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# Construction of the “Photographic Atlas of Standardized Foods and Beverages” to support the online application of the “24-hour reminder multi-step method” survey and the “NOVA 27 UPF Categories Tracker”

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## Purpose of the “Photographic Atlas of Standardized Foods and Beverages” user’s manual

This manual was created to assist in the online application of the “24-hour reminder multi-step method” survey and the “NOVA 27 UPF Categories Tracker”.

## Data sources for the construction of the atlas

There were 4 data sources used in the creation of the Photographic Atlas of Standardized Foods and Beverages:

- the “Photographic catalogue as a tool to estimate food intake in children and adults” prepared by Chumbi and Vásquez, (1)
- the “Photographic Atlas” from the Aliméntate Ecuador program by the Ministry of Economic and Social Inclusion, (2)
- photographs of ultra-processed products without proof of origin, and
- the “Health and Nutrition National Survey in Ecuadorian Population Aged 0 to 59. ENSANUT 2012», consumption survey chapter. (3)

The “Photographic Catalogue” published by Chumbi and Vásquez (1) and the “Photographic Atlas” published by Aliméntate Ecuador (2) were designed to gather quantified information on the consumption of foods through face-to-face interviews. In both cases, the food recording process was done per portion, assigning codes to differentiate each food and its portion regarding volume and amount in grams or milliliters.

Given that Chumbi and Vásquez’s (1) “Photographic Catalogue” and the Aliméntate Ecuador Atlas (2) do not record the ultra-processed products category—which are part of the population’s diet—it was decided to add foods and beverages without proof of origin to

the Photo Atlas of ultra-processed foods and beverages. Once the photos were selected from these 3 sources, they were grouped into 5 categories, 65 subcategories and 118 portions.

## Characteristics of the “Photographic Catalogue as a tool to estimate food intake in children and adults”

The “Photographic Catalogue as a tool to estimate food intake in children and adults” by Chumbi and Vásquez (1) was based on mainly consumed products in Ecuador’s Azuay province. It is made up of 12 categories, displayed in Table 1.

**Table 1.** Food categories from the “Photographic Catalogue” by Chumbi and Vásquez (1)

1. Soups	5. Salads	9. Oils and fats
2. Meats and charcuterie	6. Fruits and vegetables	10. Dairy products
3. Breads and Cereals	7. Legumes	11. Beverages
4. Tubers and bananas	8. Eggs	12. Others

Each category is divided into various subcategories, to which a letter from A to F is assigned depending on the size or portion of the subproduct and on the number of subproducts. For example, broaster chicken was assigned number 1 and 3 capital letters: B, D, F. Dry chicken was assigned number 2 and letters A, B, C, E, F, G, depending on portion size and weight.

An index is presented at the end of the document, this index records every food by category, the portion of each food with its weight in grams or volume in milliliters. This catalogue registers a total of 87 foods.

## “Photographic Atlas of Food Portions”

Aliméntate Ecuador’s “Photographic Atlas” (2010) (29) was based on 20 interviews conducted by geographic region in 5 Ecuadorian regions. The interviews were conducted in each selected person’s home. Data was collected on the foods consumed on the day of the interview. Pictures were also taken, which were later systematized to reflect weight and measurement equivalencies. Using the systematized data, a code was assigned to identify each portion of each food, in order, from the largest to the smallest.

This atlas presents the 29 most consumed foods of the 5 selected regions. Four photographs were taken of each food that differ in portions, amounts and weights. The photographs show different foods such as cereals, tubers, bread, noodles, vegetables, fruits, meats, eggs, fats and sugars. Prepared foods were also included, such as salads and soups, and also photographs of glasses, mugs and cups.

The food photos collected were grouped according to the classification pattern published by the U.S. Department of Health and Human Services and the U.S. Department of Agriculture. (4) Food and portion sizes were then identified. Afterwards, 10 units of each food were obtained to weigh them according to size and were classified into small, medium, large and extra-large portions.

The procedure described by Nelson and Haraldsdóttir was used for food recording. (5) Each image was coded with numbers and letters, depending on food type, following

the order of presentation of portion images. For example, number 1 was assigned to potatoes; letter A refers to the larger potato, B refers to a smaller potato, C refers to an even smaller potato and D refers to a very small potato.

## Inclusion of photographs of ultra-processed products

As mentioned earlier, given that neither Chumbi and Vásquez’s “Photographic Catalogue” (1) nor Aliméntate Ecuador’s “Photographic Atlas” (2) include ultra-processed products; photographs of ultra-processed foods and beverages purchased in supermarkets in Quito were taken for this document. They were taken out of their packaging to avoid identification of the brands that produce them. The ingredients information provided on each product packaging was reviewed and each product was later coded following the established system.

## Construction of the “Photographic Atlas of Standardized Foods and Beverages” to validate the “NOVA 27 UPF Categories Tracker”, which focuses on ultra-processed products consumption

The atlas was designed in a first draft after organizing the 3 data sources. This atlas allows to look for each food and beverage reported by the interviewee, since they are able to identify the product and the approximate amount consumed by viewing different photographs of the same product, or a similar one, to that consumed in the 24 hours prior to the interview.

This “Photographic Atlas of Standardized Foods and Beverages” includes 5 categories, 65 subcategories and 118 portions, as shown in the following table.

**Table 2.** Components of the “Photographic Atlas of Standardized Foods and Beverages”

Categories	Subcategories	Total	Portions
1. Cooking ingredients		4	16
2. Standardized food portions	a. Cereals	5	19
	b. Fruits	6	21
	c. Vegetables	4	15
	d. Tubers, roots and bananas	3	12
3. Dishes prepared at home or at restaurants	a. Soups and second courses	16	56
	b. Home-made beverages	5	11
	c. Others	3	11
	d. Desserts	1	4
4. Ultra-processed products and beverages		11	20
5. Snacks		7	16
Coding and weights			
Total		65	118

The atlas was validated after its development, at the same time that the “NOVA 27 UPF Categories Tracker” and the “24-hour reminder multi-step method” survey were validated. This process enabled us to adjust the atlas, given that they reported consuming products not listed in the atlas, which could lead to misclassification when applying both the tracker and the survey. For example, chocolate made from 100% cacao, which does not belong to the processed or ultra-processed categories, since its production does not include products used by the food and beverage industry. Therefore, this product belongs to the minimally-processed category. Another example is powdered milk, placed in the ultra-processed category, since the ingredient information shows that the company adds sugar substitutes to improve taste. Based on the same criteria, the decision was made to divide the *salchipapas* dish into French fries, which are simply fried in oil, and sausages, which are ultra-processed. Also, coffee and tea produced by the industry were included as ultra-processed beverages. Jello was placed in the fruit-flavored beverages category. Lastly, canned menestra, humitas, quimbolitos and muchines, as well as pre-cooked, frozen and seasoned products, which are also produced industrially, even though they maintain the same appearance as home-made dishes, were added to the ultra-processed list. However, in their industrial form, additives are used to improve their taste, appearance, shelf life, and thus are ultra-processed products.

After validating the atlas, the original list of products was updated and it was decided that, during the interview, the surveyor must ask the interviewee verifying questions regarding the product they report consuming to assign it the proper category in the NOVA system and in the 24-hour questionnaire.

## Coding

A unique code was assigned to code the foods in the atlas, which consists of:

- two digits followed by a period,
- two digits followed by a period,
- three capital letters that correspond to the first three letters of the product’s name, followed by another period, and
- a lowercase letter beginning with “a” and follows alphabetical order by the number of portions contained in each product.

Under this coding system, the first two digits refer to the category and the following two digits refer to the subcategories within each category. For example, in the sugar chart, sugar portions are recorded as 01.01.AZU.a; 01.01.AZU.b; 01.01.AZU.c or 01.01.AZU.d to indicate one, two, three or four portions, respectively.

Each code also corresponds to a specific weight the interviewee reports having consumed. The code selected by the interviewee is recorded in the “ORGA AUX Final Survey (standardized food and beverages)” sheet, which is the database being built as each interview is conducted. (See annex 1)

## Application of the “Photographic Atlas of Standardized Foods and Beverages”

The atlas was developed as supporting material for applying the “24-hour reminder” survey in an online interview (e.g., via Zoom) or in person, and for applying the “NOVA 27 UPF Categories Tracker”.

To apply it with the tracker, which is the first questionnaire used in the interview, it must be noted that it begins with a quick check-up in which the interviewee identifies, from the list presented to them, each food consumed in the previous day. This interview should last no more than 5-10 minutes, however, if the interviewee needs to confirm what they consumed in the previous day, a photograph of the corresponding (or the most similar) UPF product from the atlas they claim to have consumed, to confirm the selection of the UPF product chosen initially.

When applying the “24-hour reminder” questionnaire, the interviewee is asked on each food consumed and its amount. To ensure that the reported amount, portion or volume consumed is closer to the real portion consumed, a photograph of the product from the atlas is shown to select the one that resembles the most to what they consumed. If the atlas does not include a photo of the product reported by the interviewee, a photo of the product closest to the reported product is shown to choose size or volume consumed.

Since the survey data entry is automated, once the interview is finished, data is already recorded in the “ORGA\_AUX Standardized Foods and Beverages: Final Survey Database” Excel sheet. The database is built automatically, which, in Ecuador, was moved to KOBO Open data kit (6), and which in other countries may be moved to another electronic platform.



## References

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