ULTRA-PROCESSED FOODS

Background Paper

This paper provides background information to the PHAA Ultra-processed Foods Policy Position Statement, providing evidence and justification for the public health policy position adopted by Public Health Association of Australia and for use by other organisations, including governments and the general public.

Summary

There is compelling evidence that increased consumption of highly processed, low nutritional quality foods is associated with adverse health and environmental outcomes. Ultra-processed foods are a fit-for-purpose concept used to assist the development of modern nutrition policy actions aimed at tackling unhealthy and unsustainable population eating patterns. Holistic and integrated food and nutrition policy actions to reduce availability, promotion and consumption of ultra-processed foods that consider the health, social, cultural, economic, and environmental dimensions of the food system are needed. If left unaddressed, the dominance of ultra-processed foods in the modern food supply will continue to drive the increasing burden of chronic disease and environmental degradation and perpetuate an intergenerational human crisis.

Contents

Background and priority

What are ultra-processed foods and why are they important?

Over the past 50 years, food systems have become increasingly industrialised and globalised. This has resulted in extensive amounts of highly processed foods in population eating patterns, and consequently, the emergence of new and unprecedented challenges for dietary health[1-3]. The impact of such large-scale industrial food processing on population health and environmental sustainability has been a focus of research, policy, and practice. Food and nutrition science has advanced from a predominant focus on the nutrient composition of foods to whole foods and dietary patterns[4]. This has assisted in redirecting the former nutrient-centric, reductionist understanding of food and nutrition science toward a perspective that more holistically considers the level, purpose and impact of food processing on human and planetary health[4, 5].

Several schemas for classifying foods according to level of processing have been proposed. However, the NOVA system is the most widely used in nutrition research and policy[6]. The NOVA system categorises foods according to four distinct levels of processing (Table 1). As such, the system recognises that whilst some types of food processing can contribute to healthy eating, others may be harmful[6, 7]. For example, food processing has played an important role in human nutrition and evolution by helping to increase the safety, convenience, and diversity of food products. Contrarily, in the modern, industrialised food system, excessive food processing is used to create convenient, hyper-palatable and low-cost products has resulted in a dramatic increase in the availability and consumption of foods that are ultra-processed and of low nutritional quality[3].

Table 1 - The NOVA classification scheme

NOVA Group	Description
Group 1 - Unprocessed or minimally processed foods	*Unprocessed:* Edible parts of plants (fruit, seeds, leaves, stems, roots, tubers) or of animals (muscle, fat, offal, eggs, milk), and also fungi, algae and water, all after separation from nature.
	Minimally processed: Unprocessed foods altered by industrial processes such as removal of inedible or unwanted parts, drying, powdering, squeezing, crushing, grinding, steaming, poaching, boiling, roasting, and pasteurization, chilling, freezing, placing in containers, vacuum packaging, non-alcoholic fermentation, and other methods that do not add salt, sugar, oils or fats or other food substances to the original food.
Group 2 - Processed culinary ingredients	Substances obtained directly from group 1 foods or from nature by industrial processes such as pressing, centrifuging, refining, extracting or mining. Used to prepare, season and cook group 1 foods. May contain additives that prolong product duration, protect original properties or prevent proliferation of microorganisms.
Group 3 - Processed foods	Products made by adding salt, oil, sugar or other group 2 ingredients to group 1 foods, using preservation methods such as canning and bottling, and, in the case of breads and cheeses, using non-alcoholic fermentation.
Group 4 - Ultra-processed foods	Formulations of ingredients, mostly of exclusive industrial use, made by a series of industrial processes, many requiring sophisticated equipment and technology (hence 'ultra-processed'). Processes used to make ultra-processed foods include the fractioning of whole foods into substances, chemical modifications of these substances, assembly of unmodified and modified food substances using industrial techniques such as extrusion, moulding and pre-frying; use of additives

	at various stages of manufacture whose functions include making the final product palatable or hyper-palatable; and sophisticated packaging, usually with plastic and other synthetic materials. Ingredients include substances that are sources of energy and nutrients that are of no or rare culinary use such as high fructose corn syrup, hydrogenated or interesterified oils, and protein isolates; classes of additives whose function is to make the final product palatable or more appealing such as flavours, flavour enhancers, colours, emulsifiers, and sweeteners, thickeners, and anti-foaming, bulking, foaming, gelling, and glazing agents; and additives that prolong product duration, protect original properties or prevent proliferation of microorganisms.

Adapted from Monteiro CA, et al 2019[6].

Ultra-processed foods are formulations of ingredients, mostly of exclusive industrial use, that result from a series of industrial processes (hence 'ultra-processed')[8]. These formulations of ingredients (e.g., added sugars, oils, fibre extracts and protein isolates) typically contain cosmetic additives such as flavours, colours, and emulsifiers, but few whole foods. Examples include fast food dishes, soft drinks, salty snacks, biscuits, sausages and other reconstituted meats, and mass-produced supermarket convenience foods such as ready-to-eat or -heat meals, soups, dips, and desserts. Ultra-processed foods are designed to be affordable, hyper-palatable and attractive, with an extended shelf-life, and conveniently packaged to be consumed anywhere, at any time[8, 9]. They are also heavily promoted, often presenting claims of potential health benefits (such as 'plant-based' or 'low in sugar') that might mislead the public [10]. The formulation, presentation and marketing of ultra-processed foods often promote overconsumption and displacement of unprocessed and minimally processed foods in dietary patterns[6, 8].

Rise of ultra-processed foods in Australian and global diets

Globally, ultra-processed foods are ubiquitous and currently consumed at levels detrimental to health[6]. In high-income countries such as Australia, the United States, the United Kingdom, and Canada, ultra-processed foods contribute approximately half of total energy intake. Lower rates of ultra-processed food consumption are observed in low and middle-income countries[11]. However, the nutrition transition currently underway in these countries has seen a rapid shift from traditional eating patterns based on whole foods to those that are higher in ultra-processed foods[1, 2]. Early-life exposure to ultra-processed foods is increasing globally and leading to long lasting negative health impacts[12].

In Australia, ultra-processed foods comprise 42% of total energy intake[13]. Children and adolescents are the highest consumers of ultra-processed foods, with up to 55% of their dietary intake comprised of these foods[14]. Ultra-processed food consumption varies across socio-demographic groups, with higher intakes observed among those experiencing greater levels of disadvantage and lower levels of education and income[15].

Impact of ultra-processed foods on health

Evidence from over 500 studies across more than 14 countries and summarised in 23 systematic reviews published to date, shows excessive consumption of ultra-processed foods is a major contributor to the global burden of disease. Meta-analyses of large-scale population and experimental studies indicate a direct, dose-response association between ultra-processed food consumption and more than 15 health-related outcomes. This includes weight gain across all age groups, increased prevalence of health conditions including type-2 diabetes, cardiovascular disease, cancer, depression, cognitive decline, frailty, irritable bowel syndrome, gestational weight gain and diabetes and non-alcoholic fatty liver disease, as well

as higher rates of all-cause mortality[16-18]. In Australia, adults that consume higher levels of ultra-processed foods have a higher risk of being classified as obese compared with those who eat fewer ultra-processed foods[19]. They have also been shown to experience elevated high-sensitivity C-reactive protein (a biomarker of inflammation)[20].

Increased dietary intake of ultra-processed foods is inversely associated with adequate consumption of nutritious foods from the five food groups recommended in the Australian Dietary Guidelines[15]. Increased consumption of ultra-processed foods is systematically associated with increased intake of free (or added) sugars, sodium, saturated and trans-fat, and lower intakes of fibre and potassium[11, 13]. Nevertheless, the mechanisms underlying the associations between ultra-processed foods and health outcomes go beyond the poor nutrient profile of these foods. Unique attributes of ultra-processed foods include physical and chemical modifications such as the deconstruction of the food matrix (which encompasses the nutrient and non-nutrient components of foods and their synergies), the presence of industrial ingredients used to modify sensory properties and increase palatability (aroma, flavour, colour, texture), and contaminants produced through high-temperature and other highly technical manufacturing processes[21, 22]. Subsequently, ultra-processed foods tend to be less satiating, have high glycaemic loads, may impair endocrine function and gut-brain satiety signalling, and possibly contribute to microbiota dysbiosis and overall inflammation[21-23].

Impact of ultra-processed foods on environmental sustainability

The production of ultra-processed foods has a negative impact on environmental sustainability. Emerging evidence indicates the manufacture, distribution and disposal of these foods has a harmful effect on natural resources including water and land use, requires high-energy input, and contributes to high levels of plastic packaging, chemical pollution, and deforestation[24-26]. Ultra-processed foods account for up to 39% of total energy use related to food production and manufacture, one third of total diet-related greenhouse gas emissions, land use and food waste, and one-quarter of water use in high-income countries[27]. The intensive farming of a small number of crops and livestock to produce the ingredients for ultra-processed foods (e.g., sugar, corn, wheat, dairy products) directly affect production of other plant varieties[28]. Congruent to this, it has been estimated that ultra-processed foods account for 36-45% of total biodiversity loss related to food production and manufacture[27].

Market and political practices of ultra-processed food corporations

The displacement of whole foods in diets and overconsumption of ultra-processed foods is driven by powerful interests in the global agri-food industry[29, 30]. Ultra-processed foods are universally appealing due to their affordability and convenience and are extensively and pervasively marketed due to significant investment in targeted marketing strategies[30, 31]. Ultra-processed foods are produced and sold by a small number of powerful transnational agri-food corporations, including food manufacturers, retailers, and supermarket chains[2, 31, 32]. Such organisations use their significant power to shape food systems whereby traditional, culturally appropriate eating patterns are rapidly being displaced by the consumption of ultra-processed foods[2].

This has enormous social, cultural, economic, and political implications[7]. For example, ultra-processed foods are inherently more convenient as they can be 'ready-to-eat' or 'ready-to-heat', meaning that cooking at home is displaced. This has implications for the shared experiences of preparing, cooking, and consuming a meal together, a tradition which builds social connection and has been a significant part of the human experience for millennia. More broadly, national, and local cultures are disrupted by the presence

of ultra-processed foods, whereby globally sourced packaged 'foods from nowhere' lack transparency over how they have been produced, as a consequence of long and complex supply chains. The rise of transnational agri-food corporations, supported by significant financial investment from banks and government subsidies, has been facilitated by international trade agreements, trade liberalisation and neoliberal government policies that allow them to dominate food systems. This is to the detriment of localised and more culturally authentic food systems, that are generated from a variety of traditional and heterogenous processes and production methods. Small- and middle-sized businesses are pushed out of the market by large-scale manufacturers and distributors, resulting in a push for production of variations of ultra-processed foods in order to be competitive[2, 29-31]. The proliferation of ultra-processed food corporations – and ancillary commodity producers – is further enabled by the dominant neoliberal market-centric agenda which minimises the policy role of government to promote global trade and freer movement of goods[33]. Their dominance is maintained through corporate political activity, including investing in relationships with governments, making it difficult to implement policies and regulations that deter the production and availability of ultra-processed foods[2, 30, 31].

Policies aiming to reduce consumption of ultra-processed foods are needed to address a range of adverse societal and health outcomes. If left unaddressed, the dominance of ultra-processed foods will continue to drive the chronic disease burden and perpetuate an intergenerational human crisis. The need for future research in specific focus areas (e.g., health mechanisms, environment, culture and policy and politics) should not delay action to slow, stop and reverse the increases in production and consumption of ultra-processed foods.

Policies to reduce ultra-processed food consumption around the world

Public health policies which aim to restrict the availability, promotion and consumption of ultra-processed foods are increasingly important. The rapid rise of ultra-processed food within the food system has been driven by multifactorial and dynamic factors. As such, long-term, multi-sectoral and mutually reinforcing policy interventions are required to facilitate meaningful reductions in the amount of ultra-processed foods in population eating patterns[5, 34]. There are examples from several countries which have implemented policies to either directly or indirectly reduce ultra-processed food consumption (Table 2).

In the last decade, several countries have integrated environmental sustainability themes, including the impact of food ultra-processing, in national dietary guidelines. For example, in 2014 Brazil became one of the first countries to consider environmental sustainability and ultra-processed foods in their national dietary advice. Since then, several countries including Peru, Ecuador, Uruguay, Maldives, Malaysia and Israel have adopted a similar approach (see Table 2). This transition represents a shift away from traditional government dietary guidelines based solely on nutrient content to guidelines that consider whole foods and the impact of food processing, as well as nutrients[35].

Chile has taken a cascading policy approach to ultra-processed foods whereby mutually reinforcing strategies have been implemented to create a larger net effect. For example, food products that are eligible for front-of-pack warning labels (many of which are ultra-processed) are subsequently subject to marketing restrictions and are prohibited from being provided in school feeding programs. Future iterations of this 'cascade' approach may include sales taxes on ultra-processed foods[34].

Table 2 - International examples of policies implemented that affect ultra-processed food consumption.

	Brazil	Mexico	South Africa	Chile	Peru	Uruguay	Israel	Ecuador	Maldives	Malaysia
National dietary guidelines	X				X	X	X	X	X	X

Sugar-sweetened beverage taxes		X	X							
'Non-essential' food taxes		X								
Front-of-pack labelling (warning labels)	X	X		X	X	X	X			
School feeding programs	X									
Cascading policies				X						

(Source: (Popkin, 2021))[34]

Future opportunities for ultra-processed food policies in Australia

Mounting evidence and United Nations recognition, emphasises that government policies must focus on reducing ultra-processed food production and consumption[34, 36]. Professional associations and advocates across Australia are calling for recognition of the human and planetary health impacts of ultra-processed food production and consumption when providing recommendations in the next iteration of the Australian Dietary Guidelines (ADGs)[37-39]. The definition of 'unhealthy foods' (i.e., 'discretionary' foods) in the current ADGs, only captures 54% of ultra-processed foods[40, 41]. In future, a definition for 'unhealthy foods' that considers foods as a whole, nutrient content and level of processing would help align Australia's national dietary advice with recent dietary guidelines issued globally[35].

Whilst evidence from some studies has identified 'unhealthy foods' in the National Preventive Health Strategy[42] and the National Obesity Strategy[43] a coordinated and strategic policy approach to addressing ultra-processed foods in Australia does not exist. Moreover, Australia's primary front of pack labelling scheme, the Health Star Rating, and the Healthy Food Partnership Reformulation Program do not account for the level of food processing. A sole focus on nutrients without considering foods as a whole and processing level, may result in unintended consequences. For example, [44, 45]an Australian study identified that 75% of new ultra-processed foods introduced into the market between 2014-19 received a Health Star Rating of 2.5 stars or higher, which may inadvertently permit highly processed foods to be labelled as 'healthy'[46]. Furthermore, food industry organisations wishing to meet food reformulation targets may do so by replacing nutrients without considering the impact of processing. For example, food reformulation targets may be met by replacing some of the sugar in foods with non-nutritive sweeteners, but not reducing the level of processing of the food. Whilst the nutrient profile of the final product may meet specified targets, the product remains detrimental to heath by virtue of being overly processed[44, 45].

Recommended actions

1. Recognition by Federal, State and Territory, and Local Governments, Food Standards Australia New Zealand, the agri-food industry, and the public domain of the impact of ultra-processed foods on population and planetary health.
2. Synergistic actions across government, industry, not-for-profit and academic sectors to reduce the impact of ultra-processed foods, including:

Policy and regulatory actions

3. Inclusion of the level of processing of foods as part of the next iteration of the *Australian Dietary Guidelines.*

4. Consideration of how the level of processing can be incorporated into government funded food provision policies, such as:

   a. departmental food procurement policies;

   b. food provision guidelines for government funded settings (e.g., childcare centres, school canteens, hospitals and health services, sport and recreation facilities, correctional facilities, and other public settings).

5. Inclusion of the level of processing of foods in national, state, and local public health and wellbeing policies and strategies, as well as in a new National Nutrition Policy.

6. System-wide mandatory regulatory actions to discourage production and consumption of unhealthy foods should consider the level of processing . For example:

   a. marketing restrictions on unhealthy foods and beverages, particularly to children, including digital and point-of sale marketing and price promotions;

   b. food labelling policies such as front of pack labelling that incorporate the level of processing;

   c. fiscal policies to disincentivise the production and consumption of highly processed, low nutritional quality foods and beverages;

   d. corporate regulation such as transparency of lobbying and political donations, and adding consideration of public health outcomes in competition assessments for new food industry mergers and acquisitions;

   e. Trade policies to address the pervasiveness of highly processed, low nutritional quality food availability, such as tariff-rates and tariff-rate quotas, and limits on imports of such products.

Public education and communication

7. Inclusion of the concept of ultra-processing within the wider education system, including:

   a. Health-related tertiary education (e.g., nutrition and dietetics, medicine, oral health and allied health courses);

   b. Food service training and education (e.g., standard childcare and aged care food provision courses).

8. Public education and communication (e.g., through funded social marketing campaigns) designed to support improved levels of literacy and education about food and nutrition and incorporating the associated human and planetary health impacts of highly processed foods.

Research and innovation

9. Investment in research to examine foods systems, human and planetary health impacts of ultra-processed foods, and modelling the potential and actual benefits of integrated policy solutions when using ultra-processed food classification systems.

Promoting fresh and minimally processed foods

10. Policies to increase the production and consumption of whole foods (e.g., fruits and vegetables, nuts, cereals, and legumes), including:

    a. fiscal policies that make whole foods and nutritious meals more affordable;

     b.   setting minimum standards for the amounts of whole foods required to be served via food procurement policies;

     c.   setting standards for sale and promotion by food retailers and food service outlets.

11. Encouraging "wholefoods reformulation" whereby food innovations focus on supplying new convenient and affordable whole or minimally processed foods to the Australian public.

12. Incentives for smaller-scale and mixed farming and shifting away from sole, large-scale commodity crops (such as corn and wheat), which tend to end up in ultra-processed foods.

13. Providing the food literacy skills needed to support quick, easy and nutritious home food preparation.

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