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The Global Diet Quality Score-Meal Metric: An Innovative Metric for Measuring Meal Quality

The ROCKEFELLER FOUNDATION

Background: Filling the School Meal Data Gap

School feeding programs operate in almost every country and play a significant role in the nutrition of school-aged children globally. For example, school feeding reaches 305 million children in low- and middle-income countries[1], 47 million in Brazil[2], 30 million in the US[3], and 3.5 million, or more than a quarter of the population, in Rwanda[4]. However, despite widespread school feeding programs, there has been limited investment in designing rigorous metrics to assess the quality of meals served in schools and other institutional food service settings.

To fill this important gap, the *Intake* – Center for Dietary Assessment at FHI Solutions and the Rockefeller Foundation, in consultation with the World Food Program and other partners, are developing the Global Diet Quality Score-Meal (GDQS-Meal) metric.

Overview of the GDQS-Meal Metric

The GDQS-Meal metric is designed to be low-cost, robust, and appropriate for use across different countries and contexts. The metric provides comprehensive information on the quality of the meal served in institutional settings. The initial primary application is targeted for use in school feeding programs globally.

The GDQS-Meal metric builds on an existing, validated metric called the Global Diet Quality Score (GDQS), which is a population-based metric that measures diet quality over a 24-hour reference period at the population level. The GDQS incorporates both nutrient adequacy and the risk factors associated with non-communicable diseases in its design and scoring method. The GDQS was initially validated for non-pregnant, non-lactating women of childbearing age (15-49 years)[5] and is currently being validated for children 2 years and older, and adolescents 10-14 years of age. The GDQS-Meal metric builds on the core principles and validity of the GDQS but is modified to focus on quality at the meal level rather than for a 24-hour reference period.

1 WFP. A chance for every schoolchild - WFP School Feeding Strategy 2020–2030. Available at https://docs.wfp.org/api/documents/WFP-0000112101/download/?_ga=2.102847872.1091515748.1594909434-156317280.1585736299

2 Brazilian Ministry of Education. Available at http://portal.mec.gov.br/component/tags/tag/33209

3 Oliveira, Victor. *The Food Assistance Landscape: FY 2018 Annual Report,* EIB-207, U.S. Department of Agriculture, Economic Research Service, April 2019.

4 Rwanda Ministry of Education. Available at https://mineduc.gov.rw/fileadmin/Documents/statistics/Rwanda_Education_Statistics_2019.pdf

5 Bromage S, Batis C, Bhupathiraju SN, Fawzi WW, Fung TT, Li Y, Deitchler M, Angulo E, Birk N, Castellanos-Gutiérrez A, He Y, Fang Y, Matsuzaki M, Zhang Y, Moursi M, Gicevic S, Holmes MD, Isanaka S, Kinra S, Sachs SE, Stampfer MJ, Stern D, Willett WC. (2021). Development and Validation of a Novel Food-Based Global Diet Quality Score (GDQS). *J Nutr.* 151(12 Suppl 2):75S-92S. doi: 10.1093/jn/nxab244. PMID: 34689200; PMCID: PMC8542096.

The scoring for the GDQS-Meal metric is based on assessing which of 25 different food groups are served in the meal and the amount of each respective food group served. Like the GDQS, the 25 food groups that compose the GDQS-Meal metric reflect food groups that are considered, for the purpose of scoring, as healthy[6], unhealthy[7], or unhealthy in excess[8] (Table 1). Points are also awarded for the fortification and biofortification of foods served in the meal for 16 micronutrients[9]. Higher values of the overall GDQS-Meal indicate meals of better quality, that is, meals that offer a more diverse, balanced, and healthy combination of foods and nutrients.

Data Requirements for the GDQS-Meal Metric

The data used for tabulating the GDQS-Meal metric are based on the food and beverage types and the amount of each food and beverage served per student. Currently data are collected and analyzed using an Excel-driven SAS-based analysis program designed for standardized, simple tabulation of GDQS-Meal results. In 2023, an app will be developed to further streamline the collection and tabulation of GDQS-Meal data. The app will come with a comprehensive food list of over 5,500 items to allow for easy selection and automated classification of each food and beverage served into the appropriate GDQS food group.

Future Development and Use of the GDQS-Meal Metric

Future work on the GDQS-Meal metric includes adjusting the cut-offs for the food group thresholds to account for the age groups targeted by school feeding programs, developing an extension of the GDQS-Meal to measure Menu quality (e.g., based on the meals served across a 5-day school week), developing the GDQS-Meal & Menu app for data collection and tabulation, testing assumptions related to food waste, adapting the metric for use at the procurement level and for use in cafeteria settings, quantifying the environmental impact of the meals and menus measured, and extrapolating the meal and menu quality scores to diet quality.

The GDQS-Meal and GDQS-Menu metrics will be piloted with the World Food Program in up to five countries in 2023. Following rigorous testing and upgrades based on user feedback, the GDQS-Meal and GDQS-Menu metrics will be available for wider use and adoption.

6 Citrus fruits, Deep orange fruits, Other fruits, Dark leafy green vegetables, Cruciferous vegetables, Deep orange vegetables, Other vegetables, Legumes, Deep orange tubers, Nuts and seeds, Whole grains, Liquid oils, Fish and shellfish, Poultry and game meat, Low fat dairy, Eggs

7 Processed meat, Refined grains and baked goods, Sweets and ice cream, Sugar-sweetened beverages, Juice, White roots and tubers, Purchased deep fried foods

8 High fat dairy, Red meat

9 Vitamins A, C, D, E, B1, B2, B3, B5, B6, B9, B12, Iron, Zinc, Calcium, Magnesium, and Iodine

Table 1: Food groups and cut-offs for the GDQS-Meal Metric[1, 2]

Food Group Category	Food Group	Categories of Amounts Served per Meal			
		Low	Middle	High	Very High
Healthy	Citrus fruits				
	Deep orange fruits				
	Other fruits				
	Dark green leafy vegetables				
	Cruciferous vegetables				
	Deep orange vegetables				
	Other vegetables				
	Legumes				
	Deep orange tubers				
	Nuts and seeds				
	Whole grains				
	Liquid oils				
	Fish and shellfish				
	Poultry and game meat				
	Low-fat dairy				
	Eggs				
Unhealthy in excessive amounts	High-fat dairy* (in milk equivalents)				
	Red meat				
Unhealthy	Processed meat				
	Refined grains and baked goods				
	Sweets and ice cream				
	Sugar-sweetened beverages				
	Juice				
	White roots and tubers				
	Purchased deep fried foods				

*Hard cheese should be converted to milk equivalents using a conversion factor of 6.1 when calculating total consumption of high-fat dairy for the purpose of assigning a GDQS consumption category.

1 Specific thresholds (grams/meal) for the low/middle/high/very high categories of each food group are being determined and likely differ by age group. Shading corresponds to the number of points awarded at each threshold wherein red cells receive fewer points, yellow cells medium points, green cells higher points.

2 Table adapted from Table 3 in Bromage S, Batis C, Bhupathiraju SN, Fawzi WW, Fung TT, Li Y, Deitchler M, Angulo E, Birk N, Castellanos-Gutiérrez A, He Y, Fang Y, Matsuzaki M, Zhang Y, Moursi M, Gicevic S, Holmes MD, Isanaka S, Kinra S, Sachs SE, Stampfer MJ, Stern D, Willett WC. (2021). Development and Validation of a Novel Food-Based Global Diet Quality Score (GDQS). *J Nutr.* 151(12 Suppl 2):75S-92S. doi: 10.1093/jn/nxab244. PMID: 34689200; PMCID: PMC8542096.