

Frequency of Fruit and Vegetable Consumption

MEASURING TOOL



KNOWLEDGE TRANSLATION

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This document is part of the [Toolbox for Carrying Out a Food Access Diagnostic and Evaluating the Effects of a Food Cooperative](#), developed as part of the EffICAS study conducted by the Institut national de santé publique du Québec. One of the main goals of this toolkit is to help stakeholders draw up a diagnostic portrait—a snapshot at a given point in time—of people’s food access and to assess the effects of a food cooperative on individuals and communities.

More specifically, the proposed measuring tool can be used to determine the frequency of fruit and vegetable consumption. Improving fruit and vegetable consumption is often a desired effect of food-related interventions, since it is considered to be conducive to healthy eating, an important determinant of health (WHO, 2002). As such, this tool can be used to measure the frequency of consumption at a given point in time, as in a diagnostic portrait, and to compare several measurement times with each other to assess the impact of an intervention focused on fruit and vegetable consumption.

DEFINITION AND SOURCE

The frequency of consumption of fruit and vegetables refers to the number of times an individual consumes fruit or vegetables per unit of time, regardless of the quantity consumed.

The questions concerning the frequency of fruit and vegetable consumption are taken from the Canadian Community Health Survey (CCHS) (Statistics Canada, 2019, 2022). A measure of the frequency of daily fruit and vegetable consumption, as gauged in this tool, provides an estimate of the number of portions consumed daily (Traynor *et al.*, 2006).

QUESTIONNAIRE

The questions used in EffICAS study to measure the frequency of fruit and vegetable consumption are as follows:

- An introduction;
- General instructions;
- A series of six (6) mandatory questions on whether certain food categories are consumed, each accompanied by a conditional question relating to the frequency of consumption;
- An indication for five (5) of the six (6) food categories to determine what is included or excluded.
- Two response scales and one numerical response.

Introduction: These next questions are about the fruits and vegetables you ate or drank during the last month. Think about all meals and snacks, at home and away from home.

Instructions: In the last month, please indicate how often you have eaten the following foods.

Mandatory questions, with indications on the inclusion or exclusion of foods covered by the wording:

1. Did you drink **100% pure fruit juices**, such as pure orange juice, apple juice or pure juice blends? **Exclude** fruit-flavored drinks with added sugar or fruit punch.
2. Did you eat **fruit** (excluding the above-mentioned juices)? Please remember to **include** frozen, dried or canned fruit.
3. Did you eat **dark green vegetables** such as broccoli, green beans, peas and green peppers or dark leafy greens including romaine or spinach? Please remember to include frozen or canned vegetables and vegetables that were cooked in soups or mixed in salad.
4. Did you eat **orange-coloured vegetables** such as carrots, orange bell pepper, sweet potatoes, pumpkin or squash? Please remember to include frozen or canned vegetables and vegetables that were cooked in soups or mixed in salad.
5. Did you eat **potatoes** that are not deep fried?
6. **Excluding** the green and orange vegetables as well as the potatoes you have already reported, in the last month, did you eat **OTHER vegetables**? Examples include cucumber, celery, corn, cabbage and vegetable juice.

Answer choice to mandatory questions and associated values:

- 1- Yes
- 2- No
- 99- Prefer not to answer / Don't know

CONDITION: For each of the six mandatory questions, if the answer is "yes," ask the following question of frequency.

Conditional question: How many times? You can report per day, per week or per month.

Digital answer: Authorized value between 1 and 300 (Note: These limit values are taken from the CCHS. However, the EfficAS team has revised these values in the light of responses to its first questionnaire. More details in the *Processing and Analysis* section).

Answer choice and associated values: 1 – Per day, 2 – Per week, 3 – Per month

PROCESSING AND ANALYSIS

In the CCHS tool, the frequency of fruit and vegetable consumption can be measured in two ways, either including or excluding the consumption of 100% fruit juice. However, it is recommended to prefer the measurement without the consumption of fruit juices, as these are considered a sweetened beverage in the 2019 edition of *Canada's Food Guide* (Health Canada, 2019). In both cases, the aim is to calculate an average consumption frequency for the five or six fruit and vegetable categories covered.

Since the CCHS questionnaire allows for a wide range of responses in terms of frequency of consumption (three response modalities, and numbers that can be high), the EffICAS team followed NIH recommendations (National Cancer Institute, 2021) and chose to eliminate certain outliers (extremes) before proceeding with the calculation of the average. Here are the actions taken to limit or correct the responses obtained:

- The values allowed in response to the question “How many times” **per week or per month** were limited to between 1 and 50 in the questionnaire administered to EffICAS study respondents. As a result, no corrections were made when processing the data.
- The values allowed in response to the question “How many times” **per day** were limited based on the Dietary Screener Questionnaire (DSQ) in the American *National Health and Nutrition Examination Survey 2009–2010* (National Cancer Institute, 2021). Since the DSQ groups foods differently from the categories used by the CCHS questionnaire, the EffICAS team chose an equivalent food group between the two questionnaires to delimit the frequency values to be retained or included for the analyses. The following table shows the values considered to be outliers for the six food categories studied, as well as the food group used as a reference.

CCHS fruit or vegetable category	DSQ food group	Values considered to be outliers
100% pure fruit juice	Fruit juice	More than 8 times per day
Fruits	Fruits	More than 8 times per day
Dark green vegetables	Salads and other vegetables	More than 5 times per day
Orange vegetables		More than 5 times per day
Other vegetables		More than 5 times per day
Potatoes, not fried	Potatoes, not fried	More than 3 times per day

Once the outliers have been removed, the responses obtained must be transformed to make them comparable, using a single unit of frequency: daily consumption. To do this, we divide the answers for the number of times a week by 7, and for the number of times a month by 30.

Once outliers have been processed and converted to daily consumption, all that remains is to calculate the fruit and vegetable consumption score by totalling the five (excluding fruit juice) or six (including fruit juice) food categories. To avoid inducing non-response bias, the sum can only be calculated if a response has been obtained for each of the food categories surveyed. The score for the frequency of fruit and vegetable consumption per day can thus vary:

- **including fruit juice** (six categories): **from 0** (never ate or drank fruit and vegetables in the last month) **to 34** (said they ate or drank the maximum number of times a day for all categories in the last month);
- **excluding fruit juice** (five categories): **from 0 to 26**.

INTERPRETATION

The World Health Organization (WHO) recommends consuming a minimum of 400 g of fruit and vegetables per day, equivalent to five or more servings per day (World Health Organization, 2018; WHO, 2002). A measure of the frequency of daily fruit and vegetable consumption, as gauged in this tool, provides an estimate of the number of portions consumed daily (Traynor *et al.*, 2006).

With this in mind, the minimum threshold for meeting the WHO recommendation is a frequency of consumption of five or more times a day. Below this level, the frequency of consumption is probably insufficient to generate fruit and vegetable consumption in line with the recommendation.

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