International tables of glycemic index and glycemic load values 2021: a systematic review

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ABSTRACT

Background: Reliable tables of glycemic indexes (GIs) and glycemic loads (GLs) are critical to research examining the relationship between glycemic qualities of carbohydrate in foods, diets, and health. In the 12 years since the last edition of the tables, a large amount of new data has become available.

Objectives: To systematically review and tabulate published and unpublished sources of reliable GI values, including an assessment of the reliability of the data.

Methods: This edition of the tables lists over 4000 items, a 61% increase in the number of entries compared to the 2008 edition. The data have been separated into 2 lists. The first represents more precise values derived using the methodology recommended by the International Standards Organization (~2100 items). The second list contains values determined using less robust methods, including using limited numbers of healthy subjects or with a large SEM (~1900 food items).

Results: Dairy products, legumes, pasta, and fruits were usually low-GI foods (≤55 on the 100-point glucose scale) and had consistent values around the world. Cereals and cereal products, however, including whole-grain or whole-meal versions, showed wide variation in GI values, presumably arising from variations in manufacturing methods. Breads, breakfast cereals, rice, savory snack products, and regional foods were available in high-, medium-, and low-GI versions. Most varieties of potato were high-GI foods, but specific low-GI varieties have now been identified.

Conclusions: The availability of new data on the GIs of foods will facilitate wider research and application of the twin concepts of GI and GL. Although the 2021 edition of the tables improves the quality and quantity of GI data available for research and clinical practice, GI testing of regional foods remains a priority. This systematic review was registered in PROSPERO as #171204. *Am J Clin Nutr* 2021;114:1625–1632.

Keywords: glycemic index, carbohydrates, diabetes, glycemic load, ISO Standard (26642:2010)

Introduction

Evaluating the quality of carbohydrates in foods and diets could be considered more important than ever (1). Markers such as dietary fiber content, added sugar, the ratio of starch to sugar, and the liquid to solid ratio have been joined by the glycemic index (GI), a metric that ranks the glycemic potential per gram of carbohydrate. Previous editions of the *International Tables of Glycemic Index* were published in 1995, 2002, and 2008. In the past 12 years, the number of scientific publications that include "glycemic index" or "glycaemic index" in the title, abstract, or keywords has trebled from ~2500 to ~7500. Yet, the GI concept itself remains widely misunderstood and even dismissed (2). Many health professionals consider it complex or unreliable for clinical practice (3, 4). However, over time, the WHO (5), International Diabetes Federation (6), American Diabetes Association (7), Diabetes UK (8), and Diabetes Canada (9) have given it qualified support. Irrespective of viewpoint, the availability of reliable tables of GIs is critical for continuing research and for resolution of the controversy.

New data have become available in the 12 years since the publication of the 2008 tables. In addition, several methodological milestones have also been passed since then. In 2010, a detailed, more rigorous methodology for GI determination was published by the International Standards Organization (ISO), along with

This study was funded by internal revenue supplied by the University of Sydney.

Supplemental Figure 1 and Supplemental Tables 1 and 2 are available from the "Supplementary data" link in the online posting of the article and from the same link in the online table of contents at https://academic.oup.com/ajcn/.

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Abbreviations used: CENTRAL, Cochrane Central Register of Controlled Trials; GI, glycemic index; GL, glycemic load; ISO, International Standards Organization.

Received February 3, 2021. Accepted for publication June 17, 2021.

First published online July 13, 2021; doi: https://doi.org/10.1093/ajcn/nqab233.

suggested cut points for classification of high (GI ≥70), medium (GI 56–69), and low (GI ≤55) GI values (10). This has enabled a uniform GI testing protocol that applies to GI testing in all member countries, and there is a basis for food regulation and global food labeling standards. A third interlaboratory study specifically addressed the ISO Standard, reporting no significant differences in mean GI values among 3 different laboratories for 6 identical foods (11). Although the SDs around the mean varied between laboratories, the ISO method was sufficiently precise to distinguish a mean GI of 55 from a mean GI ≥70 with 97%–99% probability.

For this edition of the tables, the aim was to systematically tabulate published and unpublished sources of reliable GI values of foods using a priori criteria guided by the ISO Standard to justify inclusion. Additionally, we calculated GL values based on standardized available carbohydrate portions. In our review, we endeavored to answer the following questions: are there new GI values for foods or varieties? Are there additional measurements of foods that have been tested previously and, if so, are there any secular (time-related) changes in regard to staples such as bread or rice, which have been repeatedly measured over the years? Finally, are there any national/regional differences within certain food groups, such as bread, rice, or potatoes?

Methods

This systematic review was registered in PROSPERO as #171204. Our strategy included searching the MEDLINE, Cochrane Library [Cochrane Central Register of Controlled Trials (CENTRAL)], and EMBASE databases, using the terms "glycemic index" and "glycaemic index," for studies published between 1 January 2008 and 30 June 2020 (**Supplemental Figure 1**). Studies were limited to the English language and restricted to human studies without geographical boundaries. Two independent researchers conducted the literature search (FSA and JG). Study protocols published on CENTRAL were used to additionally search for unpublished data, and authors of the respective protocols were contacted to ask for data. In addition, we manually searched references from published studies and contacted GI testing laboratories around the world in regard to unpublished data.

We divided the data into 2 tables based on the quality of data. Quality was assessed relative to the ISO Standard (ISO 26642:2010) and predefined criteria for data extraction, table designation, classification, and presentation. Quality was assessed by 2 independent researchers (FSA and JG) who screened studies and extracted data.

Supplemental Table 1 contains the most reliable GI values, with a full description of the food and related information, such as the cooking method, processing, and composition, if available. Specifically, we included GI values for foods and beverages extracted from published and unpublished studies, determined using a methodology in accordance with the ISO Standard (10). Studies where GI values were assessed as part of a larger study of variable design (randomized controlled trial or cohort study) were eligible. GI values listed in previous editions were not automatically entered but were assessed according to our inclusion criteria first. In brief, GI values in Supplemental Table 1 needed to have been tested in ≥10 healthy adults (allowing for 1 outlier to be excluded for GI determination) with reported normal glucose tolerance aged 18–65 years. Blood sampling time points were those specified in the ISO Standard (0, 15, 30, 45, 60, 90, and 120 minutes), although we allowed those that sampled additional time points, such as 75, 105, 150, and 180 minutes. Recommended analysis methods according to the ISO Standard are spectrophotometry or electrochemical detection-coupled enzyme systems. If glucometers were used, in accordance with the ISO Standard, only studies that used glucometers with a laboratory inter-assay CV on standard solutions <3.6% were included in Supplemental Table 1. The ISO Standard specifies that 50-g carbohydrate portions should be tested unless the carbohydrate content is too low to consume the volume/bulk of food required. In this case, the Standard specifies a 25-g carbohydrate portion can be tested. Thus, test food portions had to contain either 25 or 50 g of available carbohydrate. We excluded from Supplemental Table 1 published or unpublished studies conducted in <10 healthy adults or in individuals with impaired glucose tolerance, with a known history of diabetes mellitus, or using antihyperglycemic drugs or insulin to treat diabetes and related conditions. We also excluded studies performed in pregnant or lactating women (with 1 exception for testing human milk) and studies where an SEM was not presented/provided (even after contacting the authors) or where the SEM was above a prespecified cut point (>10 for low-GI foods and >15 for medium- and high-GI foods) suggesting excessive variability.

In **Supplemental Table 2**, we included GI values for foods and beverages that were extracted from published and unpublished studies, determined using methodology that did not meet the ISO methodology. Hence, Supplemental Table 2 included studies conducted with adults aged 18 to 65 years, with healthy adults with normal glucose tolerance, with adults with impaired glucose tolerance (including type 1 diabetes, type 2 diabetes, and gestational diabetes), with pregnant or lactating women, which recruited 9 or fewer subjects, which used an available carbohydrate portion other than 25 or 50 g, or which used blood samples collected at fewer time points than specified by the ISO. Excluded from Supplemental Table 2 were studies that used in vitro methods to estimate GI values, studies using a reference food other than glucose or white bread without providing a conversion factor to the 100-point glucose scale, studies examining glycemic responses to a food or a meal where the ingredients or the preparation method were not described precisely, or studies not providing sufficient information to allow an assessment of quality.

Most importantly, we excluded mixed meals from either table because the GI values of mixed meals should be calculated by summing the weighted means of the component foods, not measured in vivo (12, 13) This is justified for scientific and practical reasons (13). The addition of protein and fat to carbohydrate foods lowers the incremental area under the glucose curve, and therefore the GI, by 25%–50% and narrows the overall range in GI values obtained, with high-GI sources decreasing more than low-GI carbohydrates. However, it is not possible to test every composite meal with every permutation of fat and protein. In the case of some traditional food mixtures, it is difficult to establish the line between a mixed meal for which GI should not be tested and foods that are commonly consumed together and can therefore not be disentangled.

We defined a food as a single food or beverage that could not be separated or disassembled into 2 or more component foods. For example, spaghetti is a single food but spaghetti Bolognese is a mixed meal. This distinction is important because, in nutrition epidemiology, the GI of each carbohydrate food is coded to estimate the dietary GI. This is also a pragmatic decision that obviates the need to test every single recipe and creates a level playing field for comparison of different foods. Some minor exceptions to this rule were made in order to include more "traditional foods" where the carbohydrate component is uniquely modified by the processing method. For example, the cellular structure of rice in sushi is changed by the addition of vinegar and sugar during preparation and by refrigeration.

Our systematic search also indicated that many older studies had tested single foods with the addition of milk (e.g., breakfast cereals) or other accompaniments, such as a small amount of butter or margarine added to bread and potatoes to improve palatability. In the case of breakfast cereals, there were reports where the authors included the lactose in the milk as part of the 50 g available carbohydrate portion, while in others the lactose was additional. For the most part, the resulting GI values differed little from the results using the food alone (14). However, all these values were excluded from the 2021 edition of the tables. If, however, the reference food was also tested with the same additions as the test food, then those foods have been included in Supplemental Table 2 with an associated footnote.

In order to generate GL values, we assigned a standardized available carbohydrate portion size to each food category and estimated the GL according to the formula: GL = GI/100 × grams of carbohydrate in a standardized portion (15). The foods are listed in 21 different food categories in alphabetical order, with the standardized available carbohydrate portion shown in brackets: bakery products (30 g carbohydrate); beverages (25 g carbohydrate, except for beer, where 10 g carbohydrate was used); breads (15 g carbohydrate); breakfast cereals (20 g carbohydrate); cereal grains (45 g carbohydrate); cookies (20 g carbohydrate); crackers (15 g carbohydrate); dairy products and alternatives (10 g carbohydrate was used for plain products; 20 g carbohydrate was used for flavored or sweetened versions); fruit and fruit products (15 g carbohydrate); fruit and vegetable juices (20 g carbohydrate, except for tomato, carrot, or vegetable juices, where 10 g was used); infant formula and weaning foods (10 g carbohydrate); legumes (15 g carbohydrate); meal replacements and weight management products (20 g carbohydrate); nutritional support products (30 g carbohydrate); nuts (5 g carbohydrate); pasta and noodles (40 g carbohydrate); snack foods and confectionery (25 g carbohydrate); soups (20 g carbohydrate); sugars and syrups (5 g carbohydrate, except for sugar replacers, where 2.5 g was used); vegetables (20 g carbohydrate, except for some low-carbohydrate exceptions, including beetroot, parsnip, pumpkin, carrot, peas, or tomato sauces, where 10 g was used); and regional or traditional foods (35 g carbohydrate).

For convenience, a small number of items appear in more than 1 category (e.g., corn appears under vegetables as well as cereal grains). Within each food category, foods have been described as unambiguously as possible using descriptive data given in the original publication. Sometimes this was extensive, including the variety or the manufacturer's details, plus the cooking and preparation procedures. In other cases, the description is brief (e.g., potatoes or apple). If the cooking method and cooking time were stated in the original reference, the details are given. The user should bear in mind that countries often have different names for the same food product or, alternatively, the same name for different items. For example, both Kellogg's Special K and All-Bran breakfast cereals are different formulations in North America, Europe, and Australia, with different GI values. Similarly, food names may mean different things in different countries. For example, the terms "biscuits," "muffins," and "scones" have different meanings in North America and Europe. The terms used in the 2021 tables have been selected to be as internationally relevant as possible. Under each food category, subgroups were also compiled: for example, under dairy products, yogurts that were nonfat, low-fat, and full-fat have been listed.

As in earlier editions, the 2021 tables show the GI value for each food, the type and number of subjects tested, the reference food and time period used, and the published source of the data. However, to avoid confusion, all values are expressed relative to glucose on a 100-point scale only. Where bread was the reference food used in the original study, the GI value for the food was multiplied by 0.71 to obtain the GI value with glucose as the reference food (14). A small number of studies used other foods [e.g., rice (reference 45 in Supplemental Table 1)] as their reference food.

For many foods, multiple testing allowed the mean GI value to be calculated (in Supplemental Table 1) and listed underneath the data for the individual foods. In this way, the user can appreciate the variation for any 1 food and, if possible, use the GI value for the food found in their region or use the mean GI value. Researchers are encouraged to select values from Supplemental Table 1. If this is not possible, they should carefully select the value(s) that best suit their purposes from Supplemental Table 2. To assist researchers, we calculated the mean (SD) values and the percentages of low-, medium-, and high-GI foods for every food category. The results are listed in **Table 1** of the manuscript. In order to assess the possibility of changes over time, we compared GI values of food items that had been repeatedly tested over the last 3–4 decades. For certain food categories, such as bread, cereals, potatoes, or dairy products, analyses of national or regional differences were conducted (i.e., between Australia, North America, Asia, and Europe).

An open-access, searchable database of all the 2021 data in the current edition of the tables will be available online (16). The online database will be regularly updated and represents the most comprehensive list of GI values available.

Results

The present (fourth) edition of the *International Tables of Glycemic Index and Glycemic Load Values* lists over 4000 individual food items, close to double the number of entries in the 2008 edition ($n = 2480$). Supplemental Table 1 shows the highest quality and most precise GI values, totaling 2091 foods representing 21 food categories, derived using the methodology recommended by the ISO. Supplemental Table 2 contains 1927 food items, showing values that are considered reliable, but not optimal, for the purposes of nutritional epidemiology and research.

Table 1 presents the average GI value (mean ± SD) and the percentage of low-, medium-, and high-GI foods for each

TABLE 1 Summary table of mean and SD GI values of each food category and percentages of low-, medium-, and high-GI foods[1]

Food category	*n*	Mean	SD	Proportion of products in each category: Low-GI foods	Medium-GI foods	High-GI foods
Bakery products	72	58	16	49%	31%	21%
Beverages	74	50	20	68%	18%	15%
Carbonated drinks	7	63	7	29%	43%	29%
Breads	214	64	14	29%	36%	35%
Breakfast cereals	148	61	15	37%	33%	30%
Cereal bars	20	54	14	45%	15%	20%
Cereal grains						
Rice	128	67	17	28%	34%	38%
Other cereal grains	60	47	20	73%	15%	12%
Cookies	135	49	9	84%	12%	4%
Cracker	43	55	17	47%	42%	12%
Dairy products	186	35	11	95%	5%	0%
Fruits and fruit products						
Fruits	105	51	11	72%	22%	6%
Fruit and vegetable juices	27	47	9	85%	15%	0%
Fruit spreads, jams	28	49	15	71%	25%	4%
Infant formula and weaning foods	43	48	17	65%	28%	7%
Legumes	32	34	14	94%	6%	0%
Meal replacement and weight management products	59	30	9	100%	0%	0%
Nutritional support products	62	42	20	90%	2%	8%
Nuts	3	22	1	100%	0%	0%
Pasta	77	52	12	64%	29%	8%
Snack food and confectionery						
Savory snack foods	35	60	15	46%	20%	34%
Sweet snacks and confectionery	53	48	16	68%	21%	11%
Fruit bars and snacks	41	45	21	76%	7%	17%
Snack bars	47	44	16	79%	15%	6%
Sports (energy) bars	35	32	13	94%	6%	0%
Soups	21	49	10	71%	29%	4%
Sugars and syrups	50	58	21	44%	32%	24%
Vegetables						
Potatoes and potato products	66	71	15	14%	29%	58%
Other vegetables	91	66	19	34%	14%	52%
Regional or traditional foods						
African	9	56	20	56%	0%	44%
Arabic and Turkish	28	61	11	32%	43%	25%
Asian	89	60	19	40%	34%	26%
Asian Indian	19	65	13	32%	32%	37%

Values are taken from Supplemental Table 1 only. Abbreviations: GI, glycemic index.

[1]High-GI foods are defined as those with a GI value ≥70, medium-GI foods are those with a GI from 56 to 69, and low-GI foods are those with a GI value ≤55 (10).

food category (considering foods from Supplemental Table 1 only). A number of generalizations can be made. The highest average values were found among potatoes (71 ± 15; 58% of the entries categorized as high-GI foods); rice (67 ± 17; 38% high-GI entries); vegetables other than potatoes, including sweet potatoes (66 ± 19; 52% high-GI entries); and Asian-Indian regional foods (65 ± 13; 37% high-GI entries), while the lowest values were seen in meal replacement products (30 ± 9; 100% low-GI entries), dairy products (35 ± 11; 95% low-GI entries), legumes (34 ± 14; 94% low-GI entries), and sports energy bars (32 ± 15; 94% low-GI entries). Nuts had the lowest average GI values (22 ± 2; 100% low-GI entries), although they are so low in carbohydrate that most varieties cannot be tested. Average GI values of breads, breakfast cereals, and cereal grains were also relatively high, but there are examples of both low- and high-GI foods within each food category. Overall, savory snack products had higher GI values (60 ± 15; 46% low-GI entries and 34% high-GI entries) than sweet snacks and confectionery products (48 ± 16; 68% low-GI entries and 11% high-GI entries).

Although potatoes as a group have high GI values (Table 1), there was a wide distribution (range, 35–103; **Figure 1**). Variety and the cooking and processing methods appear to be important, with average values of 84 for instant mashed potatoes, 79 for regular mashed potatoes, 73 for boiled potatoes, and 49 for cooked potatoes that were refrigerated overnight. It is difficult to detect trends across time because of the diversity of origins, varieties, and cooking methods, although there may be regional variation. The average GI value of tested potatoes was highest in Australia (77 ± 14; $n = 23$), followed by Europe (73 ± 11;

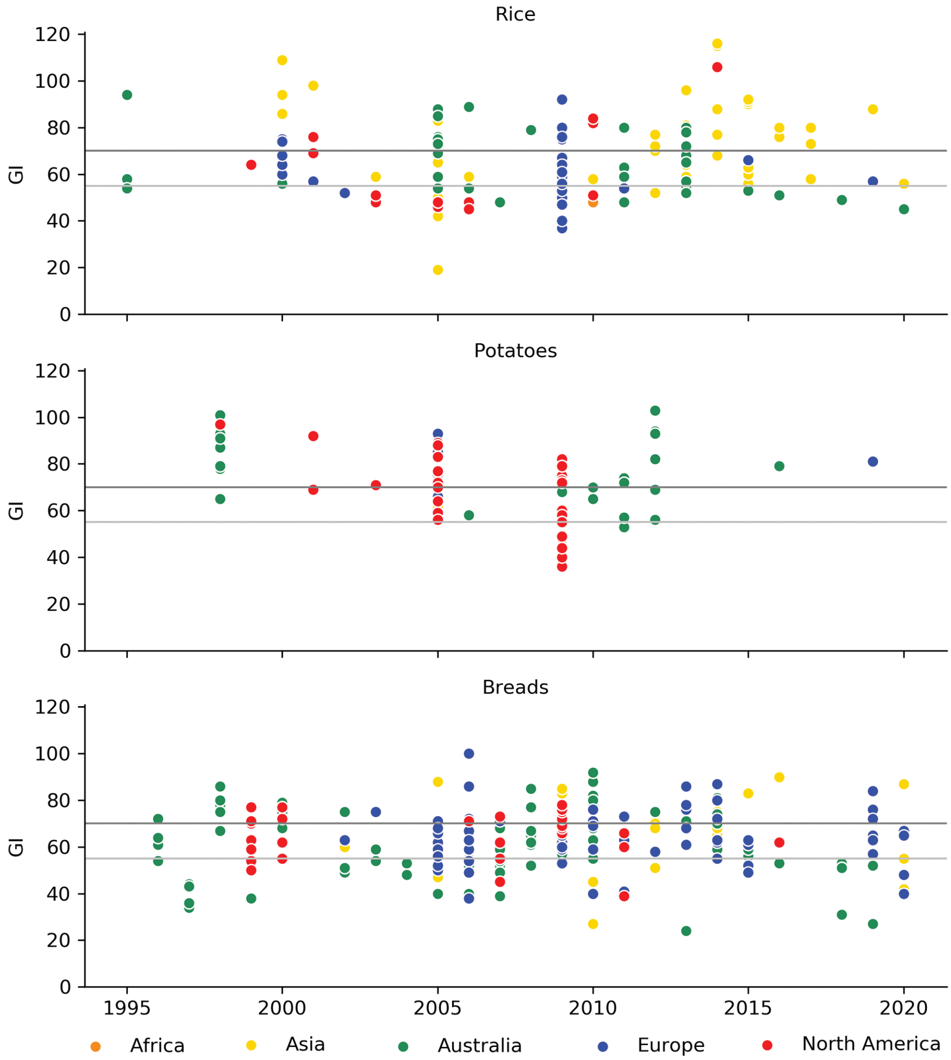

FIGURE 1 Secular time trend in GI values of potatoes, rice, and breads by continent. The figure depicts data determined according to the ISO Standard (10) taken from Supplemental Table 1 only. Abbreviations: GI, glycemic index; ISO, International Standards Organization.

$n = 10$). The average was lower in North America (67 ± 16; $n = 30$).

Similarly, there was also wide variation for the GI values of rice products (range 19–116; Figure 1). The average GI for white rice was 73 and the average for brown rice was 65. We cannot conclude that this difference is due to differences in fiber or cooking/processing (e.g., parboiling), because the rice variety also varied. The highest GI values were seen in Asia (74 ± 19; $n = 48$), with lower averages in Australia (65 ± 13; $n = 37$), Europe (61 ± 12; $n = 26$), and North America (60 ± 17; $n = 16$).

Breads also varied widely (range, 24 to 100; $n = 214$; Figure 1) and 1 in 3 had a high GI ($n = 75$). On average, the breads tested in Asia were highest in GI (68 ± 16; $n = 26$). Notably, there were relatively few data for breads from Germany and Scandinavian countries: that is, countries recognized for their distinctive rye breads and high proportion of breads with intact grains.

Among breakfast cereals, a third of the tested products had high GIs and more than a third had low GIs. The high-sugar products (e.g., Coco Pops and Frosties) had an average GI of 74 ± 9 ($n = 16$), similar to those with a relatively low sugar content (Cornflakes and Bran Flakes; 74 ± 11; $n = 21$). Products made with oats or oat flakes (e.g., mueslis) had an average GI of 55 ($n = 30$).

Discussion

The fourth edition of the *International Tables of Glycemic Index and Glycemic Load Values* lists over 4000 items, an increase of >60% from the 2008 edition. The tables will be valuable to a wide audience, including researchers in clinical nutrition and epidemiology, dietitians, clinicians, food scientists, and consumers. Since 2000, epidemiologists in particular have matched GI values from comprehensive tables such as these to either average food items included in FFQs (17), food records (18), or to individual food items in food composition databases (19) in order to estimate the GI and GL of whole diets. Similarly, intervention studies draw on published GI values for foods used in the intervention diet (20, 21). The list is also of particular value for clinical practice workers, such as diabetes educators, for counseling patients or development of preventive or therapeutic programs. Finally, as GI labeling is increasingly demanded around the globe, this list is of interest for the food industry, as well as health policy makers.

A critical appraisal of the data indicates that some generalizations still hold true. The GIs of dairy products, legumes, pasta, and fruits tend to be low (GIs 55 or less on the glucose scale) and are remarkably consistent around the world. Cereals and cereal products, however, including whole-grain or whole-meal versions, show wide differences, presumably arising from variation in manufacturing methods. Breads, breakfast cereals, rice, and snack products are available in both high- and low-GI versions. Many varieties of potato and rice are high-GI foods, but more low-GI varieties have been identified by research and development. By providing percentages for low-, medium-, and high-GI foods per food category, the summary table highlights the ability to replace high-GI choices with lower-GI choices within the same food category (i.e., potatoes, rice, regional foods, or breads). Users should be aware that food items entered into the GI tables are not necessarily representative of food items available in any particular region, but rather foods that were tested by various laboratories for research or commercial purposes. Importantly, the foods are not characterized by composite sample means of their energy and nutrient compositions, as in national tables of food composition, but by a single food of specific composition. Although the current edition improves the quality and quantity of GI data available for research and clinical practice, GI testing of regional foods remains a priority.

Assignment of GI values to foods for any purpose requires knowledge of the GI values of local foods. Ideally, branded product information is available, because different manufacturers prepare and process foods, particularly cereal products, in different ways. This is not unique to the GI, but true of other nutritional factors too, including saturated fat, dietary fiber, and salt. The recent compilation of GI values of non-Western foods is a positive step towards greater representation of Asian-Indian foods (22). The majority of the values included there also appear in this edition of the tables.

One of the most important differences between the 2008 and 2021 editions of the tables is the use of a standardized carbohydrate portion to calculate GL values in the current edition. This approach was chosen because typical serving sizes (necessary to calculate the GL) vary widely from product to product, as well as country to country. Researchers, health professionals, and consumers should use our calculated GL values as a guide only. GL values estimated for studies or counseling should be calculated by multiplying the known amount of carbohydrate contained in the specified serving size by the GI value of that food (using glucose as the reference food), then dividing by 100.

There is still confusion over the meaning of the GI and how it should be used. A widespread misconception is that it relates "only" to portions of foods containing 50 g available carbohydrate, and cannot be extrapolated to amounts eaten in practice (23). In fact, the GI value of a food item is a gram-for-gram comparison of carbohydrate, and the ranking is relevant to whatever the amount of carbohydrate actually consumed. The GL allows us to compare foods where the amount consumed varies from 1 food to another. While the magnitude of the glycemic response varies within (day-to-day) and between (person-to-person) individuals (24), these sources of variation do not preclude real differences in the relative glycemic potential of the carbohydrates in different foods.

To address potential concerns on the reliability of published GI values, this new edition now uses much stricter criteria for consideration in Supplemental Table 1. The ISO methodology published in 2010 was developed with input from experts in multiple member countries (10). In particular, it makes clear the necessity for the reference food to be repeated in order to reduce the effects of day-to-day variation in glucose tolerance. It also specifies that capillary blood sampling is optimal in order to capture the rapid fluctuations in blood glucose after a meal. Nonetheless, a limitation of the present tables is that we did not undertake a systematic bias assessment for the included studies, since we screened according to the use (or not) of the ISO Standard. This screening addressed several potential sources of bias, including bias in selection of participants, due to missing data, and in measurement of the outcome (25). Common reasons for nonadherence to the ISO Standard should be addressed more specifically in future revisions of the Standard. Indeed, the major reasons for assignment of values to Supplemental Table 2 instead of Supplemental Table 1 were the lack of repeated tests of the reference food or the use of nonstandard time points for glucose sample collection.

In addition to the vast increase in published values, some new products entered the tables for the first time, including human milk; Chinese pearl barley; Asian fruits such as lychee, dragon fruit, and pomelo; and new varieties of dates, barley, and gluten-free products. Interestingly, whole tomatoes are a new addition with a GI of only 22, one of the lowest on record. One of our objectives was to determine changes in the same product over time (secular changes). However, this proved difficult to detect because of the diversity in products, processing, and cooking, and the possibility that the products tested were not representative of the products commonly consumed in the different parts of the world.

The relevance of the GI concept is confirmed by recent studies and meta-analyses, linking it to the management and/or prevention of diabetes (26–28), weight loss maintenance (29, 30), coronary heart disease (31), cardiovascular disease and mortality (32), and specific cancers (33). However, the certainty of evidence of a beneficial effect on blood lipids, blood pressure, or primary prevention of cardiovascular disease is still low (34). Further studies link GI values to cognitive functions (35, 36) and sports performance (37–39). Finally, postprandial glycemia per se is receiving substantial recognition in the context of personalized nutrition and is the focus of concerted research efforts by basic scientists and clinicians (40).

In our view, the GI sits firmly within the current shift in dietary guidance from a focus on single nutrients toward food- and dietary pattern–based recommendations that allow for flexibility in the proportion of macronutrients (including carbohydrate) in the diet and a focus on quality over quantity and on dietary patterns over single nutrients. It is hoped that this new edition of the tables will reduce unnecessary repetition in the testing of individual foods and facilitate wider research and application of the twin concepts of GI and GL. Testing services are now available in Sydney, Toronto, Singapore, Beijing, Sweden, South Africa, and the United Kingdom, and some offer training and accreditation. Ideally, foods that appear only in Supplemental Table 2 will be retested according to the ISO Standard. Similarly, foods in categories with a high percentage of high-GI foods may be reformulated and may soon become available in lower-GI versions. Presently, the tables summarize foods that were commonly tested rather than foods that are commonly consumed. Thus, more market surveillance and consumer-driven testing is needed so that it can be determined whether there are true regional differences in staple products such as bread, rice, and potatoes. In addition, the tables will assist food manufacturers in increasing the range of low-GI processed foods, by providing them with information regarding differences in GI values associated with various ingredients and food processing methods.

The authors' responsibilities were as follows—FSA and JG: searched the literature, evaluated the quality of the data and composed the tables; and all authors: conceived of the study, contributed to the interpretation of the findings, contributed to writing the final paper, and read and approved the final manuscript.

Author disclosures: FSA, KF-P, and JCB-M are coauthors of books about the glycemic index (GI) and health and receive royalties from Hachette Australia. FSA and JCB-M oversee a GI testing service at the University of Sydney and are nonexecutive directors of the Glycemic Index Foundation Ltd. JCB-M and AEB are members of the International Carbohydrate Consortium. AEB is a member of the ILSI Europe Carbohydrate Task Force. JCB-M serves on the Scientific Advisory Board of the Novo Foundation and Zoe Global, and receives royalties from the University of Sydney. The other author report no conflict of interest.

Data Availability

Data described in the manuscript will be made available upon request pending application to the corresponding author and stipulation that the data will not be used for commercial purposes.

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