

The Nutri-Score: A Science-Based Front-of-Pack Nutrition Label

Helping consumers make healthier food choices

International Agency for Research on Cancer



Summary

Helping consumers make healthier food choices is a major challenge for the prevention of cancer and other chronic diseases and related deaths. The Nutri-Score is a simple nutrition label based on the British Food Standards Agency nutrient profiling system (modified version) (FSAm-NPS), adapted for the purpose of labelling, which has been promoted as a candidate to enable uniform food labelling systems across the European Union. Epidemiological analyses in large-scale prospective cohorts in the diverse European population have shown that people who consume more foods with higher FSAm-NPS scores (corresponding to less-favourable Nutri-Score ratings and lower nutritional quality) have a higher risk of cancer as well as overall and cancer-related mortality. These findings support the relevance of using the Nutri-Score to rate the nutritional quality of food products as a basis for strategies to prevent cancer and other chronic diseases.

IARC Evidence Summary Brief No. 2

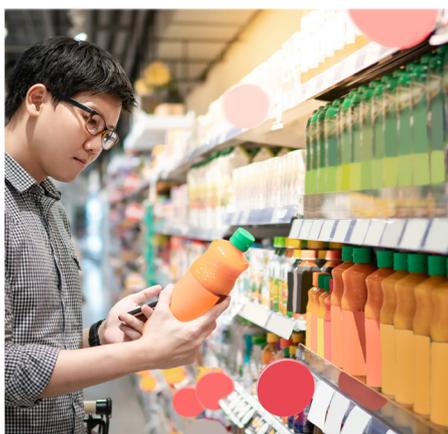
“The Nutri-Score label is a tool that comes from research and provides a simple translation of data on nutritional composition, based on the strong evidence currently available, to guide consumers towards healthier food choices.”

– Dr Mélanie Deschasaux

Introduction

About 11 million deaths worldwide in 2017 were attributed to diseases related to unhealthy diets. Helping consumers make healthier food choices, i.e. with lower intakes of sugars, saturated fats, salt, and energy, and higher intakes of dietary fibres and fruits and vegetables, remains an important challenge in public health. In many countries, political authorities are considering implementing a simplified, interpretive front-of-pack labelling system to reflect

the overall nutritional quality of food products, as a key strategy to prevent chronic diseases and the related mortality. Along with other public health nutrition measures, the Nutri-Score interpretive nutrition label aims to influence consumers at the point of purchase to choose food products with a better nutritional profile, and to incentivize food manufacturers to improve the nutritional quality of products, thereby contributing to a healthier food environment.



Features of the European Prospective Investigation into Cancer and Nutrition (EPIC) study

- Multicentre prospective cohort study that investigates **metabolic, dietary, lifestyle, and environmental factors** in relation to cancer and other chronic diseases
- **> 500 000** volunteers (aged 25–70 years) recruited in 1992–2000 at 23 administrative centres in **10 European countries** (Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, and the United Kingdom) with **diverse profiles and dietary patterns**
- Food composition database with **> 10 000 country-specific foods and beverages**
- Standardized country-specific dietary assessment methods (self-reported food frequency questionnaire)
- Incident cases of cancer identified through record linkage with population-based cancer registries, health insurance records, pathology registries, and active follow-up of study participants

How can the Nutri-Score label help consumers?

The Nutri-Score is a front-of-pack label that provides user-friendly information on the nutritional quality of food and beverages, using five different colours to classify food products into five categories: from category A (dark green), indicating higher nutritional quality, to category E (dark orange), indicating lower nutritional quality. This rating system was developed to help guide consumers towards healthier food choices and thus prevent a wide range of nutrition-related chronic diseases. The score for a given food or beverage is calculated by allocating points for the content per 100 g (or per 100 mL for beverages) of energy, saturated fatty acids, sugars, sodium, dietary fibres, and proteins, and of fruits, vegetables, legumes, and nuts (and, since 2019, olive, rapeseed, and nut oils).

The Nutri-Score is based on the British Food Standards Agency nutrient profiling system (FSA-NPS), as the French modified version (FSAm-NPS), which has been studied in relation to health outcomes at the national level in the SU.VI.MAX and NutriNet-Santé

Key evidence messages

- Consumption of more food products with higher FSAm-NPS scores (lower nutritional quality, corresponding to light orange and dark orange Nutri-Score labels) may increase the risk of cancer.
- Consumption of more food products with higher FSAm-NPS scores may increase the risk of overall mortality, and more specifically of mortality due to cancer and diseases of the circulatory, respiratory, and digestive systems.
- The FSAm-NPS score and the derived Nutri-Score help to rate the nutritional quality of food products, independently of the food category or the country-specific dietary patterns.
- **By categorizing foods and beverages into five colours that reflect their overall nutritional quality (i.e. “healthier” or “less healthy”), the Nutri-Score can help the general public and patients to choose food products of higher nutritional quality and reduce their risk of chronic diseases.**

“A clear and simple evidence-based front-of-pack label like the Nutri-Score could be an effective tool to help consumers lower their risk of noncommunicable diseases such as cancer.”

– Dr Inge Huybrechts

cohorts in France and in the SUN and ENRICA studies in Spain. Consumption of more food products with lower FSAm-NPS scores (corresponding to higher nutritional quality) was shown to be associated with more favourable

outcomes with respect to weight gain, asthma symptoms, metabolic syndrome, cardiovascular diseases, and cancer in France and with lower mortality (overall and chronic disease-related) in Spain.

Call to action



A harmonized and mandatory front-of-pack nutrition label urgently needs to be adopted at the European Union level and beyond.



The Nutri-Score is the only front-of-pack nutrition label in Europe for which strong scientific evidence has demonstrated its effectiveness and its superiority to other existing labels.



The scientific community must emphasize that science should guide political decisions in the field of public health.



Consumers should be well informed about the benefits of using the Nutri-Score label as a guide towards healthier food choices.

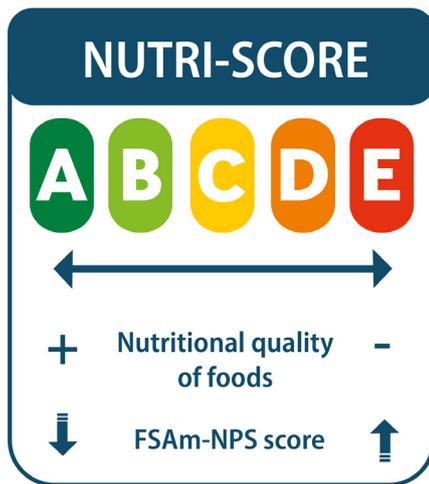


Fig. 1 The Nutri-Score, a five-colour nutrition label based on the British Food Standards Agency nutrient profiling system (modified version) (FSAm-NPS) score.

The FSAm-NPS score

- The FSAm-NPS is a modified version of the original British Food Standards Agency nutrient profiling system (FSA-NPS), with slight adaptations to the allocation of points for specific foods (i.e. beverages, cheese, and added fats) as recommended by the French High Council for Public Health to consider variations in the nutritional quality of these specific food groups.
- The FSAm-NPS score was calculated for all foods and beverages in the EPIC food composition database.
- The **FSAm-NPS score**, a **food/beverage-level score**, was obtained from the sum of points (0–5) allocated for the content per 100 g (or per 100 mL for beverages) of nutrients for which the consumption should be promoted, i.e. dietary fibres (g), proteins (g), and fruits, vegetables, legumes, and nuts (%), subtracted from the sum of points (0–10) allocated for the content of nutrients that should be consumed in limited amounts, i.e. total sugars (g), saturated fatty acids (g), sodium (mg), and energy (kJ). The percentage content of fruits, vegetables, legumes, and nuts was derived using standard recipes.
- The **FSAm-NPS dietary index (DI) score**, an **individual-level score**, was calculated to characterize the nutritional quality of an individual's diet. The DI score is the sum of the FSAm-NPS score for each food or beverage consumed multiplied by the amount of energy provided by that product (i.e. the energy content per 100 g multiplied by the estimated daily intake assessed using the baseline dietary questionnaires), divided by the sum of energy intake from all foods.
- **A higher FSAm-NPS DI score reflects an overall lower nutritional quality of foods consumed** (see Figures 1 and 2).

Universality of the FSAm-NPS

The FSAm-NPS is the most validated nutrient profiling system and the easiest to compute, through an openly available algorithm that uses food components that are almost all readily available on food packaging, regardless of the eating culture or country. Most of these food components have

been shown to be involved in the development of obesity and chronic diseases, in epidemiological and mechanistic studies. In addition, via its proxies (fruits and vegetables) for some vitamins and minerals, the algorithm takes into account more items than the list displayed for its calculation.

Thus, the FSAm-NPS was designed to serve as a basis for food nutrition labelling (such as the Nutri-Score) and other public health nutrition policies (e.g. regulation of advertising, taxation, regulation of the content of vending machines) to improve the prevention of a wide range of nutrition-related chronic diseases. To enable comparison of individuals' diets according to the nutritional quality of the foods consumed, the FSAm-NPS dietary index (DI) score has been proposed to summarize the FSAm-NPS scores of all food items usually consumed by an individual, by allocating points based on the consumption of foods, food groups, or nutrients relevant for the risk of all chronic diseases or specific chronic diseases.

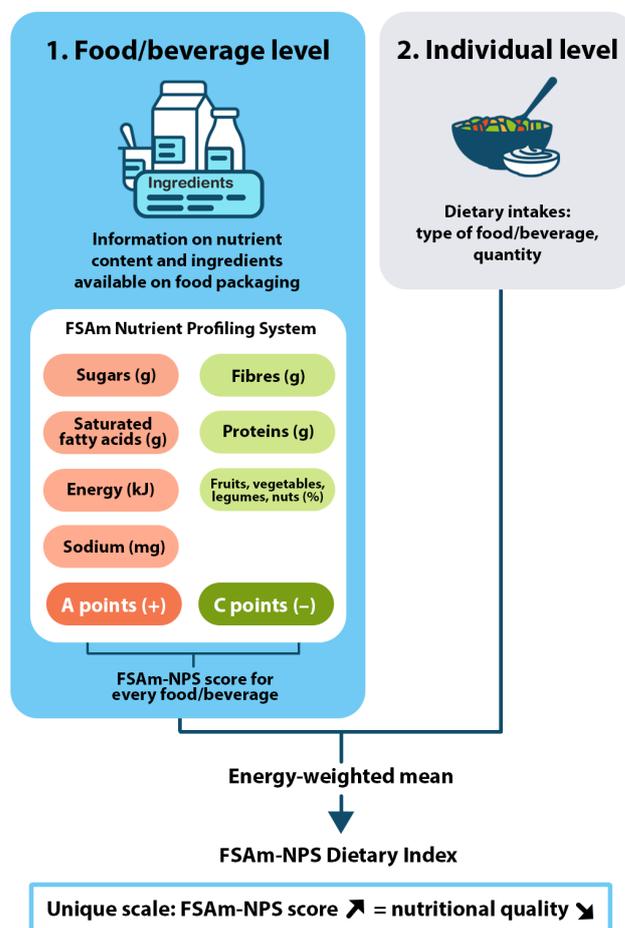


Fig. 2 The FSAm-NPS score concept and algorithms and the derived FSAm-NPS dietary index (DI) score for characterizing the nutritional quality of an individual's diet.

The need for convincing evidence to guide labelling regulations

According to the European Union labelling regulations, displaying the Nutri-Score label on food products remains optional and relies on voluntary uptake by food manufacturers. Therefore, scientific evidence on the relevance of this labelling system and the potential public health impact at the international level is of the utmost importance. To expand scientific investigations to the European level and as part of a comprehensive assessment of the validity of the FSAm-NPS, the association between the nutritional quality of food products consumed and the risk of disease and mortality was studied in the large multinational European Prospective Investigation into Cancer and Nutrition (EPIC) cohort.

FSAm-NPS DI score and risk of cancer (all locations)

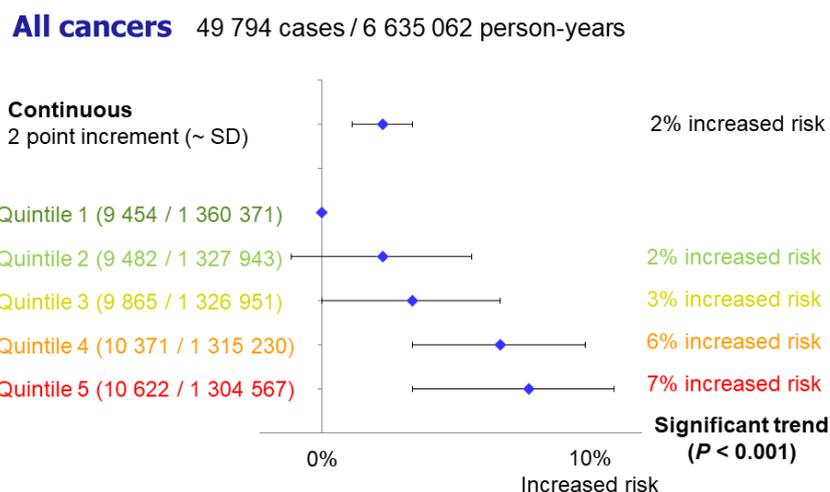


Fig. 3 Graph showing the increase in the risk of cancer with increasing FSAm-NPS dietary index (DI) score (as a continuous score as well as divided into quintiles). The number of cancer cases that occurred during the estimated time-at-risk is 49 794 for all participants in the study combined, or per 6 635 062 person-years. SD, standard deviation.

Nutritional profiles of foods and risk of cancer

Among 471 495 adults followed up in the EPIC study for a median period of 15.3 years, 49 794 were diagnosed with cancer during follow-up. The most common cancers were those of the breast (12 063 cases), prostate (6745 cases), and colorectum (5806 cases). A higher FSAm-NPS DI score of all food items usually consumed by an individual, reflecting lower nutritional quality of the diet, was consistent with unhealthy dietary intakes (e.g. higher intakes of alcohol, energy, and red and processed meat, and lower intakes of dietary fibres, vegetables, fruits, fish, and lean meat). Those individuals with the highest FSAm-NPS DI scores had a higher risk of developing cancers overall (Figure 3), and specifically cancers of the colorectum and liver (especially in women), upper aerodigestive tract and stomach, and lung (in men). For sex-specific cancers of the reproductive system, a higher FSAm-NPS DI score was associated with a higher risk of postmenopausal breast cancer and prostate cancer.

Nutritional profiles of foods and risk of mortality

Among 501 594 adults followed up in the EPIC study for a median period of 17.2 years, 54 951 died during follow-up. A total of 23 143 of the deaths were from cancer, 13 246 from diseases of the circulatory system, 2857 from diseases of the respiratory system, 1561 from diseases of the digestive system, and

“To maximize its public health impact and contribute to efficiently reducing chronic diseases, the scientifically validated Nutri-Score label should be affixed in a mandatory manner on all foods in Europe, for more transparency for citizens.”

– Dr Mathilde Touvier

1839 from external causes. A higher FSAm-NPS DI score, reflecting lower nutritional quality of the diet, was associated with an increase in the risk of overall mortality (by 6% when comparing individuals with the highest versus the lowest FSAm-NPS DI scores), specifically for cancer and diseases of the circulatory, respiratory, and digestive systems.

Well-established evidence exists on the impact of nutrition on the risks of cancer and cardiometabolic diseases, and increasing evidence supports a substantial impact of nutrition on respiratory health, through several pathways involving oxidative stress, inflammation, epigenetics, and the gut microbiome. Notably, dietary fibres (which are involved in anti-inflammatory responses) and fruits and vegetables (which are sources of antioxidants), as part of a healthy diet, have been suggested to play a beneficial role

in respiratory health, whereas food components such as saturated fats and red or processed meat (which are involved in pro-inflammatory responses), or, more generally, diets typical of industrialized countries, would have detrimental effects on health.

Implications

The Nutri-Score is a promising tool that has been proposed to promote a healthier food environment, by simplifying nutrition information for consumers while providing front-of-pack, interpretative, and easy-to-use information on the nutritional quality of food products that will enable consumers to make healthier food choices.

In addition, because the Nutri-Score is easily computable by industrial and public stakeholders, it encourages the food industry to improve the nutritional quality of the food supply.

After a series of studies showing the validity, scientific relevance, and potential public health benefits of the FSAm-NPS and the Nutri-Score label, France officially adopted the Nutri-Score in 2017. The European Commission announced in May 2020, as part of its Farm to Fork Strategy, that a harmonized and mandatory front-of-pack nutrition label would be adopted for Europe by the end of 2022. Given its scientific evidence base, as of 2021, the Nutri-Score has already been adopted by several European countries (Belgium, France, Germany, Luxembourg, the Netherlands, Spain, and Switzerland) and has been central to the European Commission discussions for several months. Medical professionals and academic societies

have also recognized the importance and potential of the Nutri-Score as a tool for public health nutrition policies in Europe that can guide the general public and patients towards food choices of higher nutritional quality.

The studies summarized here complement published or ongoing studies supporting the suitability of the FSAm-NPS as an underlying nutrient profiling system. Results of studies using the FSAm-NPS are also consistent with recent reports from the Global Burden of Disease Study and the *EAT-Lancet* Commission estimating that about 7% of premature deaths worldwide could be prevented with healthier diets. These findings are very relevant considering the current debates on the



possible implementation of a uniform mandatory front-of-pack nutrition label for all European Union countries. Similar discussions are also under way in Australia and countries in North and South America.

Acknowledgements

European citizens who participated in EPIC and investigators involved in the EPIC Nutri-Score Project investigating associations between the FSAm-NPS/Nutri-Score and cancer and mortality in EPIC:

Inge Huybrechts, co-Principal Investigator; Corinne Casagrande, co-Investigator; Carine Biessy, co-Investigator; Neil Murphy, co-Investigator; Pietro Ferrari, co-Investigator; Marc Gunter, co-Investigator, International Agency for Research on Cancer, Lyon, France;

Mathilde Touvier, Principal Investigator; Mélanie Deschasaux, co-Principal Investigator; Chantal Julia, co-Investigator; Serge Hercberg, co-Investigator; Emmanuelle Kesse-Guyot, co-Investigator; Paule Latino-Martel, co-Investigator, Nutritional Epidemiology Research Team (EREN): UMR U1153 Inserm/U1125 Inra/Cnam/Paris 13, France;

EPIC collaborators involved in the EPIC Nutri-Score Project.

Funding: Institut national du cancer (INCa) France, and Fondation pour la Recherche Médicale. This project received the NACRe Network Partnership Label.

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