

Evidence review: Addressing the social determinants of inequities in healthy eating

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Addressing the social determinants of inequities in healthy eating

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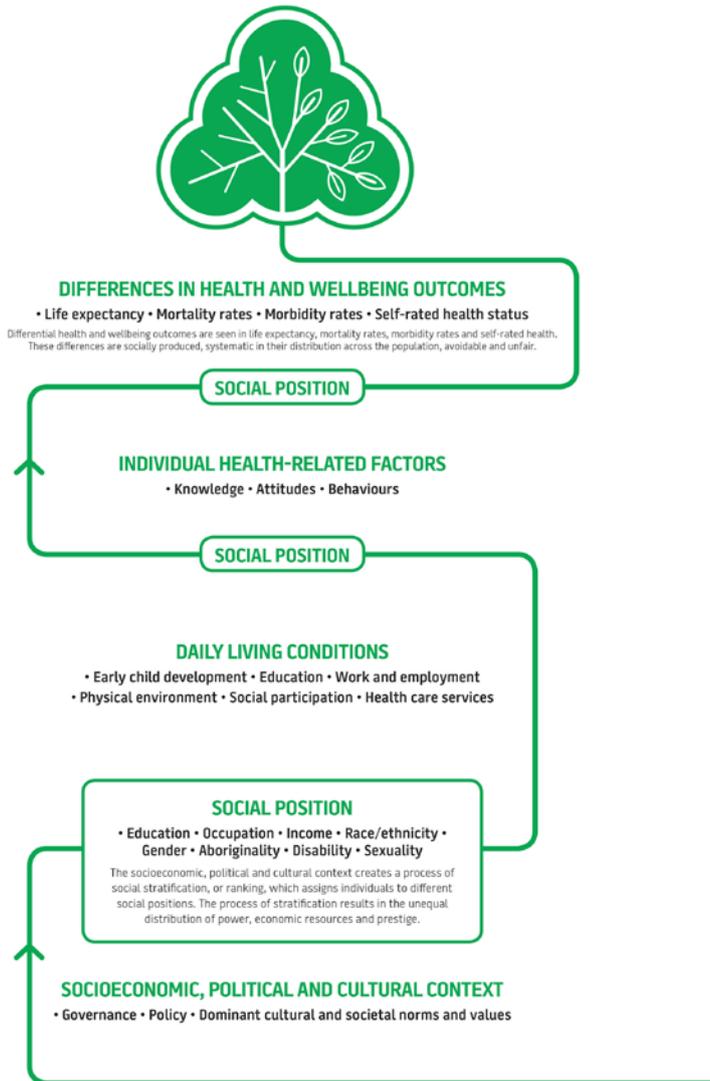
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Background

VicHealth released 'Fair foundations: The VicHealth framework for health equity' (hereafter called the Framework) in October 2013 as a planning tool for equity-focused health promotion policy and practice in Victoria, Australia. The Framework draws on the conceptual framework developed by the World Health Organization Commission on Social Determinants of Health and identifies three layers of influence and entry points for action in the social determinants of health inequities: Socioeconomic, political and cultural contexts; Daily living conditions; and Individual health-related factors (Figure 1).

The focus of this report is on healthy eating. Diet quality and associated health outcomes follow a social gradient in Australia, with those in the highest income groups, non-Indigenous Australians and people living in more advantaged neighbourhoods more likely to eat a healthy and balanced diet, be a healthy weight, and have better health outcomes. Conversely, Indigenous Australians, minority cultural groups, people living with disabilities, and people living in remote and/or socioeconomically disadvantaged areas are less likely to buy healthy food and less likely to eat a healthy diet, more likely to be overweight or obese, more likely to have poor oral health, more likely to develop cardiovascular disease (CVD) or type II diabetes in their lifetime and more likely to die from chronic diseases.

This report reviews the evidence base on the social determinants of inequities in healthy eating and highlights promising approaches for addressing these inequities at each level of the Framework. It is intended to provide practical, evidence-informed recommendations for promoting equity in healthy eating in a format that will support policymakers and practitioners in the State of Victoria and across Australia, and to highlight areas for further research and action.



Fair Foundations: The VicHealth framework for health equity
 The social determinants of health inequities: The layers of influence and entry points for action

Figure 1. Fair Foundations: The VicHealth framework for health equity

Report aim and objectives

The aim of this report is to identify promising evidence-based approaches for promoting equity in healthy eating at each level of the Fair Foundations Framework. Underpinning this, the report has four specific objectives:

1. To synthesise current Australian and international evidence describing the social determinants of inequities in healthy eating
2. To summarise the scope, nature and quality of the evidence base for promoting equity in healthy eating
3. To identify promising strategies which could feasibly be implemented in Victoria, and across Australia, at each level of the Fair Foundations Framework, identifying where possible the means

by which successful or promising interventions have improved equity in healthy eating, for whom, how and under what circumstances, and identify key implementation considerations.

4. To identify key gaps in the evidence base and make recommendations for future research priorities.

Methods

A rapid review of the Australian and international literature was conducted in October-November 2013 aimed at a) Summarising the evidence base on the social determinants of inequities in healthy eating, and b) Identifying policies, regulations, programs, services and intervention projects which have been evaluated for their impact (or have significant potential to impact) in one or more of the following three areas:

1. Inequities in healthy eating and diet quality
2. One or more of the social determinants of inequities in healthy eating
3. Healthy eating in the general population (i.e. without considering distributional effects).

This inclusive approach to the intervention literature search was intended to recognise: a) The overall dearth of evaluation evidence demonstrating the effectiveness of interventions targeting the social determinants of health and aimed at reducing inequities; b) The important influence that actions taken outside of health (and without an explicit goal to influence health) have on health equity; c) The challenges inherent in evaluating the impact of complex population-level interventions on individual-level behaviours (such as eating and diet quality) and health outcomes; and d) The fact that the majority of actions aimed at promoting healthy eating have been aimed at whole populations, rather than addressing the social gradient, or even gaps between social groups, and few evaluations have explicitly measured distributional effects between social groups.

Diet quality is influenced by a multitude of factors shaping knowledge, attitudes and behaviours over a lifetime. Single interventions are unlikely to change behaviours of a sufficient magnitude to positively impact on diet quality and diet-related health outcomes within the timeframe of most evaluations, and over a sustained period of time. Therefore, 'upstream' outcomes, such as changes in policies, services and programs; in the nature and quality of the food supply; and in knowledge, attitudes, and food purchasing behaviours can be important intermediate measures. Similarly, applying an equity lens to interventions which have not explicitly sought to influence health, or which have not incorporated equity outcome measures, ensured the review was inclusive of a wide range of potentially promising approaches.

The broad scope and rapid nature of the review precluded a comprehensive systematic literature search. Rather, the focus was on providing a broad overview of the evidence base and practical, evidence-informed recommendations on interventions which have shown the most promise to date at each level of the Framework.

Search strategy

The literature search was conducted in four phases. First, a purposive scan was conducted of the evidence on the social distribution of diet quality and diet-related health outcomes in Australia, and of the recent (post-2000) Australian and international literature on the social determinants of inequities in healthy eating.

Second, a systematic search of the published intervention literature was conducted using a pre-defined search strategy across three bibliographic databases and citation indices: Web of Knowledge, Campbell Library and Cochrane Library. Health equity search filters are yet to be validated, and equity-related terms have been inconsistently indexed in conventional databases (Welch et al., 2013). Equity-focused literature searches are therefore at a particularly high risk of missing potentially relevant studies. To address this as much as possible, a wide range of search terms was identified and pilot-tested before beginning the review (see Appendix 1). This phase was successful in yielding large numbers of studies targeted at the levels of individual health-related behaviours and daily living conditions, and in specific settings (mainly schools and workplaces). It was less useful in identifying evaluations of actions conducted outside of the food or health systems, and particularly at the socioeconomic, political and cultural context level.

Therefore, in a third phase, more targeted searches were conducted of the Web of Knowledge citation index and Google Scholar – using search terms specific to each layer of the Framework – as well as hand-searches of key journals, and of papers and reports.

Finally, a scan of relevant websites was conducted, including those of Australian federal and state government departments, as well as key national and international institutions and research centres, including VicHealth, the UCL Institute for Health Equity, the Rudd Centre for Food Policy and Obesity at Yale University, the Physical Activity, Nutrition and Obesity Research Group (PANORG) at the University of Sydney, the UK National Health Service and Food Standards Agency, and the US Centres for Disease Control and Prevention (CDC).

A wide range of study types was considered in order to maximise the recommendations that could be made. The search of the intervention literature focused on identifying high-quality systematic reviews and reviews of reviews, as well as experimental studies, and policy and program evaluations. Where these were not available, modelling studies (including cost-benefit analyses) and observational studies were considered. Theoretical and conceptual papers were excluded, as were those that only reported a process evaluation. Major programs that the review team were aware of but are yet to be formally evaluated were also excluded. While taking an explicit Australian focus, promising approaches conducted in other high-income countries (HICs) that could feasibly be applied in, or adapted to, the Australian context were considered.

Searching, abstract screening and data extraction were conducted by two reviewers. All studies were assessed for quality according to strength of study design and data quality, as well as transparency in description of study design and assumptions, and how outcomes were measured. Data synthesis was conducted using a narrative approach.

The social distribution of diet quality and diet-related disease in Australia

Energy-dense foods and beverages high in fat, salt and/or sugar are readily available, easily accessible and widely consumed in Australia, as they are in all other high- and middle-income (and increasingly many low-income) countries. Imbalanced diets containing excessive amounts of these foods are associated with increased risk of ischaemic heart disease, stroke, atherosclerosis, insulin resistance, diabetes, chronic kidney disease, osteoporosis, dental decay, gall bladder disease and some cancers (including colorectal, breast and prostate) (AIHW, 2012a, AIHW, 2012b, AIHW, 2012c).

Without high levels of physical activity, energy-dense diets can result in weight gain over and above a healthy weight. Overweight (defined as BMI > 25) and obesity (BMI > 30) affect two in three Australian adults (63%) and one in four Australian children (26%); amongst the highest rate in the world) (AIHW, 2012c). Obesity is associated with higher risk of morbidity and premature mortality from hypertension, ischaemic heart disease, stroke, diabetes, osteoarthritis, musculoskeletal conditions, asthma, sleep apnoea, polycystic ovary syndrome (PCOS), depression and other mental health disorders, and some cancers (including oesophageal, colorectal, breast, endometrial and kidney) (Reilly and Kelly, 2011, Key et al., 2004).

At the same time, less than one in 10 Australians eat enough vegetables daily to meet Australian Dietary Guidelines, and less than half of the population meets the guideline daily fruit intake (Commonwealth of Australia, 2013). Inadequate fruit and vegetable consumption is linked to increased risk of micronutrient deficiencies, coronary heart disease, dementia and other neurodegenerative diseases, and some cancers, while high-fibre, nutrient-rich diets rich in a diverse range of fruits and vegetables help to maintain a healthy weight and protect against a range of chronic diseases and early death (He et al., 2007, AIHW, 2012c).

Diet-related chronic diseases now dominate Australia's disease burden. Cardiovascular diseases, including ischaemic heart disease and stroke, are the country's leading causes of death and disability (contributing 20% of total disease burden), followed by lung cancer, colorectal cancer, depression, type II diabetes, arthritis and osteoporosis (AIHW, 2012a), and diabetes is expected to be the leading cause of disease burden by 2023 (AIHW, 2012c). Much of the disease burden associated with these conditions (excluding lung cancer) could be prevented through improvements in diet quality and physical activity levels.

Diet quality and associated health outcomes follow a social gradient in Australia, and internationally. Australians in the highest income groups, with higher levels of education, and living in more advantaged neighbourhoods, are more likely to eat a healthy and balanced diet, be a healthy weight and have better health outcomes. Indigenous Australians, minority cultural groups, people living with disabilities, and people living in remote and/or socioeconomically disadvantaged areas are less likely to buy healthy food (Turrell et al., 2002) and less likely to eat a healthy diet (Giskes et al., 2002, Magarey et al., 2006), and more likely to be overweight or obese, more likely to have poor oral health, more likely to develop cardiovascular disease (CVD) or type II diabetes in their lifetime, and more likely to die from chronic diseases (Commonwealth of Australia, 2013, AIHW, 2012c) (AIHW, 2012a). Indigenous Australians experience the greatest impact from diet-related illnesses, with higher rates of cardiovascular disease, overweight and obesity, diabetes, chronic kidney disease, dental decay and dementia than other Australians (AIHW, 2012a). Overweight and obesity are also most prevalent among those who are food insecure (have limited or uncertain availability of, or ability to acquire, nutritious, safe, and socially and culturally appropriate foods) (Burns, 2004). Food insecurity affects an estimated 5% of all Australian households and more than 20% of single parent and/or low-income households, and is paradoxically associated with both nutritional deficiencies and obesity (Burns, 2004).

The social determinants of inequities in healthy eating in Australia

What, when, where and how much people eat is influenced by a complex mix of factors at the societal and individual levels. These influences operate both directly through the food system (for

example, agriculture and food policies shaping what foods are available, where and for what price), and indirectly through political, economic, social and cultural pathways – people’s dietary behaviours are a response to the broader daily living conditions in which they are born, live, learn, work and age. People with less money, less education, insecure working conditions and poor living conditions are more likely to experience food insecurity, and have higher levels of dietary-related diseases. It is important therefore to consider people’s daily social experiences, physical environments, financial resources, and other material living conditions when addressing inequities in healthy eating (Friel, 2009).

These influences are not distributed or experienced equally across all social groups. Inequities in dietary practices, the food environment and conditions of daily living are shaped by deeper social structures, processes and contexts, including economic, social and health policies and priorities; the governance arrangements that develop and implement policy and social action, including the degree to which all social groups have engagement and participation in decision-making and implementation processes; and the cultural norms and values that pervade society (Friel, 2009).

Empowering all social groups to pursue healthy diets requires addressing these social determinants (the underlying structural drivers and conditions of daily living) as well as the individual-level factors that affect inequities in healthy eating. In the remainder of this section we present a more detailed description of the social determinants of diet quality, organised by the three layers of the VicHealth framework: socioeconomic, political and cultural contexts, daily living conditions, and individual health-related factors.

Socioeconomic, political and cultural context

The fundamental social determinants of health are made up of the system of values, policies and institutions by which society manages economic, political and social affairs through interaction within and among the state, civil society and private sector; the mix of macroeconomic and social policies and priorities, and prevailing cultural and social norms and values. This broad socioeconomic, political and cultural context creates a process of social stratification, and shapes the distribution of power, resources and prestige within a society, directly and indirectly influencing diet quality and its social distribution (Marmot et al., 2008, Gore and Kothari, 2012, Friel, 2009).

Governance

A society’s systems of governance and delivery includes the definition of needs, civil participation, accountability and transparency in public administration, and the laws, rules and practices that set limits and provide incentives for individuals and organisations. The nature of this governance system determines the degree to which policy, legislation, services and projects represent the needs and interests of all social groups. It also determines the extent of each social group’s voice, inclusion and participation in the decision-making process, and ability to challenge and change the distribution of those conditions that affect their health and daily lives (Friel, 2009).

From a healthy eating perspective, the prevailing ideology in Australia – favouring limited government interference in the market, industry self-regulation and a focus on individuals’ responsibility for their health – has played a powerful role in the increasing power and influence of the private sector over public policy processes and decision-making affecting food supply and consumption. Although there is general consensus that a conflict of interest prevails between the

tobacco and alcohol industries and public health goals, the food industry is widely seen as ‘part of the solution’ to unhealthy eating in Australia, and internationally, despite little evidence of the effectiveness of self-regulation and the growing trends towards public-private partnerships in improving diets.

Policies directly influencing the food environment

The food system encompasses all activities involved in food production and trade, processing, manufacturing, distribution, marketing, retail and procurement. The food system directly affects the social distribution of healthy eating by influencing the relative physical accessibility, nutritional quality, price and acceptability of different foods in local environments. Changes in global and national socioeconomic, political and cultural contexts have reshaped food systems over the last half-century, making less healthy food significantly more readily available, affordable and acceptable (Friel and Lichacz, 2010). While these shifts have been global, they have also contributed to dietary divergence within and between populations, where different social groups increasingly consume different types of foods, bought from different types of stores, and influenced by different types of marketing techniques (Hawkes, 2006). Where more affluent groups may benefit from greater food diversity and the availability of more expensive healthy market ‘niches’, lower-income groups are more likely to consume heavily marketed, cheaper and less healthy food product (Nicholls et al., 2011). There are complex mechanisms behind this divergence.

Trade and agricultural policies influence the types, quantities and prices of foods available, both directly through influencing the volume and nutritional quality of foods available, and indirectly (for example, through attracting investment in the manufacturing, retail and advertising of highly processed foods). Subsidies, price supports, and protective measures favouring specific sectors and food categories can lower the retail price of these products, altering their relative affordability. These dynamics play a key role in shaping population diets, and inequities in diets and related health outcomes, by altering the availability, accessibility, quality, price and promotion of foods in consumer food environments (Friel et al., 2013b). International trade and investment agreements can also limit the capacity for governments to implement health policy and health promotion strategies. For example, trade agreements can affect dietary health through their restriction of governments’ ability to regulate on public health grounds, for example, to introduce new rules around nutrition labelling and advertising for food (Gleeson and Friel, 2013, Friel et al., 2013a).

Food prices, and the relative retail price of different foods, are a central concern for health equity because they have the strongest impact on lowest-income shoppers, who spend a greater share of their income on food and are more price sensitive than shoppers with higher incomes at their disposal (Wall et al., 2006, Nicholls et al., 2011, Brambila-Macias et al., 2011, Thow et al., 2010). Foods recommended in healthy eating guidelines are frequently more expensive than less healthy options (Friel and Lichacz, 2010), and the cost of healthy foods in Australia has been rising faster than the cost of less nutritious foods and the Consumer Price Index (CPI) (Harrison et al., 2007, Harrison et al., 2010).

Food advertising is also an important driver of food preferences and purchasing behaviours, shaping the types of foods and dietary patterns that are acceptable and desirable in different social groups. Marketing of unhealthy food and beverages is now widely recognised to have sufficient negative influence on food preferences, purchases and dietary intake, and therefore diet-related chronic

disease risks, to warrant preventive action (Galbraith-Emami and Lobstein, 2013). This evidence is particularly strong for children and young people, who are overwhelmingly exposed to marketing of energy-dense, nutrient-poor foods and beverages and are uniquely vulnerable to the persuasive power of marketing (Cairns et al., 2008). The five most heavily marketed food categories in high-income countries are all high in fat and/or sugar: sugared breakfast cereals, soft drinks, confectionery, savoury snacks, and fast foods (Hawkes et al., 2009). Reducing children's exposure to the promotion of unhealthy foods and beverages has been identified as a key target for child obesity prevention, and the World Health Organizations' set of recommendations to protect children from marketing of foods high in saturated fats, trans-fats, free sugars and salt was adopted by all member states at the 63rd World Health Assembly in May 2010 (WHO, 2010). Although these recommendations are non-binding, there have been strong calls for statutory regulation of food marketing to children from health policy makers and civil society in almost all high-income countries (Hawkes and Lobstein, 2011). A number of countries have implemented or taken steps towards statutory regulation, including the UK, South Korea, Malaysia, France and Ireland. There is strong public support in Australia for statutory regulation of unhealthy food marketing targeted at children on free-to-air and pay TV, as well as non-broadcast media (such as email/SMS, magazines and websites) (Morley et al., 2012, Chung et al., 2012, Pollard et al., 2013, National Preventative Health Taskforce, 2009). Yet, the approach faces strong opposition from industry and within parts of governments, and regulation of food marketing in Australia remains restricted to self-regulation by the advertising and food industries (Chung et al., 2012).

Macroeconomic and social policies

While policies directly affecting the food system have a clear role to play in shaping diets, the role played by fiscal measures, trade, labour, social welfare, land and housing, education, health, transport, and other macroeconomic and social policies is less well researched. However, these broader policies, and the systems of governance and political priorities shaping them, play a critical role in shaping the conditions of people's daily lives, and subsequently their ability to access and afford a healthy diet.

Household income is one of the key determinants of dietary choice among low-income groups (Friel and Conlon, 2004). Today, half of Australian households have a pre-tax income of less than \$80,000 per year. Since 1975, the wages of a (full-time non-managerial) worker in the bottom ten 10% of income earners has risen by 15% (\$32,000 to \$37,000). For a worker in the 90th percentile, their wages have risen by 59% (from \$65,000 to \$103,000) (Leigh, 2013). Numerous Australian studies have indicated that families or households who are on low incomes or are welfare-dependent find it difficult to afford a healthy diet (Kettings et al., 2009). Compared with households on average or above-average income, low-income households spend a greater proportion of their money on food (40% of income as opposed to the population average of 12%), although in real terms the amount spent is less (Burns, 2004, Burns et al., 2011, Kettings et al., 2009). Therefore, even if an individual or household strives for a healthy diet, there may be serious financial constraints limiting their ability to achieve this. When household finances are under pressure, food spending is often seen as more flexible than other essential expenditure demands, such as housing and education costs, which can and often do take priority over food (Dowler, 2008).

Cultural and societal norms and values

Cultural and societal norms and values constitute an important part of the context in which policies affecting food supply and consumption are developed and implemented. Culture refers most broadly to the language and accumulated knowledge, beliefs, assumptions and values that are passed between individuals, groups and generations (Boyden, 2004). The dominant societal and cultural norms of a society lead to processes of socialisation, i.e. the transfer of attitudes, beliefs and behaviours between and within generations, and the means by which societies shape patterns of behaviour. Socialisation also reproduces lifestyles and identities. A culture of individualism and materialism, the current dominant culture in Australia, could also produce the attributes of a culture of inequality, especially when interacting with different socioeconomic groups – for example, materialism and individualism might accentuate the costs of being poor or of low social status by making money more important to social position and weakening social bonds and group identity (Eckersley, 2006). Values around social support and safety nets for low-income groups influence the degree to which these are prioritised politically.

Whether particular foods and dietary patterns are acceptable to, and desirable for, various social and cultural groups is shaped by a wide range of influences. Socio-cultural norms and values defining what is socially acceptable, desirable and appropriate to eat and feed others (as well as when, where and in what quantities) may be as or more important than physical environmental factors in determining diet quality and the social distribution of healthy eating behaviours (Brug et al., 2008). They may include social norms around consumption of takeaway, convenience and snack foods, as well as sugary beverages (Thornton et al., 2014); meal times, occasions and rituals; eating away from the home; gender norms around food shopping and cooking, and food allocation within families and households; openness to new foods; valuing of thrift or displays of wealth and status in food purchasing; and social acceptability (or desirability) of body fat. Food industry actors are increasingly influential in shaping these norms; most visibly through advertising, which is widely recognised to shape food preferences, but also less obviously through the increasingly powerful position of manufacturers and retailers as cultural authorities on food, nutrition and lifestyle (Dixon, 2003).

Gender roles and norms also play a significant role in household eating practices. Although women are less likely than men to control household income, they are more likely to bear the responsibility for day-to-day budgeting, for food shopping and for preparation of food for the family (Inglis et al., 2005). Cultural norms still assume women are the primary carers and act to support the wellbeing of their children, partners and others, such as dependent older or disabled family members, often through food and nutrition (Blake et al., 2009, Bittman et al., 2003, Lake et al., 2006), and can play a role in the distribution of food within a household.

Daily living conditions

The structural drivers outlined above ultimately shape the daily living conditions in which people are born, live, learn, work and age, including their homes and communities, and their access to quality health care, education, employment, food and social safety nets. These conditions, in turn, have a profound influence over diets and the social distribution of healthy eating in Australia. People with less money, less education, insecure working conditions and poor living conditions are more likely to experience food insecurity, and have higher levels of diet-related diseases.

Early childhood and education

Inequities in learning experiences and the learning environment operate as determinants of healthy eating, both directly and indirectly. Early child development (ECD) and quality education help equip people with material security, resilience and personal control, each an important determinant of healthy dietary choices. Disadvantage in pregnancy and in utero effects, low birth weight and improper infant feeding, and deprivation in early childhood are associated with poor nutritional status and associated health outcomes in later life. Early child development, which includes not only physical and cognitive development but also social and emotional development, can play an important protective role (Early Child Development Knowledge Network, 2007). What children experience during the early years sets a critical foundation for their entire lifecourse – influencing basic learning, school success, economic participation and social citizenry. Each of these provides skills and resources that influence dietary behaviour. Interventions that integrate the different dimensions of child development are particularly successful, resulting in sustained improvements in physical, social, emotional and cognitive development, while simultaneously reducing the immediate and future burden of disease, especially for those who are most vulnerable and disadvantaged (Engle et al., 2007).

Access to quality education and health literacy are strongly associated with healthy behaviours and risk avoidance – equipping individuals with the resources needed throughout the lifecourse to achieve a secure income, provide for family and cope with health outcomes in later life. Maternal education in particular has been shown not only to improve children’s nutritional status but also to improve school attendance (Smith LC et al., 2003). Children from disadvantaged backgrounds are more likely to do poorly in school and drop out early – and subsequently as adults are more likely to have lower incomes and higher fertility, and be less empowered to provide good health care, nutrition and stimulation to their own children, thus contributing to the intergenerational transmission of disadvantage (Grantham-McGregor et al., 2007). Barriers to education include issues of access, quality and cultural appropriateness of education. Integration of social and emotional learning in curricula in primary and secondary schools as well as attention to children’s physical and cognitive development improves school attendance and educational attainment. Poverty relief and income-generating activities together with measures to attract quality teachers, provision of more accessible schools and classrooms, culturally relevant materials, and reduced family out of pocket expenditure on school materials are critical elements of a comprehensive strategy to make education a reality for all children (Alford K and James R, 2007).

Employment and working conditions

Employment status and working conditions can impact on healthy eating and weight, through both stressors at work and outside of work (van Drongelen et al., 2011, Devine et al., 2009, Devine et al., 2006, Kouvonen et al., 2005). In addition to the direct influences of wages and/or welfare benefits on the amount of money an individual or household has available for food purchasing (see social and economic policies section, page 8), as well as the types, quality and cultural acceptability of foods available in the workplace, employment conditions can shape food choices and eating behaviours indirectly through their influence on time stress and time available for meal planning, food shopping and preparation; their contribution to ‘role overload’ and work-home life spillover; as a source of stress, fatigue and dissatisfaction; and their influence over perceived self-efficacy and control (Devine et al., 2006). Inflexible job schedules, shift work, variable and non-standard work hours,

working overtime and multiple jobs, lack of job security, low pay and low status jobs all make food choices and scheduling family meal times more difficult and are associated with fewer family meals prepared or eaten at home; lowered expectations, valuing and frequency of shared meals; poorer nutritional quality of meals; and less healthy diets (Devine et al., 2006). Frequency of family meals is positively associated with children's diet quality (Devine et al., 2006, Neumark-Sztainer et al., 2003).

Common coping strategies identified by time-pressured low-income working parents include using ready-meals, and using food as treats for the family to cope with everyday stress. These coping strategies can themselves elicit feelings of guilt and dissatisfaction with personal food choices, as well as spousal and parental roles, thus exacerbating stress (Devine et al., 2006).

Physical environment

Local food environments – the number and mix of food retail and food service outlets located in a community; their physical proximity, walkability and proximity to public transport options; and the range, cost and quality of foods available – can play an important role in shaping diet quality. In turn, differences in the nature and quality of local food environments may play a role in the social patterning of healthy eating behaviours. The 'obesogenic environments' concept, first coined by Swinburn et al. in the 1990s (Swinburn et al., 1999), has been widely used to refer to neighbourhoods or communities in which there is an overabundance of unhealthy food options and a relative lack of affordable healthy food options, and in which there is a lack of opportunities or incentives for active transport and physical activity. Remoteness (distance from a major urban centre) appears to be a strong predictor of inequities in healthy food access in Australia, with healthy foods less available, more expensive and of lower quality in remote areas (Lee et al., 2009). There is some evidence from Australia, as well as the US, that a higher density of fast-food outlets in lower-income neighbourhoods (Reidpath et al., 2002) and frequency of consumption of food from these outlets, is associated with unhealthier lifestyles, poorer psychological profiles and increased risk of obesity (Thomson et al., 2013, Li et al., 2009, Hilmers et al., 2012).

The nature of the household environment is also important in shaping home cooking and eating behaviours. The availability and adequacy of space and facilities for food preparation, cooking and storage, as well as home and kitchen layout; thermal comfort and the ability to afford heating/cooling and fuel bills; a sense of privacy, security and personal safety can all play a role (White, 2007, Thomson et al., 2013). As already noted, frequent consumption of ready-prepared meals purchased outside of the home is associated with lower diet quality, while home cooking is consistently associated with better diet quality.

Social participation

Social participation is defined for the purposes of the Framework as supportive relationships, involvement in community activities, civic engagement, and participation in decision-making and implementation processes. A certain level of social participation is what confers citizenship, and food consumption plays an important part in this: being forced through lack of income and material resources to forfeit the social pleasures of eating out, eating in other people's homes or having guests for a meal is a marker of diminished participation (Coakley, 2001).

Lack of money and functional limitations arising from advanced age, disability and/or lack of access to a car or reliable transport can both limit social engagement and contribute directly to food

insecurity by restricting the ability to access food retail outlets, as well as to carry groceries (Burns et al., 2011). Older Australians, households located in disadvantaged areas, and households in which the main food shopper has a low level of educational attainment, a low income or is unemployed, are more likely to have difficulties accessing a car and carrying groceries (Burns et al., 2011). Strong social and welfare networks can mediate these effects by facilitating social engagement and allowing people to access independent transport, making food shopping easier (Coveney and O'Dwyer, 2009).

Individual health-related factors

Personal taste, attitudes, nutritional knowledge, peer influences, and the availability of food- and nutrition-related information all play a role in determining food choices. Nutrition and food-related knowledge, attitudes, skills and behaviours vary by social group, including gender, educational attainment, employment status and occupational group (Inglis et al., 2005, Ball et al., 2006, Winkler and Turrell, 2010). In addition to increasing money available for food shopping, the positive effect of higher incomes and levels of education may operate by increasing access to information, skills, and household help and social support (Devine et al., 2006). Social support for healthy eating, particularly from a partner or other family members, is a key influence on food choice, and can vary across socioeconomic status (SES) groups, with lower SES Australians reporting poorer support (Ball et al., 2006). There is also evidence that modelling of healthy eating behaviours of family members may be indirectly associated with diet behaviours via strength of habit development, at least with fruit intake (Tak et al., 2013).

People receive dietary information and advice from multiple sources, including government, the food industry, the media and family. Access to credible, consistent nutrition and health messages and understanding of these messages is critical. A recent survey of 1634 women living in disadvantaged neighbourhoods in Melbourne and trying to lose weight identified that while the women surveyed were aware of and understood messages about weight control (lower fat and energy density of diet, and increase physical activity), a lack of understanding of energy density of foods and which types of foods to limit may contribute to the poor weight loss/control results observed (Jeffery et al., 2013).

Cooking skills and confidence also play an important role in healthy eating. A survey of Brisbane residents with lower education and low household income showed that the people surveyed had significantly lower confidence to cook than their higher socioeconomic counterparts, and that lower confidence to cook was in turn associated with less household vegetable purchasing (Winkler and Turrell, 2010).

What can be done to address the social determinants of inequities in healthy eating

The evidence base of promising approaches to improve healthy and equitable eating is described below according the layers of the VicHealth Framework. A summary of all the studies included in the review is also presented in Appendix 2. Many multi-component interventions explicitly involve actions across more than one level, while some interventions (such as school- and workplace-based healthy eating programs) could be considered to target either individual-level health factors or daily living conditions, or both. In these cases, the intervention was allocated according to whether it involved a greater focus on influencing daily living conditions (for example, by modifying the physical

environment or school curricula) or individual knowledge, attitudes and behaviours (for example, through nutrition education).

Socioeconomic, political and cultural context

Interventions at this level aim to reshape the fundamental social, economic, political and cultural systems, processes and norms in order to address the social distribution of, and promote enabling structural environments for, healthy eating. Actions at this level tend to be the most politically sensitive and difficult to instigate because they target governance structures and processes, policy priorities and initiatives, and deeply ingrained cultural and societal norms and values. They are also the most challenging to evaluate for their impacts on behaviours and health outcomes, as reflected in the dearth of evaluation evidence at this level.

Policy

Policies aimed at influencing the social distribution of healthy eating behaviours can be broadly categorised into *nutrition-specific* and *nutrition-sensitive* measures (UNDP, 2013). Nutrition-specific policy measures aim to directly influence the food supply. To date, interventions in this category have most commonly involved a) economic instruments (such as taxes and subsidies aimed at increasing the relative retail price of unhealthy foods and/or lowering the price of healthy foods such as fruits and vegetables); b) regulatory and legislative controls aimed at improving food labelling, composition (reformulation), and control of the extent and nature of food advertising; and c) food relief schemes (such as targeted subsidies or the provision of vouchers for the purchase of fruit and vegetables).

Nutrition-sensitive policies, on the other hand, are typically conducted outside of the health and food sectors and may not necessarily recognise or seek to address nutrition, but can have a significant impact on inequities in dietary behaviours and associated health outcomes by shaping the nature, extent and distribution of social stratification. This area includes a wide range of potential measures, including regulation of working conditions, increasing access to education, challenging harmful gender norms, the promotion of a rights-enhancing legal environment, urban development policy promoting healthy local food environments, and social protection programs.

Nutrition-specific economic instruments

Economic instruments influencing food consumption can operate at the macro or micro level (Goodman and Anise, 2006). Micro-level strategies are designed to influence food prices in daily living settings such as schools, worksites, restaurants, cafeterias and food markets. Evidence for the potential for these strategies to address equity in healthy eating is therefore discussed under the daily living conditions layer later in the report. Macro-level fiscal policy interventions, on the other hand, are designed to change the price of foods, or relative price of different food categories, as a means of promoting dietary change at the population level. Potential policy measures include differential application of, or exemption from, consumption-oriented taxes according to the nutrient content of specific food categories; provision of vouchers or subsidies targeted at high-risk or disadvantaged groups; or policy instruments designed to encourage or incentivise the food industry to produce and market healthier food products (Wall et al., 2006).

Consumption-oriented taxes are broad-based taxes applied to goods and services and paid for by the final consumer. In Australia, this is known as the Goods and Services Tax (GST), while some countries internationally refer to it as a Value Added Tax (VAT). Taxes (or additional taxes) on specific foods or food groups aimed at discouraging their consumption (so-called 'health taxes' or 'fat taxes') have the potential to be a highly cost-effective strategy for shifting population diets in a healthier direction (Sacks et al., 2011). The GST is currently differentially applied to food categories in Australia, as well as in a number of other countries, including the UK and France (as VAT), although the primary driver behind this is typically revenue generation rather than health promotion. As a result, evaluations of their impact on food sales, let alone diets and equity, are scarce (Wall et al., 2006).

Health-oriented food taxes have recently been implemented, or are being considered, in several jurisdictions, including Denmark, the UK, Finland, France, Hungary and Mexico, and a number of US states, with varying degrees of success, but it remains unclear what the impact will be on dietary inequities. In the absence of real-world evaluations, evidence for the impact of food taxes on food sales and diets is largely based on modelling studies. According to this literature, taxes on unhealthy foods are probably likely to have a positive influence on diets at the population level, with a stronger impact for foods high in fat or salt than for sugar-sweetened beverages, and subsidies on fruits and vegetables may be beneficial (Ni Mhurchu et al., 2013, Eyles et al., 2012). However, the magnitude of these potential impacts is still unclear and is likely to depend significantly on the extent of the tax or subsidy. The potential for compensatory substitutions either between or within product categories – so-called cross-price elasticities – makes it very difficult to accurately estimate the potential impact of fiscal measures on diets.

The only study that has appraised the actual effects of food price policies on food purchasing and consumption behaviours is a short-term evaluation of the Danish fat tax. Denmark introduced a tax on saturated fat in 2011 as part of wider tax reforms, with the explicit aim of shifting purchasing patterns away from energy-dense foods. While all food sold in Denmark is already subject to a uniform 25% VAT, the saturated fat tax amounts to an additional 3% on the price of minced beef, 14.6% on whipped cream, 13-16% on rapeseed and sunflower oils, and 30% on butter (Smed and Robertson, 2012). Preliminary evidence suggests a short-term positive impact on purchases of fats and oils (10-15% reduction), and increased sales of healthier products, but unhealthy products were also substituted with cheaper varieties of the same composition (Jensen and Smed, 2013).

Disincentives in the form of food taxes without concomitant subsidisation of healthy foods may be financially regressive because they place a disproportionate burden on those who are socioeconomically disadvantaged. A regressive tax is one for which low-income people pay a higher percentage of their income than high-income people (Fry et al., 2013). The implication is that consumers choosing to continue to purchase the taxed food will have to spend more money, and may compensate by reducing the amount of healthy foods they buy (Smed and Robertson, 2012). While subsidies on healthy foods offer the potential to be more beneficial for those on lower incomes (Nicholls et al., 2011), there is also the potential that they will be accompanied by undesired increases in purchases of foods high in fat, salt and sugar (Brambila-Macias et al., 2011, Ni Mhurchu et al., 2013).

Therefore, policy packages of taxes on unhealthy foods and subsidies on healthy foods are considered to offer the greatest potential from a health equity perspective, and would ideally be

implemented as part of a multi-strategy approach encompassing stronger food labelling and reformulation policies, advertising restrictions, and a focused, sustained public awareness campaign (Nghiem et al., 2013, Cabrera Escobar et al., 2013, Thow et al., 2010, Ni Mhurchu et al., 2013).

No country has yet attempted to introduce healthy food subsidies designed to promote healthy diets at the population level. Controlled intervention trials involving targeted fruit and vegetable price discounts at point-of-purchase in supermarkets have been conducted in New Zealand (Ni Mhurchu et al., 2010), France (Bihan et al., 2012), the Netherlands (Waterlander et al., 2013) and Australia (Brimblecombe et al., 2013) with these studies suggesting that healthy food subsidies may be a promising strategy for promoting healthier food purchasing in low-income groups.

Subsidies designed to encourage consumption of fruits and vegetables (such as GST/VAT reduction or elimination) are generally considered to be more politically feasible than extra taxes on unhealthy foods (Waterlander et al., 2010), which face strong competing interests and opposition from industry groups, as well as some parts of government. Trans-fats and sugar-sweetened soft drinks are generally considered to be the most straightforward targets for tax interventions because they offer no nutritive value. Trans-fats are also increasingly becoming banned or controlled ingredients in many countries. An advantage of taxes on unhealthy foods is that they generate funds which can be used for other health promotion initiatives, or to evaluate the effect of these taxes on health (Smed and Robertson, 2012).

Regulatory and legislative controls

Food advertising

The evidence base for the effectiveness of statutory regulation of TV advertising in reducing children's exposure to unhealthy food and beverage marketing is relatively lacking, having been evaluated in few jurisdictions and demonstrating a limited positive impact on reducing overall exposure in Norway, Sweden and Quebec, Canada, although there is stronger evidence of impact in the UK and South Korea (Galbraith-Emami and Lobstein, 2013). Impact in limiting overall exposure is likely to be limited by the shifting of advertising to new media (for example, internet, social media), and across jurisdictions not subject to regulations (this has been a particularly pressing problem within the EU). Therefore, ideally, restrictions would be implemented across all dominant forms of media, including outdoor advertising, the internet and sports sponsorship, and would be accompanied by clear objectives and accountability, and appropriate evaluation to improve the evidence base (Magnus et al., 2009, Kelly et al., 2013).

The Assessing Cost Effectiveness in Obesity prevention (ACE-Prevention) project found control of food advertising to be one of the most cost-effective child obesity prevention approaches available (Haby et al., 2006, Magnus et al., 2009, Magarey et al., 2006). In addition, population-wide controls on food marketing through mass media and in public settings where people (and in particular children) spend a large amount of time (such as schools, shopping malls and sports clubs) are likely to have positive impacts across the social hierarchy. Statutory regulation is technically feasible to implement at the states and territory level in Australia through existing food regulatory powers, although would ideally occur under the overall directive of the Commonwealth (Chung et al., 2012, MacKay et al., 2011).

Food labelling

Food labelling is defined by the Codex Alimentarius Commission as ‘any written, printed or graphic matter’ on food packaging, accompanying food or displayed near food (Hearn et al., 2006). While most food labelling is voluntary for the purpose of marketing and promoting the sale of a product, mandatory regulation of certain aspects of food labelling is widely accepted as an important tool for aiding informed food choices. Clear, easy-to-use and readily understood nutrition labelling has the potential to support healthier food choices across the population and is especially important among populations with reduced literacy. Food labelling also has the potential for additional benefits in the form of product reformulation as companies try to improve the nutritional profile of products in response to stricter labelling standards.

Current practice in Australia is mandatory inclusion of back-of-pack nutrition information panels (NIPs) on pre-packaged foods. However, there is strong evidence that NIPs are not effective in encouraging consumers to make healthier choices, and use and understanding of NIPs are significantly lower in lower-income and ethnic minority groups than in other groups (Hawkes, 2006). There is strong public support in Australia for stricter food labelling (Pollard et al., 2013), including more accessible and easier-to-understand nutrition information on pre-packaged foods and at point-of-purchase. In addition, the ACE-Prevention project found shifting to a mandatory front-of-pack traffic-light labelling on food products, coupled with a one year national social marketing campaign, to be a highly cost-effective population health intervention (Sacks et al., 2011).

However, while self-reported use and understanding of NIPs are moderate-to-high at the population level (Hawkes, 2006), there is only weak evidence for the direct impact of nutrition labelling on food choices and health outcomes. Traffic-light labels have consistently been identified as the most popular and easy-to-understand in consumer testing, and appear to be an equitable and effective method for signposting the healthfulness of foods (Hawkes, 2006). However, a recent UK study found no impact of traffic-light labelling on sales (Sacks et al., 2011). In 2006, the UK Food Standards Agency (FSA) recommended that food retailers and manufacturers in the UK place front-of-pack traffic-light labels on products in a range of categories. The labelling format recommended by the FSA consists of four separate colour-coded lights indicating the level of fat, saturated fat, sugar and salt in the product. A ‘red’ light indicates a ‘high’ level of that nutrient, an ‘amber’ light indicates a ‘medium’ level and a ‘green’ light indicates a ‘low’ level, with nutrition criteria set by the FSA (Sacks et al., 2009).

The Australian Heart Foundation Tick Program is designed to help consumers to make healthier food choices at point-of-purchase (Williams and Mummery, 2013). The Heart Foundation works with food manufacturers to improve the nutritional composition of packaged food products voluntarily (focusing on salt, saturated fat and energy content), in return for the right to buy an endorsed logo that can be used on product packaging to achieve a marketing advantage. The royalties received from food manufacturers cover the costs of monitoring product compliance, program administration, evaluation, education and health promotion (NHF, 2014). While the Tick Program is highly trusted and recognised by Australian consumers, and is considered to be a cost-effective population-level health promotion strategy, the voluntary nature of the scheme limits its potential impact due to the small range and number of products involved. Cobiac et al. (2010) estimated that the current Tick Program can be expected to avert less than 1% of disease burden in Australia

(DALYs), as opposed to a potential 18% (as modelled for breads, margarines and cereals) if it was made mandatory and reached the entire packaged food supply. From a health equity perspective, there is the risk that packaged foods not covered by the scheme are targeted to, or are more affordable for, less-advantaged consumers.

A recent systematic review found that middle-aged or younger adults, women, individuals with higher incomes, individuals with higher education levels, larger households and those with children, Caucasians, individuals with healthier eating habits, and those who spend more time shopping were generally more likely to use nutrition labels (Campos et al., 2011). Therefore, nutrition labelling may not be an effective strategy for reaching population groups at highest risk of unhealthy eating, and may have the potential to exacerbate inequities, without adequate consideration of barriers to their use and understanding in population groups most at risk of unhealthy diets.

Food reformulation

Interventions aimed at reducing the proportion and amount of less healthy nutrients in processed food products can be achieved through legislation (for example, through trans-fat bans) or through voluntary collaboration between industry, governments and/or non-government bodies (for example, the UK Responsibility Deal, the Australian Food and Health Dialogue or the Australian Heart Foundation Tick Program). Reducing salt and eliminating trans-fats from the food supply are widely considered to be 'best buys' for non-communicable disease prevention. The strongest evidence is for the impact and cost-effectiveness of government-led food reformulation initiatives (Webster et al., 2012); however, to date, most actions have involved voluntary industry commitments.

Most regions of the world (except Africa) now have salt-reduction programs in place; however, so far, the majority of actions worldwide have involved voluntary industry commitments. Finland, France, Ireland, Japan and the UK have demonstrated some impact of salt-reduction initiatives, including evidence of changes in population salt consumption (Webster et al., 2012). The UK Responsibility Deal, involving voluntary reformulation combined with information campaigns, has contributed to a 10% reduction in salt intake in the UK (Shankar et al., 2013). Regulating trans-fat usage by fast-food outlets has also been an effective intervention for decreasing the trans-fat content of purchases, without increasing total fat content, in both high- and low-poverty neighbourhoods in high-income countries (Angell et al., 2012, Downs et al., 2013). A modelling study evaluating the impact of the New Zealand Heart Foundation Tick Program estimated that the program has reduced the average sodium content of bread by 26%, margarine by 11% and breakfast cereals by 61% (Young and Swinburn, 2002).

However, as noted above, the voluntary nature of these initiatives limits their potential impact. In addition, while salt and trans-fats are relatively straightforward targets for reformulation programs, it is more difficult to set targets for other nutrients such as total fat, sugar and energy content. Key characteristics of successful initiatives include strong national government leadership, clear and transparent roles and accountability, population targets, and food industry cooperation, in combination with mass media campaigns, mandatory warning labels on foods containing high levels of sodium, saturated and trans-fats and refined sugars, and regular monitoring to assess impacts in a wide range of population groups (Webster et al., 2011).

Targeted food relief schemes

Providing targeted food or financial assistance offers potential to support low-income households to access healthier diets. However, there is limited high-quality evidence on the impacts of providing subsidised food or food vouchers to specific population groups (for example, low-income women, infants, children, elderly) on healthy eating (Black et al., 2012). Two US studies found that the Food Stamp Program is associated with weight gain and the likelihood of being overweight or obese in females (Zagorsky and Smith, 2009, Meyerhoefer and Pylypchuk, 2008). Food vouchers/subsidies targeting specific food commodities, such as fruits and vegetables, whole grains or juice, do appear to be effective, particularly when improving the packaging of these products, but cost-effectiveness has not been adequately evaluated and targeted food subsidies alone may not be efficient without additional policy instruments (Black et al., 2012, Dallongeville et al., 2011, Alston et al., 2009, Andreyeva et al., 2012, Andreyeva and Luedicke, 2013, Andreyeva et al., 2013). Similarly, indirect targeted supports such as housing subsidies or improvements (including provision to low-income households) may feasibly increase money available for healthy foods, but there is no evidence of their impact on inequities (Bambra et al., 2010, Thomson et al., 2013). In addition, direct cash payments or positive taxation schemes have shown no significant evidence of improving child health or wellbeing (Lucas et al., 2008) and there is the potential for compensatory spending of money saved through subsidies, or gained through positive taxation, on less healthy foods, cigarettes or alcohol (Black et al., 2012). Food assistance targeted at fruits and vegetables seems to be most successful at improving diets; however, more research needs to be completed on cost-effectiveness and additional policy components. As already noted above, supermarket-based intervention trials in Australia and New Zealand, and elsewhere around the world, have demonstrated the potential for targeted discounts on fruits and vegetables to be a promising strategy for improving food purchasing behaviours amongst low-income shoppers.

Nutrition-sensitive economic and social policy

Income and social protection

There are relatively few social policies and legislation that explicitly consider nutrition. However, as discussed earlier in the report, policies in early child development, education, planning and working conditions can indirectly influence, positively and negatively, inequities in dietary behaviour through their distribution of money, other material resources and psychosocial control over one's life.

The adequacy of welfare rates is a key issue in tackling food poverty and inequities in dietary behaviours. Unemployment benefits in Australia have declined steadily compared to other benefits and to community standards regarding costs of living. Increasing the payment level for Newstart would significantly improve the equity of income distribution as, at present, Newstart recipients are among the lowest income earners in the country. (Denniss and Baker, 2012)

Scandinavian countries have good health outcomes and low levels of income inequities relative to many other countries. They are renowned for generous and universal welfare provisions, believed to be instrumental in reducing their health and social inequities (Bambra, 2011, Lundberg et al., 2008). Brazil has been one of the few countries to reduce income inequities over the past two decades and simultaneously to enjoy improvements in health indicators (Beddoes, 2012). The country has achieved this partly through significant investment in education and through the use of a comprehensive social welfare program called *Bolsa Familia* (Popay et al., 2008). Similarly, the

Mexican government introduced the successful *PROGRESA* (later renamed *Oportunidades*) – a government conditional cash-transfer program, designed to target poverty by providing cash payments to families in exchange for regular school attendance, health clinic visits and nutritional support (Rivera J et al., 2004). Shifting how payments are used from various social protection programs, including cash transfers and public works schemes, away from harmful items such as processed foods towards healthier items such as fruits and vegetables is an attractive opportunity for making social protection healthy-eating sensitive.

Trade and investment policy

Despite the clear associations between trade and investment policy, food supply and food environments, trade policies have rarely been employed to improve diets, and there is a dearth of evidence available to inform health promotion actions in this area. Sustainability impact assessments of trade agreements are now regularly conducted in the European Union, and a number of gender, social and human rights-oriented trade impact assessments have been conducted (Plummer et al., 2010, George and Kirkpatrick, 2004, European Commission, 2006) (MacLaren, 2012, Harrison, 2010) (Lee et al., 2007, Lee et al., 2006). However, health/nutrition-related trade impact assessments are not systematically undertaken or reported but should be, especially at the moment with the new large regional trade agreement – the Trans Pacific Partnership agreement – currently under negotiation. There is scope to retain policy space for nutrition and health in trade agreements by including specific health exceptions during trade negotiations. This requires public health researchers and policy makers engaging with the complexities of trade policy and participating in the negotiation consultation phase.

Governance

At the government level, Australia's current national preventive health strategy, spearheaded by the National Partnership Agreement on Preventive Health (2009-2018) (NPAPH), represents a potential coordination mechanism to ensure a coherent approach and joint action across government. However, the Australian Government's approach to supporting healthy eating in the population has long been dominated by a framing of the problem as one of individual responsibility, and a significant proportion of the federal government preventive health expenditure continues to be dedicated to lifestyle-related social marketing campaigns. From the food supply side, there has been an enduring emphasis on self-regulatory approaches aimed at encouraging the food industry to deliver healthier foods and act responsibly in its marketing activities.

While the NPAPH explicitly incorporates a commitment to address social inclusion and Indigenous and socioeconomic disadvantage, the linking of ongoing funding to successfully meeting performance benchmarks for average health or risk factor gains, rather than reducing inequities, represents a major disincentive for states and territories to address the social gradient in health outcomes (Baum and Fisher, 2011). In addition, much of the current policy and action in Australia explicitly aimed at addressing inequities focuses on the difference between social extremes. This has led, arguably, to an overemphasis on targeted interventions, rather than proportionate universal actions which aim to improve the health of all but with proportionately more impact further down the social hierarchy (Friel, 2009).

The National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan (2000–2010) provided a broad framework for nutrition interventions, which addressed both supply and demand-side issues, and made a stronger commitment to equity issues. However, the strategy was inadequately resourced and implementation was inconsistent (Lee et al., 2009). Nutrition issues were not included in the final National Indigenous Reform Agreement of the Council of Australian Governments (Lee et al., 2009).

The ongoing Australian Government's Food and Health Dialogue (<http://www.foodhealthdialogue.gov.au>) is a joint government-industry-public health initiative aimed at addressing poor dietary habits and making healthier food choices easier and more accessible for all Australians. However, it is primarily concerned with action on food innovation, including a voluntary reformulation program across a range of commonly consumed foods. While currently the focus is narrow, around specific foods, the Dialogue does provide a mechanism to introduce discussion about a social determinants approach to healthy and equitable eating. To do this, greater representation by equity-focused public health researchers and practitioners is needed.

From a nutrition perspective, safeguarding the independence of regulatory authorities and policy-making processes from undue influence of the food industry, especially the processed food industry, and special interest groups is particularly important. Social movements can play an important role here, pushing for greater social responsibility in the private sector and holding government and industry to account.

Dominant cultural and societal norms and values

No evaluations of interventions which have explicitly sought to shift cultural and social norms and values relating to healthy eating were identified. However, the various types of policy instruments described in the following sections can help mitigate harmful industry influences over food preferences and demand, and also shift cultural and social norms and values to be more equitable and nutrition sensitive. For example, the graphic warning labels and plain-packaging recently introduced in Australia counteract pervasive tobacco product advertising and marketing. This will raise awareness of health effects but will importantly impact on social and cultural norms around smoking and ultimately elicit behaviour change both in terms of uptake of smoking and quitting. The same may be possible with food (see Public Awareness Campaigns section, page 30).

The rise of celebrity chefs may hold promise in shifting cultural and social norms. Smith describes television programs such as that of Jamie Oliver as bearing potential for transformation in television itself through the motivation of its producers to create programs that are 'a starter for change' (Smith, 2012). Jamie Oliver's missionary zeal informed his early desire to train young working-class men to cook (*The Naked Chef*) to campaigning for healthy school meals (*Jamie's School Dinners*) and more compassionate farming methods (*The Big Food Fight*, *Fowl Dinners* and *The Big Fish Fight*). Oliver has now trained a new generation of socially excluded young people to become professional chefs through his Fifteen Foundation. His *Ministries of Food*, which set out to give simple recipes to families living on junk food, have spread to Australia. Largely as a result of *School Dinners*, British schools are now emphasising practical food experience, including cooking skills and food growing, helping to educate future food citizenship skills and increasing an understanding of how marketing affects food choices (Smith, 2012). According to the School Food Trust, the average school lunch is now lower in fat, sugar and salt than it was in 2005 (Nelson et al., 2011).

Daily living conditions

Actions at this level aim to improve the immediate conditions in which people are born, live, work and play in order to address the social distribution of, and promote enabling local environments for, healthy eating. In addition to addressing food availability, accessibility and price in local food environments, an equity-focused social determinants approach to healthy eating would ideally consider action that seeks to improve the inequities in the actual conditions in which people live (for example, by improving people's early life experience; their access to, and quality of, education and employment; and, similarly, the physical environment in which different social groups live). It is also critically important to consider people's daily social experiences, physical environments, financial resources and other material living conditions when addressing inequities in dietary quality (Friel, 2009). However, there appears to be no published evaluation of such actions. By far, most of the available intervention evidence at this level relates to action taking place to improve the quality of foods that are available for consumption in various settings, such as schools, workplaces, primary health care centres and community spaces. For a comprehensive review of settings-based equity-focused nutrition interventions, see the report (published after completion of this evidence review) by the Centre for Disease Control *A practitioners guide for advancing health equity: community strategies for preventing chronic disease* (CDC, 2013).

Early childhood and education

The learning environment as a setting for intervention

Encouraging fruit and vegetable consumption in early childhood and preschool settings has been used as an intervention in young children. A systematic review found that available research offered limited evidence on the effectiveness of this approach, but no adverse events or unintended consequences were reported (Wolfenden et al., 2012). The UK Food Dudes program, which encourages young children to taste new food and eat fruits and vegetables through hero characters and rewards, has been shown to increase fruit and vegetable consumption (Lowe et al., 2007); however, increases in intake were not maintained over the long term (Upton et al., 2013). Munch and Move, a low-intensity intervention based in preschool, has shown small but positive effects on healthy diets in early childhood. Parent involvement in early childhood appears to produce more successful interventions (Bluford et al., 2007, Campbell and Hesketh, 2007, Hearn et al., 2006).

The evidence on school-based interventions is mixed (Hawkes, 2013). School meals programs have been shown to be effective in improving healthy eating for undernourished children (Kristjansson et al., 2009). A systematic review and meta-analysis of childhood obesity prevention interventions – of which the majority were school-based – found that, overall, programs were effective at reducing adiposity and interventions did not appear to increase health inequities (Waters et al., 2011). However, another systematic review of school-based interventions found that there was insufficient evidence to assess the effectiveness of interventions (Cobiac et al., 2010).

Studies on the provision of free or subsidised fruit and vegetables and garden-based nutrition programs in schools have shown that they may improve knowledge and diets as well as reduce inequities, but further research is needed for stronger evidence, especially on the distributional effects (de Sa and Lock, 2008, Lorenc et al., 2013, Cleland et al., 2013, McAleese and Rankin, 2007, Viola, 2006, Robinson-O'Brien et al., 2009, Gibbs et al., 2013, Parmer et al., 2009, Howerton et al., 2007, Somerset and Markwell, 2009, Mozaffarian et al., 2012). In Norway, the provision of free fruit

and vegetables, along with nutrition education – as opposed to the offering of low-cost fruit and vegetables – stimulated increased consumption in schools (Bere et al., 2006a, Bere et al., 2006b) and had a long-term multifaceted impact on the social gradient, reducing the frequency of unhealthy snack consumption, particularly in children of parents without higher education, and resulting in an increase in fruit consumption by the parents of children receiving free fruit and vegetables in schools (Ovrum and Bere, 2013, Overby et al., 2012, Bere et al., 2007). In addition to fruit and vegetable subsidies and school gardens, interventions which remove unhealthy foods from school canteens may improve students' healthy eating (Schwartz et al., 2009, Long et al., 2013); however, policy must take into account the local context, such as social and cultural variations in food preferences and the profitability of the canteen (Ardzejewska et al., 2013).

Nutrition education programs and comprehensive school-based initiatives, combining capacity-building, nutrition education, skill-building and policy changes, appear promising (Foster et al., 2008, Mozaffarian et al., 2012, Cobiac et al., 2010, Shill et al., 2012, Silveira et al., 2013); although one review identified the potential for multi-component programs to increase inequities (Lorenc et al., 2013) and several studies found that these interventions had differential effects by socioeconomic status, ethnicity, age and gender (Oldroyd et al., 2008, Cobiac et al., 2010, Foster et al., 2008, Cleland et al., 2013, De Bourdeaudhuij et al., 2011, Brown and Summerbell, 2009).

The systematic review by Waters et al. (2011) offers several promising policies and strategies for school-based obesity prevention programs, such as a school curriculum that includes healthy eating, physical activity and body image; improvements in nutritional quality of the food supplied in schools; environments and cultural practices that support children eating healthier foods and being active throughout each day; support for teachers and staff for program implementation; and parent support and home activities that encourage children to eat more nutritious food.

Overall, interventions in early childhood settings tend to show the largest effect among disadvantaged groups – special attention therefore to socially disadvantaged households will help considerably to reduce health and social inequities. Programs and services should include, but not be limited to, breastfeeding and nutrition support, comprehensive support to mothers before, during and after pregnancy. Empowering caregivers to choose healthy foods means ensuring enough money and time to do so. This requires 'family-friendly' social protection policies that guarantee adequate income and maternity benefits, and allow parents to balance their time spent at home and work (Irwin et al., 2007)

Employment and working conditions

Workplace interventions to promote healthy eating have shown improvements in employees' nutrition (Steyn et al., 2009, Maes et al., 2011, Hutchinson and Wilson, 2012, Plotnikoff et al., 2005) and there is some evidence that workplace interventions (including nutrition education and canteen changes) may reduce inequities (Lorenc et al., 2013). Two systematic reviews conclude that there is strong evidence that worksite nutrition and physical activity programs have a consistent, although modest, effect on promoting healthy weight, but it was not possible to evaluate the effectiveness of interventions to reduce health inequities, as little information on equity was reported in studies (Anderson et al., 2009, Bellew, 2008).

Hawkes (2013) provides some examples of workplace wellness initiatives with nutrition education components, such as the Grupo Bimbo Healthy Company Program in Mexico and Novartis' 'Be Healthy'. Workplace interventions such as these can have positive impacts on employees' nutritional knowledge, food intake and health, as well as on workplace productivity and firm profitability (Jensen, 2011). Women are generally more likely than men to participate in educational and multi-component workplace interventions (Robroek et al., 2009), and greater effects of the intervention have been observed in younger populations (Rongen et al., 2013). Further research is needed to generalise workplace interventions to all workers, different population groups and different working contexts (Chau, 2009), and interventions should take into account potential determinants of dietary behaviour, such as social and cultural differences (Maes et al., 2011).

Greater employee control over work hours and changes to the organisation of shift-work schedules may improve work-life balance (Bambra et al., 2010), thereby allowing more time and flexibility for healthy food shopping and preparation; however, no evaluations of such interventions were identified.

Physical environment

The physical environment is widely recognised as an important entry point for action to improve healthy eating. However, if not planned properly, local food environment interventions can increase inequities in food access (Sallis and Glanz, 2009, Papas et al., 2007, Walker et al., 2010). Addressing the social gradient in healthy eating behaviours requires improvements in housing quality and location, transport options, the quality of the built environment, and access to quality social support and health services for the most disadvantaged groups, in addition to improving the availability of healthy food options in local food environments; however, there is limited evidence available demonstrating the effectiveness of these strategies.

In Victoria, the Food for All Program (FFA) 2005-2010 funded interventions including delivering fresh food to the elderly, developing community gardens, and addressing transport and food access issues in disadvantaged communities (VicHealth, 2011). Although the main goal of FFA was a structural one of reducing local government systemic infrastructure barriers to food security, the intervention resulted in changes to daily living conditions by making fresh food more accessible for those involved. However, the evidence of the effect on healthy eating and inequities is mixed, and requires further data collection and analysis.

The evidence of the effectiveness of farmers' markets and community gardens is also limited, with a review of 16 US studies finding that while they may influence fruit and vegetable intake, there are too few well-designed research studies to draw real conclusions (McCormack et al., 2010). Though the effect of farmers' markets and community gardens is unclear on fruit and vegetable consumption, improving farmers' market locations and marketing and outreach efforts can increase accessibility for low-income groups (Pearson and Wilson, 2013, Project for Public Spaces and Columbia University, 2013), and community kitchen garden projects often have perceived health benefits by participants and promote social health and community cohesion (Mundel and Chapman, 2010, Wakefield et al., 2007).

Interventions in retail food stores and supermarkets, including those aimed at improving healthy food availability or food labelling, have shown mixed results. In some cases, such as the Guiding

Stars point-of-purchase program in the US (Sutherland et al., 2010), they have shown modest success at increasing sales of healthy food items (Levy and Thompson, 2012, Seymour et al., 2004). However, 'Heart Foundation Tick Approved' foods are infrequently chosen in McDonalds outlets in Australia (Wellard et al., 2012, Atkinson and Palmer, 2012). In the US, Song et al. (2009) conducted a point-of-purchase intervention in corner stores, as they are more likely to be located in urban and disadvantaged areas, and found that intervention stores increased the stocking and promoting of healthy foods, which increased sales of those foods. Subsidies to local convenience stores in Scotland allowed stores to stock more and better-quality produce, particularly fruit and vegetables (Gibbs and Christie, 2007). In Queensland, a retail store nutrition program in Aboriginal communities enabled two remote food group stores to employ a qualified nutritionist, increase the range of healthy foods in the stores and promote those items, and deliver other nutrition services. Preliminary data indicate that the impact on sales was positive, but only in some stores, which may have been due to 'the relatively short timeframe during which promotional activities were conducted, changes in the number of people living in some communities, or the higher cost of some food and drink choices coupled with lower household income in remote Queensland' (Commonwealth of Australia, 2013). In addition, the Remote Indigenous Stores and Takeaways (RIST) project in remote Aboriginal Australia saw some positive changes in store stocking practices, but little impact on sales of healthy choices, which may be related to the cost of healthy food and drink choices, compared with less nutritious choices (Queensland Health, 2010).

Requiring food establishments to provide nutritional information has been a proposed intervention to address unhealthy eating out of home. The New South Wales Government introduced the kilojoule menu labelling initiative in 2012, which required fast-food and snack outlets to display kilojoule information and resulted in a shift towards consumers having a better understanding of the average daily energy intake, and some reduction in kilojoules purchased was observed (NSW Food Authority, 2013). The literature on the effectiveness of displaying nutritional information in fast-food and chain restaurants is mixed (Swartz et al., 2011, Stran et al., 2013). One study in New York City found that consumers who used the nutritional information made lower energy choices; however, women customers in the wealthiest neighbourhoods and older customers were most likely to use the nutrition information (Dumanovsky et al., 2011). Another US study found that although nutrition menu labelling did not modify the behaviour of the majority of adolescent consumers, there was a reduction in energy and fat in purchases by some, and that food establishment revenue was not adversely affected (Yamamoto et al., 2005).

There is limited research on the effectiveness of public transport schemes or fresh food delivery programs in improving access to healthy food and therefore improving diets. One study in California did find that a supermarket-sponsored shuttle program could be self-supporting in low-income areas in that region (Cassady and Mohan, 2004). Diets can be beneficially affected by upgrades to housing location and transport, including improvements to housing space and quality that ensure adequate food storage and preparation space (Thomson et al., 2013).

There is limited evidence of the effectiveness of healthy eating initiatives in the context of sporting clubs (Priest et al., 2008). A community-directed health promotion program in an Aboriginal community of northern Victoria resulted in favourable changes to the provision of a healthier food supply in sports clubs (Reilly et al., 2011). The Healthy Sporting Environments Demonstration Project (HSEDP) was an initiative started in 2010 with 100 community sport clubs in the wider Geelong

region in Victoria to help the clubs achieve a minimum of standards, including healthy eating (La Trobe University, 2013). Similarly to the community-directed health program in northern Victoria, many clubs involved in HSEDP increased the provision of healthier foods offered at canteens, for example by replacing white rolls with multigrain, introducing low-fat milk and increasing the number of salad rolls available (La Trobe University, 2013). Despite this success, a final survey of club members found no evidence of altered food consumption in club environments (La Trobe University, 2013).

Health care services

Many of the programs described in the previous sections are settings-based health promotion programs that have been delivered through the health system. Health care services themselves, including community and Aboriginal health centres, and community pharmacies, offer an additional potential setting for healthy eating interventions.

Aboriginal community-controlled health services aim to promote health in Aboriginal communities (AIHW and NACCHO, 2013, AIHW, 2012). A recent pilot project in Victoria, 'Facilitating healthy eating policy development and implementation in Aboriginal organisations', aimed to investigate and influence healthy eating policies and practices, add to the evidence base about effective Aboriginal health promotion practice and inform a state-wide rollout of evidence-based healthy eating policy implementation in Victorian Aboriginal organisations (Genat, 2013). The project involved the development of Healthy Catering Resource Kits, dissemination of nutritional health promotion resources and nutrition education (Genat, 2013). The project made seven recommendations, including funding for a Victorian Aboriginal nutrition-specific workforce within Aboriginal Community Controlled Health Organisations and dedication of program funding for the development of locally tailored Koori nutrition health promotion resources to enable healthy food choices as the easy option in these organisations. In addition to the Victorian pilot project (Genat, 2013), a fruit and vegetable subsidy program for low-income families at an Aboriginal Medical Service in New South Wales was initiated. This program was associated with improvements in some indicators of short-term health status among children, but the proportion of overweight and obese children at baseline did not change at 12-month follow-up (Black et al., 2013).

A recent skills-development program delivered to mothers of young children through first-time parents' groups in Victoria – which focused on healthy eating, physical activity and TV viewing time – had a modest positive effect on mothers' intakes of energy-dense and high-fat foods post-intervention (15 months) (Campbell et al., 2013). However, the study had an over-representation of older and university-educated participants, and it is not clear if the benefits could be sustained.

Medicare Locals also run health promotion programs, such as South Western Sydney's Healthy Eating Activity & Lifestyle (HEAL) and Tasmania's Healthy Living program, but no evaluations of these programs could be located.

Overall, there is evidence that nutrition education delivered through primary care settings can be effective in the short-term, but interventions do not always have a sustained effect in the long term (Hawkes, 2013). Interventions targeted at high-risk groups and more resource intensive interventions such as one-on-one counselling are more effective (McKevith et al., 2005, Harris et al., 2012). Mother and infant nutrition education has been shown to reduce anthropometric indicators

of childhood obesity risk in the short term, although equity was not addressed in the evaluation (Daniels et al., 2012). Access to primary health care is necessary for intervention success. Oldroyd et al. (2008) reviewed two studies in primary care settings and found that both interventions had differential results by ethnicity (Calfas et al., 2002, Kristal et al., 1999). Multicultural health workers can have an impact on addressing some of the language and cultural barriers that may affect health outcomes (Goris et al., 2013).

Social participation

No studies were identified which have evaluated policies, strategies or projects explicitly targeting social participation in its broad sense – by promoting civic engagement and participation in decision-making and implementation processes –to address inequities in healthy eating, or promote healthy eating more generally. However, a growing number of community-based obesity prevention and healthy projects in Australia in recent years have actively sought to promote civic engagement, community participation and relationship-building as a means of promoting healthy eating behaviours.

In total, 11 large whole-of-community demonstration projects have been implemented in Australia over the last decade, nine of which were in Victoria. These include Romp & Chomp, Colac Be Active Eat Well (BAEW), It's Your Move, and Fun 'n' Healthy. All evaluations have reported positive impacts on reducing unhealthy weight gain in children and adolescents (de Silva-Sanigorski et al., 2010, Simmons et al., 2008, Millar et al., 2011) and a study on BAEW concludes there was no evidence of harm and strong evidence that the program did not increase, and may have reduced, inequities by reducing the SES gradient with body weight (Simmons et al., 2008, Sanigorski et al., 2008). A rapid review of the Victorian community-based interventions concluded that there is evidence that they are effective in creating positive change in the social environment and in reducing health inequities (Centre for Allied Health Evidence, 2009).

Community-based interventions in other parts of Australia, New Zealand and overseas aimed at improving healthy eating in children, families and Indigenous communities, involving a significant focus on community engagement and participation components, have also had some success at reducing health inequities (Mercer et al., 2013, Rush et al., 2013, Smith et al., 2004, Wilson et al., 2012, Henry and Knowles, 2005, Rowley et al., 2000, Borys et al., 2012). There has been a dominant focus in these interventions on school environments. Project ENERGIZE in New Zealand works with the Waikato community through schools and has seen a decrease in the proportion of overweight boys and girls, both Indigenous Maori and non-Maori children, and across SES (Rush et al., 2013). In the context of socioeconomically disadvantaged communities, the Eat Well Be Active program in South Australia reduced the prevalence of overweight/obesity in children in the intervention group (Pettman et al., 2013). EPODE is a community-based approach to reducing childhood obesity started in France in the early 1990s in which local environments, childhood settings and family norms are directed to facilitate the adoption of healthy lifestyles in children (EIN, 2013). It has successfully demonstrated reducing childhood overweight among school-age children (Romon et al., 2009, Borys et al., 2012) and has expanded its reach to eight countries. Moreover, the 'EPODE for the Promotion of Health Equity' (EPHE) approach has recently been created to help to understand whether the implementation of an adapted EPODE methodology could reduce socioeconomic inequities in health-related diet and physical activity behaviours of families and children (EPHE Project, 2012).

The Victorian initiative 'Healthy Together Victoria' uses the EPODE methodology to improve people's health where they live, learn, work and play (Department of Health Victoria, 2014). Healthy Together Victoria is made up of 12 Healthy Together Communities and includes initiatives such as Healthy Together – Healthy Eating Advisory Service, which provides healthy eating advice for early childhood services, schools, workplaces and hospitals, and the Victorian Healthy Eating Enterprise, which involves a range of strategies to support families, workplaces and communities to make healthier food choices (Department of Health Victoria, 2014).

Whole-of-community-based intervention projects appear to be a promising strategy for increasing community capacity (de Groot et al., 2010) and social capacity (Henry and Knowles, 2005), in addition to reducing unhealthy weight gain; however, these interventions need sufficient planning time and clear governance structures (Haby et al., 2012). Several studies note the importance of local context and involving the local community in planning, ownership and evaluation of interventions (Wilson et al., 2012, Adams et al., 2012, Haby et al., 2012, Mercer et al., 2013). Community engagement and participation, along with partnership development, are also vital components to intervention success (Krishnaswami et al., 2012, Parry et al., 2004, Smith et al., 2004, Wilson et al., 2012). Although whole-of-community-based intervention projects have largely been successful, they do require considerable investments by both government and non-government sectors and long-term community commitment to the intervention (Rush et al., 2013, Nichols et al., 2011). Swinburn et al. (2012) have proposed strategies for further advancing child health gains after a community-based intervention, including stronger food policies and policy implementation support; greater coordination and evaluation efforts; implementation of regular monitoring systems; and increased funding for comprehensive, systems-oriented community action.

An Australian national knowledge exchange organisation for community-based obesity prevention projects – the Collaboration of Community Obesity Prevention Sites (CO-OPS Collaboration) – has recently been established (Swinburn and Wood, 2013). The CO-OPS Collaboration performed an evidence summary of community-based obesity prevention interventions for children and adolescents achieving equity and relevance (Clark et al., 2009). While the evidence summary found that no literature reviews of interventions considered equity directly, and the differential effects of interventions have rarely been examined, the authors offer recommendations to understanding and achieving equity in program implementation, such as working to tackle the social determinants across the broad community; working across settings with consideration for equity-relevant dimensions; considering equity at the social determinants level, community level and among high-risk individuals; and getting to know the community (Clark et al., 2009). The UK New Deal for Communities program is a promising international example which has successfully worked to 'close the gap' in low-income neighbourhoods through initiatives to support healthier lifestyles and tackle childhood obesity (Batty et al., 2010).

Individual health-related factors

Actions aimed at changing individual knowledge, attitudes and behaviours relating to healthy eating can broadly be classified into three categories: nutrition education, skill-building programs and public awareness campaigns. Nutrition education initiatives and public awareness campaigns have been overwhelmingly the most commonly employed strategy to promote healthy eating at the population level in Australia and internationally (Capacci et al., 2012). Compared to the other two layers of the Framework, there is available a considerable literature that evaluates these initiatives,

albeit with considerable variability in study design and quality, and with little attention to the distributional effects. Importantly, there is general agreement that actions at this level have considerable potential to exacerbate inequities (Bastian, 2011, Lorenc et al., 2013).

Nutrition education

Nutrition education programs are directly aimed at influencing individual knowledge, attitudes and behaviours, and are typically delivered within specific settings, such as within the home, schools, workplaces, primary care or community settings. They can vary widely in approach and intensity, from individual or family-based counselling and motivational support to specialised nutrition-focused school curriculum development, workplace wellness initiatives, brief information sessions and the provision of written materials such as pamphlets containing healthy eating messages. Examples of population-level nutrition education programs delivered within Australia include the NSW Get Healthy Information and Coaching Service (<http://www.gethealthynsw.com.au/> a telephone-based support service first launched in New South Wales in 2009 and now available in Tasmania, ACT and Queensland), and the National Network of Regional Healthy Lifestyles teams in Aboriginal communities (<http://nacchocommunique.com/2013/10/01/naccho-smokefree-how-to-contact-a-tackling-smoking-healthy-lifestyle-team/>). Nutrition education strategies typically require substantial investments in terms of time and resources. Increasingly, e-interventions (using internet and mobile technologies) have emerged as a popular and potentially cost-effective health promotion strategy for reaching large numbers of people, including rural and remote households.

Evidence for the effectiveness of nutrition education interventions in promoting health equity is mixed. Nutrition education delivered as part of comprehensive, multi-component programs in school and workplace settings shows promise, particularly when combined with environmental changes (Maes et al., 2011, Van Cauwenberghe et al., 2010, Borys et al., 2012). Two Australian education interventions for first-time parents have shown to be effective in improving healthy eating in young children (Campbell et al., 2013, Wen et al., 2012). Telephone-based coaching programs (such as the Life! Telephone Health Coaching (THC) Program in Victoria and the NSW Get Healthy Information and Coaching Service (GHS)) have shown some modest success in influencing eating behaviours and weight in Australia (O'Hara et al., 2013). Dietary counselling provided through primary care and community pharmacy setting may also be effective, although impacts have again been modest and these interventions appear to be most effective when targeted at individuals at high risk of diet-related chronic disease (Hawkes, 2013). Combining nutrition education with other strategies appears to improve effectiveness. An Australian pharmacy-based intervention program targeting adults aged 18-50 years with at least one risk factor for chronic disease development combined nutrition counselling with cooking classes and supermarket tours, and appeared to achieve improvements in fruit and vegetable consumption and reductions in waist circumference (Kellow, 2011). It should be noted that this was a small study which did not involve a control group. E-learning initiatives have also demonstrated some success at increasing fruit and vegetable, and dietary fibre consumption, and at reducing fat intakes, though the evidence base for these strategies is still limited and inconclusive (Kroeze et al., 2006, Hawkes, 2013, Harris et al., 2011).

Importantly, from an equity perspective, nutrition education programs tend to be resource intensive, making them challenging to implement in low resource settings in the absence of external support, and tend to consistently report an overrepresentation of women, people from higher

socioeconomic positions and otherwise advantaged groups. Although e-interventions offer promise, computer-based initiatives require reliable internet access and literacy, and their effectiveness is yet to be proven. They appear to be most effective when sustained over a long period of time and when combined with other strategies. For example, a combination of specialised nutrition education curricula, environmental and policy changes, and parental/family involvement appears to be effective in improving healthy eating in school children (Van Cauwenberghe et al., 2010, Mozaffarian et al., 2012).

Skill building

Skill building strategies aimed at improving healthy eating typically target food shopping and preparation (food literacy programs, including cooking classes, food tasting, supermarket tours and budgeting advice), but can also target food production skills (such as home, school and community garden programs). Evidence for the effectiveness of both food literacy and community garden projects has been subject to systematic review. Food literacy programs can improve knowledge and attitudes relating to healthy food shopping and preparation, and may result in modest short-term improvements in eating behaviours (Wrieden et al., 2007, Cullerton et al., 2012). However, this evidence is mixed and there is little evidence of long-term behaviour change. Regular evaluations of the US Expanded Food and Nutrition Education Program (EFNEP), the largest federally funded nutrition education and skill-building program in the US, for example, have found no improvements in food consumption in either children or adults, despite observed improvements in food safety and nutrition knowledge, and food preparation skills (Townsend et al., 2006, Greenwell Arnold and Sobal, 2000, Rajgopal et al., 2002). Skill building programs frequently report greater success in promoting general confidence, social interaction and community connection (Iacovou et al., 2013, Cullerton et al., 2012, Wrieden et al., 2007).

School and after-school garden programs combined with nutrition education curriculum have shown promise for improving knowledge, skills and behaviours, including willingness to try new, healthy foods, both in Australia (Block et al., 2009) and internationally (Davis et al., 2011, McAleese and Rankin, 2007, Robinson-O'Brien et al., 2009, Oxenham and King, 2010). A recent systematic review of community garden programs similarly found modest positive impacts on cooking skills and nutritional intake (Iacovou et al., 2013).

Important factors behind successful and equity-oriented skill building programs such as cooking classes appear to be community ownership, offering classes in familiar community locations (such as cafes, community kitchens or childcare centres), flexibility with class times and locations, providing child-care with familiar childcare workers and considering the provision of incentives (such as providing vouchers for the local grocery store, cooking equipment, or certificates or recognised credentials on completion of the program) to promote recruitment and retention of disadvantaged groups (Cullerton et al., 2012).

Public awareness campaigns

Public awareness campaigns use organised communication strategies to create awareness and change behaviour in the general population through a range of channels, including mass media (television, radio, newspapers and magazines), as well as social media, billboards and other outdoor

advertising, local community settings and events, and food-based dietary guidelines (FBDG) (such as the Australian Dietary Guidelines) (Hawkes, 2013).

Public awareness campaigns may influence knowledge, awareness and behaviours directly through their messages, as well as indirectly by shaping cultural norms and values, public opinion and public policy over the long term (King et al., 2013).

Internationally, the majority of mass media public awareness campaigns incorporating healthy eating goals have used generic messages or promoted consumption of healthy foods (typically fruits and vegetables), with fewer using 'eat less' messages to reduce consumption of unhealthy foods (Hawkes, 2013). Recent mass media social marketing initiatives incorporating healthy eating messages in Australia have included GoFor2&5, Rethink Sugary Drink, Measure-Up, Swap It Don't Stop It, Get Up & Grow and Western Australia's (WA's) LiveLighter campaign.

Evidence for the effectiveness of public awareness campaigns in changing eating behaviours is mixed, and their overall effect may be to deepen inequities in eating behaviours and associated health outcomes (Lorenc et al., 2013, Baum, 2011). Well-designed and executed, and sustained, mass media public information campaigns can result in modest population average improvements in knowledge, awareness and attitudes, as observed in a three-year follow-up of the WA Go for 2&5 campaign (Pollard et al., 2008). However, they have been much less successful in translating into behaviour change (Capacci et al., 2012, Brown et al., 2011, Keller and Lang, 2008), and they have been consistently shown to be more successful in improving knowledge, attitudes and behaviours among women, and more educated and higher SES groups. A recent evaluation of the Measure-Up campaign, for example, found that the campaign achieved a relatively high overall awareness rate (90%); however, awareness was significantly higher among women than men, and among more educated and more affluent adults, with no improvements in fruit and vegetables consumption (King et al., 2013). Awareness was also significantly lower amongst older adults. In the UK, the Change4Life campaign is a national social marketing campaign aimed at reducing childhood obesity and involving a wide range of awareness-raising activities, including mass media (billboards, television spots), branded materials used by public sector and private sector 'partners', and a website. A randomised, controlled evaluation of Change4Life found that the campaign had little impact on attitudes and behaviours, despite raising public awareness and knowledge (Crocker et al., 2012).

Tailoring campaigns to specific populations, focusing on specific target foods and nutrients, using multiple delivery channels, and ensuring campaigns are sustained over a long period of time may increase their effectiveness (Mozaffarian et al., 2012, Hawkes, 2013). Importantly, any public awareness campaign should be evaluated for its distributional effects and should be supported with complementary actions, including changes to the food environment to reinforce the intended change in awareness and empower individuals to make sustained behavioural changes.

Conclusions and recommendations for future action

The bulk of evidence available on healthy eating relates to lifestyle-based interventions targeting individual-level factors, such as social marketing campaigns, individual counselling, nutrition education and food literacy programs. Actions at this level have been the focus of successive Australian Governments' investments in addressing unhealthy eating and the associated health,

economic and social burden over recent decades. Well-designed and well-executed actions at this level can achieve modest short-term improvements in individual health-related knowledge and awareness at the population level at best. Alone, they are unlikely to be sufficient to reduce inequities in healthy eating at the population level, and at worst, may exacerbate existing inequities, with uptake and impact consistently shown to be higher in more advantaged groups. In addition, positive impacts on knowledge and awareness are less likely to track through to behaviour change to the extent necessary to have an impact on diet-related health outcomes, and there is little evidence of sustained behaviour change over time. Nonetheless, carefully designed strategies with an explicit equity focus can support and reinforce actions at the other two levels of the Framework.

Settings-based approaches to improve access to, and demand for, healthy foods in schools, workplaces and other everyday living environments are at least sensitive to the conditions in which people live, and show some promise in promoting healthy eating among disadvantaged groups, but will not alone address the social distribution of unhealthy eating behaviours if they are not combined within a multi-layered strategy which tackles the broad socioeconomic, political and cultural contexts driving these environments in the first place. In addition, there is the potential for actions at the level of the individual and daily living conditions to exacerbate inequities if they do not explicitly incorporate equity goals.

Actions at the socioeconomic, political and cultural level are inherently aimed at addressing the distribution of money, power and resources across the population. They typically require more direct government intervention, and are unsurprisingly the most difficult to evaluate (and least evaluated) for their impact on nutrition and equity outcomes.

While the health sector has a critical leadership and stewardship role to play in the pursuit of healthy and equitable eating, many of the actions needed to address inequities in healthy eating lie outside the health sector. Collaboration is needed across a range of sectors and stakeholders to make healthy foods physically, socially, culturally and financially the easier and more desirable choice relative to less healthy foods.

Overall, there appears to be stronger evidence of effectiveness for interventions aimed at increasing consumption of healthy foods (such as fruits, vegetables and low-fat dairy products) than for strategies aimed at reducing consumption of unhealthy foods or nutrients (such as salt or saturated fat).

Prompts for planning

The following nutrition-relevant prompts for planning have been developed based on the evidence review. General health equity prompts for planning at each level of the Framework are provided in the detailed Fair Foundations framework available from VicHealth (<http://www.vichealth.vic.gov.au/Publications/Health-Inequalities/The-VicHealth-framework-for-health-equity.aspx>).

- Explicit nutrition equity objectives must be a central goal of all relevant health promotion programs and policy.
- A much greater emphasis on, and investment in, structural and daily living conditions layers of the Fair Foundations framework is needed, to help rebalance current emphasis on individual-level dietary factors.

- Coordinated, comprehensive interventions involving multiple components designed to work synergistically are likely to be most effective; for example, combining policies on nutrition labels with education campaigns, public awareness campaigns with food product reformulation, and school food standards with educational initiatives in schools. The sequencing of these actions may also be important.
- Structural-level interventions need to be flexible and adaptable at the local level.
- Programs need to be of sufficient intensity and longevity to achieve impact.
- It is vital that target communities are involved at all stages of planning, implementation and evaluation.
- All nutrition health promotion programs should be monitored and evaluated for their impacts across social groups (for example, by gender, ethnicity, income level, disabilities).
- Greater investment is needed in equity-focused training and capacity-building in health and non-health sectors.
- Community-needs-driven approaches require local data (needs assessment, inequities in food consumption and health outcomes).

Recommendations for future research

There is a dearth of information on the equity impact of many nutrition-specific policies, programs and projects. The few studies available which have assessed distributional effects of healthy eating interventions have mainly focused on differential impacts by income or SES. There are considerable gaps in research on impacts across the range of social stratifiers.

Evaluations of interventions aimed at promoting healthier diets are often short term, with limited follow-up, and involve vastly different study designs of varying quality. More research is needed which builds in the potential for impact over longer time periods and which makes use of natural experiments, where policies and programs are taking place not for nutrition or equity purposes but which could plausibly have an impact in these issues.

Retrospective nutrition equity evaluation could be undertaken to understand the impact of action that has taken place in the different determinants of nutrition health inequity, and to understand why certain actions worked in different socio-political and organisational contexts. Specific foci that could be addressed in this type of research include:

- i. Identify a particular action/intervention/sectoral policy which took place, and retrospectively evaluate its impact on nutrition health inequity
- ii. Identify a particular intervention which took place that was explicitly focused on a reduction in inequity – did it succeed in relation to nutrition health equity?
- iii. Identify where/when nutrition inequities have been reduced and investigate what policy/programs/changes took place that caused this reduction.

Prospective action-oriented applied research is also necessary. This would involve sensitising the different stakeholders to the social determinants of nutrition health equity through advocacy and partnership building. The focus of this research is on collaborative knowledge production and intersectoral participation (researchers, policy makers, practitioners and community groups working together) and would be built around different models of governance in different socio-political and

economic contexts, aimed at inclusionary nutrition interventions. The health equity impact of the change/action would be evaluated prospectively.

Table 1. Promoting equity in healthy eating: an overview

| Layers of influence | Examples of promising actions at this level | Prompts for planning |
|---|--|--|
| <p>Socioeconomic, political and cultural context</p> | <p>Governance</p> <ul style="list-style-type: none"> • No evaluated interventions identified <p>Policy</p> <ul style="list-style-type: none"> ▪ Fiscal policy packages comprising a mix of consumer-oriented taxes on unhealthy foods or nutrients and subsidies on healthy foods ▪ Targeted food assistance programs (e.g. subsidies, food stamps, vouchers) ▪ Regulation of unhealthy food advertising ▪ Nutrition labelling ▪ Food composition regulations and reformulation incentives ▪ Food policy councils ▪ Employment and labour policy supportive of healthy eating (e.g. flexible work hours, changes to shift-work schedules) ▪ Agriculture and trade policy incorporating health goals <p>Dominant cultural and societal values and norms</p> <ul style="list-style-type: none"> • No evaluated interventions identified | <p>Governance</p> <ul style="list-style-type: none"> ▪ Strong leadership and clear accountability essential ▪ Coordination mechanisms needed to ensure a coherent approach and joint action across government ▪ Promote active participation of a range of stakeholders in policy and program development and implementation ▪ Promote community engagement in policy/action decision-making commonly facilitated by other actors such as government, NGOs or the private sector ▪ Allocate adequate dedicated capacity and resources ▪ Develop social structures that mandate and ensure the rights of groups to be heard and to represent themselves – such as legislation and institutional capacity <p>Policy</p> <ul style="list-style-type: none"> ▪ There is considerable public support for food advertising restrictions in Australia and regulation is technically feasible to implement at the state level. Ideally, restrictions would be implemented across all dominant forms of media and be accompanied by clear objectives and accountability, and appropriate evaluation <p>Dominant cultural and societal values and norms</p> <ul style="list-style-type: none"> ▪ A wide range of healthy eating interventions can influence broad-based norms and values indirectly, and evaluations of this impact are needed ▪ Targets include both norms and values around food consumption, as well as wider norms and values around health equity and the social distribution of diet-related health outcomes |
| <p>Daily living conditions</p> | <p>Early childhood development</p> <ul style="list-style-type: none"> ▪ Fruit and vegetable tasting programs <p>Education</p> <ul style="list-style-type: none"> ▪ School meal programs may be effective for addressing undernourishment ▪ Provision of free or subsidised fruit and vegetables ▪ School garden-based nutrition programs ▪ Removing unhealthy foods from school canteens and vending machines ▪ Comprehensive school-based initiatives combining capacity-building, nutrition education, skill-building and policy changes <p>Workplaces</p> <ul style="list-style-type: none"> ▪ Nutrition education ▪ Changing foods available in canteens and vending machines <p>Social participation</p> <ul style="list-style-type: none"> ▪ Community-based obesity prevention programs <p>Physical environments</p> <ul style="list-style-type: none"> ▪ Increasing availability and accessibility of community gardens and farmers' markets ▪ Retail planning regulations restricting density, proximity and opening hours of fast-food outlets ▪ Improving urban design and public transport infrastructure to facilitate access to healthy-food outlets ▪ Incentives for retail stores to provide fresh, healthy foods ▪ Menu labelling in food service outlets (must target disadvantaged groups) | <p>Early childhood development</p> <ul style="list-style-type: none"> ▪ Consider using fun characters and rewards to encourage children to try new foods and involve parents <p>Education</p> <ul style="list-style-type: none"> ▪ School meal programs can be effective in addressing undernourishment ▪ School canteen interventions must take into account social and cultural variations in food preferences and canteen profitability ▪ School-based initiatives may have differential effects by socioeconomic status, ethnicity, age and gender ▪ Ensure sufficient teacher and parent support to implement the program ▪ Incorporate activities aimed at influencing food consumption in the home <p>Workplaces</p> <ul style="list-style-type: none"> ▪ Women and younger adults appear more likely to participate in workplace interventions than men and older age groups ▪ Consider social and cultural variations in food preferences <p>Social participation</p> <ul style="list-style-type: none"> ▪ Whole-of-community interventions appear promising but require considerable investments by both government and non-government sectors and long-term community commitment. Ensure sufficient funding and planning time ▪ Establish clear governance structures and involve the target community in planning, ownership and evaluation of interventions. Community engagement and participation, along with partnership development, is vital <p>Physical environments</p> |

| | | |
|---|---|---|
| | <ul style="list-style-type: none"> ▪ Improving housing location and quality, including food storage and preparation space <p>Health care services</p> <ul style="list-style-type: none"> ▪ Provision of nutrition education, advice and counselling | <p>Health care services</p> <ul style="list-style-type: none"> ▪ Interventions targeted at high-risk groups and more resource-intensive interventions such as one-on-one counselling are more effective ▪ Multicultural health workers can also improve effectiveness |
| Individual health-related behaviours | <p>Knowledge, attitudes and behaviours</p> <ul style="list-style-type: none"> ▪ Nutrition education (delivered through specific settings as well as e-interventions) ▪ Skill building programs (e.g. food literacy programs encompassing meal planning, food shopping, preparation and budgeting, as well as school and community gardens) ▪ Public awareness campaigns (through mass and social media, and other channels) | <p>Knowledge, attitudes and behaviours</p> <ul style="list-style-type: none"> ▪ Conduct education and skill-building programs in familiar community locations, provide flexibility in times and child-care support, and include explicit strategies to recruit and retain disadvantaged social groups ▪ Tailor programs and campaigns to target the most disadvantaged social groups ▪ Interventions must be sustained over a long period of time to impact on behaviours, making long-term funding and community engagement vital ▪ Combine education and public awareness campaigns with other strategies designed to reinforce changes in knowledge and awareness, including changes to the local food environment. |

Appendices

Appendix 1: Search strategy

The search strategy outlined below was used across the following bibliographic databases and citation indices: Web of Knowledge, Campbell Library and Cochrane Library. The search strategy was modified slightly to meet the search requirements of each individual database. The search was modified in a second-phase targeted search of Web of Knowledge and Google Scholar.

1. (1-12) AND [(13-34) OR (35-49) OR (50-57)] AND (58-65) AND (66-73) AND (74-75)
2. (1-12) AND [(13-34) OR (35-49) OR (50-57)] AND (58-65) AND (74-75)
3. (1-12) AND [(13-34) OR (35-49) OR (50-57)] AND (66-73) AND (74-75)

Search terms

Intervention

1. health promotion
2. policy
3. legislat*
4. regulat*
5. law
6. program*
7. intervention
8. advocacy
9. service
10. initiative
11. media
12. review

Socioeconomic, political and cultural context

13. politic*
14. policies
15. economic*
16. cultur*
17. social
18. socio*
19. norm
20. value
21. trade
22. investment
23. labour
24. education
25. land use
26. housing
27. transport*
28. infrastructur*
29. environment
30. agriculture
31. physical
32. welfare
33. insurance
34. health care

Daily living conditions

- 35. income
- 36. housing
- 37. poverty
- 38. neighbourhood
- 39. neighborhood
- 40. work*
- 41. employment
- 42. early child*
- 43. school
- 44. social protection
- 45. social network
- 46. social connection
- 47. participation
- 48. social determinant
- 49. safety

Individual health-related factors

- 50. knowledge
- 51. attitude
- 52. awareness
- 53. behaviour
- 54. behavior
- 55. eating
- 56. diet*
- 57. food consumption

Health and wellbeing outcomes

- 58. nutrition
- 59. health*
- 60. weight
- 61. obes*
- 62. body mass index/BMI
- 63. non-communicable
- 64. chronic disease
- 65. life expectanc*

Equity

- 66. affordab*
- 67. access*
- 68. availab*
- 69. equit*
- 70. inequit*
- 71. inequalit*
- 72. equalit*
- 73. disparit*

Population

- 74. Australia
- 75. high income countr*

Appendix 2: Summary of studies considering action on the social determinants of healthy eating and its social distribution

See separate document

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