



Supplementary Materials to the Policy Brief



Nine in Ten Packaged Foods in Indonesia Are High in Sugar, Salt, or Fat: Evidence from Nutrient Profile Models

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1. Methodology

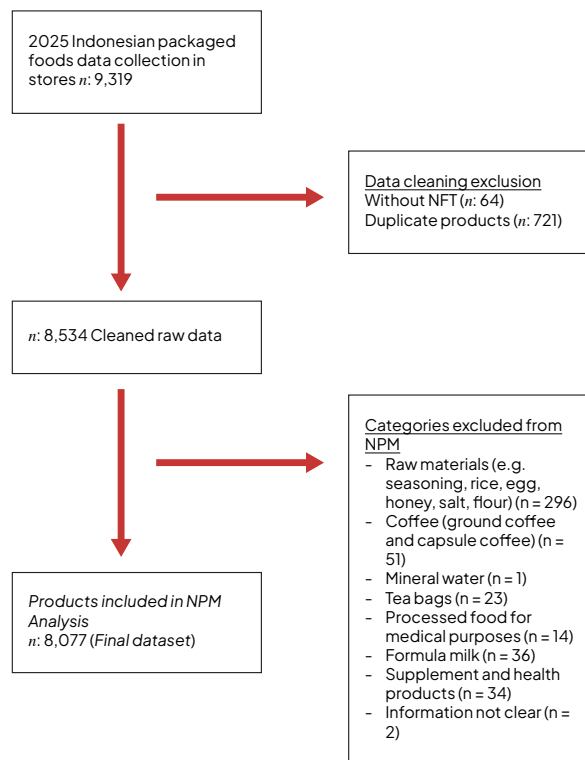
Data Collection

This analysis was conducted using a cross-sectional dataset of 8,534 packaged food and beverage products collected from eight supermarkets located in four major Indonesian cities: Jakarta, Surabaya, Makassar, and Medan. Products were systematically documented and nutrition information table data were extracted. The dataset includes both solid food products and beverages; throughout this brief, “packaged foods” refer to all packaged food and beverage products unless otherwise specified.

Nutrient Profile Model Application

Prior to analysis, the dataset was cleaned to exclude products that are not subject to NPM analysis following the WHO SEARO and WHO PAHO NPMs exclusion criteria and other similar NPMs assessment studies [12–15], including mineral water, supplements and health products, infant formula, plain tea bags, plain ground coffee/coffee capsules, culinary ingredients, and foods for medical purposes. In addition, products with unclear or incomplete packaging information were removed from the dataset. The following **Figure A1** illustrates the data cleaning process, including the corresponding number of samples.

Figure 1.1. Data cleaning process



¹ The WHO SEARO NPM excludes products that fall outside the 18 food categories defined for NPM application. These include, for example, raw materials/culinary ingredients, tea bags, and ground coffee.

² The WHO PAHO NPM excludes products for special use, including health and food supplements, as well as formula milk (for infants).





After data cleaning, the nutritional quality of products in the dataset was then assessed using three evidence-based nutrient profile models (NPMs) and Indonesia's proposed Nutri-Level thresholds:

1. The WHO South-East Asia Regional Office (SEARO) nutrient profile model [8]
2. The Pan American Health Organization (PAHO) nutrient profile model [9]
3. The best-practice nutrient profile model benchmarked against frameworks from WHO SEARO NPM, PAHO NPM, and AFRO NPM as well as lessons from Latin American countries such as Mexico and Chile [4]
4. Indonesia's proposed Nutri-Level thresholds (based on draft regulation dated 9 September 2024)

Each product was evaluated against the criteria and nutrient and ingredient of concern thresholds specified in each model.

Under the WHO SEARO model, products were assessed against category-specific thresholds for sugar, sodium, total fat, and the presence of non-sugar sweeteners to determine whether they would be subject to marketing restrictions.⁴ Although originally developed to regulate the marketing of foods and beverages to children, the SEARO model can also be adapted for other policy applications, including front-of-pack labeling, school food policies, and others, as it is developed based on the WHO's population nutrient intake goals [11]. The PAHO nutrient profile model was applied to processed and ultra-processed products to identify those exceeding thresholds for added sugar, sodium, total fat, saturated fat, and containing non-sugar and other sweeteners.⁵ The model is designed to support a range of public health policies, including front of pack labeling, marketing restrictions, and fiscal policies. Similar to SEARO, PAHO is also developed based on the WHO's population nutrient intake goals.

The best practice nutrient profile model is designed by synthesising key features from internationally recognised, evidence-based nutrient profile models (NPMs), including those developed by the WHO SEARO, WHO PAHO, and the WHO AFRO⁶. It represents a highly effective approach for identifying packaged food products high in nutrients of concern. Similar to the PAHO model, it is intended to apply to processed and ultra-processed products, identifying those that exceed thresholds for added sugar, sodium, total fat, trans fat and saturated fat, as well as those containing non-sugar sweeteners. The model is also designed to support a range of public health policies. **Table 1.1** outlines the criteria and thresholds of best practice model, as follows:

⁴ Detailed criteria and thresholds for the WHO SEARO nutrient profile model are available at: <https://iris.who.int/server/api/core/bitstreams/f14a9ed9-0bcc-49cb-923d-e071f63d3297/content>

⁵ Detailed criteria and thresholds for the PAHO nutrient profile model are available at: <https://iris.paho.org/bitstreams/e5f2ea91-bf73-4553-bffd-d157231ff353/download>

⁶ Detailed criteria and thresholds for the best-practice nutrient profile model are available at: <https://www.advocacyincubator.org/news/2024-03-04-navigating-the-food-policy-landscape-a-discussion-on-applying-nutrient-profile-models-for-better-policies>





Table 1.1. Best-practice NPM Criteria and Thresholds

Sodium	Free Sugars	Non-Sugar Sweeteners and Other Sweeteners	Total Fat	Saturated Fat	Trans Fat
≥ 1 mg of sodium per 1 kcal OR ≥ 300 mg/100 g of product OR ≥ 40 mg/100 ml in beverages that do not provide any energy	≥ 10% of total energy from free sugars in solids OR ≥ 5% of total energy from free sugars in liquids	Any amount of non-sugar sweeteners and other sweeteners	≥ 30% of total energy from total fat	≥ 10% of total energy from saturated fat	≥ 1% of total energy from trans fat

In the Nutri-Level proposal, products are classified into four categories (A–D) based on proposed national thresholds per 100 ml for beverages. As the draft regulation does not explicitly specify thresholds for foods (solid) and only includes thresholds for beverages (liquid), we assumed the same reference basis (per 100 g) for foods to ensure comparability with other nutrient profile models.

Table 1.2 presents the proposed Nutri-Level thresholds based on the BPOM draft, along with its additional classification criteria. While other NPMs provide thresholds for a broader range of nutrients of concern—such as saturated fat and trans fat—the Nutri-Level system considers only sugar, sodium (presented as “salt (sodium)” in the draft, despite being nutritionally distinct), total fat, and sweeteners.

The model also introduces several additional criteria. For sweeteners, products are graded based on whether the sweetener is “natural” or “artificial” used: to receive a grade A, products must be free from all types of sweeteners; grade B permits only natural sweeteners; and products containing artificial sweeteners are assigned a grade C or D. However, the classification of products into C or D based on the presence of artificial sweeteners introduces ambiguity and added complexity, particularly when the assessment is limited to sweeteners alone (i.e., the product is not high in total fat, salt or sugar). This differs from other evidence-based NPMs, which typically provide a clear regulatory signal when any non-sugar sweetener is present.

Additional classification rules include the definition of sugar, which encompasses monosaccharides and disaccharides, while explicitly exempting lactose from sugar thresholds. Furthermore, total fat thresholds do not apply to plain dairy products, such as plain milk and yoghurt in liquid, concentrate, and powder forms. These exclusions differ from those used in evidence-based nutrient profile models (NPMs), which apply





more consistent criteria across product categories. As a result, certain products may be excluded from assessment under the Nutri-Level thresholds, potentially limiting its ability to comprehensively identify unhealthy products.

Table 1.2. Summary of Proposed Nutri-Level Thresholds (Draft BPOM Regulation)

(Per 100 g of food or per 100 ml of beverage)

Nutrient	A	B	C	D
Sugar (g)	≤ 0.5	> 0.5 – ≤ 6.0	> 6.0 – ≤ 12.5	> 12.5
Salt (Sodium) (mg)	≤ 5	> 5 – ≤ 120	> 120 – ≤ 500	> 500
Total Fat (g)	≤ 0.5	> 0.5 – ≤ 3.0	> 3.0 – ≤ 17.0	> 17.0

Additional Classification Criteria of Nutri-level thresholds

Criterion	A	B	C	D
Sweeteners	No natural or artificial sweeteners	Natural sweeteners only	Natural and/or artificial sweeteners permitted	Natural and/or artificial sweeteners permitted
Front-of-Pack Labelling Requirement	Voluntary	Voluntary	Mandatory	Mandatory
<ul style="list-style-type: none"> ● Plain milk/dairy products are exempt from total fat thresholds ● Lactose is exempted from sugar thresholds 				

Outcome Measures

The primary outcome measure for the study was the proportion of products subject to food policy measures under each model or proposed thresholds, defined as products exceeding at least one nutrient or ingredient-of-concern threshold.

Comparisons across models were then conducted at two levels:

- Overall packaged food environment (All packaged foods)
- Ready to consume Sugar-sweetened beverages (SSBs), the product category prioritised for initial implementation under Indonesia’s proposed Nutri-Level policy





Thus, two denominators were used depending on the scope of analysis:

1. **All packaged foods:** denominator = total number of packaged foods in the cleaned dataset subject to NPM analysis.
2. **Ready-to-consume Sugar-sweetened beverages (SSBs):** denominator = SSBs in the cleaned dataset subject to NPM analysis that would be subject for regulation (includes concentrates and powdered products).

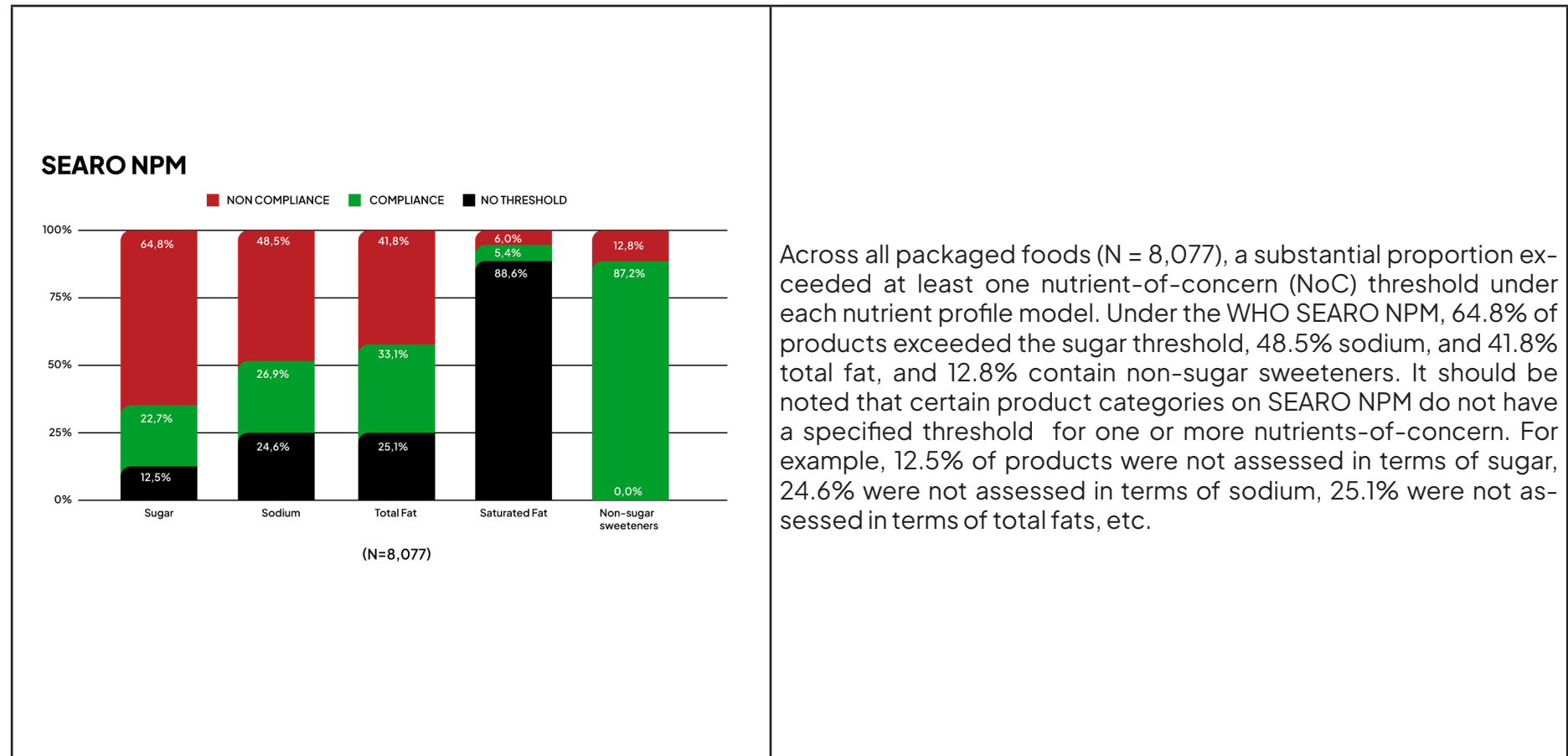
This approach ensures comparability within product groups and prevents distortion arising from mixed denominators.



2. Nutrient Profile Assessment Results

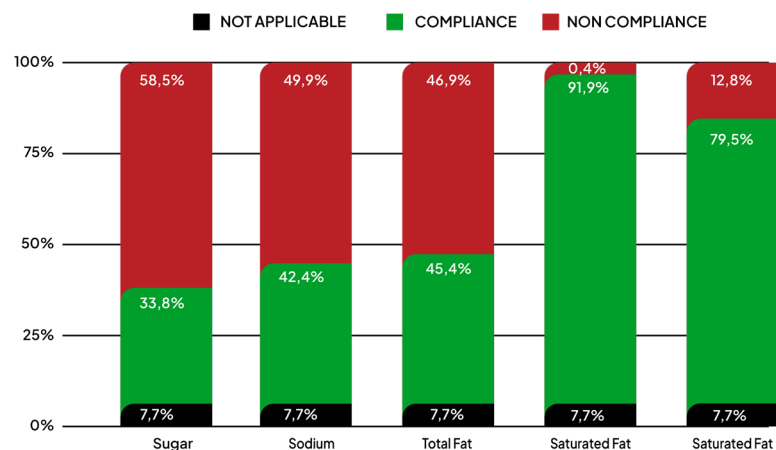
All Packaged Food

Table 2.1. Proportion of all Indonesian-packaged foods and beverages that would trigger at least one of the NoCs thresholds (inc. NSS), based on Nutrient Profile Models and Nutri-level thresholds





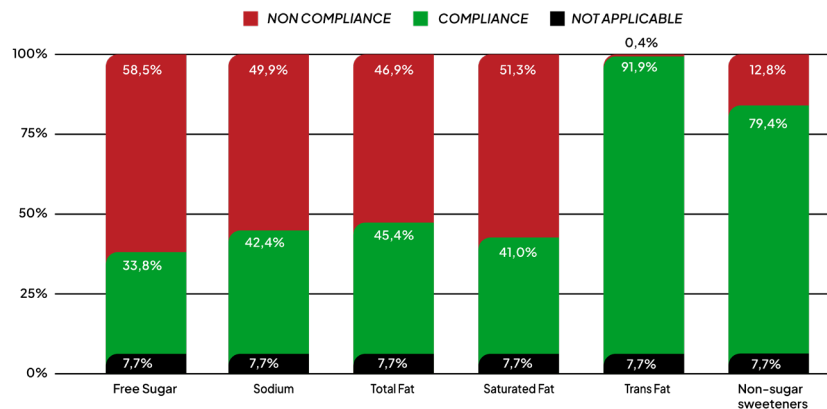
PAHO NPM



(N=8,077)

The PAHO NPM similarly identified high levels of non-compliance for sugar (58.5%) sodium (49.9%), total fat (46.9%), saturated fat (51.1%) and trans fat (0.4%). It should be noted that 7.7% of products in the total sample were not assessed under the PAHO model, as they fell outside the definition of processed and ultra-processed foods. However, comparing this to the SEARO model, the thresholds of the PAHO model still capture more products for each of the nutrients of concern.

BEST PRACTICE NPM

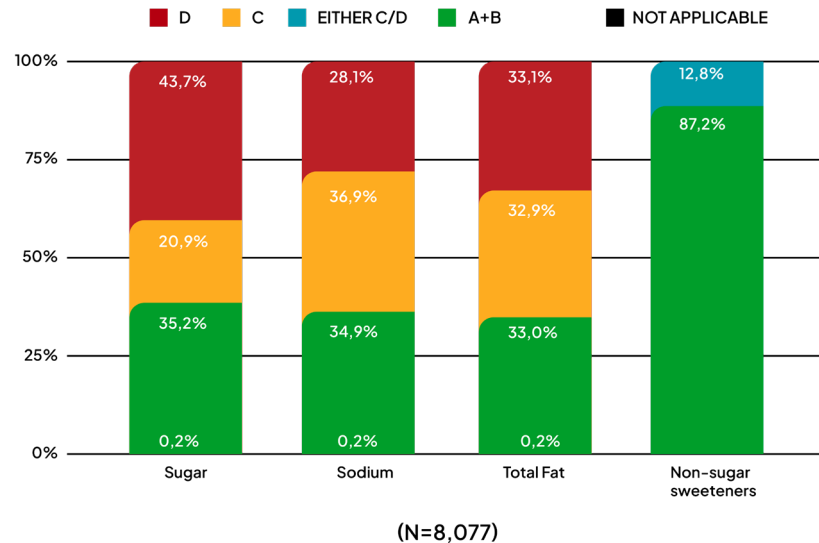


(N=8,077)

Based on the best practice NPM, 58.5% of products exceed free sugar threshold, 49.9% exceeding sodium threshold, 46.4% exceeding the total fat threshold, 51.3% exceeding saturated fat threshold. Meanwhile, only 0.4% of products exceed the trans fat threshold and 12.8% of products contain non-sugar sweeteners. Similar to PAHO, the best practice NPM includes only processed and ultra-processed products, which means it excludes the unprocessed and minimally processed foods (7.7%).



Nutri-level



Under the proposed Nutri-Level thresholds, the proportions of products classified in categories C and D vary by nutrient. For sugar, 20.9% of products fall into category C and 43.7% into category D. For salt (sodium), 36.9% are classified as C and 28.1% as D. For total fat, 32.9% fall into category C and 33.1% into category D. For the Nutri-Level thresholds, it should be noted that the percentage of products that are categorized as D (the unhealthiest) for these nutrients of concern is much lower compared to the percentage of products that are clearly classified as “excess in” under other models.

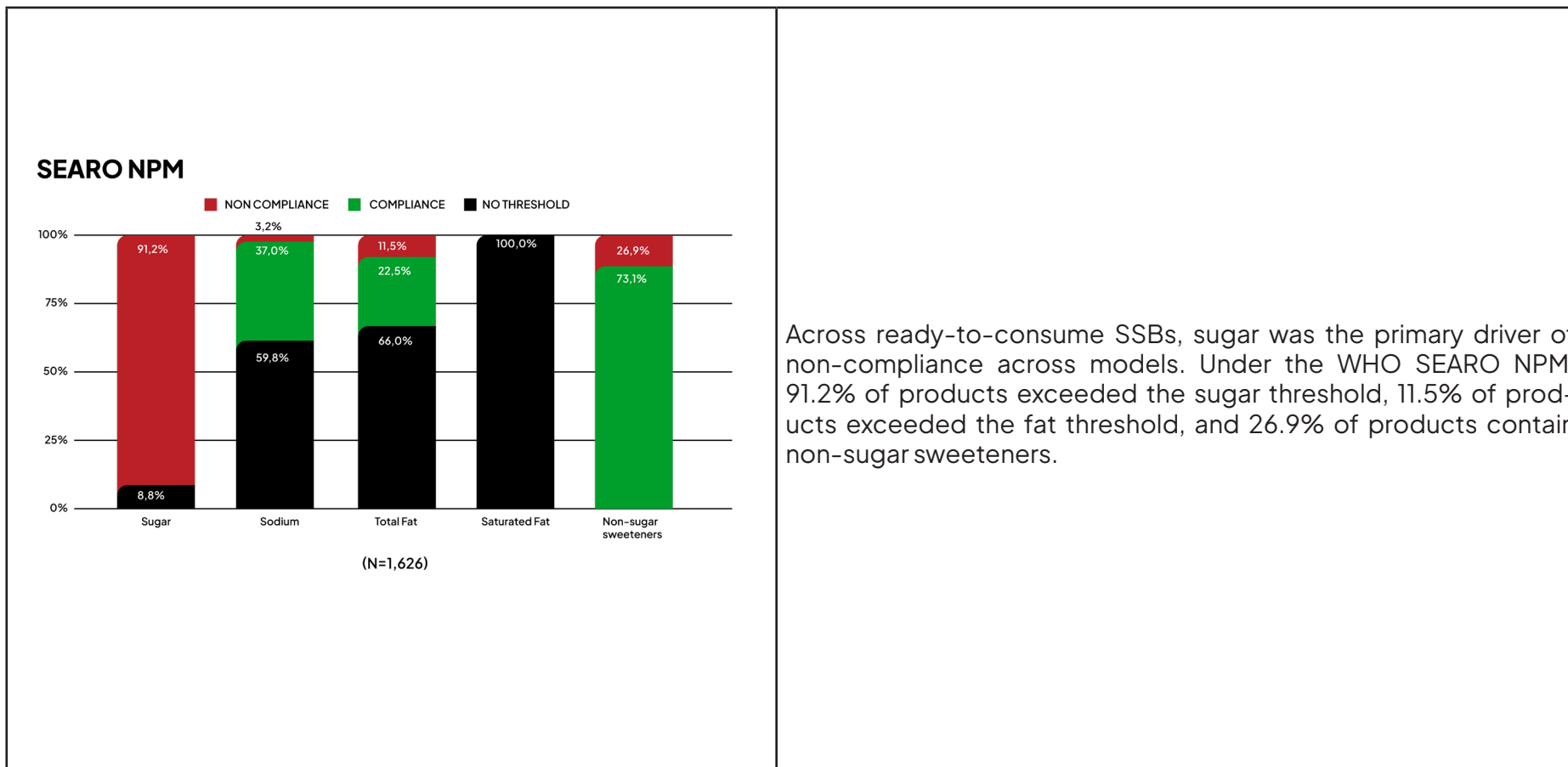
A small proportion of products are excluded from the assessment for specific nutrients. Approximately 0.2% of fresh and fresh-frozen products (such as meat, poultry, seafood, fruits, and vegetables) are excluded from the sugar thresholds and the sodium thresholds. For total fat, 1.0% of products are excluded, including the similar fresh and fresh-frozen products as well as plain milk products, which are exempted from the total fat thresholds.

For non-sugar sweeteners, 12.8% of products fall into either category C or D, highlighting the ambiguity of Nutri-Level criteria for sweeteners.



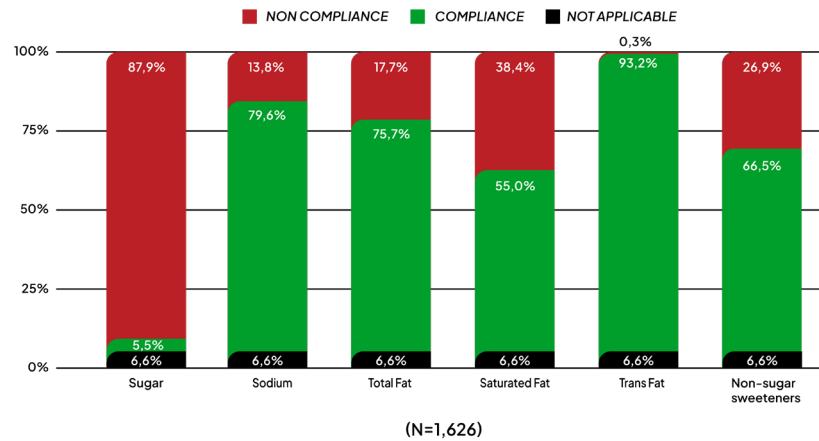


Table 2.2. Proportion of all Indonesian-ready-to-consume SSBs that would trigger at least one of the NoCs thresholds (inc. NSS), based on Nutrient Profile Models and Nutri-Level thresholds



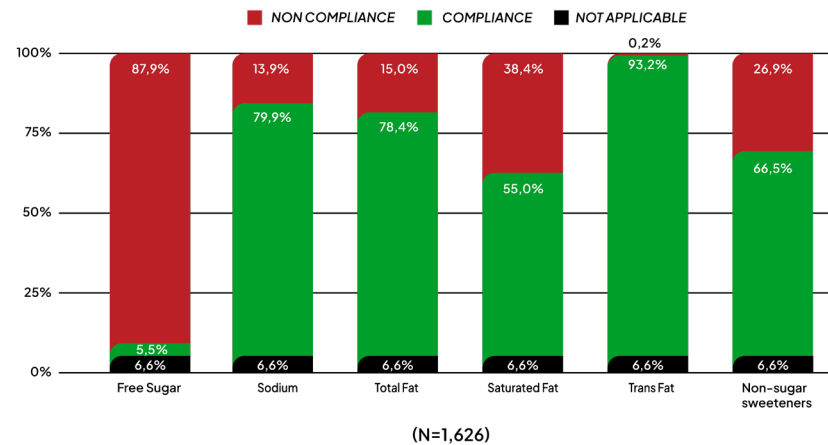


PAHO NPM



The PAHO NPM identified 87.9% of products as exceeding the sugar threshold and 38.4% of products as exceeding the saturated fat threshold, while exceedance for sodium (13.8%) and total fat (17.7%) was comparatively low. Approximately 26.9% of products also have to be regulated as they contain non sugar sweeteners. Saturated fat thresholds were triggered for 0.2% of products. It should be noted that 6.6% of SSBs were not assessed under the PAHO model, as they fell outside the definition of processed and ultra-processed foods. These include products such as fresh milk, 100% fruit juice (no food additive ingredients), unsweetened coffee or tea.

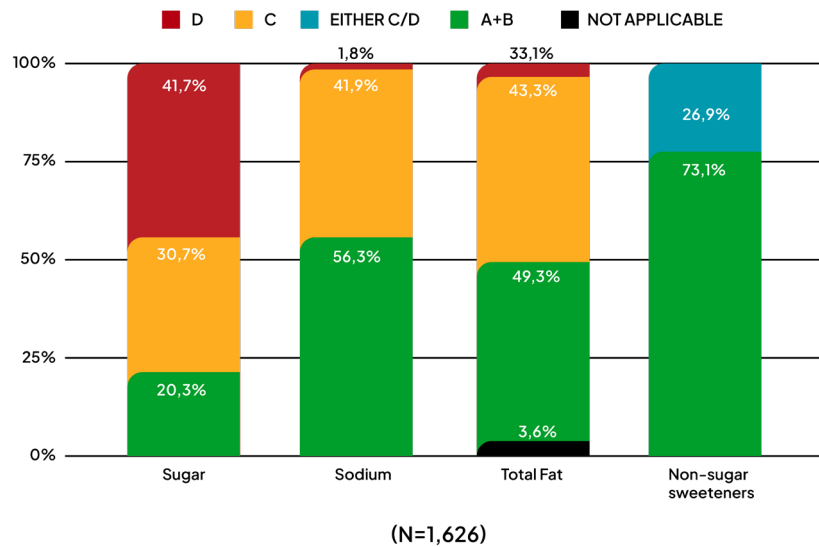
BEST PRACTICE MODEL



Based on the best-practice NPM, 87.9% of ready-to-consume SSB products exceed the free sugar threshold. In comparison, 13.9% exceed the sodium threshold, 15.0% exceed the total fat threshold, and 38.4% exceed the saturated fat threshold. Meanwhile, only 0.3% of products exceed the trans fat threshold, and 26.9% contain non-sugar sweeteners.



Nutri-level



Under the proposed Nutri-Level thresholds, a substantial proportion of ready-to-consume SSBs are classified in categories C and D. For sugar, 35.7% of products fall into category C and 41.7% into category D. For salt (sodium), 41.9% are classified as C and 1.8% as D. For total fat, 43.3% fall into category C and 3.8% into category D. For the Nutri-Level thresholds, it should be noted that the percentage of products that are categorized as D (the unhealthiest) for these nutrients of concern is much lower compared to the percentage of products that are clearly classified as “excess in” under other models.

Approximately 3.6% of SSBs are exempt from the total fat assessment under the Nutri-Level thresholds, as plain milk and dairy products are excluded from the total fat criteria.

For non-sugar sweeteners, 26.9% of products fall into either category C or D, highlighting the ambiguity of Nutri-Level criteria for sweeteners.

3. Nutrient Profile Model Assessment based on food categories

Table 3.1. presents the proportion of Indonesian packaged foods and beverages that would trigger at least one nutrient-of-concern (NoC) threshold (including non-sugar sweeteners, NSS), based on the WHO food categorization system (18 categories), according to WHO SEARO NPM, WHO PAHO NPM, the Best Practice NPM, and Nutri-Level thresholds.

The results show that beverage categories—including milk and dairy-based drinks (6b), water-based flavoured drinks (6c), and coffee, coffee substitutes, tea, and herbal infusions (6d)—are among the product categories with the highest proportion of items triggering at least one NoC threshold. This is followed by confectionery (1), fine bakery wares, and potato-, cereal-, starch-, and animal-based snacks (5a).

Table 3.1. Proportion of all Indonesian-packaged foods and beverages that would trigger at least one of the NoCs thresholds (inc. NSS)

	SEARO NPM	PAHO NPM	BEST Practice NPM	Nutri Level C	Nutri Level D
	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)
FOODS and BEVERAGES					
1. Confectionery	14.2%	13.6%	14.2%	1.7%	12.8%
2. Fine bakery wares	13.3%	13.1%	13.2%	0.2%	13.0%
3. Bread and ordinary bakery wares	3.8%	3.7%	3.8%	0.9%	2.9%
4. Cereals	3.1%	2.7%	2.9%	1.1%	2.4%
5a. Potato, cereal or starch-based (from roots, tuber, or legumes) and animal based (from skin)	10.0%	9.9%	10.0%	0.4%	9.6%



	SEARO NPM	PAHO NPM	BEST Practice NPM	Nutri Level C	Nutri Level D
	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)
5b. Processed nuts	3.7%	3.2%	3.7%	0.0%	3.7%
5c. Fish-based	0.3%	0.3%	0.3%	0.0%	0.3%
6a. Juice	2.3%	0.6%	2.6%	1.6%	0.3%
6b. Milk and dairy based drinks	33.6%	31.1%	33.6%	10.2%	16.9%
6c. Water-based flavoured drink	33.8%	33.5%	33.8%	18.1%	14.3%
6d. Coffee, coffee substitutes, tea, herbal infusions	21.4%	21.8%	22.1%	8.0%	11.3%
6e. Cereal, grain, tree nut-based beverages	3.3%	5.0%	5.2%	2.3%	1.0%
7. Frozen dairy based desserts and edible ices	2.2%	3.1%	3.1%	1.1%	1.9%
8. Curdled dairy based desserts	2.6%	2.4%	2.6%	0.9%	1.6%
9. Cheese and analogues	1.4%	1.5%	1.6%	0.1%	1.5%
10. Composite foods	7.7%	8.0%	8.1%	1.1%	7.0%
11. Fats and oils, and fat emulsions	0.8%	2.2%	2.4%	0.0%	2.4%
12. Pasta and noodles and like products	1.1%	1.1%	1.2%	0.7%	0.7%





	SEARO NPM	PAHO NPM	BEST Practice NPM	Nutri Level C	Nutri Level D
	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)	% out of total sample (n: 8,077)
13. Fresh and frozen meat, poultry, game, fish and seafood products	-	-	-	-	-
14a. Processed meat, poultry and game products	5.6%	5.5%	5.6%	1.3%	4.2%
14b. Processed fish and seafood products	2.9%	3.1%	3.3%	1.4%	1.9%
15. Fresh and frozen fruits and vegetables and legumes	-	-	-	-	-
16. Processed fruits and vegetables	6.6%	7.0%	7.8%	2.1%	5.3%
17. Solid-form soybean products	0.4%	0.4%	0.5%	0.2%	0.2%
18. Sauces, dips, and dressings	9.5%	9.5%	9.7%	0.9%	8.8%
TOTAL FOODS and BEVERAGES REQUIRING REGULATION	90.2%	90.7%	93.8%	19.5%	73.0%

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