (2022). An objective assessment of children's exposure to brand marketing in New Zealand (Kids'Cam): a cross-sectional study. The Lancet Planetary Health, 6(2): e132-e138, https://doi.org/10.1016/S2542-5196(21)00290-4

[105] Signal LN, Jenkin LS, Barr MB et al (2019). Prime Minister for a day: children's views on junk food marketing and what to do about it. NZMJ 29 March 2019, Vol 132 No 1492. https://nzmj.org.nz/media/pages/journal/vol-132-no-1492/prime-minister-for-a-day-children-s-views-on-junk-food-marketing-and-what-to-do-about-it/fb1a4e904e-1696473826/prime-minister-for-a-day-children-s-views-on-junk-food-marketing-and-what-to-do-about-it.pdf

[106] Frost H, Te Morenga L, Mackay S, McKerchar C, Egli V, 2025. Impact of unhealthy food/drink marketing exposure to children in New Zealand: a systematic narrative review, Health Promotion International, Volume 40, Issue 2, April 2025, daaf021, https://doi.org/10.1093/heapro/daaf021

The Public Health Advisory Committee (2024), Rebalancing Our Food System, builds on this evidence base and recommends considering legislative restrictions on the marketing, advertising, and sponsorship of unhealthy foods and drinks to children and young people, including in digital environments and settings such as schools. The report also emphasises the importance of clear definitions, monitoring, and enforcement mechanisms, alongside complementary measures (e.g. school food policies).[107]

The Health Coalition Aotearoa (2024) Consensus Statement: "Protect Kids from Junk Food Marketing" reflects a broad coalition of public health organisations and sets out a unified position that current protections are insufficient. It calls for new legislation to restrict children's exposure to junk food marketing across digital media, public spaces, and child-focused environments (including schools and sports settings), and emphasises that protection should extend to all exposure, not only advertising explicitly directed at children.[108]

Interpretation within a metabolic health framework

Across these studies, the foods most commonly marketed are consistently described as unhealthy or ultra-processed products, often characterised by high levels of sugars and refined ingredients. In summary, New Zealand researchers have demonstrated:

- Consistent evidence of high and patterned exposure of children to unhealthy food marketing;
- The limitations of current self-regulatory approaches; and
- Broad support for stronger regulatory measures, including statutory restrictions and improved policy design.

While the precise form of regulation remains a matter for policy development, there is broad agreement that current arrangements do not adequately limit children's exposure to unhealthy food marketing.

The individual papers have typically used standard nutrient profiling approaches rather than a metabolic framework. When viewed through a metabolic health lens, these findings highlight a further limitation in current regulatory approaches. Existing frameworks typically define 'unhealthy food' using broad nutrient thresholds, including salt and saturated fat, rather than targeting the primary dietary drivers of metabolic disease: refined carbohydrates, sugars, and ultra-processed food patterns.

The New Zealand evidence base shows that the products most heavily marketed, and most widely consumed, are those that drive glycaemic instability, hyperinsulinaemia and downstream metabolic dysfunction. Aligning advertising restrictions with revised dietary guidance that explicitly addresses these drivers would strengthen coherence between policy, evidence, and health outcomes.

Recent international evidence strengthens this position by demonstrating that how the issue is framed materially affects public understanding and policy traction. Experimental research shows

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[107] Public Health Advisory Committee (May 2024) Rebalancing our food system. Wellington: Ministry of Health. https://www.health.govt.nz/system/files/2024-09/rebalancing-our-food-system-sep24.pdf

[108] Health Coalition Aotearoa (Nov 2024). Consensus Statement. Protecting children from unhealthy food and drink marketing. https://www.healthcoalition.org.nz/wp-content/uploads/2024/11/JFM-Consensus-Statement.pdf

that messages emphasising industry practices, specifically the engineering and marketing of highly palatable, addictive-like UPFs, are more effective at shifting public attitudes than traditional health or individual responsibility messaging. This approach mirrors the trajectory of tobacco control, where reframing harm as a consequence of industry behaviour, rather than personal failure, proved critical to regulatory change. Importantly, such framing does not increase weight stigma, suggesting that stronger, more direct public-health communication is both effective and ethically appropriate. [109]

[9] LOW PRIORITY: NZ RESEARCH ON METABOLIC UNDERPINNINGS OF DISEASE

The global burden of disease is now dominated by environmentally mediated non-communicable diseases rather than by infectious or purely genetic conditions. However, New Zealand's health research architecture does not reflect this epidemiological shift and consequent mental and metabolic health burden.

Over time, the national science system has developed comparatively strong capability in areas such as genetic disease research and gene technologies, while maintaining far less sustained capacity in the mechanistic drivers of disease causation within real populations. Research capability relating to metabolic dysfunction, nutrient insufficiency, environmental contaminants, and cumulative exposures remains comparatively limited.

Key domains where long-term national expertise is thin include metabolic health, nutrition science for optimal health, and the health impacts of heavy metals, pesticides, plastics, pharmaceuticals, and other household, environmental, and occupational exposures. These exposures interact across biological systems and life stages, yet the scientific capability required to investigate their cumulative effects has not been systematically developed.

Institutions that previously contributed to this capability have been weakened or discontinued. Examples include the Centre for Public Health Research and the Gravida National Centre for Growth and Development. Researchers in these areas have frequently struggled to secure sustained funding because public-good research on long-term disease causation has often fallen outside prevailing funding frameworks.

More recently, the disestablishment of the independent Health Research Council further illustrates the structural change underway. Its functions and budget are being absorbed into the newly established Research Funding New Zealand under a broad "Health and Society" investment area, with responsibilities distributed across Research Funding New Zealand, the Ministry of Business, Innovation and Employment, and the Ministry of Health.

[109] Good KE, Parnarouskis L, Cummings JR, Gearhardt AN (2025). Adapting anti-tobacco messages to ultraprocessed foods: message framing's impact on attitudes toward the food industry. Obesity. 33(5):903-914. DOI: 10.1002/oby.24272

The cumulative effect of these institutional shifts is that New Zealand currently lacks a clearly mandated national capability dedicated to investigating the environmental, nutritional, and biological drivers of chronic disease across the life course.[110] [111]

'The 2024–2025 science-system reform framework does retain a formal place for curiosity-driven basic research, but that space remains broad and largely unstructured. For fields such as chronic metabolic disease, neurodegeneration, nutrition science, environmental toxicology and the wider environmental determinants of health, the absence of clearly identified ring-fenced funding streams risks leaving significant knowledge gaps unresolved, even as the national disease burden increasingly shifts toward chronic and environmentally mediated conditions.

MBIE's new funding strategy states that the future system will sit under four broad pillars: economy, advanced technology, environment, and health and society, and that 'discovery-led science and research will continue to be funded', including beyond these pillars. However, the same documentation notes that the structure is indicative, with detailed priorities and allocations to be determined through the *Science Investment Plan* and associated *Pillar Investment Plans*. While this preserves a conceptual space for discovery research, the framework does not yet identify topic-specific ring-fenced funding for areas such as metabolic disease, neurodegeneration, nutrition, psychiatric or brain health, endocrine disruption, chronic toxic exposures, or long-term environmental drivers of disease.' [112] [113]

As a consequence, areas such as metabolic disease and metabolic regulation, neurodevelopmental vulnerability and brain health, psychiatric and mental health determinants, nutrition science and nutrient adequacy, and endocrine disruption and the role of chemical exposures in harming metabolic function (including degrading digestive tract function, provoking inflammation, neurotoxicity and hormone disruption) are relatively unstudied.

The consequences extend into health services and local infrastructure. Doctors and nurses are often not well supported by a science system that has prioritised innovation over foundational human biology, leaving gaps in applied knowledge on refined carbohydrate burden, prediabetes prevention, nutrient repletion, optimum nutrient status, multimorbidity, and the personal and economic costs of polypharmacy.

[10] NZ RESEARCH FOCUS FAVOURS GENETICS & INFECTIOUS DISEASE

New Zealand's health research investment has not kept pace with the changing profile of disease. While the dominant burden of illness now arises from chronic, non-communicable conditions with metabolic, nutritional and environmental determinants, research capability and funding remain comparatively concentrated in areas such as infectious disease surveillance, genetic disease research, and gene technologies.

These fields are scientifically valuable, but the relative emphasis has left far less sustained national investment in metabolic health, dietary and nutritional science, and the biological

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[110] MBIE (Jan 26, 2026). Research Funding New Zealand. https://www.mbie.govt.nz/science-and-technology/science-and-innovation/refocusing-the-science-innovation-and-technology-system/research-funding-new-zealand
[111] MBIE (Jan 28, 2026) Board Members Research Funding New Zealand.
[112] MBIE. A new funding strategy for the science system. https://www.mbie.govt.nz/science-and-technology/science-and-innovation/refocusing-the-science-innovation-and-technology-system/a-new-funding-strategy-for-the-science-system
[113] See: MNZH POLICY [7] ESTABLISH A PUBLIC-GOOD ENVIRONMENTAL HEALTH RESEARCH INSTITUTE.

mechanisms linking metabolism to brain health and chronic disease across the life course. As a consequence, New Zealand has limited long-term scientific capacity to investigate the population drivers of metabolic dysfunction, multimorbidity and neurodevelopmental vulnerability, despite their growing contribution to national disease burden and health system costs.

WORLD HEALTH ORGANIZATION FINDINGS[114]

Using WHO's broad cause groups, non-communicable diseases (NCDs) accounted for 59.5% of all global deaths in 2000 and rose to 73.9% in 2019. Communicable, maternal, neonatal and nutritional causes fell from 32.2% in 2000 to 18.2% in 2019. COVID then temporarily pushed infectious/communicable mortality back up, but even in 2021 NCDs still accounted for 65.3% of all deaths, compared with 28.1% from communicable causes. On that basic comparison, chronic disease has been greater throughout the whole period, and the gap widened markedly before the pandemic shock.[115] [116] [117]

In absolute terms, WHO reports that noncommunicable diseases killed at least 43 million people in 2021. That is the dominant mortality block globally, even after the COVID surge. WHO also notes that 18 million people died from NCDs before age 70 in 2021, and that this premature NCD toll was greater than all injuries, infections including COVID-19, and maternal and nutritional causes combined.[118]

The split understates the chronic side, because many of the major metabolic, environmental, and mental-health-related drivers feed into deaths that are ultimately coded as cardiovascular disease, stroke, diabetes, cancer, respiratory disease, kidney disease, or injury. For example, WHO says higher-than-optimal BMI caused an estimated 3.7 million deaths in 2021, while IHME reports air pollution accounted for 8.1 million deaths globally in 2021. Suicide caused about 727,000 deaths in 2021, but mental ill-health also contributes indirectly to mortality through substance use, self-harm, cardiometabolic disease, and poorer outcomes in other illnesses, which means direct death coding understates its total role. These driver categories overlap, so they cannot simply be added together, but they reinforce the same point: the global burden has shifted strongly toward chronic, multifactorial disease.[119] [120] [121]

THE BROADER SCIENTIFIC LITERATURE[122]

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[114] See: MNZH POLICY [7] ESTABLISH A PUBLIC-GOOD ENVIRONMENTAL HEALTH RESEARCH INSTITUTE.
[115] WHO (2024). World health statistics 2024: monitoring health for the SDGs, Sustainable Development Goals https://iris.who.int/server/api/core/bitstreams/74b12494-f213-4b5b-9533-18442147e1fb/content?
[116] WHO (2026). Global Health Estimates. https://www.who.int/data/global-health-estimates?
[117] WHO (2021). Global health estimates: Leading causes of DALYs. Disease burden, 2000–2021. https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys?
[118] WHO (Sept 2025). Noncommunicable diseases. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases?
[119] WHO (Dec 2025). Obesity and overweight. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight?
[120] IHME (June 2024). Air pollution. https://www.healthdata.org/news-events/newsroom/news-releases/air-pollution-accounted-81-million-deaths-globally-2021-becoming?
[121] WHO (May 2025). Suicide worldwide in 2021: global health estimates. https://www.who.int/publications/i/item/9789240110069?
[122] See: MNZH POLICY [7] ESTABLISH A PUBLIC-GOOD ENVIRONMENTAL HEALTH RESEARCH INSTITUTE.

A growing body of peer-reviewed literature indicates that environmentally mediated factors, including diet, nutrient deficiencies, pollution, and chemical exposures, constitute a major share of the global disease burden. Large comparative analyses show that dietary risk alone is responsible for a substantial proportion of chronic disease mortality. For example, Afshin et al. estimated that suboptimal diet accounted for approximately 11 million deaths globally in 2017, making it one of the largest modifiable contributors to disease worldwide.[123]

Similarly, global analyses of micronutrient intake indicate that billions of people experience inadequate intake of essential nutrients, including iron, zinc, calcium and vitamin E, with implications for immune function, neurodevelopment and long-term disease risk.[124] These findings reinforce the role of dietary quality and nutrient adequacy as foundational determinants of metabolic health and chronic disease.

Environmental exposures beyond diet also represent a major health burden. Fuller et al. report that pollution contributes to roughly nine million premature deaths annually, primarily through cardiovascular disease, respiratory illness and toxic exposures.[125] Reviews of the environmental burden of disease emphasise that existing estimates likely capture only a portion of environmentally mediated risk, as many exposures, particularly endocrine-disrupting chemicals, neurotoxicants and complex chemical mixtures, remain poorly quantified in global burden.[126] As a result, current burden estimates are widely regarded as conservative.

The potential scale of chemically mediated disease has been explored in a series of influential analyses led by Philippe Trasande and colleagues, which focused on endocrine-disrupting chemicals (EDCs). Using epidemiological exposure–response relationships and economic modelling, Trasande et al. estimated that EDC exposures may contribute substantially to disease and dysfunction, primarily through neurodevelopmental impairment, metabolic disease and reproductive disorders. For example, one conservative European analysis estimated that EDC exposures could account for €157 billion in annual health-related costs annually, largely associated with neurodevelopmental effects such as IQ loss and neurodevelopmental disorders.[127] Subsequent modelling suggested that the disease costs of EDCs were much higher in the USA than in Europe ($340 billion [2·33% of GDP] vs $217 billion [1·28%]), again dominated by neurodevelopmental outcomes linked to chemical exposures.[128] These analyses highlight the potential magnitude of chronic disease burdens arising from low-dose environmental chemical exposures, even where causal pathways remain incompletely characterised.

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[123] GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2019 May 11;393(10184):1958-1972. doi: 10.1016/S0140-6736(19)30041-8.

[124] Passarelli S, Free CM, Shepon A, Beal T, Batis C, Golden CD. Global estimation of dietary micronutrient inadequacies: a modelling analysis. Lancet Glob Health. 2024 Oct;12(10):e1590-e1599. doi: 10.1016/S2214-109X(24)00276-6.

[125] Fuller R, Landrigan PJ, Balakrishnan K et al. Pollution and health: a progress update. The Lancet Planetary Health, Volume 6, Issue 6, e535 - e547

[126] Shaffer RM, Sellers SP, Baker MG *et al.* Improving and Expanding Estimates of the Global Burden of Disease Due to Environmental Health Risk Factors. Environ Health Perspect. 2019 Oct;127(10):105001. doi: 10.1289/EHP5496.

[127] Trasande L, Zoeller RT, Hass U *et al.* Estimating burden and disease costs of exposure to endocrine-disrupting chemicals in the European union. J Clin Endocrinol Metab. 2015 Apr;100(4):1245-55. doi: 10.1210/jc.2014-4324.

[128] Attina TM, Hauser R, Sathyanarayana S, *et al.* Exposure to endocrine-disrupting chemicals in the USA: a population-based disease burden and cost analysis. Lancet Diabetes Endocrinol. 2016 Dec;4(12):996-1003. doi: 10.1016/S2213-8587(16)30275-3.

Taken together, this literature suggests that dietary risks, nutrient deficiencies, pollution, and endocrine-disrupting chemical exposures represent major drivers of chronic disease globally, often operating through metabolic, neurological and developmental pathways. At the same time, several reviews emphasise that the scientific understanding of these relationships remains incomplete, particularly for cumulative exposures, chemical mixtures, and long-term environmental determinants of disease. Consequently, many researchers argue that the current estimates likely understate the true burden of environmentally mediated illness, underscoring the importance of sustained basic research to better understand these complex drivers of health and disease.

The human and economic burden of environmentally mediated chronic disease has exceeded that of infectious disease for decades and continues to increase. with multiple comorbid conditions more prevalent than a single condition, and multimorbidity impacting low-income populations a decade earlier than in higher income groups.[129] [130] [131] Although the cost of multimorbidity is 'super-additive'[132] the Ministry of Health does not evaluate the cumulative cost of pharmaceuticals (when two or more a dispensed) by age and gender, to analyse whether other more protective and preventative interventions would be more appropriate, and there is no health research institution employed in this task.

COVID caused a temporary rebound in communicable mortality, but it did not overturn the longer-run pattern. The longer trend remains one of declining infectious mortality and rising dominance of chronic disease, especially disease shaped by aging, metabolic risk, environmental exposure, and long-term psychosocial stressors.

[11] CONCLUSION: METABOLIC HEALTH REFORM - A GOVERNANCE IMPERATIVE

Metabolic and mental health policy in New Zealand has traditionally focused on clinical service delivery and pharmacological treatment, with comparatively less attention to the biological and nutritional determinants of brain health.

Yet a growing body of scientific literature now points to links between nutrient sufficiency, metabolic health, diet quality, as a driver of both poor metabolic and brain health, and a large literature highlights the problem of multimorbidity and the frequency of diagnoses of metabolic and brain-related conditions in patients. This evidence is supported by an increasing emerging clinical research body showing benefits from dietary including health coaching, and broad-spectrum micronutrient interventions where patients present with metabolic and/or brain-related symptoms, and screens indicate elevated blood glucose and lower than optimum nutrient levels.

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[129] Head A, Fleming K, Kypridemos C, et al. (2021). Multimorbidity: the case for prevention J Epidemiol Community Health 2021;75:242–244. DOI:10.1136/jech-2020-214301

[130] Skou ST, Mair FS, Fortin M. et al. (2022). Multimorbidity. Nat Rev Dis Primers 8, 48. DOI: 10.1038/s41572-022-00376-4

[131] Russell et al (2019). Multimorbidity in Early Childhood and Socioeconomic Disadvantage: Findings From a Large New Zealand Child Cohort. Academic Pediatrics, 20(7),P619-627.

[132] Blakely T, Kvizhinadze G, Atkinson J, Dieleman J, Clarke P. (2019). Health system costs for individual and comorbid noncommunicable diseases: An analysis of publicly funded health events from New Zealand. PLoS Med. 16(1):e1002716. DOI: 10.1371/journal.pmed.1002716

Within this context, the question facing policymakers is no longer purely clinical or ethical. It increasingly raises a governance question: whether public institutions have a responsibility to evaluate and incorporate credible dietary and nutritional approaches into health strategy when evidence suggests potential benefits and relatively low risk.

From an administrative law perspective, public decision-making in health policy is expected to be responsive to relevant evidence and open to emerging scientific knowledge. Where peer-reviewed research demonstrates plausible biological mechanisms and repeated clinical signals of benefit, particularly in areas of significant public health burden such as diabetes, elevated tryglyceride levels, depression, anxiety, ADHD and emotional dysregulation, it becomes difficult to justify excluding such approaches from policy consideration altogether. The issue is not that any single intervention must automatically be adopted, but that it should be systematically assessed within the policy framework rather than remaining outside it.

The scale of the metabolic and mental health burden in New Zealand strengthens this governance argument. Diabetes and mental illness are leading causes of disability, lost productivity and long-term health expenditure. If nutritional status, metabolic health and food environments contribute to mental resilience and recovery, as an expanding literature suggests, then addressing these factors could represent an important component of prevention and early intervention. A policy framework that focuses exclusively on downstream medical treatment risks overlooking upstream drivers of mental health outcomes.

New Zealand's constitutional context also reinforces the need for such consideration. Under the Treaty of Waitangi, health policy must pursue equitable outcomes and protect Māori wellbeing. Māori experience disproportionate burdens of mental distress and its social determinants, including food insecurity, metabolic disease and unequal access to health-promoting environments. Approaches that address nutritional sufficiency, metabolic health and broader determinants of wellbeing therefore have potential relevance to the Treaty principles of protection, partnership and equity. Importantly, this is not only a matter of equitable access to services, but of improving equity in health outcomes themselves.