

## Policy Document

# Food and Nutrition

### Position Statement

The Australian Medical Students' Association (AMSA) affirms that in order to meet the nutritional needs of a growing population, we require both a global and nationwide food systems transformation. Current dietary trends towards ultra processed, calorically dense and nutrient-poor foods are contributing to a rising burden of malnutrition and non-communicable diseases. Our food system is failing to sustain us nutritionally, and is also one of the key contributors to environmental degradation and climate change. AMSA stresses the co-benefits of addressing our food system for both human and planetary health; recognising that a transition to nutritious and sustainable food systems will have a direct impact on health through increased food security and provision of adequate nutrition, and an indirect benefit through ensuring environmental sustainability. Access to a wide range of healthy and nutritious foods in line with individual dietary and cultural requirements is paramount for community and individual health and wellbeing. AMSA advocates for health to be placed at the centre of both a global and national food systems transformation.

### Policy

AMSA calls upon:

1. The Australian Federal and State Governments to:
  - a. Update the National Dietary Guidelines to include new evidence regarding health, reduced consumption of meat and animal sourced foods, and food sustainability. These should follow recommendations made by the World Health Organisation (WHO), the EAT-Lancet Commission and the Food and Agriculture Organisation (FAO) of the United Nations;
  - b. Update the 1992 Australian National Nutrition Policy to account for new evidence and recommendations made by the WHO, EAT-Lancet and the FAO;
  - c. Create a specific, standardised food and nutrition curriculum and ensure its delivery in schools;
  - d. Provide training and instructional material to aid teachers in implementing a national food and nutrition curriculum at a primary, secondary and tertiary level;
  - e. Improve delivery of education-based nutrition initiatives empowering behavioural change in vulnerable and disadvantaged groups such as those with chronic disease and people living in rural and remote communities;
  - f. Develop and deliver public education targeting decreased consumption of discretionary foods;
  - g. Update the National Healthy School Canteen Guidelines in alignment with new evidence and research, including recommendations from WHO and the EAT-Lancet Commission, and develop strategies to increase its implementation and adherence in all Australian schools;
  - h. Regulate food and drink options available in health facilities to develop a healthier environment for patients, staff and visitors through:
    - a. Implementing national guidelines for the sale of food and drink in health care centres and hospitals, such as an institution-appropriate adaptation of the Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework; and
    - b. Improving availability and funding of dietetics referral services in the healthcare setting;

Head Office  
42 Macquarie Street,  
Barton ACT 2600

Postal Address  
PO Box 6099  
Kingston ACT 2604

ABN 67 079 544 513

Email [info@amsa.org.au](mailto:info@amsa.org.au)  
Web [www.amsa.org.au](http://www.amsa.org.au)  
Twitter [@yourAMSA](https://twitter.com/yourAMSA)

- i. Refine the Health Star Rating system and mandate its adoption for all food products sold in Australia;
- j. Develop comprehensive media guidelines addressing the advertising of discretionary food to children in all media, including television, online media, and sporting events;
- k. Review existing evidence and conduct further research into the implementation of a sugar sweetened beverage tax in an Australian context, and determine the feasibility of its implementation;
- l. Review existing evidence and conduct further research into a red and processed meat tax in an Australian context and determine the feasibility of its implementation;
- m. Conduct research into quantifying revenue implications of food and beverage taxation in Australia as a means to maximise public health outcomes and minimise economic impact on disadvantaged groups;
- n. Review existing evidence on true cost accounting in the Australian context as a means to promote sustainable food production and make consumers more aware of the environmental impacts of food production;
- o. Improve access to nutritious food in rural and remote regions;
- p. Implement long term strategies to improve the nutrition for Aboriginal and Torres Strait Islander people through:
  - a. Working in partnership with Aboriginal Community Controlled Health Organisations (ACCHOs), Indigenous community leaders, and Indigenous community organisations, and local Indigenous communities to ensure that strategies are culturally appropriate and are effectively addressing the needs of Aboriginal and Torres Strait Islander people; and
  - b. Including multi-component strategies that address nutrition education, food insecurity and barriers to food access including geographical and socioeconomic factors; and
  - c. Ensuring that nutrition education is culturally appropriate and provided in a way that is effective and applicable; and
  - d. Increasing the availability, accessibility, affordability of nutritious food, including fruits and vegetables, in rural and remote areas of Australia; and
  - e. Addressing the underlying socioeconomic factors that impact food security, affordability of nutritious food and influence dietary choices, including unemployment, low income and poverty
- q. Regulate household food disposal by making green bins mandatory, alongside recycling and general waste bins;
- r. Regulate food wastage and disposal strategies used by commercial food retailers by following the recommendations of the National Food Waste Strategy and the CSIRO Food Loss Bank;
- s. Invest in transitioning the Australian agriculture sector to produce, process, transport and distribute food through sustainable agricultural practices, as advised by the EAT-Lancet Commission;
- t. Provide funding and support to farmers to enable the transition from animal agriculture to plant based agriculture or to implement more sustainable farming practices;
- u. Utilise a cross-disciplinary approach to ensure a food systems transformation by integrating health, agricultural and environmental sectors;
- v. Dedicate funding and research resources to translate and downscale global recommendations of the EAT-Lancet report to the Australian context, ensuring a food systems transition;
- w. Dedicate funding and research into the specific barriers and solutions to a just transition of Australia's food system; and
- x. Dedicate funding and resources toward further research on the implications of climate change on Australian food production as well as on adaptation strategies to reduce the effects of climate change on crop quality and yield.

## 2. Australian universities, medical schools and medical colleges to:

- a. Improve the quality, quantity, and continuity of nutrition education in medical curricula, ensuring that post graduation, medical students are prepared to provide appropriate nutritional advice in clinical practice and advocate for nutrition within the community;
- b. Ensure that nutrition education in medical schools is delivered through a competency-based curricula, with inclusion of multidisciplinary teaching;
- c. Empower medical students to improve their own health and nutrition (by utilising this knowledge), serving as role models for healthy and sustainable food choices;
- d. Strengthen education on the social determinants of health (including food security and nutrition) in medical school curricula;
- e. Provide adequate resources and teaching to medical professionals to ensure they can offer comprehensive nutrition counselling to patients;
- f. Provide affordable, nutritious food options on university campuses;
- g. Implement food labelling at university campuses and teaching sites to encourage healthier food choices - such as a traffic light system;
- h. Increase recycling and composting options on campuses and reduce food waste in cafes and canteens;
- i. Ensure provision of nutritious and sustainable foods, including plant-based options, when catering events; and
- j. Encourage public health officials to engage with industry, researchers and key stakeholders in agriculture, so as to achieve a common vision for food systems transformation in Australia.

## 3. Hospitals and health institutions to:

- a. Provide a variety of nutritious, sustainable and affordable food options in line with the planetary health diet, including the provision of plant-based options;
- b. Reduce the amount of discretionary foods served to inpatients, and increase the number of fruits, vegetables and nutritious food options, including the provision of plant-based meal options;
- c. Minimise food waste and loss;
- d. Implement guidelines that regulate the sale of food and drink according to nutritional content and in line with other evidence-based interventions;
- e. Advocate for patient health by educating patients about food and nutrition, the benefits of maintaining a healthy diet and strategies for doing so;
- f. Continue to implement behavioural interventions that encourage healthy food and drink consumption; and
- g. Implement screening tools to identify malnutrition in the acute health care setting and provide appropriate management and follow up, including referral to dietitians or physicians.

## 4. National, state, and university medical student societies to:

- a. Provide nutritious and environmentally sustainable catering at events, including predominantly plant-based catering;
- b. Advocate for adequate nutrition education; and
- c. Where appropriate, include nutrition and lifestyle interventions in academic events and initiatives.

## 5. All businesses, companies, and organisations to:

- a. Reformulate unhealthy products to reduce sugar, saturated fat and salt content;
- b. Restrict the advertising of unhealthy foods, particularly to children;
- c. Minimise food wastage throughout the supply chain, by implementing strategies such as selling or donating, rather than rejecting edible but cosmetically-imperfect produce;

- d. Provide accurate and comprehensive front-of-pack labelling of food and beverage item content;
- e. Adopt the Health Star Rating System on all food and beverage product packaging; and
- f. Work with government and non-government organisations to improve supply and availability of healthier foods to all individuals.

## Background

Nutrition is the greatest risk for death and disability globally (1). Transitions to unhealthy diets are increasing, corresponding to a rise in obesity, malnutrition and diet-related non-communicable diseases (1). Concurrently, methods of food production have resulted in the agricultural sector being the single greatest driver of environmental degradation (1). To safeguard the future of human and planetary health, we require an urgent and drastic food systems transformation. This will require targeted government interventions, in addition to policy and dietary guidelines, which reflect up-to-date evidence on dietary recommendations, and address food sustainability.

## STATE OF NUTRITION

### *Malnutrition*

Food and nutrition is vital to the physical and mental health of all people around the world (2). Malnutrition can be defined as deficiencies, excesses or imbalances in a person's caloric or nutrient intake (3). The three broader subgroups of malnutrition are: undernutrition, micronutrient-related malnutrition and overweight and obesity, all of which can have serious implications on health and wellbeing (3). The 'double burden' of malnutrition refers to the multifaceted nature of malnutrition and the coexistence of both undernourishment and overnourishment within a population, household or individually throughout the course of one's life (4).

Malnutrition in all of its forms continues to be a significant global issue, with the double burden of malnutrition represented increasingly amongst low- and middle-income countries (4). Globally, more than 821 million people suffer from undernutrition, over 2 billion people suffer from micronutrient deficiencies, whilst 1.9 billion are overweight or obese (3). Despite its status as a high-income country, Australia is not immune to the impacts of malnutrition. In Australia, overnutrition is the dominant form of malnutrition, whereby approximately 67% of adults and 25% of children and adolescents are overweight or obese (5). Overweight and obesity alone costs the Australian health system approximately AUD\$8.3 billion every year and without change could incur an additional AUD\$87.7 billion in costs over a 10 year period (5).

### *Health implications of current dietary trends*

Dietary intake is a significant contributor to overall health and wellbeing. Food provides us with essential nutrients, that if consumed in excess or insufficient amounts, can contribute to ill health and the development of chronic diseases (6). Medical conditions often associated with poor dietary intake include; coronary heart disease, stroke, hypertension, some forms of cancers, type 2 diabetes mellitus, dental caries, gallbladder disease, and nutritional anaemias (6). The Lancet "Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017" concluded that in 2017, globally, consumption of nearly all healthy foods and nutrients was suboptimal in all regions including Australia, with the largest gaps between optimal and current intake observed for nuts and seeds, milk and wholegrains (7). The study also found that dietary risks were responsible for 11 million deaths globally (with cardiovascular disease the leading cause of death) and 255 million disability adjusted life years (DALYs) amongst adults (7).

In Australia, currently 9 in 10 adults aged over 19 do not eat the recommended number of daily serves of vegetables, and nearly 4 in 5 adults aged 19-50 do not meet the recommended daily intake of fruit (6). Furthermore, approximately one third of Australians' daily caloric energy comes from discretionary foods, which are foods that are high in energy, low in nutrients, and are not necessary to meet daily nutrient requirements (6). Whilst high salt intake has been shown to increase the risk of developing heart and kidney disease, Australians are eating roughly 9 grams of salt a day, which is nearly double the recommended maximum intake (6, 8).

As a result of current dietary patterns, 7.3% of the total burden of disease in Australia is attributable to poor diet (6). Diet related non-communicable diseases are on the rise, with coronary artery disease continuing to be the leading cause of death in Australia (9). In 2017, type 2 Diabetes Mellitus contributed to over 11% of deaths (10). Furthermore, over 2 in 3 Australian adults have abnormal lipids on blood examination, and over 1 in 3 Australian adults suffer from hypertension (11). The health implications of poor nutrition are far-reaching, affecting not only physical but also mental health (12, 13). Poor dietary intake is associated with a greater risk of depression and anxiety, and in turn, good nutrition is associated with better mental health outcomes (12). Poor nutrition has also been associated with low concentration and fatigue, and immune system dysfunction - which is also linked to mental health, and impaired brain development (12).

### *Indigenous Health*

Indigenous Australians continue to experience lower quality of health, reduced lifestyle expectancy and a disproportionate burden of nutrition-related risk factors disease compared to non-Indigenous Australians (14). When considering the increased burden of disease amongst Indigenous Australians, it is important to recognise precipitating factors and social determinants that place Indigenous Australians at greater risk of poor health and contributes to health system inequities.

Compared to non-Indigenous populations, Indigenous Australians have higher reported consumption of discretionary foods as a percentage of total food intake (41% compared to 33% in the general populace), which is a contributing factor to disproportionate health outcomes (15). According to Australian Institute of Health and Welfare data, Indigenous Australians are 3.3 times more likely to have diabetes and 1.2 times more likely to have cardiovascular disease than non-indigenous Australians (14). Chronic illnesses are responsible for 75% of the mortality gap between Indigenous and non-Indigenous Australians, whilst 9.7% of the burden of disease experienced by Aboriginal and Torres Strait Islander populations can be attributed to dietary risk factors alone (16).

Current disparities in nutritional status and associated health outcomes are grounded in three underlying issues, these are; nutritional knowledge and education, logistical barriers to accessing health food and food insecurity. Whilst programs and campaigns exist to improve nutrition and nutritional knowledge in Indigenous populations, there is a lack of clarity surrounding their implementation and efficacy (17). Evaluation of these programs may also focus on short-term outcomes, neglecting deeply-rooted social and economic factors. Lifestyle interventions that are implemented at individual, family and community levels have shown positive outcomes. Community empowerment and local ownership over health promotion can be very effective in implementing nutritional programs, whilst engaging community members as experts in program delivery will also help to ensure programs are more suitable for different contexts (17). Interventions in schools may serve as effective programs given the capacity to influence change at an early age by facilitating peer-led intervention, breakfast/lunch programs and cooking classes. The ability of communities to respond to these interventions can also rely on adequate health literacy and therefore, improving nutritional knowledge and health literacy go hand-in-hand. Long-term follow-up on these programs is also important to ensure efficacy and longevity (17).

The nutritional status of Indigenous people is underpinned by a range of social determinants and other factors that may have a significant impact on the access to and affordability of nutritious food. The overrepresentation of Aboriginal and Torres Strait Islander people in geographically and socioeconomically disadvantaged groups contributes to the differences in nutrition, rather than Indigeneity itself. Rural and remote locations can be at risk of inadequate supply of food due to logistical challenges of transporting food, particularly perishable items including fruits and vegetables, long distances and to smaller populations with less demand (18). As a result, the food that is available, particularly in remote areas, can be of poorer quality, can be more expensive and can have limited availability (18). With 65.7% of Indigenous people living in rural and remote areas compared to 28.4% of non-Indigenous people, it is evident that a disproportionate number of Aboriginal and Torres Strait Islander people face the challenges of food availability and affordability due to geographic location (19).

Food insecurity is a pertinent issue for Indigenous populations, whereby 22% of Aboriginal and Torres Strait Islander populations live in a household that ran out of food in the previous 12 months and could not afford to buy more. This is compared to 3.7% in non-Indigenous populations (20). The underlying causes of food insecurity in Indigenous populations are multifactorial and include socioeconomic and geographic determinants. Factors impacting socioeconomic status, including unemployment, low income, poverty and education levels, can have a significant impact on the ability to afford nutritious foods such as fruit and vegetables (21). The unemployment rate of Aboriginal and Torres Strait Islander people is 20.1% compared to Australia as a whole being 12.7%. Amongst Aboriginal and Torres Strait Islander people, those who are unemployed are more likely to have an inadequate fruit and vegetable intake (21). There is a need for a government approach to Indigenous food insecurity in urban, rural and remote areas, that addresses these factors with a human-rights based approach. Current initiatives such as the SHOP@RIC, where health promotion was delivered in combination with a fresh food discount, can be used as part of a multi-component strategy to address food insecurity (22). Improving the overall nutritional status of Aboriginal and Torres Strait Islander people requires long term solutions to the multitude of issues that underlie food access, availability and affordability.

### *Food insecurity*

Food insecurity is defined by the United Nations' Food and Agriculture Organisation as a "lack of secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life" (23). Food insecurity is both impacted by and a major contributor to non-communicable disease and socioeconomic disadvantage. Approximately 3.6 million Australians (15%) have experienced food insecurity at least once in the past 12 months, with three in five of these individuals experiencing food insecurity at least once a month (24). Food insecurity is more prevalent amongst marginalised communities, affecting 71% of asylum seekers (25), 25% of disadvantaged households (26), 23% of unemployed individuals (27), as well as the elderly, frail and socially isolated populations (28). In addition, welfare-dependent families spend 40% of their disposable income on nutritious diets, compared to 20% for the average Australian family (29). Furthermore, low-income households are more likely to be in regions with access to over twice as many fast food outlets compared to more affluent areas, increasing their exposure to obesogenic environments (30). Efforts to tackle food insecurity have failed to adequately address the issue, with only 37% of charities able to fully meet the needs of the people they assist (24). Given the prevalence of food insecurity throughout Australia, improving food accessibility and availability is necessary to address health outcomes and achieve health equity.

### *Dietary recommendations*

The World Health Organisation (WHO) has made a number of nutritional recommendations for maintaining a healthy diet, which aim to reduce and prevent malnutrition and non-communicable diseases (NCDs). The WHO places emphasis on the consumption of vegetables, fruits, legumes (e.g lentils and beans), nuts, and

wholegrains (e.g. unprocessed maize, millet, oats, wheat and brown rice). The WHO has made the following specific daily nutritional recommendations: at least 400 grams of fruits and vegetables, less than 5 grams of salt, less than 10% of total energy intake from free sugars, and less than 30% of total energy intake from fats (2). The WHO also advocates for reduced consumption of red and processed meat, categorising processed meat (cured, smoked or salted meats such as sausages, ham, corned beef and jerky) as a group 1 carcinogen (carcinogenic to humans) and red meat as a group 2A carcinogen (probably carcinogenic to humans) (31,32). Research has demonstrated that consumption of processed and red meat increases the risk of colorectal cancer, whilst also increasing the risk of death from cardiovascular disease, stroke and type 2 diabetes mellitus (32, 1). In 2015, the US Dietary Guidelines Advisory Committee undertook the largest ever prospective study of vegetarian diets and concluded that, in contrast with omnivorous diets, diets that are vegan, vegetarian, semi-vegetarian or pescatarian are associated with an overall 12% reduction in mortality (33).

In 2019, the EAT-Lancet Commission's landmark report evaluated current scientific evidence and outlined recommended intakes for specific food groups that align with a 'planetary health' diet (1). At its core, the planetary health diet is designed to optimise human health, whilst addressing the immediate challenge of feeding a growing population with a healthy diet that upholds global sustainability objectives. The report acknowledges that the necessity to transform eating habits is two-fold; populations urgently need to optimise human health as well as curb the environmental impacts of food systems. The proposed planetary healthy diet consists of high intake of vegetables, fruits, wholegrains, legumes and nuts, and recommends a low to moderate intake of seafood and poultry, and includes no or low intake of red meat, processed meat, added sugar, refined grains and starchy vegetables (1). Specifically, the report recommends a daily red meat intake of 14 grams (reference range 0-28 grams). However, the authors note that this recommendation must factor in regional context, for example, Sub-Saharan Africa (one of the most nutritionally insecure places on the planet), where intake of red meat and animal products is necessary to significantly improve growth and micronutrient levels (1).

The report concluded that such dietary changes can result in major health benefits and reduction in diet-related disease mortality, preventing approximately 11 million deaths per year, representing between 19-24% of total annual deaths in adults (1,34). These findings suggest that a shift towards a dietary pattern emphasising whole grains, fruits, vegetables, nuts, and legumes will be beneficial not only in lowering rates of NCDs but also in reducing greenhouse gas emissions and the environmental impact of the agriculture sector. The report quantifies dietary targets that not only guide individual consumption but can serve as the backbone for large scale and coordinated efforts to transform global food systems.

#### *Transition to healthy & sustainable diets*

Increasing evidence indicates the need to translate EAT-Lancet findings to the Australian context. However, such a transition must also take into consideration cultural, social, and financial factors, amongst others. Many cultures within Australia value and utilise food in different ways, and the EAT-Lancet report does not dismiss the role of culture in food choices. The report recommends that changes are applied according to different countries and cultural contexts, and that diets should reflect the culture, demographic and geographical locations of populations and individuals (1).

In Australia, an estimated 270,000 people are employed in the agriculture sector, with a further 223,000 employed in food and beverage processing (35). This means that many Australian families are dependent on income from farming and agriculture; and shifts in these practices as well as in food demand may be detrimental to their livelihood (36). The EAT-Lancet report encourages farmers to modify their practices to reduce waste and emissions whilst producing higher quality and more nutritionally dense produce (37). A just transition approach is necessary, whereby farmers, farmworkers, food processors, and marginalised communities, are supported through appropriate

safety nets and social protection (38,39). The Transformation Project is an American-based initiative to support farmers who wish to transition from animal agriculture to plant based agriculture (40). The implementation of similar projects in Australia, with support from the Australian Government, can enable farmers to pursue alternative agricultural practices without the risk of losing income, their business or their property.

### *Australian National Dietary Guidelines*

National food-based dietary guidelines are an important resource for consumers, policy writers, health professionals and industry (23). They should provide up-to-date, evidence-based recommendations that are adapted to suit the national context. The Australian Dietary Guidelines outline recommended quantities of particular foods, beverages, and macronutrients with the aim of preventing chronic disease and diet-related conditions (Appendix). The current version of the Australian Dietary Guidelines was last revised in 2013 and therefore lacks critical new evidence (41). Organisations such as the Public Health Association Australia and the Dieticians Association of Australia have called for a review of current dietary guidelines as well as Australia's National Nutrition Policy, which has not been updated since 1992 (9). This is essential to ensure Australian Dietary Guidelines are in accordance with recommendations made by the WHO and EAT-Lancet. Whilst the current guidelines recommend that Australian males reduce consumption of red meat, there is no recommendation to restrict intake of processed meat or generally restrict consumption of red meat (41). The current dietary guidelines recommend up to 455 grams of red meat (beef, lamb, pork, venison or kangaroo) per week (one serve, 65 grams, per day) (41). In contrast, the EAT-Lancet Commission concluded that in order to ensure both human and planetary health, the recommended intake of red meat (defined by the Commission as beef, lamb and pork) should be 98 grams per week, with the recommended daily intake set at 14 grams (34). In 2017, The High Level Panel of Experts on Food Security and Nutrition called for the inclusion of sustainability in national dietary guidelines to ensure "sustainable, resilient food systems for healthy diets" for future populations (43). Revising the Australian Dietary Guidelines in line with the Planetary Health Diet and ensuring that they acknowledge sustainability will recognise the impact of food choices on population health and the environmental burden of food production.

## **EDUCATION**

### *Nutrition education in schools*

Given that lifestyle and eating behaviours adopted by children are likely to be carried to adulthood, nutritional education in schools provides the opportunity for the prevention of obesity and subsequent chronic diseases during a critical developmental period (44). WHO's framework for nutrition recommends a core curriculum that includes nutrition, health literacy, and practical skills (44). This encompasses food preparation, nutrition and personal health, food production and sustainability as well as eating habits and their sociocultural influences (44). These requirements are also reflected in the Australian food and nutrition curriculum (45). However, the delivery of this curriculum is limited by an overcrowded education framework, lack of curriculum-specific teaching resources and inadequate knowledge from teachers (46). The Stephanie Alexander Kitchen Garden foundation is one example of how hands-on interventions in schools can make a meaningful impact (47). The not-for-profit charity runs food education programs in early education centres, primary schools, and high schools, teaching students to grow their own produce and to form positive food habits (47). The success of this program is reflected in its implementation in 1,954 schools across Australia (47).

### *Nutrition education in medical school curricula and further professional development*

Medical professionals provide nutritional advice to encourage healthy lifestyles and to manage lifestyle and diet related illnesses (48). In order to integrate nutritional care into clinical practice, medical practitioners need sufficient and clinically relevant nutritional knowledge (48). Despite this, medical students have reported that nutritional education provided in medical school is inadequate to confidently provide nutritional care (48). Australian medical students were often reluctant to perform dietary assessments and



did not feel confident to manage nutritional issues in medical conditions (48). In turn, a competency-based curricula is recommended, whereby interprofessional management and early integration of nutritional interventions are emphasised (48).

General Practitioners (GPs) are among medical professionals who frequently provide nutrition counselling, yet many report inadequacies in the current curriculum (49). Advice provided to patients is often broad, and GPs frequently encounter barriers such as the lack of confidence and time to provide adequate advice on diet, particularly for those with specific or complex conditions (49). They advise within current Australian Dietary Guidelines, which are outdated, and nutritional recommendations may differ for the elderly or patients with chronic health conditions such as obesity, diabetes or frailty (50). GP guidelines currently advise referral to dietitians for dietary management of such conditions (50). There is also a lack of continuing education, and updated guidelines for clinicians (49).

### *Culinary medicine*

Culinary medicine is an evidence-based discipline which aims to improve eating behaviours and reduce the global burden of nutrition-related disease (51). While no formal definition has been established (52), it broadly encompasses nutritional science and education about food choices, as well as food preparation for disease prevention and treatment (51, 53). Culinary medicine promotes enjoyment of healthy food (54), encourages condition-specific dietary decisions, and empowers patients to care for themselves as a primary care technique (3). There has been focus on benefits of condition-specific food choices for diseases such as type 2 diabetes, Alzheimer's or chronic kidney disease (54). There is however, a lack of evidence on the existence and impact of current Australian educational initiatives in culinary medicine on health behaviours and outcomes outside of primary and secondary schooling. One of few examples is the Monash University "Food as Medicine" free online course provided by the Department of Nutrition, Dietetics and Food (55). Educational initiatives in culinary medicine are designed to target changes in food shopping, meal planning, preparation, and storage and are aimed at clinicians, medical students or directly for patients and communities (51)

Development of such initiatives in Australia may be guided by critiques of 10 US culinary medicine education programs identified in a 2016 review (52). Areas to focus on include clear learning objectives for culinary medicine in medical school curricula and patient education (52). Patient education curricula should be applicable to various diets and nutritional recommendations based on the individual (52). Further, trainer competencies in nutrition and behavioural change are essential (52).

Culinary medicine may be integrated into the medical curriculum in various ways, with trials showing success of an elective during medical school at increasing student confidence and knowledge of culinary skills (56). Integration of culinary medicine within clinical practice such as General Practice, requires development of guidelines with a defined scope.

### *Nutrition education in the general public*

Public education campaigns for health and nutrition in Australia have been delivered at national and state levels, however there is a lack of coordinated national approach and long-term direction (57). Previous national campaigns targeted healthy eating as a means of weight reduction, including Measure Up in 2008 and Swap it Don't Stop It in 2010, with small changes in attitudes and limited impact on health behaviours (57). The LiveLighter Western Australian campaign in 2012 which was later taken up by other states, increased knowledge about the impact of sugary drinks on weight (57) and decreased consumption of sugary drinks by overweight adults (58). The Public Health Association of Australia recognises the importance of education campaigns to encourage healthy eating and ensure Australians have knowledge about healthy foods, food budgeting and preparation techniques (59, 60). Cooking skills intervention programs have had inconclusive evidence about their effectiveness at changing dietary behaviours in Australia (61). Education programs targeting chronic disease in

disadvantaged populations, such as the FOODcents nutrition education courses delivered in Western Australia, increased consumption of fruit and vegetables, confidence in budgeting skill for healthy foods, awareness of the links between diet and disease, and nutrition knowledge, especially in an Indigenous population (62). Despite positive effects of nutrition education such as cooking skills workshops, group education sessions and store interventions on BMI and biochemical risk factors, more evidence is required for the effects on reduction of anthropometric risk factors for chronic disease in Indigenous Australians (63).

To date, education-based behavioural interventions have failed to adequately target decreased consumption of discretionary foods and diets in energy surplus (64). Such interventions are likely to be more successful in conjunction with more effective and cost-effective food supply initiatives (64) such as nutrition labelling and food reformulation (65).

## **FOOD AVAILABILITY**

### *Food availability in schools*

Schools play a large role not only in the education of food and nutrition, but also in the provision of food. Programs run within the school setting can enable children and adolescents to grow and prepare their own food, encourage healthier food choices, and combat the effects of food insecurity. Breaking Barriers, Breaking Bread is an initiative developed to address children's poor breakfast consumption and food insecurity, as well as helping to reduce food waste (66). Food donated by supermarkets and small businesses, which otherwise would have gone to waste, was used to provide breakfast for all students at a public primary school in New South Wales (66). Preliminary interviews showed that one fifth of students arrived at school without having breakfast at least once a week, and one third of students arrived at school hungry (66). The implementation of the breakfast program has ensured that all students are able to access a nutritious breakfast, as well as saving over 14 tonnes of food from landfill (66).

School environments can have a significant influence on food choices and can enable students to make decisions that could be either beneficial or detrimental to their health and wellbeing. Whilst National Healthy School Canteens Guidelines do exist, they are not mandatory and have been criticised due to poor implementation, enforcement, and adherence (67). The guidelines separate foods into green, yellow, and red categories based on the current Australian Dietary Guidelines, which determine how frequently students should be offered and should select these options (68). Such categories can be misleading, as seen when pasta, noodles and pancakes are categorised as a 'green food' which should always be available on the menu. Without sufficient education or enforced restrictions, the guidelines as they stand can enable children and adolescents to consume an unlimited amount of foods containing excess sugar, salt, and saturated fats (68).

### *Food availability in universities*

Tertiary education centres are a key source of food and nutrition for more than 1.5 million students across Australia (69). Although governments have developed guidelines for food consumption and promotion within schools and health facilities, there are no existing policies mandating universities on the availability, quality, and promotion of foods and drinks on campus (69). Dietary choices within these facilities are attributed to the cost of food and the increased promotion and proportion of discretionary foods on offer (69).

Deakin University is leading the way in provision of healthy and sustainable food options on campus. Caterers have revised menus to focus on fresh, seasonal produce and reflect recommendations from the Victorian Healthy Choices guidelines (70). A 'traffic light' labelling classification system has been implemented in canteens and vending machines to provide nutritional guidance and equip consumers to make informed decisions on their food choices (70). Sustainability is also a key focus, with

the university working to minimise food wastage, use compostable packaging, and offering discounts for drinks purchased with a reusable cup (70).

### *Food availability in healthcare settings*

Health facilities and hospitals have a responsibility to model and encourage healthy food habits to patients, visitors and staff. Given the implications of nutrition on physical and mental health, it is necessary that hospitals provide an environment where patients have a variety of nutritious food options and are supported to make choices that will promote good health. Malnutrition in the acute hospital setting has been estimated to be as high as 40% of all admitted patients (71). The rate of hospital-acquired malnutrition in Australian hospitals was 12 per 10,000 hospitalisations in 2015–16 (71). Malnutrition in the healthcare setting increases the cost of admission, and prolongs hospital stay, leaving patients vulnerable to further complications (72).

Positive changes can be seen within Australian hospitals, such as through the implementation of the 'Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework' in New South Wales (NSW) (73). Key elements of this framework include the removal of sugary drinks from sale, ensuring 75% of available food is classified as an "everyday" food by the Australian Dietary Guidelines, that foods have clearly labelled Health Star Ratings, providing smaller portion sizes, and tactical marketing techniques and product placement (73). A 2018 study auditing two NSW hospitals showed that food options had improved since the implementation of the framework (74). Improvements have been seen despite the flaws in the current Australian Dietary Guidelines and Health Star Rating system, signifying the potential for even greater impact once the guidelines are revised and representative of current evidence. In 2018, California passed a bill requiring all health care facilities to make plant-based meals available, following the American Medical Association's call for hospitals to improve the health of patients, staff and visitors (75). Policies and strategies implemented by governments can enable a healthier and more sustainable environment within the healthcare setting.

## **CREATING HEALTHY FOOD ENVIRONMENTS**

### *Food labelling*

The term 'food environment' describes the setting for an individual's acquisition and consumption of food (76). Food environments result from physical, cultural, economic, and political factors which influence the accessibility, affordability, quality, and marketing of food (76). Food labelling influences how informed customers are and thus their choices within their food environment (76). Consequently, easily comprehensible food labelling should be used to foster a healthy food environment. The extent of food labelling varies between countries.

In Australia, food labelling is designed to help consumers make informed and healthier dietary choices by minimising deceptive or misleading claims, listing ingredients and nutritional information, and declaring common food allergens (77). For example, products must list ingredients in descending order by weight, and the percentage of characterising ingredients, such as strawberry in strawberry yogurt (77).

In 2014, Australia and New Zealand introduced the Health Star Rating (HSR), a voluntary front-of-pack-labelling system that rates the overall nutritional profile of packaged foods between 0.5 and 5 stars where 5 is the healthiest (78). A HSR is calculated using seven components (energy, sodium, saturated fat, total sugars, protein, fibre, and fruit/vegetable/nut/legume (FVNL) ingredients) based on healthy eating recommendations in the Australian and New Zealand Dietary Guidelines (78). Each component is assigned a point value (positive or negative) based on how much is in the product and what broad category of food the product falls under (78). Products are divided into categories to account for the different nutrient compositions of different foods when calculating a HSR (78). Some categories include cheeses, dairy beverages and other dairy foods, dairy is separated into different categories to reflect the health

benefits of eating some dairy specific dairy foods like cheese and milk and not others like ice-cream (78). This facilitates consumers making comparisons between foods within the same category (78).

A five-year review conducted in 2019 found that the HSR system was adopted in one third of packaged foods (78). Additionally, it was successful in influencing consumer purchasing behaviour where 23% of surveyed consumers reported being influenced by a HSR (78). Finally, it encouraged industry to reformulate to achieve a better rating (78). However, the system has been criticized for being voluntary, allowing companies to choose to assign HSRs to their healthier products while omitting it from unhealthy products (79). Additionally, the way HSRs are calculated has allowed muesli companies to reformulate products to have a higher FVNL content to increase their HSR despite a high sugar content (80), which is a problem exacerbated by the low penalties for sugar and salt (80). Changes to how sugars and sodium affect HSR are planned in 2020 and these changes will be implemented within two years of an agreed start date (80). Another issue identified with the HSR is that companies are able to calculate a HSR for their product grouped with foods it is meant to be eaten with, for example cereal or chocolate powder with skim milk (79). The health benefits of the added food masks the unhealthy characteristics of the product on sale, artificially inflating its health star rating (79). An example of this is Milo cereal which was rated 4.5 stars when calculated with skim milk but only 1.5 on its own (79).

### *Food marketing*

Food advertising often promotes energy-dense and nutrient-poor foods and thus contributes towards an obesogenic food environment. Food marketing influences people's food preferences and consumption (81) and can contribute towards unhealthy food behaviours and obesity. The WHO recommends marketing regulations to reduce the burden of obesity and diet-related NCDs (82). Children are particularly vulnerable to advertising, and food advertising has been linked to childhood obesity (83). Exposure to advertisements has also been exacerbated by increasing online advertisement (83). Currently in Australia, commercial broadcasting to children is regulated by the Federal Government. Between 2011 and 2015, 25 major food and beverage manufacturers and fast food companies, signed on to self-regulated advertising and food industry initiatives with the aim to voluntarily reduce advertisements to children (84). A subsequent 2017 evaluation concluded that there was no change in unhealthy food advertising to children from these measures and recommended stricter regulations to protect children (84). Given the efficacy of advertisement on children, it can be used to promote healthier food choices in this demographic. A study conducted by the Cancer Council Victoria found that when promotional toys were provided only with healthy meals and not unhealthy meals, the number of children selecting healthy options increased (85).

## **FOOD PRICE**

### *Fiscal policy*

Fiscal policy is a powerful and comprehensive method by which governments can influence consumers to improve their diets and reduce the incidence of NCDs. One rationale for implementing fiscal policy is that modulating retail prices better reflects the true social costs of foods and associated NCDs. This accounts for both the direct costs of healthcare and costs that stem from an increased burden of disease, including reduced quality of life and job productivity (86). The WHO has recommended the taxation of energy-dense food and beverages in conjunction with the subsidisation of nutrient-rich foods. This is in order to improve consumers' dietary choices (86) and mitigate the disproportionate impact of fiscal policies on low socio-economic groups. This fiscal policy may also have flow-on effects that will improve health education, food production and usage, and planetary health.

### *Food taxation*

Internationally, studies have shown that food taxation can have a positive effect, leading to changes in dietary behaviours and health outcomes, however, there is limited

evidence regarding the impact of food taxation in the Australian context (87). The primary goal of an excise tax on food and beverages is to decrease consumption by disincentivising consumer purchase. In turn, taxation programmes may also educate consumers, raise revenue for health initiatives, and encourage manufacturers to reformulate their products (88). Successful taxes have applied a tiered approach where the level of taxation is variable depending on the quantity of a given ingredient (86). For example, a beverage with 10 grams of added sugar would be taxed at a higher level than a drink with 5 grams of added sugar. This may allow consumers to choose more nutritious options by discerning the difference between products.

Concerns around food and beverage taxations focus on equity and transparency. Policy must consider the regressive economic impact of taxation on low-income consumers (87, 89). Revenue raised from taxation should be used to offset the disproportionate impact of taxation on these consumers, and this can be achieved through subsidisation, food vouchers, and health promotion efforts (89).

#### *Sugar-sweetened beverage tax*

Sugar-sweetened beverage (SSB) taxes are gaining popularity, and have been shown to be effective in reducing purchases in some countries, such as Hungary, France, Mexico and Norway (90). SSBs are considered both energy-dense and nutrient-poor and have close substitutes, such as water, that make them effective for such a taxation programme (88).

Australians are high per-capita consumers of SSBs, whereby Australians aged two years and older consume an average of 60 grams of sugar per day, 52% coming from SSBs (88). The introduction of the Goods and Services Tax (GST) in 2000 reduced taxation on SSBs from 22% to 10% (88). Recent modelling using Australian data estimated that a 20% tax on SSBs would result in a 12.6% decline in daily consumption of SSBs and a 2.7% and 1.2% decline in obesity in men and women respectively, generating greater than 400 million AUD annually (91). Further modelling demonstrated that almost 50% of healthcare savings generated by the tax would accumulate within low-income and disadvantaged communities (92).

#### *Meat tax*

Meat taxes are under consideration in many nations in the European Union as a means to tackle the sustainability and health issues associated with the consumption of meat, particularly red and processed meat (93). A UK study has found that implementing a meat tax in the UK may prevent 6,000 deaths per year and save 1.3 billion AUD in healthcare costs (94). The United Nations have also stated that human food systems account for 37% of greenhouse gas emissions, with meat production accounting for the majority (93). Australians consume over 100 kilograms of meat per capita, and levels of consumption are expected to increase within the coming decade (95). A well-designed meat taxation program may be a means to tackle the individual and planetary health impacts of meat consumption, steering consumers toward healthier dietary options. However, further research is needed to assess the feasibility of the implementation of a meat tax in an Australian context.

#### *Subsidisation*

Subsidisation in the context of food-related fiscal policy primarily focuses on increasing fruit and vegetable consumption. Subsidies have not only been associated with increased consumption of the target food but also a reduction in NCDs (86). Modelling in the UK has found that a 10% subsidy on fresh fruit and vegetables, fish, and lean meats may lead to a reduction in the population percentage of overweight people from 57% to 13%, with a monetary net benefit of 11 billion AUD in long-term healthcare costs (96).

Whilst subsidising fruit and vegetables may increase their consumption, there are concerns associated with a compensatory increase in the consumption of high sodium and energy-dense foods as consumers reorganise their spending (97). With an

increase in disposable income and a lack of concurrent nutrition education, consumers may turn to the excessive consumption of other nutrient-poor foods (97).

In Australia, the current 10% GST does not apply to fruit and vegetables, and this exemption may be considered a subsidy of sorts (98). However, given that 90% of Australian adults do not consume the recommended five daily serves of vegetables and almost 50% do not consume the recommended two daily serves of fruit (98), it is difficult to conclude whether an additional subsidy will achieve its aim. However, recent Australian modelling has suggested that, whilst a subsidy on its own may not lead to improved health outcomes, a subsidy combined with a taxation on certain macronutrients (saturated fat, salt, SSBs, and sugar) would be successful in doing so (97). This is also reflected by WHO recommendations that call for both taxation and subsidisation on particular food and beverages so as to improve dietary choices (86).

#### *Research gap on food taxation*

There is currently a dearth of research surrounding the implementation of food and beverage taxation in an Australian context (87). Further investigation is needed to comprehensively understand how food taxation will affect; consumer behaviours and consumption, economic implications for different socio-economic groups, individual health impacts, revenue earmarking, and interplay with complementary cross-disciplinary policy (87).

#### *True cost of food*

Current methods of food production, distribution and consumption have significant negative impacts on both public health and the environment, including a rise in antimicrobial resistance, environmental pollution, greenhouse gas emissions and soil degradation (99). Despite the extensive cost to society, these factors are often not economically valued, and therefore not reflected in the market price of food (100). Research has shown that true cost pricing can promote sustainable food production practices and make consumers more aware of the environmental impacts of the foods they are consuming (100). Furthermore, true cost pricing may be a mechanism to achieve Sustainable Development Goal 12, which aims to ensure sustainable consumption and production patterns by 2030 (101).

Despite its benefits, calculating the true cost of food presents multiple challenges. Some of these challenges include; which environmental impacts should be accounted for, how to attribute certain impacts to goods, and how to ensure that revenues raised would aid in mitigating and reducing the relevant environmental impacts (100). It is also crucial to evaluate how true cost pricing will affect individuals in the low socioeconomic bracket, ensuring that price rise would not threaten household food security (100).

## **FOOD LOSS & WASTE**

Between 2016 and 2017, 7.3 tonnes of food waste was generated in Australia, from manufacturing (25%), primary production (31%) and households (34%) (102). Food waste is growing, with the annual spend on household food waste increasing from \$8.9 billion in 2018 to \$10.1 in 2019 (102). The 2019 EAT-Lancet Commission called for the halving of global food loss and waste in accordance with UN Sustainable Development Goals targets, to reduce the environmental impact of food systems (1). Food waste and loss occur within the food chain, which describes the process of production, handling and storage, processing and packaging, distribution and market and consumption (103). Primary production and households are the two largest waste generating sectors, together accounting for over 65% of food loss and waste in Australia (104). Reductions should therefore target food losses at production through technological solutions, and food waste at consumption through behavioural changes (1,104).

Household practices contribute significantly to food waste (104). Education remains the best approach to reducing consumer wastage, with 32% of households reporting they could not tell if something was safe to eat so disposed of it, 51% did not understand

both use-by and best before food labels, and 36% rarely saved and ate leftovers (105). Of the 20% of households with access to a kerbside food disposal bin, 75% used them as the primary method of food disposal, highlighting the potential to provide better sustainable disposal options so as to improve disposal behaviours (105).

The 2017 National Food Waste Strategy (106) and the CSIRO Food Loss Bank (107) are two major initiatives to halve food waste in Australia by 2030 through the construction of a waste hierarchy. The waste hierarchy identifies foods that are more likely to be disposed of, and aims to repurpose or redistribute them (104). The CSIRO Food Loss Bank also aims to reduce food loss by improving methods and technology that convert and stabilise food loss materials (107). This approach is specifically recommended by the EAT-Lancet Commission as an opportunity to divert and reduce global food waste (1, 107).

## FOOD AND THE ENVIRONMENT

### *Food in the Anthropocene*

In 2019, the EAT-Lancet Commission concluded that food is the single strongest lever to optimise human health and environmental sustainability on Earth (1). Current methods of food production have resulted in the agriculture sector being the greatest driver of environmental degradation (1), significantly contributing to global greenhouse gas emissions, unprecedented biodiversity loss, environmental pollution, and water shortages (108). In Australia, the agriculture sector is responsible for 16% of Australia's annual greenhouse gas emissions (109). Food systems are a key contributor to climate change, and in turn, climate change threatens food security, placing the health and livelihoods of millions of people across the globe at risk.

### *Impacts of climate change on Australia's food system*

Australia is one of the most vulnerable developed countries in the world to the impacts of climate change (35). Increased frequency and intensity of extreme weather events, rising temperatures, and reduction in rainfall and water availability pose a significant production risk to Australian agriculture (35). Changes in climate are predicted to cause; plant and animal heat stress, crop and livestock losses from flood and drought, changes in regional suitability of certain production systems, and increased duration and severity of pest and disease outbreaks (110). These factors will significantly affect crop quality and yield, and thus lead to disruptions in food supply chains and food affordability, threatening the future of Australia's food security (35). Whilst Australia has experienced unprecedented levels of food security in the last 50 years, climate change has already caused disruptions to food systems (35). During the 2006-2007 drought, annual rainfall was reduced by 40-60% in some parts of Australia, with the affected areas including the bulk of the country's crop production region, causing reduced crop yield (110). As a result, food prices during the 2006-2007 drought increased at twice the rate of the Consumer Price Index - with fresh fruits and vegetables the most significantly affected, causing an increase in price of 43% and 33% respectively (35). Food prices are expected to continue to rise in the event of a reduction in livestock numbers or the continuation of drought conditions (35).

### *Food quality and crop yield in the Anthropocene*

In Australia, climate change is affecting both the quality and availability of many foods. Heat stress has been shown to reduce milk yields by 10-25% and up to 40% in extreme heatwave conditions. Additionally, studies have demonstrated that yields of crop species, such as; wheat, maize and rice, are reduced when temperatures exceed 30 degrees Celsius. Researchers at the University of Queensland found that prolonged high temperatures decreased the development period (i.e. earlier flowering and maturity) in sorghum varieties, resulting in lower yields, (111). In Australia, reduced rainfall and rising temperatures have stalled wheat yields since 1990. The impact of climate change on crop yield also has implications for food security, given that growing populations rely on an increase in grain yield (112). Furthermore, elevated levels of carbon dioxide have been shown to reduce the protein and mineral concentrations of

foods, reducing their nutritional value. Climate change is a contributing factor in the occurrence of extreme weather events, which are also detrimental to the quality, availability and affordability of particular foods (112).

## References

1. Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet*. 2019;393(10170):447-492.
2. World Health Organisation. Healthy Diet: Key Facts. [Internet]. Geneva : World Health organisation; 29 April 2020 [cited 27 June 2020]. Available from: <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>
3. World Health Organisation. Malnutrition: Key Facts. [Internet]. Geneva : World Health organisation; 1 April 2020 [cited 27 June 2020]. Available from: <https://www.who.int/news-room/fact-sheets/detail/malnutrition>
4. Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet*. 2020 Jan 4;395(10217):65-74. Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(19\)32497-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)32497-3/fulltext)
5. Australian Institute of Health and Welfare. Overweight and obesity: an interactive insight [Internet]. Canberra: Australian Institute of Health and Welfare; 2019 [cited 2020 Jun. 27]. Available from: <https://www.aihw.gov.au/reports/overweight-obesity/overweight-and-obesity-an-interactive-insight>
6. Australian Institute of Health and Welfare. Poor diet [Internet]. Canberra: Australian Institute of Health and Welfare, 2019 [cited 2020 May 26]. Available from: <https://www.aihw.gov.au/reports/food-nutrition/poor-diet>
7. 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 Apr. 03;393(10184):1958-1972. Available from: [https://www.thelancet.com/article/S0140-6736\(19\)30041-8/fulltext](https://www.thelancet.com/article/S0140-6736(19)30041-8/fulltext)
8. Heart Foundation. Is salt bad for your heart? [Internet] Heart Foundation. [cited 2020 May 24]. Available from: <https://www.heartfoundation.org.au/Heart-health-education/Salt-and-heart-health>
9. Australian Institute of Health and Welfare. Deaths in Australia [Internet]. Canberra: Australian Institute of Health and Welfare, 2019 [cited 2020 May 26]. Available from: <https://www.aihw.gov.au/reports/life-expectancy-death/deaths-in-australia>
10. Australian Institute of Health and Welfare 2019. Diabetes. Cat. no. CVD 82. Canberra: AIHW. [cited 2020 May 26]. Available from: <https://www.aihw.gov.au/reports/diabetes/diabetes>
11. Australian Institute of Health and Welfare. Risk factors to health [Internet]. Canberra: Australian Institute of Health and Welfare, 2017 [cited 2020 May 26]. Available from: <https://www.aihw.gov.au/reports/risk-factors/risk-factors-to-health>
12. Beyond Blue, Be You. Nutrition and mental health [Internet]. Be You [cited 2020 May 27]. Available from: <https://beyou.edu.au/fact-sheets/wellbeing/nutrition-and-mental-health>
13. Scanlan F, Fraser S, Parker A. Food for thought: the relationship between diet and outcomes for depression and anxiety [Internet]. Orygen The National Centre of Excellence in Youth Mental Health Research Bulletin (3) [cited 2020



- 27 May]. Available from: <https://www.orygen.org.au/Our-Research/Research-Areas/Mood-Disorders/Research-Bulletin-Diet-Depression-Anxiety.aspx?ext=>
14. Australian Institute of Health and Welfare. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples [Internet]. 2015; Cat. No. IHW 147. Canberra: AIHW. Available from: <https://www.aihw.gov.au/reports/indigenous-australians/indigenous-health-welfare-2015/formats>
  15. Australian Institute of Health and Welfare. Food & nutrition [Internet]. Canberra: AIHW 2020. [cited 2020 May 27]. Available from: <https://www.aihw.gov.au/reports-data/behaviours-risk-factors/food-nutrition/overvieww>
  16. Ride K. Partyline [Internet]. Major review of Aboriginal and Torres Strait Islander Nutrition; 2018 Jun 6. Available from: <https://www.ruralhealth.org.au/partyline/article/major-review-aboriginal-and-torres-strait-islander-nutrition>
  17. Kagie R, Lin S, Hussain M, Thompson S. A Pragmatic Review to Assist Planning and Practice in Delivering Nutrition Education to Indigenous Youth. *Nutrients*. 2019;11(3):510.
  18. National Rural Health Alliance. Food security and health in rural and remote Australia [Internet]. 2016. Wagga Wagga NSW: Rural Industries Research and Development Corporation. Available from: <https://www.agrifutures.com.au/wp-content/uploads/publications/16-053.pdf>
  19. Australian Institute of Health and Welfare. Australia's Health 2018 [Internet]. 2018; Australia's health series no. 16. Cat. No. AUS 221. Canberra: AIHW. Available from: <https://www.aihw.gov.au/getmedia/0c0bc98b-5e4d-4826-af7f-b300731fb447/aihw-aus-221-chapter-5-2.pdf.aspx>
  20. Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander Health Survey: Nutrition Results - Food and Nutrients, 2012-13 [Internet]. ABS Canberra 2015 March 20 [cited 2020 May 26]. Available from: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4727.0.55.005Main+Features12012-13>
  21. Lee A, Ride K. Review of nutrition among Aboriginal and Torres Strait Islander people. *Australian Indigenous Health Bulletin* [Internet]. 2018 18(1) [cited 2020 May 27]. Available from: [https://healthinonet.ecu.edu.au/healthinonet/getContent.php?linkid=624784&title=Review+of+nutrition+among+Aboriginal+and+Torres+Strait+Islander+people&contentid=34385\\_1](https://healthinonet.ecu.edu.au/healthinonet/getContent.php?linkid=624784&title=Review+of+nutrition+among+Aboriginal+and+Torres+Strait+Islander+people&contentid=34385_1)
  22. Menzies School of Health Research [Internet]. Darwin NT: Menzies School of Health Research. SHOP@RIC Stores Healthy Options Project in Remote Indigenous Communities. Available from: [https://www.menzies.edu.au/page/Research/Projects/Nutrition/SHOPRIC\\_Stores\\_Healthy\\_Options\\_Project\\_in\\_Remote\\_Indigenous\\_Communities/](https://www.menzies.edu.au/page/Research/Projects/Nutrition/SHOPRIC_Stores_Healthy_Options_Project_in_Remote_Indigenous_Communities/)
  23. Food and Agriculture Organisation of the United Nations, World Health Organisation. Sustainable Healthy Diets – Guiding Principles. Rome. 2019. Available from: <http://www.fao.org/3/ca6640en/ca6640en.pdf>
  24. Mccrindle. Foodbank Hunger Report 2017. Mccrindle. [cited 2020 May 27]. Available from: <https://www.foodbank.org.au/wp-content/uploads/2019/05/2017-Foodbank-Hunger-Report.pdf>
  25. Gallegos D, Ellies P, Wright J. Still there's no food! Food insecurity in a refugee population in Perth, Western Australia. *Nutr Diet* 2008;65:78–83.
  26. Ramsey R, Giskes K, Turrell G, Gallegos D. Food insecurity among adults residing in disadvantaged urban areas: Potential health and dietary consequences. *Public Health Nutr* 2012;15:227–37.

27. Burns C. A review of the literature describing the link between poverty, food insecurity and obesity with specific reference to Australia. Melbourne: VicHealth, 2004
28. Rosier K. Food insecurity in Australia: What is it, who experiences it and how can child and family services support families experiencing it? Australian Institute of Family Studies. 2011 Aug. [cited 2020 May 26]
29. Kettings C, Sinclair A, Voevodin M. A healthy diet consistent with Australian health recommendations is too expensive for welfare-dependent families. *Aust NZJ Public Health* 2009;33:566–72.
30. Reidpath D, Burns C, Garrard J, Mahoney M, Townsend M. An ecological study of the relationship between social and environmental determinants of obesity. *Health Place* 2002;8:141–45.
31. World Health Organisation. Q&A on the carcinogenicity of the consumption of red meat and processed meat [Internet]. World Health Organisation. [updated 2015 Oct. 26; cited 2020 May 24]. Available from: <https://www.who.int/news-room/q-a-detail/q-a-on-the-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat>
32. Bouvard V, Loomis D, Guyton KZ, Groose Y, El Ghissassi F, Benbrahim-Tallaa L, et al. Carcinogenicity of consumption of red and processed meat. *Lancet Oncology*. 2015 Oct. 26;16(16):1599-1600.
33. Orlich MJ, Singh PN, Sabate J, Jaceldo-Siegl K, Fan J, Knutsen S, et al. Vegetarian dietary patterns and mortality in Adventist Health Study 2. *JAMA Internal medicine*. 2013;173(13):1230-8.
34. EAT Lancet Commission. Food Planet Health [Internet]. EAT Lancet. [cited 2020 May 24]. Available from: [https://eatforum.org/content/uploads/2019/07/EAT-Lancet\\_Commission\\_Summary\\_Report.pdf](https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf)
35. Hughes L, Steffen W, Rice M, Pearce A. Feeding a Hungry Nation: Climate change, Food and Farming in Australia. [Internet]. Sydney: Climate Council of Australia Ltd; 2015 [cited 27 June 2020]. Available from: <https://www.climatecouncil.org.au/uploads/7579c324216d1e76e8a50095aac45d66.pdf>
36. World Economic Forum. Meat: the future series. [Internet]. Geneva: World Economic Forum; 2019 [cited 27 June 2020]. Available from: [http://www3.weforum.org/docs/WEF\\_White\\_Paper\\_Alternative\\_Proteins.pdf](http://www3.weforum.org/docs/WEF_White_Paper_Alternative_Proteins.pdf)
37. EAT-Lancet Commission. EAT-Lancet Commission brief for Farmers. [internet]. [place unknown]: EAT-Lancet Commission; [date unknown] [cited 27 June 2020]. Available from: <https://eatforum.org/lancet-commission/farmers/>
38. Anderson T. Principles for a just transition in agriculture. [online]. Johannesburg: Actionaid; 2019 [cited 27 June 2020] [https://actionaid.org/sites/default/files/publications/Principles%20for%20a%20just%20transition%20in%20agriculture\\_0.pdf](https://actionaid.org/sites/default/files/publications/Principles%20for%20a%20just%20transition%20in%20agriculture_0.pdf)
39. United Nations Environment Programme. Supporting a just transition to sustainable agriculture. [Internet]. [place unknown]: United Nations Environment Programme; [date unknown] [cited 27 June 2020]. Available from: <https://www.unenvironment.org/explore-topics/green-economy/what-we-do/economic-and-fiscal-policy/fiscal-policy/policy-analysis-6>
40. Nittle N. The Plant-Based Movement to Transition Farmers Away from Meat and Dairy Production. [online]. [place unknown]: Civil Eats; 2020 [cited 27 June 2020]. Available from: <https://civileats.com/2020/01/13/the-plant-based-movement-to-transition-farmers-away-from-meat-and-dairy-production/>

41. National Health and Medical Research Council. Australian Dietary Guidelines. National Health and Medical Research Council. Canberra 2013 Feb. Available from:  
[https://www.eatforhealth.gov.au/sites/default/files/content/n55\\_australian\\_dietary\\_guidelines.pdf](https://www.eatforhealth.gov.au/sites/default/files/content/n55_australian_dietary_guidelines.pdf)
42. Public Health Association Australia. National Nutrition Strategy Background Paper. 2018 [cited 30 May 2020]. Available from  
<https://www.phaa.net.au/documents/item/2870>
43. HLPE. Nutrition and food systems. A report by the High Level Panel of Experts on Food Security and Nutrition. HLPE Rome 2017 Sep. Available from:  
<http://www.fao.org/3/a-i7846e.pdf>
44. World Health Organisation. Food and Nutrition Policy for Schools [Internet]. Geneva: World Health Organisation; 2006 [cited 2020 May 29]. Available from:  
[http://www.euro.who.int/\\_data/assets/pdf\\_file/0019/152218/E89501.pdf](http://www.euro.who.int/_data/assets/pdf_file/0019/152218/E89501.pdf)
45. Australian Curriculum Assessment and Reporting Authority. The Shape of the Australian Curriculum: Health and Physical Education. Sydney: ACARA; 2012 [cited 2020 May 29]. Available from:  
[https://docs.acara.edu.au/resources/Shape\\_of\\_the\\_Australian\\_Curriculum\\_Health\\_and\\_Physical\\_Education.pdf](https://docs.acara.edu.au/resources/Shape_of_the_Australian_Curriculum_Health_and_Physical_Education.pdf)
46. Love P, Booth A, Margerison C, Nowson C, Grimes C. Food and nutrition education opportunities within Australian primary schools. Health Promotion International [Internet]. 2020 [cited 2020 May 29];. Available from:  
<https://academic.oup.com/heapro/advance-article/doi/10.1093/heapro/daz132/570916>
47. Stephanie Alexander Kitchen Garden Foundation. 2017-2018 Annual Report [Internet]. Stephanie Alexander Kitchen Garden Foundation; 2020 [cited 2020 May 29]. Available from: <https://indd.adobe.com/view/f15a1cdf-21a2-4512-8642-907cdf40ce31>
48. Crowley J, Ball L, Hiddink G. Nutrition in medical education: a systematic review. The Lancet [Internet]. 2019 [cited 2020 May 29];. Available from:  
[https://www.thelancet.com/journals/lanph/article/PIIS2542-5196\(19\)30171-8/fulltext#articleInformation](https://www.thelancet.com/journals/lanph/article/PIIS2542-5196(19)30171-8/fulltext#articleInformation)
49. The Royal Australian College of General Practitioners. Views and attitudes towards physical activity and nutrition counselling in general practice: National survey report 2019 [Internet]. East Melbourne: RACGP; 2019 [cited 2020 May 29]. Available from: <https://www.racgp.org.au/getattachment/e7693efa-2eec-4188-8265-e10e64180033/Physical-activity-and-nutrition-counselling.pdf.aspx>
50. The Royal Australian College of General Practitioners. Smoking, nutrition, alcohol, physical activity (SNAP): A population health guide to behavioural risk factors in general practice [Internet]. Melbourne: RACGP; 2015 [cited 2020 May 29]. Available from: <https://www.racgp.org.au/getattachment/bb78b780-1c37-498a-8ba3-b24a1a4288d9/Smoking-nutrition-alcohol-physical-activity-SNAP.aspx>
51. Parks K, Polak R. Culinary medicine: paving the way to health through our forks. American Journal of Lifestyle Medicine [Internet]. 2020 Jan [cited 2020 May 19];14(1):51-3.
52. Polak R, Phillips EM, Nordgren J, La Puma J, La Barba J, Cucuzzella M, Graham R, Harlan T, Burg T, Eisenberg D. Health-related culinary education: a summary of representative emerging programs for health professionals and patients. Global advances in health and medicine [Internet]. 2016 Jan [cited 2020 May 20];5(1):61-8. Available from:  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756781/>

53. La Puma J. What is culinary medicine and what does it do?. Population health management [Internet]. 2016 Feb 1 [cited 2020 May 23];19(1):1-3. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4739343/>
54. Hirsch IB, Evert A, Fleming A, Gaudiani LM, Guggenmos KJ, Kaufer DI, McGill JB, Verderese CA, Martinez J. Culinary medicine: advancing a framework for healthier eating to improve chronic disease management and prevention. Clinical Therapeutics [Internet]. 2019 Oct 1 [cited 2020 May 20];41(10):2184-98. Available from: <https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/2312491592/fulltextPDF/C2C6F648E675421CPQ/1?accountid=14681>
55. Department of Nutrition, Dietetics and Food. Food as Medicine - Free open online course [Internet]. Monash University. 2020 [cited 21 May 2020]. Available from: <https://www.monash.edu/medicine/scs/nutrition/short-courses/food-as-med>
56. Jaroudi SS, Sessions WS, Wang VS, Shriver JL, Helekar AS, Santucci M, Cole L, Ruiz J, Fackrell J, Chauncey K. Impact of culinary medicine elective on medical students' culinary knowledge and skills. InBaylor University Medical Center Proceedings. 2018 Oct 2 [cited 2020 May 21]; (Vol. 31, No. 4, pp. 439-442). Available from: <https://pubmed.ncbi.nlm.nih.gov/30948975/>
57. Martin J. Australia's Progress in Improving Diets and Preventing Obesity: Clear Opportunities for Action. Current obesity reports [Internet]. 2018 Sep 1 [cited 2020 May 23];7(3):220-6. Available from: <https://link-springer-com.ezproxy.library.uwa.edu.au/content/pdf/10.1007/s13679-018-0313-z.pdf>
58. Morley BC, Niven PH, Dixon HG, Swanson MG, McAleese AB, Wakefield MA. Controlled cohort evaluation of the LiveLighter mass media campaign's impact on adults' reported consumption of sugar-sweetened beverages. BMJ open [Internet]. 2018 Apr 1 [cited 2020 May 23];8(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/29695387/>
59. Public Health Association of Australia Food and Nutrition Special Interest Group. Public Health Association of Australia: Policy-at-a-glance-Food, Nutrition and Health Policy [Internet]. 2012 [cited 2020 May 23]. Available from: <https://www.phaa.net.au/documents/item/213>
60. The Department of Health. National Nutrition Policy. Australian Government [Internet]. 2013 April 24 [cited 2020 Jun 26]. Available from: <https://www1.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-health>
61. Begley A, Gallegos D, Vidgen H. Effectiveness of Australian Cooking Skill Interventions. British Food Journal [Internet]. 2017 May 2 [cited 2020 May 23]. Available from: <https://www.emerald.com/insight/content/doi/10.1108/BFJ-10-2016-0451/full/html>
62. Pettigrew S, Jongenelis MI, Moore S, Pratt IS. A comparison of the effectiveness of an adult nutrition education program for Aboriginal and non-Aboriginal Australians. Social Science & Medicine [Internet]. 2015 Nov 1 [cited 2020 May 23];145:120-4. Available from: <https://www.sciencedirect.com/science/article/pii/S0277953615301271>
63. Schembri L, Curran J, Collins L, Pelinovskaia M, Bell H, Richardson C, Palermo C. The effect of nutrition education on nutrition-related health outcomes of Aboriginal and Torres Strait Islander people: a systematic review. Australian and New Zealand Journal of Public Health [Internet]. 2016 Apr [cited 2020 May 23];40(S1):S42-7. Available from: <https://pubmed.ncbi.nlm.nih.gov/26123037/>

64. Lee A, Baker P, Stanton R, Friel S, Weightman, A. Scoping study to inform development of the National Nutrition Policy for Australia. Australian Department of Health and Ageing, Australia [Internet]. 2013 Jul 20 [cited 2020 May 24]. Available from: <https://eprints.qut.edu.au/93234/19/93234.pdf>
65. Heart Foundation. Improving food supply. National Heart Foundation of Australia [Internet]. 2019 [Cited 2020 Jun 26]. Available from: <https://www.heartfoundation.org.au/activities-finding-or-opinion/improving-food-supply>
66. Deavin N, McMahon A, Walton K, Charlton K. 'Breaking Barriers, Breaking Bread': Pilot study to evaluate acceptability of a school breakfast program utilising donated food. *Nutr Diet*. 2018;75(5):500-508.
67. Nathan N, Yoong S, Sutherland R, Reilly K, Delaney T, Janssen L et al. Effectiveness of a multicomponent intervention to enhance implementation of a healthy canteen policy in Australian primary schools: a randomised controlled trial. *Int. J. Behav. Nutr. Phys. Act*. 2016;13(1).
68. Department of Health. National Healthy School Canteens: Guidelines for healthy foods and drinks supplied in school canteens [Internet]. Canberra: Department of Health; 2014. Available from: [https://www1.health.gov.au/internet/main/publishing.nsf/Content/5FFB6A30EC EE9321CA257BF0001DAB17/\\$File/Canteen%20guidelines.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/5FFB6A30EC EE9321CA257BF0001DAB17/$File/Canteen%20guidelines.pdf)
69. Shi Y, Wang Q, Norman C, Allman-Farinelli M, Colagiuri S. It Is Time to Make Policy for Healthier Food Environments in Australian Universities. *Nutrients*. 2018;10(12):1909.
70. Food and Hospitality at Deakin [Internet]. What you'll see - retail, vending and catering. Available from: <https://food.deakin.edu.au/food-charter/what-you-will-see>
71. Australian Commission on Safety and Quality in Health Care. Hospital-Acquired Complication: Malnutrition. Sydney: Australian Commission on Safety and Quality in Health Care; 2018 [Updated June 2018; Cited 27 June 2020]. Available from: [https://www.safetyandquality.gov.au/sites/default/files/migrated/SAQ7730\\_HA C\\_Malnutrition\\_LongV2.pdf](https://www.safetyandquality.gov.au/sites/default/files/migrated/SAQ7730_HA C_Malnutrition_LongV2.pdf)
72. Barker L, Gout B, Crowe T. Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. *International Journal of Environmental Research and Public Health* 2011; 8: 514–27.
73. Centre for Population Health. Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework: Healthy choices in health facilities. Sydney: NSW Ministry of Health; 2017. 16 p. Available from: <https://www.health.nsw.gov.au/health/Publications/hfd-framework.pdf>
74. Tsai C, Svensen E, Flood VM, Probst Y, Reilly K, Corbett S, Wu JH. Healthiness of food and beverages for sale at two public hospitals in New South Wales, Australia. *Nutrients*. 2018 Feb;10(2):216.
75. Physicians Committee for Responsible Medicine. Gov Jerry Brown Makes Plant-Based Meals the Law in California Hospitals [Internet]. Washington: Physicians Committee for Responsible Medicine; 18 September 2018 [cited 27 June 2020]. Available from: <https://www.pcrm.org/news/news-releases/gov-jerry-brown-makes-plant-based-meals-law-california-hospitals>
76. Aggarwal A, Coates J, Drewnowski A, Hawkes C, Herforth A, Kadiyala S et al. Concepts and methods for food environment research in low and middle income countries [Internet]. London: Agriculture, Nutrition and Health Academy Food Environments Working Group (ANH-FEWG); 2016 [cited 2020

- May 29]. Available from: [https://anh-academy.org/sites/default/files/FEWG\\_TechnicalBrief\\_low.pdf](https://anh-academy.org/sites/default/files/FEWG_TechnicalBrief_low.pdf)
77. Food Standards Australia New Zealand (FSANZ) [Internet]. 2019. Labelling Poster - how to read food labels; 2019 March [cited 2020 May 29]. Available from: <https://www.foodstandards.gov.au/consumer/labelling/Pages/interactive-labelling-poster.aspx>
  78. Mp Consulting. Health Star Rating System Five Year Review Report. [internet]. 2019 [cited 2020 May 29]. Available From: [https://foodregulation.gov.au/internet/fr/publishing.nsf/Content/5FFD7984439DAE74CA2584D30082C180/\\$File/HSR-Health%20Star%20Rating%20System%20Five%20Year%20Review%20Report%202019-08.pdf](https://foodregulation.gov.au/internet/fr/publishing.nsf/Content/5FFD7984439DAE74CA2584D30082C180/$File/HSR-Health%20Star%20Rating%20System%20Five%20Year%20Review%20Report%202019-08.pdf)
  79. Han E. Nestle wipes '4.5' health star rating off flagship Milo product. The Sydney Morning Herald [internet]. 2018 March 1 [cited 2020 May 29]: Healthcare. Available from: <https://www.smh.com.au/healthcare/nestle-wipes-4-5-health-star-rating-off-flagship-milo-product-20180301-p4z295.html>
  80. Australia and New Zealand Ministerial Forum on Food Regulation. The Australia and New Zealand Ministerial Forum on Food Regulation response to the Health Star Rating System five year review. [internet]. Food Regulation; 2019 December [cited 2020 May 29]. Available from: [https://foodregulation.gov.au/internet/fr/publishing.nsf/Content/5FFD7984439DAE74CA2584D30082C180/\\$File/V1-Forum-Health%20Star%20Rating%20System%20five%20year%20review%20response%202019-12.pdf](https://foodregulation.gov.au/internet/fr/publishing.nsf/Content/5FFD7984439DAE74CA2584D30082C180/$File/V1-Forum-Health%20Star%20Rating%20System%20five%20year%20review%20response%202019-12.pdf)
  81. Jolly R. Marketing obesity? Junk food, advertising and kids [Internet]. Australian Parliament House. 2011 [cited 2020 May 29];9 2010–11. Available from: [https://www.aph.gov.au/About\\_Parliament/Parliamentary\\_Departments/Parliamentary\\_Library/pubs/rp/rp1011/11rp09#\\_Toc282609515](https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1011/11rp09#_Toc282609515)
  82. World Health Organization. Double-duty actions for nutrition: policy brief [Internet]. Geneva: World Health Organisation; 2017 [cited 2020 May 29] p. 1-10. Available from: <http://www.who.int/nutrition/publications/double-duty-actions-nutrition-policybrief/en/>
  83. Clark H, Coll-Seck AM, Banerjee A et al. A future for the world's children? A WHO-UNICEF-*Lancet* Commission. The Lancet. 2020 Feb 18 [cited 2020 May 29]; 395(10224):605-658. Available from: [https://doi.org/10.1016/S0140-6736\(19\)32540-1](https://doi.org/10.1016/S0140-6736(19)32540-1)
  84. Watson W, Lau V, Wellard L, Hughes C, Chapman K. Advertising to children initiatives have not reduced unhealthy food advertising on Australian television. *Journal of Public Health*. 2017 [cited 2020 May 29];39(4):787-792. Available from: <https://academic.oup.com/jpubhealth/article/39/4/787/2966185>
  85. Dixon H, Niven P, Scully M, Wakefield M. Food marketing with movie character toys: Effects on young children's preferences for unhealthy and healthier fast food meals. *Appetite*. 2017 October 1 [cited 2020 May 29];117:342-350. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S019566631730171X>
  86. Thow A, Downs S, Mayes C, Trevena H, Waqanivalu T, Cawley J. Fiscal policy to improve diets and prevent noncommunicable diseases: from recommendations to action [Internet]. 2018 [cited 30 May 2020]. Available from: <https://www.who.int/bulletin/volumes/96/3/17-195982/en/>

87. Position Statement - Food Taxes [Internet]. Cancer Council Australia. 2020 [cited 30 May 2020]. Available from [https://wiki.cancer.org.au/policy/Position\\_statement\\_-\\_Food\\_taxes](https://wiki.cancer.org.au/policy/Position_statement_-_Food_taxes)
88. The case for a tax on sugar-sweetened beverages (SSBs) in Australia [Internet]. Obesity Evidence Hub. 2020 [cited 30 May 2020]. Available from: <https://www.obesityevidencehub.org.au/collections/prevention/the-case-for-a-tax-on-sweetened-sugary-drinks>
89. Bayer R. Stigma and the ethics of public health: Not can we but should we. *Social Science & Medicine*. 2008;67(3):463-472.
90. Allen W, Allen K. Should Australia tax sugar-sweetened beverages?. *Journal of Paediatrics and Child Health*. 2019;56(1):8-15.
91. Veerman J, Sacks G, Antonopoulos N, Martin J. The Impact of a Tax on Sugar-Sweetened Beverages on Health and Health Care Costs: A Modelling Study. *PLOS ONE*. 2016;11(4):e0151460.
92. Lal A, Mantilla-Herrera A, Veerman L, Backholer K, Sacks G, Moodie M et al. Modelled health benefits of a sugar-sweetened beverage tax across different socioeconomic groups in Australia: A cost-effectiveness and equity analysis. *PLOS Medicine*. 2017;14(6):e1002326
93. Derwin J. Meat could be the next tobacco as governments look to 'sin taxes' as a solution to climate change. *Business Insider Australia* [Internet]. 2019 [cited 30 May 2020];. Available from: <https://www.businessinsider.com.au/meat-could-be-the-next-tobacco-as-governments-look-to-sin-taxes-as-a-solution-to-climate-change-2019-8>
94. Springmann M, Mason-D'Croze D, Robinson S, Wiebe K, Godfray H, Rayner M et al. Health-motivated taxes on red and processed meat: A modelling study on optimal tax levels and associated health impacts. *PLOS ONE*. 2018;13(11):e0204139.
95. Whitnall T, Pitts N. Meat consumption - Department of Agriculture [Internet]. *Agriculture.gov.au*. 2020 [cited 30 May 2020]. Available from: <https://www.agriculture.gov.au/abares/research-topics/agricultural-outlook/meat-consumption>
96. Flores M, Rivas J. Cash incentives and unhealthy food consumption. *Bulletin of Economic Research*. 2017 Jan;69(1):42-56. <https://doi.org/10.1111/boer.12085>
97. Cobiac L, Tam K, Veerman L, Blakely T. Taxes and Subsidies for Improving Diet and Population Health in Australia: A Cost-Effectiveness Modelling Study. *PLOS Medicine*. 2017;14(2):e1002232.
98. Fruit and vegetables and the GST [Internet]. Obesity Evidence Hub. 2019 [cited 30 May 2020]. Available from: <https://www.obesityevidencehub.org.au/collections/prevention/fruit-and-vegetables-and-the-gst>
99. Food and Agriculture Organisation of the United Nations. The True Cost of Food [Internet]. 2020 [cited 30 May 2020]. Available from
100. The True Cost of Food [Internet]. *Nature Food*. 2020 April [cited May 30 2020]. Available from <https://www.nature.com/articles/s43016-020-0070-5>
101. United Nations. Sustainable Development Goal 12 Progress [Internet]. 2019 [Cited May 30 2020]. Available from <https://sustainabledevelopment.un.org/sdg>
102. Rabobank. Food Waste Report 2019. Rabobank Australia. 2019 [cited 2020 May 24]. Available from: <https://www.rabobank.com.au/foodwaste/>
103. Lipinski, B. et al. "Reducing Food Loss and Waste." Working Paper, Installment 2 of Creating a Sustainable Food Future [Internet]. Washington,

- DC: World Resources Institute. 2013 [cited 2020 May 23] Available from: [https://pdf.wri.org/reducing\\_food\\_loss\\_and\\_waste.pdf](https://pdf.wri.org/reducing_food_loss_and_waste.pdf)
104. Verghese K, Lockrey S. NATIONAL FOOD WASTE BASELINE-Final assessment report [Internet]. ARCADIS Design and Consultancy. 2019 [cited 2020 May 21]. Available from: <https://www.environment.gov.au/system/files/pages/25e36a8c-3a9c-487c-a9cb-66ec15ba61d0/files/national-food-waste-baseline-final-assessment.pdf>
  105. Fight Food Waste Cooperative Research Centre. Food Waste Australian Household Attitudes and Behaviours National Benchmarking Study. Australian Government Department of Industry Innovation and Science. 2019 [cited May 20]. Available from: [https://fightfoodwastecrc.com.au/wp-content/uploads/2019/11/Summary-Report\\_final.pdf](https://fightfoodwastecrc.com.au/wp-content/uploads/2019/11/Summary-Report_final.pdf)
  106. Kelton N. National food waste strategy: Halve food waste in Australia by 2030 [Internet]. Food Australia. 2019 Jan [cited 2020 May 24];71(1):30. Available from: [https://fightfoodwastecrc.com.au/wp-content/uploads/2020/05/Food\\_Australia\\_Jan\\_Feb\\_Mar\\_2019\\_30-31.pdf](https://fightfoodwastecrc.com.au/wp-content/uploads/2020/05/Food_Australia_Jan_Feb_Mar_2019_30-31.pdf)
  107. CSIRO. Food loss bank [Internet]. Commonwealth Scientific and Industrial Research Organisation, 2015-2020. [cited 2020 May 22]. Available from: <https://research.csiro.au/foodlossbank/>
  108. Searchinger T, Waite R, Hanson C, Ranganathan J, Dumas P, Matthews E. Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050. World Resource Institute: Washington, DC, USA. 2018
  109. Department of Primary Industries and Regional Development. How Australia accounts for agricultural greenhouse gas emissions [Internet]. South Perth WA: Department of Primary Industries and Regional Development; 2020. Available from: <https://www.agric.wa.gov.au/climate-change/how-australia-accounts-agricultural-greenhouse-gas-emissions>
  110. Australian Bureau of Statistics. Year Book Australia, 2008 [Internet]. Canberra (ACT): Commonwealth of Australia; 2008. Report No.: 1301.0. Available from: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/7d12b0f6763c78caca257061001cc588/cce8ead2792bc3c7ca2573d200106bde!OpenDocument>
  111. Department of Water, Agriculture and the Environment. Adapting to a changing climate [Internet]. Canberra ACT: Department of Water, Agriculture and the Environment; 2019. Available from: <https://www.agriculture.gov.au/ag-farm-food/climatechange/australias-farming-future/adapting-to-a-changing-climate>
  112. Hochman Z, Gobbett D, Horan H. Climate trends account for stalled wheat yields in Australia since 1990. Global Change Biology. 2017;23(5):2071-2081.

## Policy Details

<b>Name:</b>	Food and Nutrition
<b>Category:</b>	G – Global Health
<b>History:</b>	Reviewed, Council 2, 2020 <i>Sylvia Gralak, Adam Rushford, Emily Bruggemann, Meera Kaushik, Aleksandra Markovic, Ankita Muthya, Dennis Shen, Guy Jeffery (Global Health Policy Officer)</i> Reviewed, Council 1 2018 <i>Davina Daudu, Rhys Harris, Janelle San Juan,</i>



*Alana Rottler, A. Wijetunga, Isobelle Woodruff,  
Rewena Mahesh (Global Health Policy Officer)*  
Adopted, Council 3, 2016

## Appendix

Current Australian Dietary Guidelines recommend daily consumption of:

- Between five and six serves of vegetables;
- Two serves of fruit per day;
- Between two and a half to three serves of lean meat and poultry, fish, eggs and/or plant-based alternatives;
- Two and a half serves of milk, yoghurt, cheese and/or alternatives per day (mostly low fat).

The Guidelines also recommend limiting saturated fats, added salt, added sugar, alcohol and discretionary foods as part of a healthy diet.