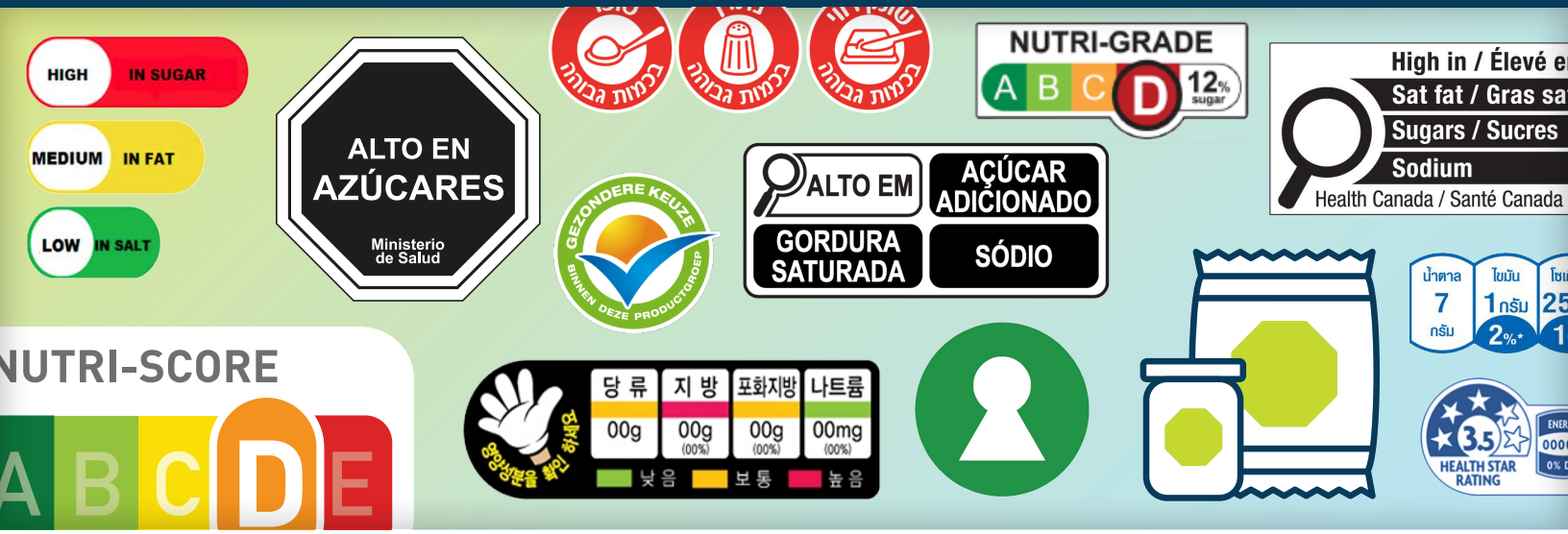
Front-of-package labeling

to empower consumers and promote healthy diets



Ultra-processed foods and drinks (UPFs) high in added sugars, sodium, saturated fats, and refined carbohydrates have become widely available virtually everywhere in the world, dramatically changing global diets. Excessive consumption of UPFs increases risks for obesity and many other chronic, nutrition-related diseases. Without policy actions to improve the food environment, these will continue to climb unchecked around the world.

Front-of-package (FOP) nutritional labels are one evidence-based policy tool that can nudge consumers towards healthier food and drink choices while also encouraging industry to improve the nutritional profile of their products. There are many forms of FOP labels in use around the world, but the best evidence currently supports labels that are mandatory; simple, clear, and immediately visible; interpretive in design (that is, interpreting and guiding consumers based on a product's nutrition information rather than providing numerical nutrient content information without specific guidance or recommendations); and based on strong underlying nutritional profiling.

This fact sheet summarizes the evidence to date on how FOP labels work and which label types in use worldwide are most and least effective. The strongest real-world evidence supports mandatory FOP nutrient warning labels to reduce purchases of less-healthy products and encouraging shifts towards healthier product purchases and availability. This document concludes with evidence-based recommendations for developing or strengthening FOP nutritional labeling policies.

CONTENTS:

Unhealthy changes in the foods we eat

Pre-packaged, ultra-processed foods and drinks have become readily available virtually everywhere in the world, to people of all income levels.[1-8] This increased availability, along with pervasive marketing, has dramatically affected the way people eat in many countries and resulted in less healthy diets.[7-22] Many ultra-processed, ready-to-eat or ready-to-heat foods and drinks are high in added sugars, sodium, saturated fats, and refined carbohydrates. Excessive consumption of these nutrients increases risk of obesity and many other chronic, nutrition-related diseases.[9,23-34]

- **Sugar:** Substantial evidence shows that consuming too much sugar increases risks for type 2 diabetes, heart disease, liver and kidney diseases, and some major cancers.[33-40] Global health experts recommend limiting sugar intake to less than 10% of total daily calories.[32-34,41-44]
- **Sodium:** Consuming too much sodium is associated with high blood pressure and increased risks for heart disease, stroke, and death.[45-48]
- **Saturated fats:** Replacing saturated fats with polyunsaturated and monounsaturated fats improves blood sugar regulation and reduces heart disease risk.[49-51] The World Health Organization and many national dietary guidelines worldwide recommend limiting intake of saturated fats.[52,53]
- **Ultra-processed foods** are associated with a multitude of elevated health risks, including for obesity, type 2 diabetes, heart disease, stroke, depression, and early death, when comparing those with highest vs. lowest intake.[54,55]

Evidence increasingly indicates that growing worldwide consumption of ultra-processed, nutritionally poor foods is a major driver of the global obesity epidemic and increases in prevalence of many other nutrition-related diseases.[7,10,27,55-60] An estimated 2.5 billion adults worldwide are classified as overweight — 43% of the population over age 18, and over 890 million have obesity.[61] Obesity prevalence among adults has more than doubled from 1990 to 2022. Among children and adolescents, prevalence of obesity and overweight exceeds 390 million for ages 5–19 years and 37 million for children under 5 years.[61] Without policy actions to improve the food environment, incidence and prevalence of obesity and other diet-related diseases will continue to climb unchecked around the world.

*Learn about **ultra-processed foods** — increasing intake, associated health risks, and environmental impacts — in our fact sheet.*

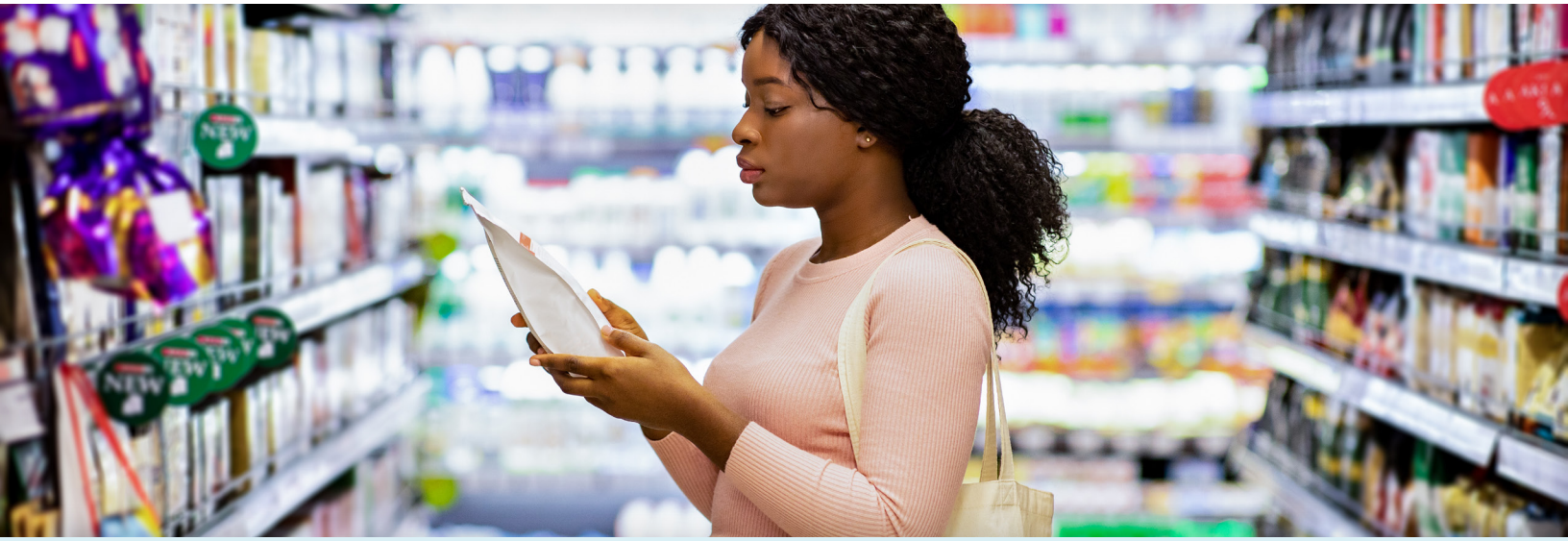
Below: Cereal packages with warning labels in Colombia

Mandatory nutrient declarations on food packages — typically presented as nutrition facts panels or tables on the back of packages — are not sufficient for helping all consumers understand a food or beverage's nutritional profile, however these declarations are an important prerequisite for implementing FOP labeling systems.[81]

Front-of-package labels can nudge consumers and industry towards healthier products

The sheer number of choices when food shopping makes it difficult for consumers to select healthier options, especially as ultra-processed products become more readily available.[7,8,11,56,62] Many countries require disclosure of ingredients lists and nutritional content on the back of food and beverage packages.[63] While back-of-package nutrient declarations and ingredients lists offer important information for consumers, they are not the most effective or used tool for guiding consumers towards healthier choices.[64,65]

- Most consumers spend only seconds selecting each item while they shop — not enough time to review complicated, back-of-pack nutrition labels and make calculations.[66-68]
- Many consumers have difficulty understanding back-of-pack nutrition tables.[69–71]
- Despite nutrition facts panels being required on the back of food packages in the United States for over 30 years, less than half of adults report using this information consistently while shopping, and those with lower educational attainment, resources, or English language fluency are even less likely to use them.[72]
- Interpreting back-of-pack nutrition facts tables requires nutritional knowledge, literacy, and numeracy skills; accordingly, their use varies significantly depending on consumers' education and income level, with disproportionate benefit going to those who have higher educational attainment and income.[73–75]
- Simple, clear front-of-package (FOP) labels are an evidence-based policy tool, backed by decades of research showing how they can effectively nudge consumers towards healthier foods and drinks while also encouraging industry to improve the nutritional profile of the products they sell.[76-78]
- The World Health Organization (WHO), World Cancer Research Fund International, and World Heart Federation all recommend FOP labeling as a key policy to promote healthy diets and prevent noncommunicable diseases (NCDs) worldwide, with a particular focus on reducing consumption of foods high in sodium, saturated and trans fats, and added sugars.[81-83]
- Simple FOP labels that are immediately visible and require little time to assess minimize consumer effort and enable them to quickly identify which products are less healthy choices, decrease intention to purchase those, and increase intention to purchase a healthier product.[84-87]



Types of FOP labels

Above: mandatory and voluntary front-of-package labels in use around the world. View more at GlobalFoodResearchProgram.org.

A wide variety of FOP labeling approaches and designs are now in use worldwide. These include nutrient warning labels; color-coded "traffic lights," Nutri-Score, Health Star Ratings, and "Guidelines for Daily Allowance" (GDA) labels. FOP labels can be:

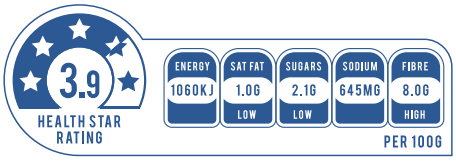
- **Interpretive** — guiding consumers based on nutrition information for one or more nutrients (e.g., a "high in [nutrient]" warning symbol or a "traffic light" that is color-coded according to nutrient content).[63,79]
- **Non-interpretive** — providing numerical nutrient content information without specific guidance or recommendations for consumers (e.g., Guideline Daily Allowance; or "Facts Up Front" labels)

Labels may combine interpretive and non-interpretive elements, such as in the Health Star Ratings label (*right*), or a "multiple traffic light" that combines color coding with nutrient composition. **The World Health Organization recommends that FOP labeling systems should be interpretive.**[63]

Some labels offer a **summary indicator** that uses multiple nutritional or ingredient criteria to determine an overall signal of the products' healthiness (e.g., star-based systems such as Health Star Ratings, Nutri-Score, or health logos).

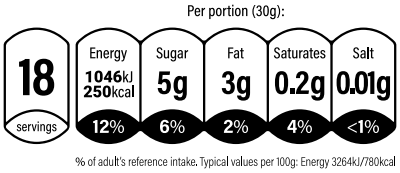
Labeling systems can also vary in whether they must be applied across *all* packaged foods and beverages. Voluntary labeling schemes are only applied at food manufacturers' or retailers' discretion (e.g., all GDAs, Health Star Ratings, Nutri-Score in European countries, and most traffic light labels). Other labeling systems are mandatory and required across the packaged food supply, as is the case with all warning label policies to date.

NUTRIENT WARNINGS *(interpretive)*



HEALTH STAR RATINGS
(interpretive, summary indicator + non-interpretive)

NUTRI-SCORE *(interpretive, summary indicator)*



GUIDELINES FOR DAILY ALLOWANCE *(non-interpretive)*

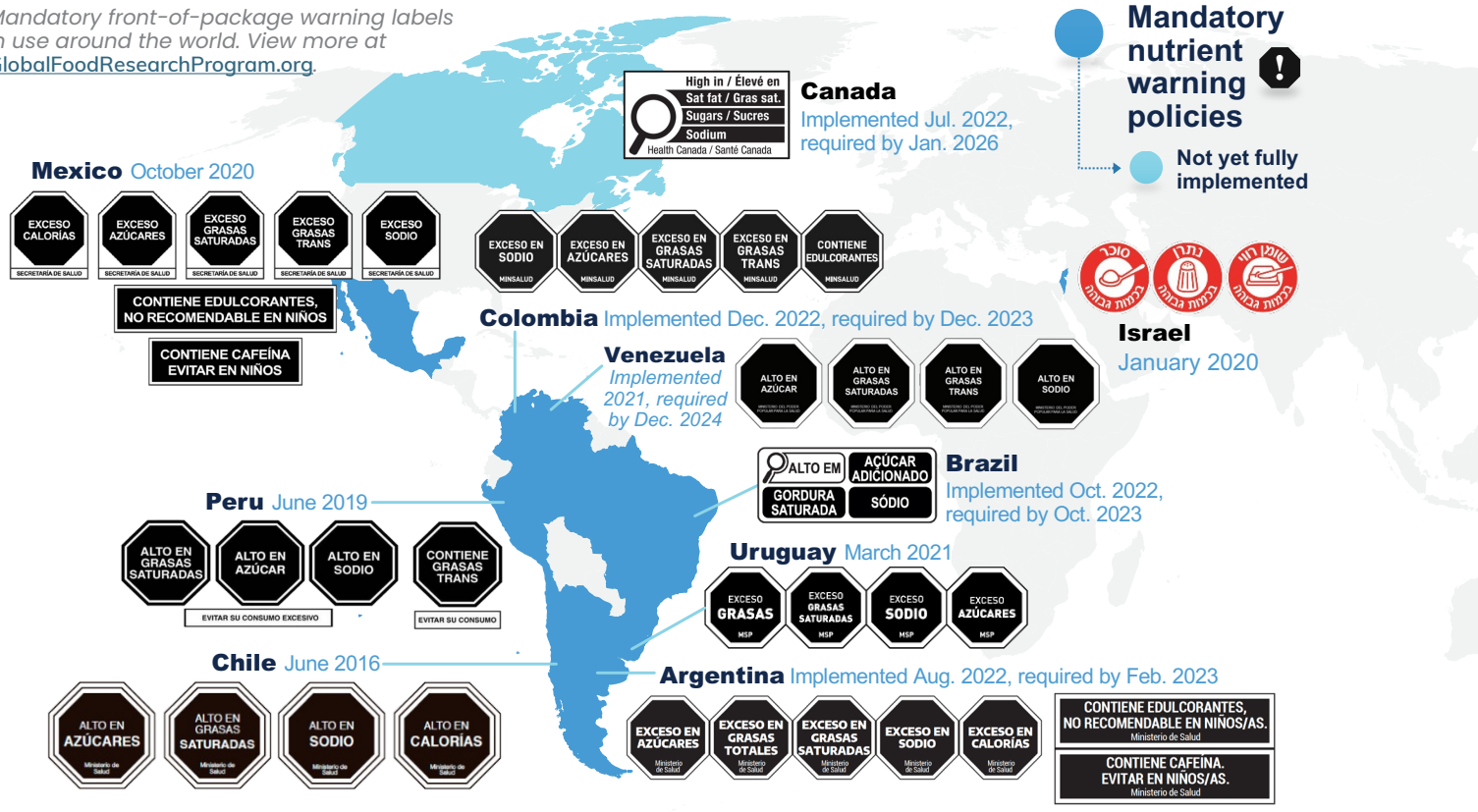
Evidence for nutrient warning labels

While a wide variety of FOP labels are now used worldwide, simple, mandatory warning labels that clearly identify unhealthy products have the strongest real-world evidence for effectiveness at discouraging food and beverage choices that can harm health.73,74,88-95 Warning labels work by helping consumers quickly identify less-healthy products and discouraging their consumption. Seeing warning labels on packages can disrupt habitual shopping decisions, even if consumers are not seeking out nutritional information.[96]

Evidence below outlines why nutrient warning labels offer a strong FOP labeling approach, particularly for the goal of reducing consumption of ultra-processed foods and drinks that can harm health.

- Warning labels such as those used in **Chile** (since 2016), **Peru** (2019), **Israel** (2020), **Mexico** (2020), **Uruguay** (2021), **Brazil** (2022), **Argentina** (2022), **Colombia** (2023), **Venezuela** (2024), and **Canada** (2026) require packaged foods and drinks that do not meet specific nutrition criteria or that contain certain ingredients (such as non-nutritive sweeteners) to carry warning labels clearly indicating the product is high in sugar, saturated or trans fats, sodium, or calories — whichever apply. These labels help consumers quickly and easily identify unhealthy foods and drinks and make healthier choices from the array of available products.
- Requiring FOP warning labels can encourage manufacturers to improve the healthfulness of their products and portfolios to meet nutritional criteria and avoid carrying negative FOP labels.[74,76,77]
- Warning labels only appear on products that pose the greatest health risk when consumed in excess. This approach can be easier for consumers to notice (i.e., warning labels are either present or absent on a package) and interpret (i.e., does not require complex computations).[97]
- Unlike rating or scoring-based interpretive label systems (e.g., Nutri-Score or Health Star Ratings), warning labels do not risk creating a positivity bias or "health halo" around products with higher-scoring (i.e., "healthier") labels that may still be high in calories, sugar, salt, or unhealthy fats.[97,98] The health halo effect can lead to overconsumption and interfere with goals to reduce intake of excess nutrients of concern.[99,100]
- Warning labels can also improve consumers' food choices when they encounter products with health and nutrient marketing claims unrelated to the product's overall nutritional profile (e.g., a "good source of vitamin c" claim on a drink that is also high in added sugar and calories).[101-103]

Mandatory front-of-package warning labels in use around the world. View more at GlobalFoodResearchProgram.org.



Real-world evidence from implemented policies

Alliance/ Getty Images

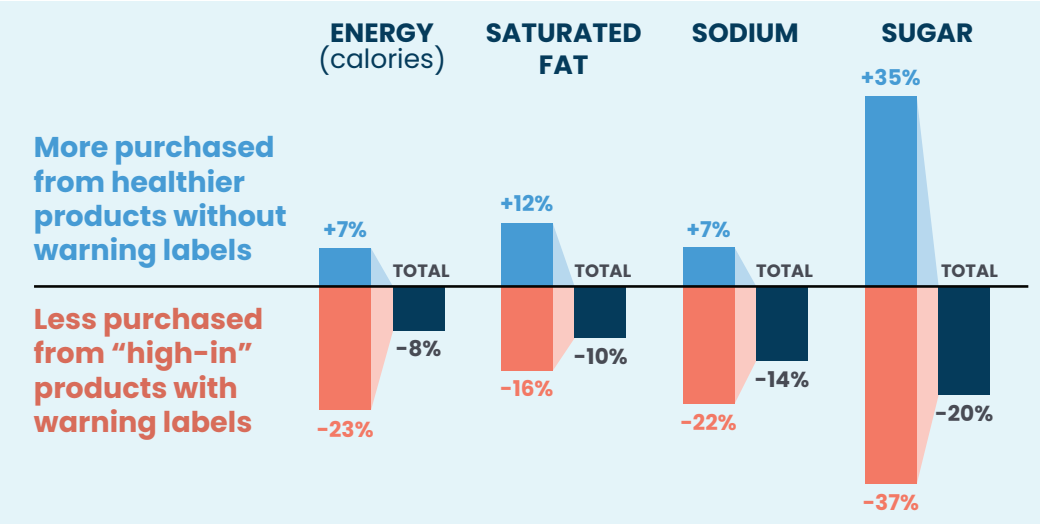
Chile: The world's first mandatory FOP warning label policy, implemented in 2016

Since Chile's FOP warning labels began appearing on packages in 2016, they have contributed to shifts in social norms and behaviors around purchasing healthier foods and drinks as well as product reformulation to reduce nutrients of concern in the food supply. Real-world evidence shows that Chilean consumers are aware of and understand the labels and are using them to make food purchase decisions at the store. This has been achieved with no reductions to employment or average wages in the food and beverage sector compared to other sectors not impacted by the law and without increasing food prices for consumers.[104,105]

- **Purchase changes:** Chile's FOP warning label policy — alongside restrictions on food marketing to children and bans on the sale or promotion of regulated foods in schools — was associated with a 24% drop in sugary drink purchases[88] and declines in sodium (–37%), total calories (–24%), calories from sugar (–27%), and calories from saturated fat (–16%) purchased from all foods and beverages in the first year of the law.[89]

  By Phase 2, households' total food and beverage purchases contained 20% less sugar, 10% less saturated fat, 14% less sodium, and 8% less calories than was estimated had the warning label law not come into effect (see *right*). Households across all income and education levels shifted their food budgets away from products carrying warning labels.[106]

Nutrients and calories purchased during Phase 2 of Chile's laws vs. hypothetical expected purchases with no policies[106]



- **Social norms:** Focus groups with low- and middle-income mothers suggest profound changes in attitudes toward food purchases, driven both by knowledge gained from seeing the labels and by children telling their mothers not to purchase unhealthy products with warning labels.[91,92]
- **Consumers in Chile understand** that a greater number of warning labels on a package means the product is less healthy than options with fewer or no warning labels.[93]
- **The food supply:** An evaluation comparing nutritional profiles of products before and one year after Chile's FOP labeling regulation found significant reductions in the proportion of products that would be required to carry "high in" sugar and sodium warning labels, suggesting that companies reformulated products to avoid the FOP warning label and other policy restrictions.[74] Food and beverage companies have also largely complied with the labeling law: In 2020, an estimated 94% of products qualifying for warning labels (i.e., high in sugar, saturated fat, sodium, or calories) had the mandated labels on their packages.[107]

> ***…She requests me salads; she doesn't accept snacks that have black labels. And because I have adapted to that as well, when we go grocery shopping, I see a product and I'm like…'No, she won't accept that if I buy it to her,' so I have to search for a product that at most contains 2 logos. But three, there is no way.***
>
> — Gina, mother of a 5-year-old[92]

Israel, implemented 2020

In 2020, Israel began requiring red nutrient warning labels on products high in sugar, sodium, or fat. This policy also includes an optional green label for products that meet certain nutrition standards for healthy foods.[108,109] (Products with red labels cannot qualify for a green label.) While changes in purchases and consumption have not yet been evaluated, evidence from surveys suggests the majority of Israeli consumers are aware of and intend to use the labels to make healthier choices:

- In the first month of labeling, nearly 60% of Israeli adults surveyed reported using the new FOP labels to some extent, and 70% said they were willing to change their purchases to buy healthier products.[110]
- During the first three months of labeling, over 80% of Israeli adults reported that intending to buy fewer red-labeled and more green-labeled products. These intentions were even higher for respondents with higher BMI or lower education, suggesting a greater impact for groups that may benefit most from the label policy.[111]
- A survey among Israeli healthcare workers conducted in mid-2020 reported that 40% of nurses, 35% of physicians, and 60% of nutritionists instruct patients to utilize the labels to improve their diet.[112]
- By 2023, nearly 70% of respondents to a phone survey of 500 households reported checking for red labels while shopping, and 60% said they preferred products without red labels in unhealthy categories.[113]

Industry's response in terms of product reformulation has not yet been reported, however there are documented attempts by industry to undermine the effectiveness of FOP labels.[114] Examples of "creative compliance" include changing the color of product packaging to red to "camouflage" red warning labels and adding round, green labels with health claims designed to mimic the regulated healthy seal.[114]

Example of product mimicking the color and style of Israel's green "healthy" label to market positive product claims.

Real-world evidence from other countries

- After **Peru** implemented FOP warning labels in 2019, food companies reformulated products to be lower in sugar and saturated fat, dropping the percentage of products in the food supply with a warning label from 82% to 62% by 2021.[75]
- Parents interviewed in Montevideo two years after **Uruguay** implemented warning labels in 2021 said the labels were easy to understand and helped them make informed choices about their food purchases.[114] Roughly half reported changing food choices because of the warning labels, most often by substituting to a product without labels, by consuming less of a warning label product, or by consuming labeled products less frequently.[115]
- Over a year after **Uruguay** fully implemented its warning label law, study participants in several cities reported very high awareness and understanding of the labels, and over half reported changing their purchase decisions because of the warning labels.[116]
  - Eye-tracking technology used on participants during a shopping trip revealed that participants used front-of-package warning labels more frequently than back-of-package nutrition information or ingredients lists when making purchase decisions.[116]
  - Eye-tracking also indicated, however, that they did not frequently seek out the warning labels while shopping, suggesting that these shoppers may have already shifted to new purchasing habits during earlier label implementation and/or that warning labels may primarily influence shopping decisions involving new or infrequently purchased items.[116]
- **Mexico's** warning labels have had a cross-border impact: A year after Mexico implemented warning labels, 64% of Mexican Americans surveyed noticed the warning labels in Mexican-oriented stores in the United States, and many reported purchasing less unhealthy foods due to the labels.[117]

Example of a "high in" or "excess" sugar warning label from Peru, Uruguay, and Mexico

More evidence for nutrient warning labels from experimental studies, surveys, and systematic reviews

- A report from the Health Evidence Network based on evidence from **15 countries in the WHO European Region** concluded that a FOP label system that is:
  1) mandatory;
  2) provides negative, evaluative judgments; and
  3) is consistent, government-led, and applied widely across all products
  is a more effective way to support consumers in making healthier choices.[118]
- Several large **systematic reviews and meta-analyses** of studies examining and comparing the effects of different FOP labeling systems have found that:
  - Warning labels were associated with significantly lower calorie, saturated fat, sugar, and sodium content of purchases.[73,119]
  - Consumers who viewed nutrient warning labels had higher odds of choosing healthier products than those who saw traffic light or Nutri-Score labels and the lowest odds of choosing less-healthy products to purchase, compared to those who saw no FOP label.[73]
  - FOP labels positively impacted the decision to purchase healthier foods in 100% of studies testing warning labels, 71% of studies testing Nutri-Score, 57% of studies testing Health Star Ratings, and 50% of studies testing multiple traffic lights.[120]

OUTCOME:

Consumer attention, perceptions, understanding, or preference

- Studies using eye-tracking technology to compare warning labels, GDA labels, and a no-label control found that warning labels were best able to attract consumers' attention and help them more quickly and easily identify whether a product is unhealthy.[121-124]
- FOP warning labels on sugary drinks were linked to lower perceptions of the drinks' healthfulness in experimental studies from the **United States** and **New Zealand**.[125-127]
- Counter to industry's claims that consumers perceive "high in" FOP labels as too harsh or restricting of their control, a large survey of young adults in **Canada** viewing warning labels on beverages found that the vast majority (93%) felt either more or no change in their own level of control, and most thought that the symbols were either "about right" or "not harsh enough."[128]
- A survey of nearly 1,000 parents of elementary-school-aged children from **Argentina**, **Chile**, **Costa Rica**, and **Mexico** found that parents with low education and overweight preferred warning labels over GDAs or traffic light labels.[129]
- A survey of adults from **Mexico** and the **United States** (white and Latino) compared consumers' understanding of four FOP label types — warning labels, GDAs, multiple traffic lights, and Health Star Ratings — and a nutrition facts table.[130] Warning labels were the easiest for subjects to understand: Subjects were nearly 5 times more likely to report understanding the warning label compared to the nutrition facts table, whereas subjects who saw the traffic light and Health Star Rating labels were only 0.56 and 0.34 times more likely, respectively.[130]
- In a survey of low- and middle-income **Mexican** consumers, warning labels outperformed both traffic light and GDA labels for consumer understanding.[131]
- In **China**, focus group participants found warning labels helpful for informing their food purchasing decisions and educating children on developing healthy eating habits.[132] Participants also believed that requiring warning labels will positively influence the food industry by encouraging healthier product reformulation.
- In a **Guatemalan** randomized controlled trial among mothers and their children (ages 8–12 years), nutrient warning labels were significantly better able than a GDA label to reduce participants' purchasing intention and perception of healthfulness for unhealthy products and better helped participants understand the nutritional content of different food items.[133]
- Compared to an ingredients list and a nutrition facts panel, the presence of warning labels improved **Brazilian** adults' understanding and perceptions of a product's nutrient profile, and was particularly helpful for identify nutrients in excess.[134]

OUTCOME:

Correctly identifying healthy/least-healthy products or those highest in nutrients of concern

- Among adolescents in six countries (**Australia**, **Canada**, **Chile**, **Mexico**, the **United Kingdom**, and the **United States**), a study comparing five different FOP label types found that octagonal warning labels had the greatest impact on teens thinking a sugar-sweetened beverage was unhealthy in all but one country.[135] Roughly twice as many participants who saw the warning labels correctly identified that the sugary drink was unhealthy. While results varied by country, Nutri-Score, GDA, and Health Star Rating labels had the lowest odds of impact, overall.
- In a survey of low- and middle-income **Mexican** consumers, the odds of subjects correctly identifying a product with the lowest nutritional quality was 4.5 times greater for warning labels compared to GDAs.[131]
- A black octagonal "high in sugar" warning label was the only FOP label that consistently made a fruit drink appear less healthful to study participants in six countries (**Australia**, **Canada**, **Mexico**, the **United Kingdom**, and **United States**). The nutrient warning label outperformed GDA, Health Star Rating, and multiple traffic light labels in all countries.[136]
- A randomized control trial in **Jamaica** found that participants exposed to a FOP warning label had double the odds of correctly identifying a food item least harmful to their health compared to a control group that saw a GDA-style "facts up front" nutrition label.[137] Magnifying glass-style warning labels and traffic light labels did not have significant impact.
- A randomized controlled experiment comparing the effects of warning labels compared to traffic light labels among **Brazilian** adults found that subjects who saw warning labels had greater improvements in their ability to identify the healthier product compared to those who saw traffic light labels (25% vs. 3%).[138]
- In **Argentina**, a randomized controlled trial found that consumers who saw black octagonal nutrient warning labels on a sample of products were 7.5 times, 10 times, and 2.9 times more likely to correctly identify the least harmful product than respondents who saw no FOP label, a GDA label, or a traffic light label, respectively.[139] The warning label group's likelihood of correctly identifying when a product contained excessive amounts of sugar, sodium, saturated fat, or *trans* fat was over 15 times higher than for the GDA and no label groups and 4.7 times higher than for the traffic light label group.

OUTCOME:

Purchase intentions or decisions, consumer choice, or nutrients purchased in shopping experiments

- FOP warning labels on sugary drinks have been linked to decreased purchasing intent and purchases of sugary beverages in experimental studies from the **United States** and **New Zealand**.[125-127]
- A shopping experiment in **Canada** found that participants who saw "high in" nutrient warning labels purchased less calories, sugar, and saturated fat from beverages and less calories and sodium from foods than participants who saw no FOP label.[140] Traffic light, Health Star Rating, and nutrition grade (i.e., Nutri-Score) labels had no significant impact on nutrients of concern purchased from beverages and limited effects among foods. The impact of warning labels was further enhanced in experimental conditions where they were combined with taxes on sugary drinks or snacks.
- A 2022 experiment conducted in a real grocery store in **Brazil** found that participants made faster and more healthful purchasing decisions when exposed to Mexican FOP warning labels compared to Brazil's magnifying glass label.[141]
- In an online randomized controlled trial, **Brazilian** adults exposed to nutritional warning labels were more likely to either abandon a food category or substitute an item within a food category for a more healthful item than those who saw a GDA-style label.[142]
- In **Argentina**, a randomized controlled trial found that subjects who saw black octagonal nutrient warning labels on a sample of products had double the odds of choosing to purchase of the least harmful product or no product compared to subjects who saw GDA labels or no labels.[139]

Momentum continues to build for FOP warning label policies

Since Chile's first implemented FOP warning labels in 2016, six more Latin American countries have adopted similar octagonal, black labels and three countries have implemented nutrient warning labels in magnifying glass or circular styles: **Peru** (2019), **Mexico** (2020), **Uruguay** (2021), **Venezuela** (2024), **Argentina** (2022), and **Colombia** (2022) have implemented or passed policies requiring FOP warning labels similar to Chile's (black-and-white stop sign warnings).[143-146]

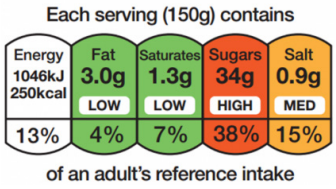
Example of Brazil's magnifying glass warning label (shown for a product high in added sugar, saturated fat, and sodium)

- **Brazil** (2020, *right*) and **Canada** (required by 2026) have implemented FOP warning labels featuring a magnifying glass design.[147,148]
- Many other countries are currently developing FOP warning labeling policies, including but not limited to: **Bangladesh**, **Costa Rica**, **Ghana**, **Guatemala**, **Kenya**, **Panama**, and **South Africa**.
  - In a randomized controlled trial using warning labels designed based on expert and focus group input, **South African** researchers found that warning labels outperformed GDAs and traffic light labels in helping consumers identify products high in nutrients of concern, identifying unhealthy products, and reducing their desire to purchase unhealthy products.[149] South Africa's National Department of Health released a draft front-of-package warning label regulation in April 2023, and is currently reviewing public comments and working on finalizing the regulation.
  - In In a randomized controlled trial in **Costa Rica**, black octagonal warning labels outperformed traffic light, GDA, and Nutri-Score labels in helping shoppers correctly identify products containing excessive sugars, sodium, or saturated fats and encouraging shoppers' intention to buy the least harmful product options offered.[150] Shoppers who saw the nutrient warning labels had three times greater odds of correctly identifying the least healthy product option compared to shoppers who saw no front-of-package label.

Above: Examples of South Africa's proposed warning labels on mock products[149]

Countries developing front-of-package warning label policies.

Other FOP labels



United Kingdom
(voluntary since 2006)

SRI LANKA
(mandatory on beverages since 2016, foods since 2019)

ECUADOR
(mandatory since 2014, but may appear on front, side, or back of pack)

Traffic Light Labels (TLLs)

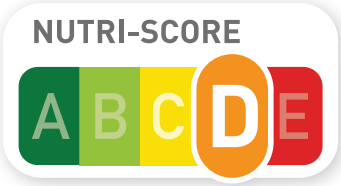
TLLs use green, amber (yellow), and red colors to indicate whether a product has low, moderate, or high levels of nutrients of concern. TLLs can vary in complexity and appearance, from simple summary indicators (Sri Lanka, right) to nutrient-specific coloring (Ecuador) or TLLs combined with GDAs (United Kingdom).

Experiments comparing different label types have found that while TLLs test moderately well for outcomes such as consumer liking, understanding, and improving intentions, they are still generally outperformed by warning labels in these outcomes and, importantly, in changing actual purchase behaviors.[73,88,97,119,151,152] TLLs can also confuse consumers by sending mixed messages about whether a product is healthy overall, if it contains excessive amounts of some nutrients but not others.[73,131,138,153]

- In a meta-analysis of experimental studies examining the effects of different label types, TLLs increased odds of selecting healthier products by 50% but did not significantly lower consumers' probability of making less-healthy choices.[73] Nutrient warning labels, however, increased odds of consumers selecting more healthful products by 261% and reduced odds of selecting less-healthy products by 35%.[73]
- A 2023 systematic review of studies comparing major FOP labeling systems found that labels positively impacted the decision to purchase healthier foods in 50% of studies testing multiple traffic lights (4 out of 8 studies) compared to 100% of the 6 studies testing warning labels.[120]
- A 2017 study comparing different labels found that TLLs and GDAs performed worse than warning labels at helping consumers identify products high in nutrients of concern and that consumers perceived products with warning labels as less healthy than the exact same products with TLLs or GDA labels.[154]
- In an experiment in **Uruguay**, warning labels had greater relative impact on children's food choices than TLLs.[155] TLLs also confused consumers in **Mexico**, who found the multiple colors difficult to compare across products and the intermediate/amber color particularly hard to interpret.[153]
- **Real-world evidence:** In 2014, **Ecuador** implemented a mandatory TLL for packaged, processed foods (*left, top*).[143] Unlike other mandatory policies, Ecuador's TLL is not required to appear on the front of packages and can be placed on the sides or back-of-pack. Evidence to date indicates that despite consumers' awareness, understanding, and self-reported use of the label, it has not led to the changes observed under Chile's warning label policy:
  - By 2018, 62% of people over age 10 in Ecuador report recognizing, understanding, and using the TLL, according to data from Ecuador's National Health and Nutrition Survey.[156]
  - Studies that examined consumer purchases in the first year of Ecuador's regulation found no evidence that TLLs significantly affected households' carbonated soft-drink-buying habits.[151,157]
  - In the first year of Ecuador's TLL policy, one study found evidence of modest beverage reformulation, with an observed average sugar reduction of 0.93 grams per 100 mL.[157]
  - Another study found that only four of the top seven soft drink brands reduced their sugar content in the first two years of labeling, while the other three brands actually increased their sugar content.[158] These brands account for over 85% of the total carbonated soft drink market in Ecuador.
  - In 2016, focus groups reported high knowledge of TLLs but few changes in behavior.[159]
  - Self-reported TLL use among adolescents and adults in Ecuador's 2018 national health and nutrition survey was associated with a slightly lower BMI (0.9–1.0 points for adolescents and 1.16–1.8 points for adults) and probability of obesity (4% for adolescents, 8.4% for adults).[160]
  - Results from two choice experiments suggest that consumers, including adolescents, have a higher willingness to pay for yellow and green-labeled items.[161,162]

Other FOP labels

Continued...



(voluntary in seven European countries beginning in 2017)

Nutri-Score

Introduced in France in 2017 and since implemented as a voluntary label by six other European countries (Spain, Belgium, Germany, Switzerland, Netherlands, Luxemburg),[163] the Nutri-Score label uses a color spectrum along with letter grades to provide a summary indicator of product healthiness. Scores are based on a nutrient profiling model that takes into account a products' nutritional content and how its ingredients (e.g., fruit, vegetable, legume, nut, or healthy oil content) may benefit or harm health.[164]

As yet, no studies have examined real-world impact of Nutri-Score on purchase patterns, consumption, or the food supply in the countries where the label is in use. In experimental studies, Nutri-Score has tested well for helping consumers to accurately rank the healthiness of products within a given category.[73,97,165-169] Some studies have also associated Nutri-Score with improvements in the nutritional quality of experimental shopping baskets[170-172] or meals in a cafeteria setting[173] compared to a no-label control condition. Research suggests that these improvements result from participants increasing purchases of higher-graded, healthier products without significantly reducing their purchases of lower-graded, less-healthy products:

- A 2016 field experiment in which Nutri-Score labels were placed on real foods across 60 **French** supermarkets observed a 14% increase in the nutritional profile of purchases from the healthiest categories examined.[170] No impact, however, was found on purchases from less-healthy categories, yielding a net improvement of just 2.5% in the average nutritional score of purchases.
  - Notably, this "real-life" study setting produced effect sizes 17 times smaller than comparable studies performed in simulated environments, highlighting the importance of evaluating FOP labeling policies beyond lab settings.[170]
- A 2021 systematic review determined that warning labels have been more effective than Nutri-Score labels at discouraging unhealthy purchases and improving the overall healthfulness of purchases.[73]

Nutri-Score's use of a nutrient profiling model that allows beneficial nutrients to offset nutrients of concern may limit the label's ability to reduce purchases of less-healthy products.[94] Furthermore, the voluntary nature of this policy may allow industry to avoid labeling or reformulating less-healthy products:

- While no research has yet characterized how many food producers have opted into using Nutri-Score labeling in **France**, one evaluation found that by 2023, 62% of France's total food sales volume was from brands applying Nutri-Score labels to at least some of their products.[175] This study did not indicate whether products with Nutri-Score labels were more or less high-scoring (i.e., healthy) than products that did not use the labels.
- In the first year of Nutri-Score use in **Belgium**, only an estimated 10% of products on the market featured the label, the majority of which displayed healthy "A" or "B" ratings.[176] This could have important implications for the label's effectiveness, as another study found greatly reduced benefits when labels are not widely adopted.[177]
- A 2020 study observed minimal reformulation of breakfast cereals in the year before Nutri-Score was adopted in **Belgium**.[178]
- In 2024, multi-national food company Danone announced that it would no longer apply Nutri-Score labels to its dairy products following updates to the label's algorithm that lowered these beverages' scores.[179] This highlights how companies can opt out of voluntary labeling schemes if they do not like the way their products would be labeled.

Finally, reports of low consumer trust for Nutri-Score may be due to lack of information on the label specifying which nutrients contribute to the product's overall score.[180]

- A 2020 pilot study in the **Netherlands** found that while subjects noticed Nutri-Score labels on packages, they did not have a significant effect on attitudes, taste perceptions, and purchase intentions.[181]
- Three years after Nutri-Score's adoption in **France**, 57% of respondents to a government-sponsored survey claimed to have changed at least one of their shopping behaviors by utilizing Nutri-Score, up from 43% the year prior.[182]

New variations on Nutri-Score labels in other countries*:

SINGAPORE
(mandatory since 2022)

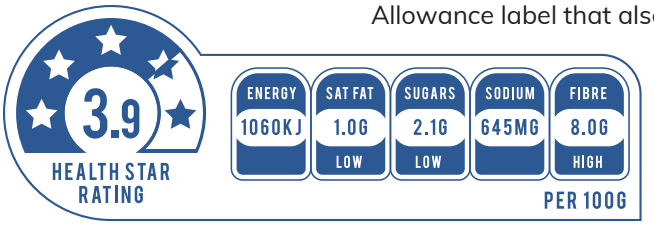
INDONESIA
(Implementing in 2025; below: single-letter label option for smaller packages)

Other FOP labels

Continued...

Health Star Rating (HSR)

The Health Star Rating (HSR) system uses an algorithm that assesses a product's risk-increasing and risk-decreasing components to calculate a summary score ranging from 0.5 stars (least healthy) to 5 stars (most healthy).[183] HSR labels appear on packages either as a circular label showing only the star score or as a combined HSR-Guideline for Daily Allowance label that also lists calorie, saturated fat, sugars, sodium, and fiber content.



HSR labels were introduced in 2014 as a voluntary measure in **Australia** and **New Zealand**, where studies find that the labels are generally liked and understood by consumers.[184] This has not necessarily translated into meaningful change, however. Ten years later, there is little evidence of HSRs having a meaningful impact on the nutritional quality of people's food and beverage purchases.

AUSTRALIA, NEW ZEALAND
(voluntary since 2014)

- Randomized controlled trials have found no significant impact of HSR labels on food purchases.[185-187]
- A meta-analysis examining HSR labels' impact on purchases found no significant effect on calories, sugar, saturated fat, or sodium purchased.[119]
- A 2022 study in New Zealand found that while the HSR label had little to no effect on the quantity of products purchased by households, industry reformulation may have contributed to small shifts in purchased sodium (-9%), protein (-3%), and fiber (+5%).[188]
- HSR labels do not appear to have significantly reduced added sugar in the Australian food supply. From 2014 to 2020, the proportion of newly released, HSR-labeled products that contain added sugar increased each year, while rates of non-nutritive sweetener use in HSR-labeled products remained the same.[189]

The lack of greater improvements in the food supply or shopping behavior associated with HSR labels could be due to the voluntary nature of existing HSR policies. For example:

Graphic showing changes in scores on Health Star Rating labels after nutrition standards for the voluntary labels were strengthened in 2019.
Source: API news

- In both Australia and New Zealand, adoption of the voluntary label has been low. In Australia in 2023, consumers only saw HSR labels on 36% of products in stores (down from 40% in 2019), and only 30% of products in New Zealand.[190,191]
- HSR labels have also been selectively implemented on higher-scoring products.[190-192] For example, 76% of products with labels in Australia were "healthier" options displaying ≥3 stars in 2019.[192]
- In the online stores of two dominant supermarket retailers in Australia, HSRs were only displayed on 14% of products and were much more likely to appear on higher-scoring, healthier items: Less than 1% of products with scores under 3.5 stars had HSR labels vs. 22% of products with ≥3.5 stars.[193]
- In a study assessing awareness, use, and understanding of different FOP labels across countries, participants from Australia reported much lower awareness and use of HSR labels than was reported in other countries, likely due in part to lower uptake of the voluntary label.[64] In 2020, only 49% of respondents in Australia reported being aware of HSR labels vs. 81% of respondents in Mexico who were aware of warning labels. The same year, only 20% of Australian respondents reported using HSR labels 'often' or 'all the time' when deciding to buy a food product, compared to 41% in Mexico (in the first two months after warning labels appeared on packages).[64]

Health scholars and advocates in the region have called for reforms to HSR labeling policies, including mandatory labeling requirement across all products, an strengthened nutritional profiling model, removal of positive health and nutrition claims from products with low HSR scores, and standardizing for label color, size, and placement on packages.[191,194-197]

Industry-endorsed FOP labels are not effective

The most common FOP system in use globally is industry's voluntary **Guidelines for Daily Allowance** (**GDAs**, also called **Guideline Daily Amounts**, "**Facts Up Front**," Reference Intakes, or **Daily Intake Guides**/**DIGs**, depending on region).[198-200] GDA-style labels were developed by grocery manufacturing and distribution associations in the United Kingdom and United States and later adopted with slight variations by industry associations in many other countries, despite little to no evidence of positive impact for consumers. In the United States, the 2011 introduction of "Facts Up Front" labeling by the Grocery Manufacturers Association was viewed by health experts as a strategic — and successful — maneuver to pre-empt ongoing government development of a mandatory FOP labeling policy.[201,202]

GDA-style labels typically display nutrient content per serving (not necessarily per package) for nutrients such as calories, saturated fat, sugars, and sodium, as well as the percentage of an average adult's recommended daily intake for each nutrient. Despite their ubiquity, these labels are regarded as unhelpful or confusing for customers.

Examples of a GDA-style label

Limitations of the GDA/DIG/"Facts Up Front" label include:[203]

- Benchmark values are not based on international nutrition recommendations and are calculated using an average adult's intake, even on products specifically targeted to or consumed by children.
- GDA labels are displayed in arbitrary serving sizes — making it difficult for consumers to compare different products in the same category — and are smaller than what people realistically consume.
- The nutrients included in a GDA label are inconsistent across products. For example, a product with very high sugar and saturated fat content may only show a GDA label for calories.
- Serving sizes are also shown in very small text, which could lead shoppers to think that label values refer to the full package contents.
- When fiber and micronutrients are included in the label, companies present percentages of minimum recommended intakes, whereas for sugars, fats, saturated fats, and sodium, they present percentages of upper consumption limits.
- Interpreting a GDA label takes more time than most shoppers spend reading a nutritional label and requires a high level of nutritional knowledge and mathematical skills.

GDAs perform poorly compared to other FOP labels and do not help consumers:

- Independent studies comparing GDA-style labels with other labeling systems consistently find that GDAs are the most confusing, take shoppers the most time to evaluate, and are ultimately least effective for encouraging consumers to make healthier choices.[120,131,133,135,139,185,204-211]
- In Latin America, studies in Mexico, Ecuador, Chile, Brazil, and Uruguay have all found GDAs to be the weakest labeling system.[122,123,135,153,155,203,210,213-214]
- In Mexico, studies show that consumers across age, education, and income groups have a hard time understanding GDA labels and do not use GDAs to make food choices.[130,131,153,203,215]
- Eye-tracking studies from the United States, Uruguay, and Chile found that compared to warning labels, GDAs are less effective at getting consumers' attention, harder to process, and worse at helping to identify unhealthy products.[121,123,216]
- In an online randomized controlled trial comparing Brazilian adults shopping choices when viewing products with FOP warning labels, traffic light labels, or GDAs, a higher percentage of participants who saw the GDA label selected the least healthful product to purchase in the choice experiement.[142]
- Introduction of GDA-style labels in the United Kingdom did not affect shoppers' product choices among yogurts or ready-meals.[217]
- Studies in Australia and New Zealand found that GDAs (there called Daily Intake Guides) were least-preferred by consumers and least helpful for discriminating between healthy and unhealthy products, compared to traffic light and Health Star Rating labels.[218,219]
- Companies often place GDAs on packages alongside other, more prominent labeling and marketing such as nutrient or health claims, which further confuses consumers.[220-224]
- A study comparing GDAs and Nutri-Score on Greek adults found that participants preferred interpretive labels over the GDA numerical label and found Nutri-Score to be easier to understand, more clear, and more visible compared to the GDA.[225]
- When 14,880 Mexican adults with noncommunicable diseases were asked to classify the healthfulness of food products with either FOP warning labels or GDA lables, 70% of particpants who saw GDAs misclassified foods' healthfulness.[226]

  The group who saw warning labels had twice the odds of correctly classifying foods, and this difference was even more pronounced among participants with three or more noncommunicable diseases (i.e., overweight/obesity, type 2 diabetes, hypertension, and/or dyslipidemia).[226]

Developing labels

Interest is growing in supplementing or enhancing existing nutritional labeling systems with FOP labels that identify ultra-processed foods (UPFs) and/or foods and drinks that have a more negative environmental or ecological impacts.

Ultra-processed foods

To date, FOP labels have been based primarily on products' nutritional content, but given the large body of epidemiological evidence pointing to UPFs' health harms even independent of their nutritional profile, some researchers and health advocates are now calling for UPFs to carry warning labels indicating to consumers that they are ultra-processed.[227-230] (See example, right.[231])

Proposed warning label for ultra-processed food[231]

- A 2022 experiment found that including an "ultra-processed" declaration on Nutri-Score labels to UPFs increased participant understanding of products' nutrient profile and level of processing and was associated with positive impacts on purchasing intentions.[230]

  Participants who were asked to choose between products with higher Nutri-Score grades (i.e., "A" or "B") alongside an "ultra-processed" declaration vs. lower-graded products that were not ultra-processed more frequently selected the lower-graded products without UPF labeling, suggesting that inclusion of the UPF dimension in a FOP labeling system could influence overall quality of purchases beyond nutritional content, alone.[230]

- Conversely, an online experiment in Brazil wherein "ultra-processed" labels were added to ultra-processed products that already had nutrient warning labels found that while the added labels helped participants better identify UPFs, the added label did not significantly enhance the effect of the warning labels, alone, on their purchase decisions.[232]

- In Australia, researchers tested modifications to the Health Star Rating system that would account for markers of ultra-processing (i.e., inclusion of industrial food substances and/or costmetic additives on products' ingredients lists). They found that the adjusted HSR approaches were in greater alignment with Nova classification for food processing and that modifying the HSR profiling system to account for ultra-processing would lower the scores of some unhealthy products that still receive high scores under the current model.[233]

- A study testing U.S. adults' perceptions of an ultra-processed warning label found that participants who saw the UPF label thought more about the risks of consuming that product and were discouraged from buying it.[234] Combining the UPF label with a nutrient content warning label ("high in sugar") more successfully grabbed participants' attention and increased their risk perception and discouragement from purchasing more than the UPF label alone.

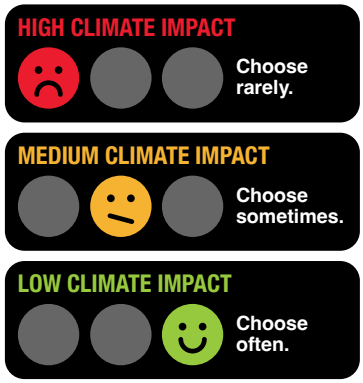
- Following the introduction of nutrient warning labels in Chile, manufacturers responded by reformulating many sugary products using non-sugar sweeteners to achieve sugar content below the thresholds of the law.[235] While this resulted in significantly less sugar purchased throughout Chile,[88,89] drinks and foods sweetened with non-sugar sweeteners are still ultra-processed and may pose a long-term health risk if consumed in high quantities.[236] Because of this, other countries in Latin America including Mexico, Peru, and Argentina have included in an additional label disclosing content of non-sugar sweeteners in their FOP regulations. While these do not directly label products as UPFs, they do inform consumers that the product contains ingredients which may contribute to overall health harm.

Experimental UPF label from an online experiment in Brazil[232]

Read more about health and environmental harms associated with high ultra-processed foods' consumption.

Eco-labels

Food choices do not just affect health via dietary intake: They can also impact the environment via plastic pollution, increased greenhouse gas emissions, water use, and stress on ecosystems — all of which negatively impact both planetary and human health.[237-241] Early evidence suggests that eco-labels could be an effective policy tool to encourage more sustainable food choices by consumers and practices by food companies, but more research is needed to understand how eco-labels can be implemented alongside or integrated with other nutritional FOP labels.[242-244]



Examples of different potential eco-label designs

- A systemic review analyzing the impact of a variety of eco-label designs across 56 studies found that eco-labels can positively impact the selection, purchase, and consumption of more environmentally friendly drinks and foods.[243]
- In randomized controlled trial testing the impact of traffic light-style eco-labels on meal component purchases in a virtual reality supermarket, participants who were exposed to eco-labels composed meals with significantly better environmental footprints without compromising healthiness, cost, or enjoyment of their chosen meals.[245]
- In a simulated shopping study where participants saw products with one of three different eco-labels designs — single traffic light, multiple traffic light, or a label that described each product's greenhouse gas emissions in terms of kilometers driven by an average car — participants' shopping basket choices had significantly lower net environmental impact when they viewed the label condition, regardless of which label type they saw.[246] These more environmentally friendly shopping baskets were similar in price and nutritional content to the reference baskets selected by the same participants when no eco-labels were shown.[246]
- To date, no country has implemented a mandatory eco-label policy for foods, and it remains to be seen how these labels can best address consumer understanding and industry responsibility for the intersecting health impacts of foods' and beverages' environmental footprint, level of processing, and nutritional profile.

Best practices for effective FOP labeling systems

- **FOP labels should be based on a strong nutrient profiling model.**
  - The model should set clear and meaningful criteria based on evidence of diet-related health risk and nutritional guidelines to determine which products must carry labels.[78,247-251]
  - The model should ideally include all nutrients of health concern and account for content of sodium, saturated fats, trans fats, and sugars.[251] Including non-sugar sweeteners in profiling can also capture products that are ultra-processed, even if not high in sugar.
  - Industry should not impact the adoption and implementation process of a profiling model.[251] Ideally, the model should be based on an appropriate WHO regional model (e.g., PAHO, SEARO, or AFRO) to define products excessive in nutrients and ingredients of concern with adaptations for country context.[251]
- **FOP labels should be interpretive, with a simple and clear design.**
  - Simple FOP labels enhance understanding and use of nutrition information, especially for consumers with less education and nutrition knowledge.[85,252,253]
  - Interpretive FOP labels work by using simple designs and easy-to-understand language to draw attention to key nutrition information, facilitate rapid comprehension, encode information into working memory, and make it easier to discriminate between healthy and less healthy options.[85,94,253-256]
  - To this end, labels should avoid numeric information; they should use symbols and shapes that leverage consumers' automatic associations, and warn or caution consumers using words or phrases such as "excess," "high," "avoid," or "warning."[94]
- **FOP labels should be immediately and easily visible on the package.**
  - Sizing and placement requirements should detailed clearly in the regulation, including specifications for a wide range of package formats — from bottles to boxes and small gum packages to large multi-packs.
- **FOP labeling should be mandatory and apply across all product categories.**
  - Applying FOP labeling selectively can create misleading perceptions of healthfulness across products.[73,257] Voluntary labeling can also lead to multiple types of logos and labels appearing on packages, which increases confusion and decreases the usefulness of the labels.
  - Mandatory labels applied across the food supply enable consumers to more easily compare products within and across categories.[258,259]
  - Food and beverage companies are more likely to re-formulate their products under mandatory labeling policies, reducing sodium, sugar, and saturated fat content of their products and leading to healthier food supply.[96,258-260]
- **Where FOP labels are required, health and nutrient claims should be prohibited.**
  - Health and nutrient claims are a marketing tool widely used by the food and beverage industry that frequently overstate or mask the overall nutritional quality of products and may promote overconsumption.[261-263]
  - FOP labels can help mitigate but not eliminate the "health halo" effect of health and nutrient claims, which confuse consumers and undermine the purpose of using warning labels to discourage purchase and consumption of less-healthy products.[102,103,264,265]
  - Prohibition of making nutrient or health claims on products with warning labels was a critical feature of Mexico's labeling regulation introduced in 2021 and Argentina's in 2022.[145,266]
- **FOP labeling policies should be developed through a transparent, evidence-based process.**
  - Successful development and implementation of a FOP label policy will depend on strong supporting evidence, a transparent process that includes pilot-testing of label systems, collaboration by different stakeholders, and strong political leadership.[267,268]
  - Criteria for the labels should be made public in advance to educate consumers and manufacturers and to encourage product reformulation.[77]
  - Industry may be allowed to comment publicly on the criteria but should not be permitted to participate or intervene in its development.[267]
  - Endorsements by trusted government bodies or scientific organizations have been shown to increase label credibility.[85,268,269]
- **FOP labeling policies should be monitored, enforced, and evaluated over time to ensure uptake, compliance, and intended impact.**
  - Ongoing monitoring and enforcement efforts should be established to ensure uptake and compliance, evaluate policy impacts, and inform continuous improvements and further policy updates, as needed.[78,268] These should be coordinated through a government agency or independent group without conflicts of interest.
- **FOP labeling should be part of a comprehensive policy package.**

  Warning labels should ideally be part of a broader package of policies that synergistically address multiple commercial and environmental determinants of diet and health, including:
  - Restrictions on marketing for unhealthy foods and drinks (including digital marketing);
  - Fiscal policies taxing unhealthy products and/or lowering the cost of healthier foods and drinks;
  - Protections for the school food environment (e.g., limiting access to unhealthy, ultra-processed foods and ensuring access to healthy foods and clean water in schools); and
  - Other policies addressing upstream determinants of healthy food access and intake.

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