# Technical Consultation on Measuring Healthy Diets: Concepts, Methods, and Metrics

## Fact Sheet: Global Diet Quality Project DQ-Q

This fact sheet on the Diet Quality Questionnaire (DQ-Q) of the Global Diet Quality Project was elaborated by Anna Herforth.

| Characteristic | Description |
|---|---|
| **Basis and rationale** | • The Diet Quality Questionnaire (DQ-Q) was developed to enable population-level diet quality monitoring. National quantitative dietary intake surveys are high cost and are not regularly or recently carried out in most countries. The DQ-Q tool and indicators provide a feasible, low-burden means for collecting accurate, reliable, comparable food group consumption data at population level. The food groups are purposefully selected to reflect diet quality holistically. <br>• The DQ-Q is designed to capture both nutrient adequacy and diet patterns related to NCD risk, as well as aspects of diets related to the nutrition transition, and to sustainability. It contains 29 food groups (see Annex) from which several indicators can be derived: (1) the MDD-W (and Food Group Diversity Score, FGDS); (2) the Global Dietary Recommendations (GDR) Score, which is a measure of alignment with WHO global recommendations for healthy diets (see box below); (3) minimal adherence to universal food-based dietary guidelines; and additional indicators (combinations of the above, sustainability indicators) under development. <br>• Many countries and programs now seek to measure the MDD-W. The DQQ is a standardized data collection tool to do so, which additionally confers new indicators that capture health-protective patterns and unhealthy food intake, aligned with dietary benchmarks expressly intended for global application. |
| **Uses** | • The DQ-Q is a monitoring tool for diet quality at population level, suitable for characterizing diet patterns and tracking trends over time. It is designed for implementation in large multi-topic surveys, including the Gallup World Poll, DHS, and national surveys, where the module must be rapid, and implementable by non-nutritionists without requiring probing or visual aids. It takes 5 minutes and can be administered in person or via phone. <br>• The characteristics that make the DQ-Q suitable for multi-topic surveys also render it a useful tool for program and multisectoral research applications, where diet quality measurement has been limited by lack of nutrition capacity, such as within agriculture programs. <br>• The food groups of the DQ-Q are universal, while the specific question wording for each food group is adapted for each country. To ensure a consistent, cognitively valid approach, the Global Diet Quality Project is producing country-adapted DQ-Qs for approximately 100 countries, to be publicly available and downloadable by the end of 2021. The availability of these ready-to-use tools is intended to facilitate and catalyze diet quality monitoring in countries, and across sectors. |

| | |
|---|---|
| | • Governments and programmers can use the DQ-Q in their own data collection, and can use the data to inform priority policies, interventions, regulations, and communications that aim to improve people's diets.<br>• The key strengths of the DQ-Q are firstly its feasibility – gathering a maximum amount of information with a minimum amount of time and resources – and secondly its attention to cognitive validity in question design to ensure consistent comprehension, verifying the meaning of specific foods and terminology in each country to a depth that has never been done before across countries.<br>• The key limitation of the DQ-Q is that it does not collect quantitative information in terms of volume of each food consumed. The data show the percent of people in the population consuming each food group, but not the average amount consumed of each food group. Energy intake is not assessed.<br>• The DQ-Q should not be used for individual-level dietary assessment. |
| **Demographic groups** | • The DQ-Q is designed for measuring food group consumption in the general population, globally. It has been validated with individuals age 15+.<br>• Note: for children under age 2, the Global Diet Quality Project is also producing country-adapted IYCF modules aligned with both the DQ-Q and WHO/UNICEF indicators for assessing IYCF practices (2021). |
| **Description and scoring**<br><br>*See Annex for further detail.* | • The DQ-Q is a set of yes/no questions about consumption of 29 food groups in the previous day or night. Respondents are asked whether they consumed any of up to 7 sentinel foods per question, which are the most commonly-consumed food items in each food group in each country setting.<br>**DQ-Q Indicators:**<br>• The FGDS is a 10-food-group continuous score for the whole population, corresponding to the 10 food groups of the MDD-W. It has a total score of 0-10. The higher score, the higher the likelihood of nutrient adequacy. For the MDD-W, a score of 5 out of 10 is associated with a higher likelihood of meeting recommendations for 11 micronutrients among women age 15-49 (Martin-Prével et al. 2017).<br>• The GDR score is a combination of two sub-components:<br>   ○ GDR-Healthy has a total score of 0-9, derived from 9 DQ-Q food groups that are strongly associated with 5 global recommendations for foods to consume in abundance (see box below). The higher the score, the more likely more recommendations are met.<br>   ○ GDR-Limit has a total score of 0-9, derived from 9 DQ-Q food groups that are strongly associated with 6 global recommendations of foods or food components to avoid or limit (see box below). The higher the score, the less likely the recommendations are met.<br>   ○ GDR score is calculated as [GDR-Healthy] minus [GDR-Limit], transformed to a range of 0-18. The higher the score, the more likely more recommendations are met (i.e., higher scores = more |

|  |  |
|---|---|
|  | health-protective diet patterns) (Herforth et al. 2020).<br>• Development and validation are underway for a combined DQ-Q score including both the FGDS and GDR score.<br><br>**A healthy diet contains:**<br><br>1. At least 400g of fruits and vegetables a day.<br>2. Legumes (beans).<br>3. Nuts.<br>4. Whole grains.<br>5. At least 25g of dietary fiber per day.<br>6. Less than 10% of total energy intake from free sugars.<br>7. Less than 30% of total energy intake from fats.<br>8. Less than 10% of total energy intake from saturated fats.<br>9. Less than 5g of salt per day.<br>10. No processed meat.*<br>11. Less than 500g red meat per week.*<br><br>Source: WHO Healthy Diet Fact Sheet, 2018.<br>*WCRF 2018 goals, after WHO IARC 2018.<br><br>• Some preliminary dichotomous indicators have also been developed:<br> o A WHO-FV score of at least 3 out of 6 fruit and vegetable groups is associated with higher likelihood of consuming 400g of fruits and vegetables.<br> o A WHO-Sugar score of 2 or more out of 6 is associated with higher likelihood of exceeding 10% of dietary energy from free sugars.<br> o A GDR score of 10 or more out of 18 is associated with meeting at least half of the dietary recommendations.<br> o These dichotomous scores require further validation in additional country datasets before assuming global validity (Herforth et al. 2020).<br>• Prevalence of consumption of some food groups can be informative indicators, by themselves or in combination. For example:<br> o Sugar-sweetened beverage consumption<br> o Zero vegetable or fruit consumption<br> o Whole grain foods consumption<br> o Legumes, nuts, and seeds consumption<br> o Animal-source food consumption<br>• An indicator of minimal adherence to food-based dietary guidelines is the proportion of the population consuming at least 1 food in each of at least 4 universally recommended food groups: starchy staples, protein-rich foods, fruits, and vegetables. |
| **Development and evaluation** | • The food groupings in the DQ-Q were developed in tandem with the indicator validation, resulting in 29 food groups that each contribute statistically and normatively to the DQ-Q indicators, also allowing for possible inferences related to environmental impacts (e.g. GHG emissions). |

| | |
|---|---|
| | • The DQ-Q question formulation was developed based on over 100 cognitive interviews in 6 languages. This cognitive testing showed that asking about sentinel foods was lower burden for respondents and more likely to be consistently understood, than asking respondents to self-characterize foods into named food groups, which sometimes resulted in misclassification.<br><br>• Analyses of nationally representative secondary data in 5 diverse countries (to date) verify that a relatively short list of sentinel foods captures the vast majority of the population consuming the food group (>95%).<br><br>• A 3-country validation study compared the DQ-Q to a quantitative 24-hour recall as a reference method. Preliminary results show that on average, the two methods result in identical population-based indicators, and small differences in consumption of individual food groups.<br><br>• An indicator validation study showed that the GDR score is a much better predictor of meeting global dietary recommendations than the FGDS (or MDD-W), the GDR-Healthy is a much better predictor of health-protective food intake than the FGDS (or MDD-W), and GDR-Limit introduces an entirely new ability to predict unhealthy food intake. The GDR score is also associated with ultra-processed food consumption. These results show that the diet quality information provided by the DQ-Q includes and expands upon the MDD-W, which has been the only food group based indicator that has been widely accepted and used to date. |
| **Cross cultural relevance and equivalence** | • The DQ-Q indicators are globally-applicable, aligned with dietary benchmarks intended for global application.<br><br>• The adaptation process centers on identifying the most culturally-relevant food items and food terms, to ensure cognitive validity of the questions and comparability across countries. The DQ-Q adaptation process is being conducted in the same way across countries, using the same criteria for inclusion or exclusion of food items. End-users in each country participate in the adaptation process.<br><br>• The GDR score and its subcomponents performed similarly in a 2-country validation study (Brazil, United States). Validation in additional countries in Africa and Asia is underway. |
| **Data requirements for population monitoring** | • Data are collected at individual level, and interpreted at population level (population = countries, states, villages, program beneficiaries, women, men, etc.)<br><br>• Population monitoring is most informative when data are nationally representative for the total population, so that they can be disaggregated by gender, age, socioeconomic status, and other characteristics. |
| **Practical considerations** | • The DQ-Q is read aloud, requires no specific enumerator expertise or special training, and takes approximately 5 minutes to implement. The main instruction is to read the questions exactly as written, without probing. |

| | |
|---|---|
| | • The DQ-Q is meant to be implemented without modifications. Additional information that may be desired by users (e.g. additional specific foods of programmatic interest) should be collected in additional questions, not by modifying the country-adapted DQ-Q.<br><br>• Analysis is a straightforward addition of "yes" answers in food groups (identified in an analytical guide), and requires no food composition data.<br><br>• Data collection platform: In 2021, the Gallup World Poll is implementing the DQ-Q in nationally-representative samples of individuals age 15+ in 42 countries. The DHS-8 is partnering with the Global Diet Quality Project to provide question adaptations for measuring MDD-W and other dietary indicators for women and IYCF indicators for children.<br><br>• The resulting data and indicators will be publicly available in 2022, at the Global Diet Quality Project website (under development), and will be incorporated into the Food Systems Dashboard. DHS data will be available through DHS.<br><br>• Country-adapted DQ-Qs for approximately 100 countries will be publicly available for download and use. |
| **Interpretation and communication for programmatic and policy relevance** | • The GDR score is expressed as a mean score in the population. Higher scores indicate higher quality diets.<br>  ○ The GDR sub-metrics (GDR-Healthy, GDR-Limit) are also expressed as mean scores.<br>  ○ The GDR score may be expressed as a dichotomous indicator of percent of the population meeting at least half of global dietary guidelines (pending additional validation).<br><br>• The FGDS is expressed as mean score in the population. Higher scores indicate higher quality diets.<br>  ○ The MDD-W is expressed as the percent of the population consuming at least 5 out of 10 food groups.<br>  ○ The FGDS can be expressed as the percent of the population consuming at least 5 out of 10 food groups. While only validated as an indicator of micronutrient adequacy among women of reproductive age, using the same cutoff across the population is informative to assess gender equity in dietary diversity.<br><br>• Development and validation is underway for a combined DQ-Q score including both the FGDS (MDD-W) and GDR score. This combined metric is envisaged to indicate diets that (1) achieve nutrient adequacy and also (2) meet dietary targets to protect against NCDs. While the sub-metrics will continue to be important to inform relevant policy and programmatic action to address country-specific dietary challenges, a combined metric may have the greatest communicative power for awareness and advocacy around the issue of diet quality as a whole.<br><br>• There is currently no basis for cutoffs that represent an absolute meaning of "good" or "poor" diets, in the GDR-score, its subcomponents, or the combined DQ-Q score. Because data will soon be available from 42 countries across a range of regions and income levels, we plan to pool the results across countries to determine global high, medium, and low relative scores (these global tertiles may be revised when all country data |

| | |
|---|---|
| | become available). A dichotomous indicator of the % of the population in each country with scores that fall above the bottom tertile threshold could be expressed as "% of population consuming a relatively healthy/low-risk diet." There would be a future research agenda to test these score cutoffs against nutrient adequacy and diet-related NCD risk. |
| | • While the new GDR indicators have not been used yet to track trends or evaluate programs and policies, use of the MDD-W and MDD indicators in programs has demonstrated responsiveness, indicating meaningful change in the proportion of women or IYC who have consumed minimum dietary diversity. The MDD-W has also demonstrated the utility of having a diet quality indicator available at population level, to raise awareness of the problem of poor diets, and to compare across countries. |
| | • Note: Other food-group indicators can be expressed as proportion of the population consuming each food group, or combinations of food groups. This type of indicator can be useful for specific programmatic or policy relevance; for example, a program on homestead aquaculture may wish to use/collect data on the % of the population consuming fish; or a government may benefit from tracking the % of the population consuming sodas before and after passing a soda tax. |
| **Summary** | • The intention of the Global Diet Quality Project is to provide the tools and data to enable feasible, valid diet quality monitoring within and across countries. |
| | • The DQ-Q has been designed to provide information on universally-relevant aspects of diet quality. It introduces several innovations in diet quality tool development, including the sentinel food approach, careful attention to cognitive validity of question formulation, and in-depth adaptation with the participation of end-users in each country. |
| | • The GDR score and its subcomponents add to the existing indicator of dietary diversity (MDD-W/FGDS), and can be calculated simply. These indicators allow characterization of both healthy and unhealthy aspects of diets, enabling greater awareness and more targeted responses to the specific areas of the diet that most need improvement. A single combined indicator is being developed and validated for both nutrient adequacy and diet patterns that protect against NCDs. |
| | • A key advantage of the DQ-Q for global monitoring is that data collection is already underway within the Gallup World Poll. By 2022, DQ-Q data will be available and publicly accessible for a first set of 42 countries, while additional phases of data collection are planned. The DHS-8 will provide additional data. |
| | • Publicly-available country-adapted, downloadable, ready-to-use tools will facilitate uptake by countries in national surveys, and by other users for comparable data collection across settings. |

## References and/or links for additional information:

FAO. (2021). Minimum Dietary Diversity for Women. Rome. https://doi.org/10.4060/cb3434en.

Herforth, A.W., Wiesmann, D., Martínez-Steele, E., Andrade, G. and Monteiro, C.A. (2020). Introducing a Suite of Low-Burden Diet Quality Indicators That Reflect Healthy Diet Patterns at Population Level. *Current Developments in Nutrition*, 4(12), p.nzaa168 https://doi.org/10.1093/cdn/nzaa168.

Martin-Prével Y., Martin-Prevel Y, Arimond M, Allemand P, Wiesmann D, Ballard TJ, Deitchler M, Dop MC, Kennedy G, Lartey A, Lee WTK, and Moursi M on behalf of the Women's Dietary Diversity Project (WDDP) Study Group. (2017). Development of a Dichotomous Indicator for Population-Level Assessment of Dietary Diversity in Women of Reproductive Age. *Current Developments in Nutrition*, 1(12), cdn-117.

International Agency for Research on Cancer (IARC). Red and processed meat. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 114. Lyon (France): IARC; 2018; [Internet]. [Cited 2020 Nov 1]. Available from: https://monographs.iarc.fr/wp-content/uploads/2018/06/mono114.pdf.

World Cancer Research Fund/American Institute for Cancer Research. Continuous Update Project expert report 2018. Recommendations and public health and policy implications [Internet]. 2018. [Cited 2020 Oct 28]. Available from: https://www.wcrf.org/sites/default/files/Recommendations.pdf.

WHO and UNICEF (2021). Indicators for assessing IYCF practices: Definitions and measurement methods.

WHO (2018). Healthy Diet Fact Sheet https://www.who.int/publications/m/item/healthy-diet-factsheet394.

## Web pages

Blog, Dec 14, 2016: Defining and Measuring Diet Quality Worldwide
https://news.gallup.com/opinion/gallup/199436/defining-measuring-diet-quality-worldwide.aspx

Blog, Oct 16, 2020: Global Diet Quality Project Aims to Bridge Data Gap
https://news.gallup.com/opinion/gallup/321968/global-diet-quality-project-aims-bridge-data-gap.aspx

Blog, 2020: Adapting Country-Specific Food Lists to Measure Diet Quality and Advance Nutrition
https://www.advancingnutrition.org/what-we-do/activities/adapting-country-specific-food-lists-measure-diet-quality-and-advance

## Annex

## DQ-Q Food Groups

| | | | |
|---|---|---|---|
| 1 | Foods made from grains | 16 | Processed meats |
| 2 | Whole grains | 17 | Unprocessed red meat (ruminants) |
| 3 | White roots/tubers | 18 | Unprocessed red meat (non-ruminants) |
| 4 | Legumes | 19 | Poultry |
| 5 | Vitamin A-rich orange vegetables | 20 | Fish and seafood |
| 6 | Dark green leafy vegetables | 21 | Nuts and seeds |
| 7 | Other vegetables | 22 | Packaged ultra-processed salty snacks |
| 8 | Vitamin A-rich fruits | 23 | Instant noodles |
| 9 | Citrus | 24 | Deep fried foods |
| 10 | Other fruits | 25 | Fluid milk |
| 11 | Baked/grain-based sweets | 26 | Sweet tea/coffee/cocoa |

| 12 | Other sweets | 27 | Fruit juice and fruit drinks |
|----|--------------|----|------------------------------|
| 13 | Eggs | 28 | Sugar-sweetened beverages (soft drinks, energy drinks, sports drinks) |
| 14 | Cheese | 29 | Fast food |
| 15 | Yogurt | | |

## Calculation of the MDD-W or FGDS from DQ-Q questions

| MDD-W Food group | Question numbers | Possible points |
|------------------|------------------|-----------------|
| *Grains, white roots and tubers, and plantains* | 1, 2, 3 | 1 |
| *Pulses (beans, peas and lentils)* | 4 | 1 |
| *Nuts and seeds* | 21 | 1 |
| *Dairy* | 14, 15, 25 | 1 |
| *Meat, poultry and fish* | 16, 17, 18, 19, 20 | 1 |
| *Eggs* | 13 | 1 |
| *Dark green leafy vegetables* | 6* | 1 |
| *Other vitamin A-rich fruits and vegetables* | 5, 8 | 1 |
| *Other vegetables* | 7* | 1 |
| *Other fruits* | 9, 10* | 1 |
| *TOTAL* | | SUM (0-10) |

*Note that these groups may be asked in two questions (e.g. 6.1 and 6.2).

## Calculation of the GDR Score from DQ-Q questions

GDR Score

Subtract **GDR-Limit** from **GDR-Healthy**, and add 9 to transform the indicator to a range of 0-18. A higher score reflects achieving more of the global dietary recommendations (Herforth et al. 2020).

GDR-Healthy Component

**FLAVOURS (Fruits, Legumes, Vegetables, Orange fruits & veg, Un-refined grains, Seeds & nuts)**

A higher score indicates inclusion of more health-promoting foods in the diet, and correlates positively with meeting global dietary recommendations.

| Food group | Question numbers | Possible points |
|------------|------------------|-----------------|
| *Whole grains* | 2 | 1 |
| *Legumes* | 4 | 1 |
| *Nuts and seeds* | 21 | 1 |
| *Vitamin A-rich orange vegetables* | 5 | 1 |

| | | |
|---|---|---|
| *Dark green leafy vegetables* | 6* | I |
| *Other vegetables* | 7* | I |
| *Vitamin A-rich fruits* | 8 | I |
| *Citrus* | 9 | I |
| *Other fruits* | 10* | I |
| *TOTAL* | | SUM (0-9) |

*Note that these groups may be asked in two or more questions (e.g. 6.1 and 6.2).

GDR-Limit Component
**FAD (Foods to Avoid or limit)**
A higher score indicates higher consumption of foods and drinks to avoid or limit, and correlates negatively with meeting global dietary recommendations.

| **Food group** | **Question numbers** | **Possible points** |
|---|---|---|
| *SSBs* | 28 | I |
| *Baked / grain-based sweets* | 11 | I |
| *Other sweets* | 12 | I |
| *Processed meat* | 16 | 2 |
| *Unprocessed red meat* | 17, 18 | I |
| *Deep fried food* | 24 | I |
| *Fast food & Instant noodles* | 23, 29 | I |
| *Packaged ultra-processed salty snacks* | 22 | I |
| *TOTAL* | | SUM (0-9) |

## Country-adapted DQ-Q Example: Brazil

Note: This example of the DQ-Q is the Brazil-adapted version, translated into English. The sentinel food examples are the most commonly consumed food items in each food group, which capture approximately 95% of people who consumed any item in the food group, across regions and seasons.

*Interviewer reads:*
Now I'd like to ask you some yes-or-no questions about foods and drinks that you consumed yesterday during the day or night, whether you had it at home or somewhere else.

First, I would like you to think about yesterday, from the time you woke up through the night. Think to yourself about the first thing you ate or drank after you woke up in the morning. [*interviewer pause*] Think about where you were when you had any food or drink in the middle of the day. [*interviewer pause*] Think about where you were when you had any evening meal … and any food or drink you may have had in the evening or late-night... and any other snacks or drinks you may have had between meals throughout the day or night. [*interviewer pause*]

I am interested in whether you had the food items I will mention even if they were combined with other foods. Please listen to the list of foods and drinks, and if you ate or drank ANY ONE OF THEM, say yes.

| (Do not read food group names) | Yesterday, did you eat any of the following foods? | (circle answer) |
|---|---|---|
| 01 *staple foods made from grains* | Rice, pasta, or bread, including sandwiches? | YES or NO |
| 02 *whole grains* | Wholegrain corn couscous, corn, brown rice, wholegrain bread, or oats? | YES or NO |
| 03 *white roots/tubers* | Potato, cassava, or yam? | YES or NO |
| 04 *legumes* | Beans or lentils? | YES or NO |
| | Yesterday, did you eat any of the following vegetables? | |
| 05 *vitamin A-rich orange vegetables* | Pumpkin, carrot, or sweet potato? | YES or NO |
| 06 *dark green leafy vegetables* | Kale, broccoli, almeirao, chard, or mustard greens? | YES or NO |
| 07 *other vegetables* | Lettuce, tomato, cabbage, beet, zucchini, chuchu, or cucumber? | YES or NO |
| | Yesterday, did you eat any of the following fruits? | |
| 08 *vitamin A-rich fruits* | Papaya, mango, peach, or persimmon? | YES or NO |
| 09 *citrus* | Orange or tangerine? | YES or NO |
| 10.1 *other fruits* | Watermelon, acai, plum, strawberry, or acerola? | YES or NO |
| 10.2 *other fruits* | Banana, apple, pineapple, grape, or pear? | YES or NO |
| (Do not read food group names) | Yesterday, did you eat any of the following sweets? | |
| 11 *baked / grain-based sweets* | Cakes, cookies, sweet tortas, or sweet breads? | YES or NO |
| 12 *other sweets* | Ice cream, candy, chocolate bars, doce de leite, pudding, peanut sweets, or gelatin? | YES or NO |
| | Yesterday, did you eat any of the following foods of animal origin? | |
| 13 *eggs* | Eggs? | YES or NO |
| 14 *cheese* | Cheese? | YES or NO |
| 15 *yogurt* | Yogurt? | YES or NO |
| 16 *processed meat* | Sausages, ham, bologna, hot dogs or jerky? | YES or NO |
| 17 *unprocessed red meat (ruminant)* | Beef? | YES or NO |
| 18 *unprocessed red meat* | Pork? | YES or NO |

| | | |
|---|---|---|
| *(non-ruminant)* | | |
| 19 *poultry* | Chicken? | YES or NO |
| 20 *fish & seafood* | Fish or seafood? | YES or NO |
| | **Yesterday, did you eat any of the following other foods?** | |
| 21 *nuts & seeds* | Peanuts, pine nuts, Brazil nuts, cashews, almonds, or walnuts? | YES or NO |
| 22 *ultra-processed packaged salty snacks* | Packaged salty snacks such as potato chips, Cheetos or Fofura? | YES or NO |
| 23 *instant noodles* | Instant noodles or instant soup? | YES or NO |
| 24 *deep fried foods* | Pastel, coxinha, enroladinho, quibe, French fries, fried cassava, or milanesa? | YES or NO |
| | **Yesterday, did you have any of the following beverages?** | |
| 25 *fluid milk* | Milk? | YES or NO |
| 26 *sweetened tea/ coffee/ milk drinks* | Coffee with sugar, tea with sugar, or Milo? | YES or NO |
| 27 *fruit juice* | Fruit juice or fruit drinks? | YES or NO |
| 28 *SSBs (sodas)* | Soda or soft drinks, such as Coca Cola, Guarana, or Tang? | YES or NO |
| 29 *fast food* | Yesterday, did you get food from any place like McDonald's, Bob's, Burger King, Habib's or Subway? | YES or NO |