Policy Brief

Front-of-pack nutrition labelling of foods and beverages

The UN Convention on the Rights of the Child states that parties should act appropriately to combat disease and all forms of malnutrition (1). Every child has the right to adequate nutrition. Yet today, the need to protect, promote and support good nutrition has never been greater.

Millions of children worldwide are consuming too many ultra-processed foods and non-alcoholic beverages that are high in saturated fats, trans-fatty acids, free sugars, or salt, with devastating consequences for their health and development (2-4). Today, unhealthy diets are a leading cause of death and disability globally, while overweight and obesity are on the rise across the world.

The food environment plays a critical role in influencing children's diets and combines with poverty and inequality to undermine children's nutrition and health. The unprecedented availability, accessibility and affordability of ultra-processed, pre-packaged foods is a key driver of the increase in unhealthy diets among children. A growing body of evidence suggests that front of pack nutrition labelling (FOPNL) can aid understanding of nutritional quality and help encourage selection and purchase of healthier foods. This policy brief explains how effective FOPNL can be a powerful tool to safeguard children's right to a healthier future.

1. Childhood overweight and obesity and diet-related diseases are on the rise

The prevalence of overweight amongst children and adolescents, from infancy to the age of 19, is on the increase almost everywhere (2-4). In 2020, an estimated 39 million children under the age of 5 years were affected by overweight or obesity, and over 340 million children and adolescents aged 5-19 were affected overweight or obese in 2016 (4). Further, the prevalence of childhood overweight and obesity amongst children and adolescents continues to increase rapidly, rising from 4% in 1975 to just over 18% in 2016 (4). Once considered a problem of high-income countries, overweight and obesity are now on the rise amongst both children and adults in low- and middle-income countries (LMICs) as well, particularly in urban settings.

Childhood obesity and a diet high in ultra-processed foods has lifelong health consequences, with increased risks of non-communicable diseases (NCDs) including heart disease, diabetes, and some cancers which increase morbidity and mortality (5, 6). Children living with overweight and obesity may also experience psychological and psychosocial impacts, such as weight stigma, social isolation, depression, low self-esteem, and poor educational attainment (6, 7). As the world has seen during the COVID-19 pandemic, children and adults living with overweight and obesity can also be more susceptible to infectious diseases- leading to disastrous consequences (8, 9).

The economic cost of obesity is also startling. In 2019, the global healthcare costs attributed to obesity were estimated at more than USD 990 billion per year (10). A recent pilot study of eight countries found that the economic impact of inaction on obesity is projected to double to an average of 3.6% of GDP by 2060 (11). The same study also shows us that if we implement prevention policies now, we can drastically reduce these future economic consequences.

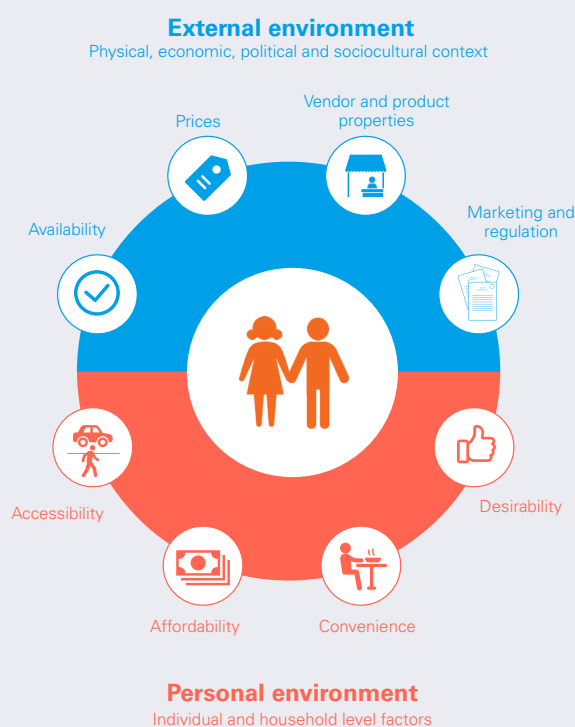# 2. Unhealthy food environments undermine children's rights

Food environments around the world make it harder and harder for children to access and afford healthy diets that appeal. Fuelled by the actions of a powerful food and beverage industry, the globalisation of food systems is driving a transition towards unhealthy food environments where highly processed, unhealthy foods and beverages are now more available, convenient, cheaper, and promoted than ever before (12-14). This transition of food environments has precipitated a global shift towards unhealthy diets which have become the major driver of overweight, obesity and diet-related NCDs around the world (15, 16).

To curb this shift towards unhealthy diets, the World Health Organization (WHO) has urged its member states to implement a comprehensive suite of food environment regulations and policies. Evidence-based policies include the implementation of a government-led, mandatory FONPL system for packaged foods and beverages, food and beverage taxes, and marketing restrictions on unhealthy foods and beverages (15, 17).

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Box 1. Food environments

Food environments are **spaces where children and their families interact or engage with food**. Depending on how they are structured, they may either help or harm children's nutrition.

External environment
Physical, economic, political and sociocultural context

Prices
Vendor and product properties
Marketing and regulation
Availability
Desirability
Accessibility
Affordability
Convenience

Personal environment
Individual and household level factors

An **unhealthy food environment** is a food environment with low availability, accessibility, desirability and affordability of healthy foods; and high availability, affordability and promotion or marketing of unhealthy foods. Unhealthy food environments lead to increased consumption of unhealthy foods and beverages. It is increasingly recognized that unhealthy food environments violate multiple child rights.

Children deserve to live, learn and play in spaces where nutritious and affordable food is available for all.
They should be protected from promotion of unhealthy foods and beverages. Families and caregivers should be supported to provide healthy diets. The F&B industry should be incentivised and regulated to act in the best interest of children.

3. Misleading nutrition labels contribute to unhealthy diets and poor health in children

Around the world, modern food retail environments are selling more ultra-processed packaged foods than ever before. In many instances, retail owners prioritize these unhealthy foods over healthier options for both shelf space and promotions (18, 19). Not only have food and beverage products become less healthy over time, but the sheer number of choices in stores make it hard for consumers to choose healthy options (20). This has contributed to rapid increase in the consumption of unhealthy foods across the world. In Europe, for example, one quarter of household food purchases is ultra-processed (21).

Adding fuel to this problem, unhealthy products often make misleading health and nutrition claims on their packages for promotion purposes. This includes claims related to specific nutrients (e.g., "high in iron") and claims about supposed health benefits (e.g., "healthy heart"), but often also includes the use of cartoons, brand characters, colours and packaging that appeal to children. These claims can give unhealthy products a "health halo" and mislead consumers on nutritional quality as well as encourage children to pester their parents to buy products for them, resulting in children and families consuming more than they would otherwise (22-25). In addition, evidence shows that shoppers spend less than 10 seconds selecting each item — not enough time to review current back-of-the-pack nutrition labels. These detailed nutrition declarations are complicated for most consumers and point to the need for simpler and more helpful labelling (26-28).

4. Why FOPNL Systems are important

Nutrition labelling is one of a suite of policy tools that can help rebalance unhealthy food environments. FOPNL refers to nutrition labelling systems that are presented on the front of food packages with the aim of supporting consumers to make healthier food choices at the point of purchase by delivering simplified and at-a-glance nutritional information. FOPNL on pre-packaged foods and beverages can provide quick and easy-to-understand information for consumers at the point of purchase, allowing them to distinguish between healthy and unhealthy food and drink options (29).

Simply put, people need a clear and easy way to make healthier purchases. Evidence shows that consumers prefer a FOPNL that is immediately visible and can be understood easily at a glance (30, 31). Labels that minimize effort allow shoppers to swiftly identify which items are unhealthy and decrease their intention to purchase such items, while also increasing their intention to purchase something healthier (27, 32-35). An evidence-based FOPNL system can also be used to inform other food environment policies such as restrictions on marketing to children, school food policies and even taxes.

Box 2. What are ultra-processed foods?

Food processing generally refers to any action that alters food from its natural state, such as drying, freezing, milling, canning, or adding salt, sugar, fat, or other additives for flavor or preservation. Most foods and beverages are processed in some way before purchase or consumption.
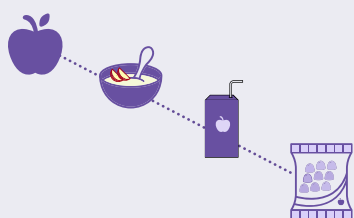
Ultra-processed foods and beverages, however, are industrially manufactured formulations of food substances, typically containing excess amounts of nutrients of concern, such as sugar, sodium, and saturated or trans fats, and are often highly calorie dense. Ultra-processed foods are designed and manufactured for maximum profit: they contain low-cost ingredients, have long shelf-lives, are hyper-palatable, and are highly branded and marketed to consumers. They are typically calorie-dense and high in free sugars, refined starches, unhealthy fats, and sodium.
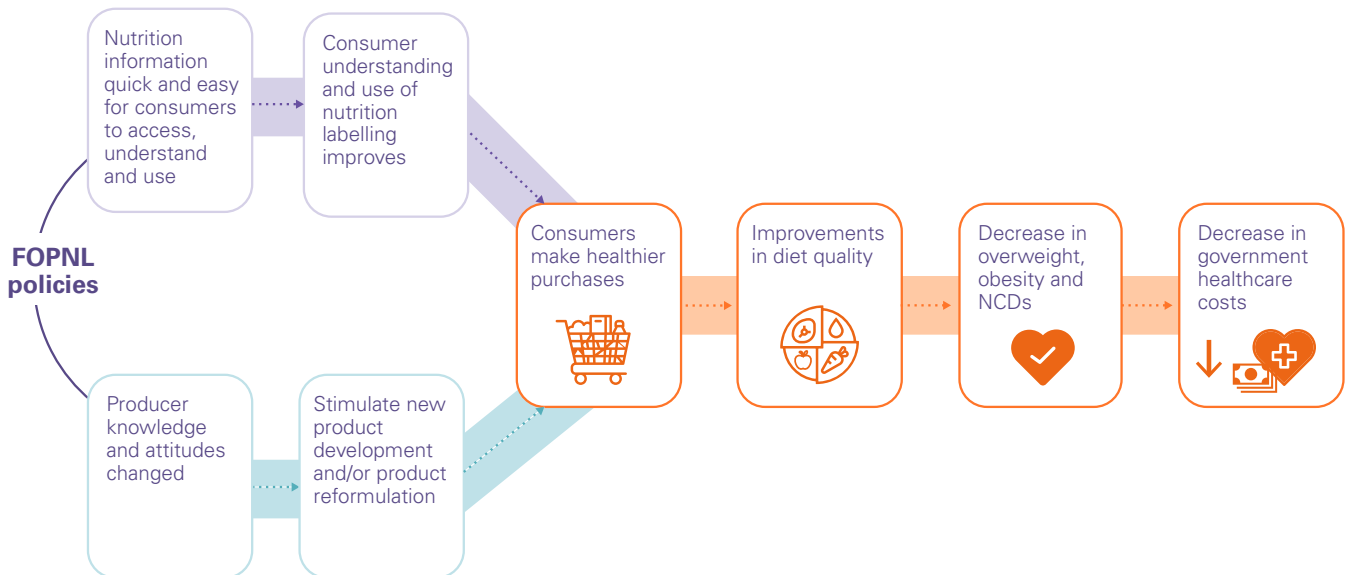
A large and growing body of research has found **strong associations between high ultra-processed food intake and many elevated health risks**, including increased overweight and obesity, type 2 diabetes, cardiovascular disease and all-cause mortality.

Note: See "Ultra-processed foods, diet quality, and health using the NOVA classification system" for more information / https://www.fao.org/3/ca5644en/ca5644en.pdf

5. How do FOPNL policies work?

The figure below shows the pathway by which FOPNL policies influence consumption of these unhealthy products and subsequently population health outcomes.

Figure 1. How do FOPNL policies work?

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6. What are the likely impacts of FOPNL policies?

Impact	
Impact of FOPNL policies on consumer attention/ awareness and understanding	**FOPNL systems that quickly capture consumers' attention and ease information processing are preferable to those that require more time and cognitive effort to process.** Contrast between the label and the package is important (e.g., black stands out well against a colourful package background) and the label must be clear and big enough to be easily legible. Studies show good attention-grabbing potential and understanding with nutrient-specific warning labels and summary indicators (also known as spectrum ratings) such as Nutri-Score (32, 36).
	Consumers find interpretative labels useful. For example, Ecuadorian consumers reported that they understand the traffic light label and believe that it provides important and useful information (37), while 87% of British adults reported that traffic-light labelling helps people make informed choices about the food they buy (38). In Australia, consumers reported understanding and using the summary indicator Health Star Rating system (39).
	There is, however, growing evidence that nutrient specific warning labels may be read more quickly than other systems, and be better at improving consumers' understanding of excess nutrient content (40-43). For example, Chile's warning label has been associated with a decreased 'health halo' effect of health claims on regulated products (44). Mothers of pre-school children also show improved nutrition knowledge with the warning label (45). In Mexico, 74% of people surveyed said that they approved of the warning label, and 72% said it was easy to understand and useful for making decisions about which products to purchase. The warning label for sugars was most influential (46). The same has been observed in Uruguay with high awareness and self-reported use of nutritional warnings. In addition, before and after comparison showed that the implementation of warnings increased citizens' ability to use nutritional information to compare products and to identify products with excessive content of sugar, fat, saturated fat and sodium (47).
	Evidence suggests that Guideline Daily Amounts labels are *not* helpful, particularly for groups with low levels of food and nutrition literacy, and are the most confusing, take the most time for shoppers to evaluate, and are ultimately the least effective for encouraging consumers to make healthier choices (48-52).
Impact of FOPNL policies on healthiness of consumer purchases and diet quality	A 2021 meta-analysis of more than 100 studies found that **traffic lights, nutrient-specific warning logos and Nutri-Score systems all increased the likelihood of selecting more healthy products and decreased the likelihood of selecting less healthful products (53).** Nutri-Score and nutrient-specific warning logos were associated with an increased overall healthfulness of products purchased. This study, and another 2020 meta-analysis (54), also found that traffic lights, nutrient-specific warning logos and Nutri-Score were associated with a reduced energy, sodium and total saturated fat content of purchases. Modelling similarly suggests that FOPNL policies have the potential to reduce total energy intake by 6% to 13%, depending on the design of the FOPNL (55).
	Chile provides the strongest evidence that a nutrient-specific warning label results in significant reductions in real-world purchases of targeted (unhealthy) products (56), something that has not be convincingly demonstrated for other systems. The law also led to increased food reformulation by the food and beverage industry, increasing the healthfulness of targeted products (57, 58). Emerging evidence from Mexico also indicates that the warning label system is encouraging reduction in nutrients of concern (i.e. sugar, salt, saturated fat) (46). There is some evidence to suggest that colour-coded summary indicators such as Nutri-Score may perform better in nudging consumers towards the purchase of more healthful products, while warning labels are more effective in discouraging unhealthful purchasing behaviour.

Impact of FOPNL policies on **health outcomes**	**Modelling suggests that FOPNL policies have the potential to reduce the prevalence and incidence of a range of NCDs, by as much as 5%, depending on the design of the FOPNL (59).** A 2019 study found that mandatory FOPNL on sugar-sweetened beverages in the United States would reduce obesity prevalence by 3.1% in 5 years (60).
Impact of FOPNL policies on **economic outcomes**	**Any costs associated with FOPNL policies are likely to be offset by savings in healthcare costs** associated with a shift towards consuming healthier diets or through product reformulation (61-63).
Impact of FOPNL policies on **population sub-groups**	**Focus groups with low- and middle-income mothers in Chile suggest profound changes in attitudes toward food purchases**, driven both by knowledge mothers gained from seeing these labels and by children telling their mothers not to purchase unhealthy products with warning labels (45, 64). In Uruguay, warning labels on snack foods were shown to have a greater relative impact on children's choices than traffic light labels (65) and to better capture adult shoppers' attention and discourage choosing products with warnings compared to a GDA-style label (25) or alone (66).

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7. What are some key considerations for the design of effective FOPNL systems?

Existing authoritative guidance, including the Guiding Principles and Framework Manual for FOPNL from the WHO (67), supports government-led action on FOPNL, but does not yet specify that countries should use a particular type of label. While a variety of FOPNL approaches and designs are now in use worldwide, and the experimental and real-world evidence continues to evolve, those systems that are mandatory, apply across all packaged food products, and that provide an indicator of product unhealthfulness are likely to be most helpful for consumers. Simple, nutrient-specific labels that clearly identify unhealthy products appear to be particularly effective for discouraging junk food and ultra-processed food purchases and consumption (27, 32-35). The Chilean warning label is an example of a mandatory, nutrient-specific warning label system (**Figure 2**).

Figure 2. Chilean warning label system

For FOPNL to support consumers to make informed food purchases and healthier eating choices, consumers must be aware of, and recognise the FOPNL, understand what it means, be able to use it correctly, and be motivated to use it. Label awareness is facilitated by systems that are widely adopted across the food supply – best achieved through mandatory systems- and when the format promotes visibility, such as being large in size, placed consistently on the front, and using contrasting colours and interpretive words.

There are several key learnings from current evidence that can help policymakers design an effect FOPNL:

a) The need to select an interpretive label format that highlights product unhealthfulness

There is strong evidence that *interpretive* labels (i.e. those that provide evaluative judgements about foods using meaningful symbols and/or colours) perform better than non-interpretive labels. For FOPNL to improve consumer understanding and use of nutrition labelling, policymakers must avoid non-interpretive label formats such as the industry-preferred Reference Intake or Guideline Daily Amount label. These labels are typically monochrome and use numbers and percentages without making any judgment on the healthiness of foods. There is good evidence that these systems *do not* work for consumers.

Labels that identify unhealthy products, and thereby have potential to direct consumers away from particular foods (e.g. by using a stop-sign logo, meaningful colours that signal 'stop', or a low rating) are shown to be most useful. In the real-world, nutrient-specific warning labels are now highlighting products that are high in salt, sugar, and harmful fats in the six countries that have implemented them. Some countries also use them to highlight products that contain caffeine or artificial sweeteners. Summary indicators are currently only used in voluntary form and it appears that they are being used selectively by manufacturers, meaning that they have so far been less effective in practice at highlighting unhealthy products than they could be if they were implemented on a mandatory basis. An example of a summary indicator system (or summary indicator) that could be more effective if made mandatory is the Nutri-Score label (**Figure 3**).

Figure 3. French Nutri-Score labelling system

b) Mandatory, government-led implementation ensures consumers receive the full benefit of FOPNL

Many FOPNL systems worldwide remain voluntary. Some types of FOPNL (e.g., nutrient-specific warnings) require mandatory implementation through legislation given the lack of commercial incentive for companies to display information that discourages consumption on a voluntary basis. While summary indicators have the potential to signpost unhealthfulness, evidence from over five years of uptake of the Health Star Rating in Australia suggests that in a voluntary form, FOPNL has been applied selectively by most manufacturers (68). It has been used to highlight ratings where products score well, but not used (i.e., consumers are not informed) when products score poorly. Similar patterns have been observed in early uptake of the Nutri-Score system in Belgium (69). This suggests that, regardless of the system chosen, countries should pursue mandatory FOPNL to ensure that labels work for consumers, and not just for food companies.

c) Nutrient-specific warning labels are particularly effective

Overall, the evidence of effectiveness for nutrient-specific warning labels is particularly strong in terms of influencing consumers' perceptions and discouraging unhealthy dietary choices/purchases (70). Warning labels have been extensively evaluated in Chile (44, 45, 56-58, 64, 71, 72). Nutrient-specific warning labels require packaged foods and drinks that do not meet specific nutrition criteria to carry warning labels on the front of the package. These clearly identify the product as HFSS and/or calories — whichever apply. They help consumers quickly identify foods that are less healthy. Unlike FOPNL systems that score foods on an unhealthy to healthy scale, warning labels only appear on products that pose the greatest nutritional health risk (73). Warning labels also do not carry the risk of creating a "health halo" around products with positive labels, which could lead to overconsumption of foods and drinks bearing higher-scoring labels that may still be considered ultra-processed.

8. How to implement FOPNL?

When implemented, evidence-informed FOPNL policies can help to guide consumers to make healthy decisions, therein helping to improve diets, reverse rising rates of obesity, and help reduce cases of diabetes and heart disease. However, labels that meet the characteristics described above have attracted increased resistance from industry. For this reason, it is important that policymakers take smart steps to strategically design and implement best-practice FOPNL.

- **Help identify the problem that FOPNL are needed to address and understand the existing nutrition policy context:** An understanding of the nutrition and health context can be important to justify implementing an appropriate FOPNL. Data on population food consumption patterns, childhood obesity levels, NCD prevalence and even literacy can provide. An understanding of the existing nutrition policy context is necessary to: a) position FOPNL as part of a package of government actions, and b) promote alignment between nutrition policies to enhance their effects.

- **Determine country-specific aims and regulatory objectives:** it is first necessary to determine the aims and objectives of the FOPNL so that the selected label design is 'fit-for-purpose'. Government should retain responsibility for setting the regulatory aims and objectives. Objectives of FOPNL should be drafted strategically to reflect clear, measurable pathways of effect (e.g., changes in consumer understanding and behaviour and/or food composition demonstrable by short-term evaluation). While improved food labelling may contribute to broader goals (e.g., the prevention of NCDs or longer-term changes in overweight and obesity prevalence in children and adults) difficulty in producing short-term evidence of these outcomes make them less suited as an explicit objective of FOPNL when it comes to drafting regulation.

- **Establish a government-led process but include stakeholder consultation:** A government-led process is more effective than voluntary, industry-led schemes. They are also seen as more credible by consumers. Governments should take the lead in gathering baseline data and commissioning additional research, as required. The policy development process should be safeguarded from undue food industry interference. Stakeholders should be engaged in consultation, but industry should not

be invited to co-design or be part of decision-making processes.

- **Select a FOPNL design that will achieve the desired objectives:** Labels should be mandatory, include interpretive elements, and signify unhealthy products, not just healthy products. For example, if the objective is informing consumers about the excessive amounts of critical nutrients associated with the greatest burden of diseases and influencing purchasing behaviour, nutrient-specific warnings will be particularly effective. The FOPNL design should be tested in the population in question – based on literacy, cultural factors, products and language.

- **Develop rules for how the FOPNL is to be displayed:** FOPNL should be salient, large enough, and appropriately placed so they are visible at a glance.

- **Develop or adopt a nutrient profiling model:** FOPNL systems must define the foods to which they apply and justify how they will treat those foods. This requires some form of criteria or nutrient profiling model. To successfully achieve the regulatory objectives, the selected FOPNL design must be paired with a nutrient profiling criteria that appropriately and accurately evaluates nutritional quality and determines how the label will be applied in practice (i.e. which foods will carry which label) (74-76). A large number of nutrient profiling criteria have already been developed by governments and UN agencies globally for various policy applications. For example, the model by the Pan-American Health Organization has previously been applied to FOPNL in Mexico (77).

- **Make the policy mandatory and develop sanctions for non-compliance:** Countries should pursue mandatory FOPNL to ensure that labels work for consumers, and not just for food companies. Government should set and enforce a range of appropriate sanctions for non-compliance with the FOPNL system, including fines and product recalls. This should be accompanied by a monitoring and evaluation system to assess policy effectiveness and refine as necessary.

- **Designate an appropriate institute to administer the FOPNL:** To promote effective implementation, FOPNL regulations should be administered by government or an independent body with sufficient authority and resources to monitor and enforce regulation once it enters into force. It is often the case that existing agencies can be used for this function, though they may require additional resources. There is usually no need to set up a new mechanism/agency.

- **Link the FOPNL policy with additional nutrition policies:** No single policy is sufficient to address rising rates of childhood overweight and obesity and unhealthy diets. A FOPNL policy can act as a good basis for the development of additional nutrition policies, such as restrictions on unhealthy food and beverage marketing to children and school food policies, as was seen in Chile and Mexico, as well as potentially inform food and beverage taxes.

Box 3. What are nutrient profiling models?

The term **'nutrient profiling'** is used to describe the science of classifying or ranking foods according to their nutritional composition for reasons relating to preventing disease and promoting health.

Healthy

Unhealthy

Nutrient profiling models classify foods and beverages according to a pre-specified nutrient criteria. In this way, products are classified as more or less healthy based on their energy, saturated fat, sugar and sodium content (though other nutrient contents may also be included in the criteria). A product with a higher content of saturated fat, sugar and/or sodium would be classified as less healthy according to a nutrient profiling system.

A common nutrient profiling model is often used across multiple policies. For example, the same criteria may be used to denote which foods and beverage products are required to bear a warning label, prohibited from marketing to children, and restricted from being sold in school settings.

9. How advocates can support government efforts

To support the development and implementation of FOPNL policies, NGOs and other advocates can foster conducive environments for, and develop evidence in support of, such policies. Actions to achieve this can include:

- **Expand understanding of the legal and political context:** It is important to understand if there are existing laws that could impact the development of a FOPNL policy. Likewise, it is important to understand where in government potential support for a FOPNL policy may come from. Academics and civil society can support government in exploring the relevant entry points.

- **Provide additional evidence in support of FOPNL:** Evidence of the impact of FOPNL impact on consumption, and population health and economic outcomes can help build case for the policy if made available to policy makers in a timely and clear manner. While government should play a lead role in reviewing the evidence, academia and civil society can support in generating new evidence or collating global evidence.

- **Support advocacy and education campaigns:** Public support for FOPNL is crucial for successful implementation. Government-led education campaigns can increase public awareness of FOPNL and minimise the impacts of industry rhetoric against the policy. Civil society can amplify the campaigns and also design their own, where resources permit.

- **Form coalitions in support of FOPNL:** United voices are more likely to raise awareness of and support for FOPNL. NGOs should reach out to government agencies, fellow NGOs and academic institutions to ensure that consistent messaging is used when campaigning for FOPNL.

- **Minimise industry influence:** The food and beverage industry will likely work to counter any effective FOPNL proposal. NGOs and academics can support government by providing the evidence and counter-arguments to dispel industry myths.

- **Provide support for monitoring and evaluation:** There is the potential for monitoring and evaluation of FOPNL to be neglected. Academics can offer their support to government to monitor the policy. In addition, NGOs can and should provide additional monitoring to identify any gaps or loopholes in the policy. Best-practice suggests that pre-implementation data should be collected for comparison purposes.

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10. What are the common arguments used by the food industry to counter FOPNL?

"FOPNL will be costly"

Firstly, costs involved with printing new labels are generally low, and companies often print new labels for seasonal and promotional reasons throughout the year. In addition, in the long run, costs associated with mandatory FOPNL are likely to be offset by savings in healthcare costs associated with a shift towards consuming healthier diets or through product reformulation (61-63).

"FOPNL will not be effective at improving diets"

An evidence-based FOPNL will be well understood by consumers and can influence their perceptions about foods and discourage unhealthy dietary purchases (40, 65). Warning labels in particular have led to decreased purchases, and in some cases have led to reformulation of "high in" products, both of which can contribute to improved diet quality.

"FOPNL only work if consumers read and understand them"

FOPNL have been shown to improve nutrition literacy among children and adults (54, 78). FOPNL have also been found to decrease the 'health halo' effect of health claims on packaged foods and beverages, minimising the impact of misleading claims (44). Even if consumers don't pay attention to FOPNL, their presence on foods and beverages may encourage manufacturers to increase the healthiness of their products to avoid the requirements to display a less healthy label (29). A simple, image-based FOPNL is easy for consumers to interpret.

"Existing FOPNL schemes developed by industry are working well"

Multiple studies have shown that schemes developed by the industry – such as the % GDA - are less effective compared to other systems including warning and interpretive FOPNL. Multiple studies have found that industry-led schemes are confusing and do not help consumers make healthier food choices (48, 79-81). It's no wonder the food industry prefers and promotes this model.
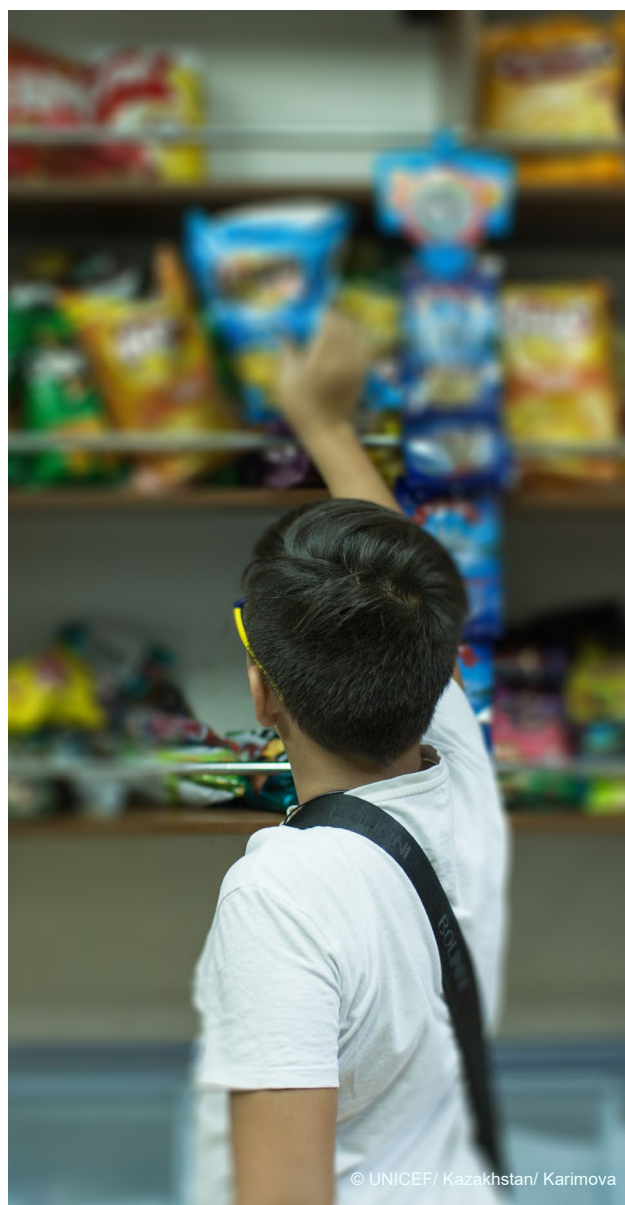
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11. Lessons learned from FOPNL policies from around the world

Appendix 2 summarises some of the evidence on the implementation and impact of FOPNL around the world. Warning labels have also been implemented in Peru (82), Israel (83) and Mexico (84), though evidence of their effectiveness is yet to be fully assessed.

Warning labels case-study: Chile Food Labelling and Advertising Law

Chile's Food Labelling and Advertising Law includes mandatory warning labels on unhealthy pre-packaged products, restrictions on food marketing directed to children (<14yo) and ban of selling and offering unhealthy products in schools and nurseries (64). The labelling law was implemented in June 2016 with nutrients cut-offs becoming stricter in June 2018 and June 2019 (45). Regional departments of the ministry of health were responsible for monitoring the implementation of the law (64). An enforcement system is in place and sanctions for non-compliance apply (71).

Nutrient cut-off limits were defined for calories, saturated fats, sugars, and sodium separately for liquid and solid foods containing greater than 100ml or 100g of product, respectively (64). The warning label is a black and white stop sign stating "High in <nutrient> Ministry of Health" that must be displayed on the FOP of regulated products (64). Health claims are allowed in regulated products only if they don't contradict the warning label (64).

One year after the introduction of the law there have been significant reductions in purchases of targeted products, leading to significant declines in purchases of all nutrients of concern (56). Mothers of pre-school children now show improved nutrition knowledge and are aware that products with more warning labels are less healthy than products with fewer warning labels (45). There has also been a decreased 'health halo' effect of health claims on regulated products carrying warning labels (44). There has been increased food reformulation by the food and beverage industry, leading to significant reductions in the energy, sugar and sodium contents of pre-packaged foods and beverages (57, 58).
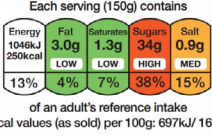
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Appendix 1: Glossary of key terms

Front-of-Pack-Nutrition-Labelling (FOPNL): FOPNL are either interpretive or warning labels that are applied to foods and beverages to educative consumers about the actual and/or relative healthiness of different products. Warning FOPNL actively try to dissuade consumers from selecting less healthy option, whilst interpretive FOPNL require that consumers make a judgement call based on the information provided.

Ultra-processed foods and beverages: Ultra-processed foods and beverages are formulations of ingredients and food additives created by series of industrial techniques and processes (85). They are typically high in salt, sugar and/or fat, and include fast-foods, sweet and salty snacks, ready-made meals, many meat products, and SSBs.

Appendix 2: Examples of how other jurisdictions have implemented FOPNL and its impact

Country and name of policy	Policy objective/ scope	Food Classification System	FOPNL design and implications	Monitoring and enforcement	Evidence of impact
Chile: **Food Labelling and Advertising Law**	Introduced as part of a broader strategy to address high rates of obesity, particularly in children (64). The Law includes mandatory warning labels on unhealthy pre-packaged products, restrictions on food marketing directed to children (<14yo) and ban of selling and offering unhealthy products in schools and nurseries (64).	A nutrient profiling system based on natural foods was used to define which pre-packaged foods and beverages with added sugars, saturated fats, and/or sodium must carry the warning labels (64). Nutrient cut-off limits were defined for calories, saturated fats, sugars, and sodium separately for liquid and solid foods considering 100ml or 100g of product, respectively (64).	Black and white stop sign stating "High in <nutrient> Ministry of Health" must be displayed in the FOP of regulated products (64). **ALTO EN CALORÍAS** Ministerio de Salud **ALTO EN GRASAS SATURADAS** Ministerio de Salud **ALTO EN SODIO** Ministerio de Salud **ALTO EN AZÚCARES** Ministerio de Salud Products carrying at least one of these warning labels are not allowed to use marketing strategies directed to children (i.e., cartoons, gifts, toys, games, etc.) on their packages. Health claims are allowed in regulated products only if they don't contradict the warning label (64).	The Law was implemented in June 2016 with nutrients cut-offs becoming more stricter in June 2018 and June 2019 (45). Regional departments of the ministry of health were responsible for monitoring the implementation of the law (64). An enforcement system is in place and sanctions for non-compliance apply (71).	• Improved nutrition knowledge among mothers of pre-schools children who are now aware that products with more warning labels are less healthy than the ones with fewer labels (45). • Decreased health halo effect of health claims on regulated products carrying warning labels (44). • Decreased use of marketing strategies directed to children in packages of a sample of "high in" breakfast cereals from 43% pre-implementation to 15% post-implementation of the Law (44). • Significant decline on purchases of SSBs high in sugar after one year of implementation of the Law (72). These reductions were even larger than the ones resulting from successful fiscal policies like Mexico's 10% tax on SSBs (72). • Increased food reformulation leading to significant reductions in the content of energy, added sugars and sodium of pre-packaged foods and beverages after the implementation of the Law (57, 58).
Uruguay: **Warning labels (Decree N°272/18)**	Warning labels on pre-packaged foods and beverages were introduced as a measure to combat obesity and encourage healthier food and beverage choices in Uruguay (86).	A nutrient profiling system was used to define which pre-packaged foods and beverages must carry the warning labels (86). Cut-offs were based off contents of sugar, total fat, saturated fat and sodium.	Black octagons stating "Excess <nutrient>" are required to be displayed on the packaging of regulated products (86). **EXCESO AZÚCARES** MSP **EXCESO SODIO** MSP **EXCESO GRASAS** MSP **EXCESO GRASAS SATURADAS** MSP	The law was approved in August 2018, and the food industry was given 18 months to prepare for the announced legislation. As such, full compliance was enforced from March 2020 (86).	Within the first month of policy enforcement, 86% of survey participants reported being aware of the existence of the policy, while 77% of survey respondents reported having seen the warning labels on food packaging (47). The implementation of warning labels increased citizens' ability to use nutritional information to compare products and to identify products with excessive content of sugar, fat, saturated fat and sodium. Some survey participants modified their purchase choices in response to the presence of a warning label (47).
France: **Nutri-Score label**	A simple FOPNL was included in the health law enacted in 2017, aiming to improve population nutrition and reduce NCD morbidity (87). The Nutri-Score system was announced as the FOPNL for France in March 2017.	A nutrient profiling system assigns foods and beverages a ranking through a points system (87). Positive points are awarded for energy, sugar, saturated fat and sodium contents. Negative points are awarded for fruit, vegetable, nut, fibre and protein contents. A final total score between-15 (most healthy) and +40 (most unhealthy) is then awarded (87).	A final letter (A to E) and colour (green to red) ranking is awarded and must be displayed on the packaging of products (87). **NUTRI-SCORE** A B C D E	The French High Council of Public Health was commissioned to develop the nutrient profile system and ensure alignment with the French dietary guidelines (88).	The presence of a Nutri-Score label has been shown to enable consumers to better assess the healthiness of products (89). The labelling system has also been shown to reduce the purchasing of unhealthy foods and beverages, and increase purchasing of healthy foods and beverages, in both experimental and real-world situations (90, 91). Nutri-Score has been shown to be more effective than comparable labels (such as traffic light labelling) at improving diet quality (79).

Ecuador: **Traffic light label**	Introduced as part of an action plan to modify the obesogenic environments in Ecuador (92). The purpose of this mandatory traffic light labelling system is to provide timely, accurate and clear information regarding the nutritional content of processed foods to Ecuadorian consumers (92).	Nutrient cut-off points were set by calculating the amount of sugars, fat and salt that the product contains according to PAHO's recommendation (92).	All packaged products must display a traffic light label in which the levels of fats, sugar and salt are indicated by red (high), orange (medium) or green (low) bars (92). ALTO en GRASA MEDIO en AZÚCAR BAJO en SAL	The regulation was implemented in 2014 (92).	Ecuadorian consumers reported that they understand the traffic light label and think that it provides important and useful information. However, children and adolescents don't use this information very often (37). Some consumers reported they have reduced their consumption of "red" products (37).
UK: **The "Multiple Traffic Light" Front of Pack Nutrition Labelling**	The objective of this FOPL system is to help people make healthier choices by providing consumers with readily accessible and easy to use information regarding the nutritional content of the product (93). This voluntary approach has been adopted by some supermarkets and food manufacturer in the UK (93).	The nutrition criteria were defined by the UK Food Standards Agency (FSA) (94).	Pre-packaged products can display four separate colour-coded lights indicating the level of fat, saturated fat, sugar and salt per serving of the product. Red light indicates a high level of that nutrient, amber light a medium level and green light a low level (93). Each serving (150g) contains Energy 1046kJ 250kcal / Fat 3.0g LOW / Saturates 1.3g LOW / Sugars 34g HIGH / Salt 0.9g MED 13% 4% 7% 38% 15% of an adult's reference intake Typical values (as sold) per 100g: 697kJ/ 167kcal	In 2006, the UK Food Standards Agency (FSA) recommended the use of FOP traffic-light labels on pre-packaged products (94). National guidelines for its voluntary implementation were published by the UK government in 2013 (94).	According to a short-term study on a small sample of ready meals and sandwiches, the traffic-light labels had no effect on the relative healthiness of consumer purchases (95).
Australia and New Zealand: **Health Star Rating (HSR) System**	The HSR system is a voluntary approach developed by the Australian government to help consumers make healthier choices that lead to better health (96).	The HSR system takes into account four negative aspects of a food product including its content of energy, saturated fat, sodium and total sugars, as well as positive aspects such as its content of fruit, vegetables, nuts and legumes (96). Star ratings range from ½ star (least healthy) to 5 stars (most healthy) (96).	Packaged products can display the HSR symbol by itself or along with additional nutritional information. 3.5 HEALTH STAR RATING or 3.5 HEALTH STAR RATING / ENERGY 1020kJ / SAT FAT 1.0g LOW / SUGARS 2.1g LOW / SODIUM 645mg / FIBRE 8.0g HIGH PER 100g Unpackaged fresh fruit and vegetables are now eligible to display a 5-star health rating using posters, shelf wobblers or any other means (96, 97).	The HSR system was implemented in 2014 (96). Implementation is overseen by several committees, including: the Australia and New Zealand Ministerial Forum on Food Regulation, The Food Regulation Standing Committee, and Health Star Rating Advisory Committee (96).	A 2019 study in Australia found that HSR was present on 20–28% of products but biased to those that scored better (HSR≥3.0) (39). Consumers reported liking, understanding, and using the HSR logo; however, its effects on purchasing were largely unknown (39). After two years of implementation in New Zealand, a study found that the reformulation of products that displayed the HSR was greater compared to the non-HSR-labelled products (98). However, recent estimates indicate that reformulation changes in Australia and New Zealand are small (99).

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