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Update of the Healthy Eating Index: HEI-2015

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Abstract

The Healthy Eating Index (HEI) is a measure for assessing whether a set of foods aligns with the Dietary Guidelines for Americans (DGA). An updated HEI is released to correspond to each new edition of the DGA, and this article introduces the latest version, which reflects the 2015–2020 DGA The HEI-2015 components are the same as in the HEI-2010, except Saturated Fat and Added Sugars replace Empty Calories, with the result being 13 components. The 2015–2020 DGA include explicit recommendations to limit intakes of both Added Sugars and Saturated Fats to <10% of energy. HEI-2015 does not account for excessive energy from alcohol within a separate component, but continues to account for all energy from alcohol within total energy (the denominator for most components). All other components remain the same as for HEI-2010, except for a change in the allocation of legumes. Previous versions of the HEI accounted for legumes in either the two vegetable or the two protein foods components, whereas HEI-2015 counts legumes toward all four components. Weighting approaches are similar to those of previous versions, and scoring standards were maintained, refined, or developed to increase consistency across components; better ensure face validity; follow precedent; cover a range of intakes; and, when applicable, ensure the DGA level corresponds to a score >7 out of 10. HEI-2015 component

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AUTHOR CONTRIBUTIONS

S. M. Krebs-Smith, T. E. Pannucci, J. Reedy, A. F. Subar, and M. M. Wilson decided changes needed to update the index. All authors reviewed interpretation issues. S. M. Krebs-Smith and T. E. Pannucci prepared the first draft (wrote one or more sections). All authors reviewed/commented on all drafts.

STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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scores can be examined collectively using radar graphs to reveal a pattern of diet quality and summed to represent overall diet quality.

Keywords

Healthy Eating index; Diet quality; Diet indexes; Dietary patterns; Dietary intake

THE HEALTHY EATING INDEX (HEI)* IS A MEASURE for assessing dietary quality, specifically the degree to which a set of foods aligns with the Dietary Guidelines for Americans (DGA).[1] Since the 2005 version, the HEI has been density-based (eg, amounts per 1,000 kcal) rather than absolute amounts and relies on a common set of standards that are applicable across individuals and settings.[2,3] The HEI yields a total score, indicative of overall dietary quality, and separate component scores that can be examined collectively to reveal a pattern of quality regarding multiple dietary dimensions. The reliance of the HEI on densities allows the index to be applied to the diets of individuals and to various settings in the food supply chain.

There have been close to 300 publications using the HEI to evaluate food intakes, availability, distribution, and marketing.[4] The index has been used to examine both prospective and cross-sectional associations between diet quality and health outcomes, such as risk for cardiovascular disease mortality.[5] It has also been used to describe diet quality in the US population,[6] as well as among population subgroups such as Mexican Americans,[7] children,[8,9] cancer survivors,[10,11] and the moderating effects of race on food security.[12] The HEI has also been used to evaluate diet quality of different levels of the food environment, including the US food supply,[13] restaurant menus,[14] grocery store circulars,[15] and federal food distribution programs.[16]

The DGA are updated every 5 years, leading to changes in emphasis and quantification as the evidence on healthy eating evolves over time. Likewise, an updated HEI, reflective of those changes, is released to correspond to each new edition of the DGA. The purpose of this article is to introduce the HEI-2015, designed to reflect the 2015–2020 DGA. The process and guiding principles used to update this latest version are the same as were described for the HEI-2010.[2] Figure 1 outlines the key features of the HEI and these guiding principles. The process used to evaluate the HEI-2015 has been examined in a separate report.[17]

COMPONENTS

The components of the HEI-2015 are listed in Table 1, and their correspondence to the key recommendations in the 2015–2020 DGA is shown in Figure 2.[18] The list of components is the same as in the HEI-2010, except that Saturated Fat and Added Sugars replace Empty Calories, resulting in 13 instead of 12 components (see Table 2).

*This article considers only the Healthy Eating Index-2005 version onward.

Added Sugars and Saturated Fats

Each previous version of the HEI included a component intended to evaluate the extent to which diets fall within the limited allowance for solid fats, alcohol and added sugars, termed Calories from Solid Fats, Alcohol and Added Sugars (SoFAAS), in 2005 and Empty Calories in 2010. This concept was also included in the latest iteration of the DGA, referred to as "remaining calories".[1] However, quantified limits for added sugars and saturated fats defined in the 2015–2020 DGA suggested including them as separate components in the HEI-2015. Also, because carbohydrates and lipids are digested, absorbed, and metabolized differently,[19] treating them separately is appropriate. In effect, the inclusion of separate components suggests these are distinct aspects of the diet to be tracked, and both conditions should be met to optimize the overall score. Alcohol is also unique from these other components metabolically. How it is accounted for in the HEI-2015 is addressed below.

The inclusion of separate components for Added Sugars and Saturated Fats reflects the explicit key recommendation, in each case, to limit intakes to <10% of energy. That recommendation for Added Sugars was new with the 2015–2020 DGA, but for Saturated Fats has been a part of the DGA since 1990[20–24] and was reiterated in the most recent edition.[1] Saturated Fats was a component of the HEI-2005; it was replaced in HEI-2010 by the Fatty Acids component to address the explicit recommendation in the 2010 DGA to limit saturated fatty acids by replacing them with monounsaturated and polyunsaturated fatty acids.[24] The Fatty Acids component is retained in HEI-2015 to capture the extent to which the substitution of healthier for less healthy fatty acids occurs. In addition, the Saturated Fats component is being reintroduced from HEI-2005 to compensate for the loss of solid fats as sources of empty calories. The decision was made to account for saturated fats specifically, rather than solid fats, because the 2015–2020 DGA emphasized saturated fats to a greater extent and these two constituents are highly correlated (Pearson's correlation of 0.92 for absolute intakes and 0.85 for percentage of energy) (unpublished data). However, it should be noted that the scales of intake are different, because solid fats are composed of multiple types of fatty acids whereas saturated fats generally comprise only a portion of solid fat intakes.

Energy from Alcohol

Energy from alcohol, beyond moderate intakes, was also accounted for in the Empty Calories component of the HEI-2010. With the removal of that component, the HEI-2015 does not account for excessive energy from alcohol as a separate component, but continues to account for all energy from alcohol within total energy (the denominator for most components). Alcohol is unique among the dietary components that have been tracked by the HEI, and considerations regarding the inclusion or exclusion of alcohol in the HEI are complicated for several reasons.

First although alcohol is consumed as a beverage and contributes energy to the diet, it also shares characteristics with drugs due its pharmacologic effects on bodily systems such as the brain, heart, and liver.[25] Epidemiologic data have suggested that alcohol may have both positive and negative health effects, depending on the outcome under investigation.[26–28] Further complexities arise related to the type of alcohol consumed, frequency of

consumption, amounts consumed on drinking days or drinking occasions, total amounts consumed over time, and varying effects by sex, age, and throughout the life cycle.

Second, an all-alcohol component resulting from the separation of empty calories into constituent types would be applicable only to certain individuals/environments. Previously, when alcohol calories were accounted for by including them in some larger set of calories (such as empty calories), it mattered less for scoring purposes that certain segments of the population avoid alcohol altogether because other sources of energy in that set were ubiquitously consumed.

Third, among the dietary constituents covered by the DGA, only alcohol carries a caution for excessive intakes on a given day, although the cumulative total, or usual, intake may also be important Consequently, the inclusion of alcohol complicates the derivation of the score from previous versions of the HEI. That is, alcohol has been assessed and scored based on any single day, whereas all other dietary recommendations have been scored using usual intake as a point of reference.

Given these considerations, alcohol is not included as a component in the index. In the case that alcohol is of interest it can still be assessed separately (in terms of grams of alcohol or drinks per day) or included as a covariate in statistical modeling, apart from HEI scores, depending on the research question or purpose.

Allocation of Legumes

All other components remain the same as for the HEI-2010, except for a change in the allocation of legumes (Figure 3). Previous versions of the HEI accounted for legumes in either the vegetable or the protein foods (formerly meat and beans) components, but not both, through a rather intricate algorithm. For any set of foods (such as a person's diet on a given day), some portion of the legumes could count toward the protein foods and the rest could count toward vegetables. Specifically, legumes were counted as protein foods only in the case that the total protein foods standard was otherwise not met, and they were counted as vegetables only after the total protein foods standard had been met.

The reason for scoring legumes this way was the concern that counting all of them in both places would be doublecounting and therefore too generous from a scoring perspective. However, application of the former indexes in various analyses revealed some other, equally troubling, concerns with the first-proteins-then-vegetables approach. First, the algorithm further complicated programming of already-complex multivariate analyses. This is not a trivial matter, especially when conducting analyses using multiple 24-hour recalls. Such analyses are statistically complex and multi-phased,[29] and interrupting the flow to deal with this issue is cumbersome.

Second, previous methods of scoring legumes made data on trends for the affected components difficult to interpret. Because legumes have an exceptional nutrient profile, they were highlighted for inclusion in a vegetable subgroup component (Greens and Beans) in both earlier versions and in a protein foods subgroup component (Seafood and Plant Proteins) in 2010. Tracking any of these components over time has been problematic

because intakes of foods vary from year to year, so the amount of legumes counted toward any one component could vary and thus alter scores differentially.

Third, the Total Protein Foods component standard has generally been met without needing the legumes (data not shown), because the diets of Americans are generally meat/fish/poultry-based. Yet, the DGA encourage "eating a variety of foods from the proteins group," including plant-based protein foods.[1] If the protein standard is met without legumes, any legumes in the diet do not count toward either Total Protein Foods or Seafood and Plant Proteins, although they are in fact serving to increase the variety of protein foods in the diet.

To avoid the complex algorithm used in previous versions of the HEI while retaining a Total Protein Foods component and another on Seafood and Plant Proteins, as well as a Total Vegetables component and another on Greens and Beans, there were three possible alternatives for scoring legumes: count them only toward the two vegetable components, only toward the two protein components, or toward all four components.

Any of these alternatives would alleviate the first two concerns (complex algorithm and difficulty tracking trends) mentioned above. Either of the last two, both of which would count all legumes toward the protein foods components, would address the third concern (capturing protein variety), but counting legumes only toward the protein foods components would run counter to their main placement in the US Department of Agriculture (USDA) Food Patterns[30] as a vegetable subgroup. For these reasons, legumes contribute to all four components of the HEI-2015.

This change in the legumes algorithm is expected to make little difference in population level total scores (around 1 point out of 100), mainly because legumes are so infrequently consumed. However, it could make a substantial improvement (about 8 points) for certain individuals, such as vegetarians, who consume more legumes (unpublished analyses).

WEIGHTING

For the purposes of deriving a total score, each component must be assigned a weight to establish an appropriate balance among them. Until data become available to suggest otherwise, it is a premise of the HEI that the DGA are meant to be considered as a whole and that all concepts are equally important; hence, components are generally weighted equally. Specifically, aspects of the diet represented by two components are assigned 5 points each; all others receive 10 points apiece.

As mentioned above, previous versions of the HEI included the constructs added sugars and solid fats (along with amounts of alcohol that were in excess of moderate intakes) within either the Calories from Solid Fats, Alcohol, and Added Sugars (2005) or Empty Calories (2010) components, and in each version, those more inclusive components were weighted at 20 points. The rationale for the 20-point score was that those constituents, when consumed in excess, exerted two important effects on the diet-contributing excess calories and displacing nutrient dense foods. This is still the case; however, because Empty Calories are now being represented by two components rather than one, the weighting has been split in half and each of these is assigned 10 points.

In the case of the Saturated Fats component, there is an additional effect of these empty calories-namely, disturbing the balance among types of fat However, the Fatty Acids component addresses this concern, so no additional weighting is assigned to the Saturated Fat component.

SCORING STANDARDS

The HEI can be applied to any set of foods, whether consumed by individuals or offered in the marketplace, because it relies on densities (generally, the amount of some dietary component per 1,000 kcal) and common scoring standards. Scores are assigned to each component by comparing the density to the relevant standards. Minimum and maximum scoring standards for the HEI-2015 are shown in Table 1. For all components, densities between the minimum and maximum standards are scored proportionately.

Standards for Maximum Scores

Standards for all maximum scores except Sodium are drawn from the USDA's Healthy US-Style Eating Patterns[30]–specifically, the amounts recommended for each food group and subgroup and the fatty acid and added sugars profiles associated with various energy levels. These amounts vary across energy levels in absolute terms but are similar on a density basis, and this overall similarity affords the use of common standards. Nonetheless, the fact that the densities are not identical across energy levels necessitates choosing some standard to represent the maximum score for each component.

The standards for assigning maximum scores for all adequacy components are the least-restrictive recommendations among the 1,200 to 2,400 kcal patterns, as was the case with previous versions. As a result the standards remained unchanged from HEI-2010 for all adequacy components.

All the moderation components except Sodium also derive their maximum score standards from the least-restrictive recommendations or associated profiles among the 1,200 to 2,400 kcal patterns, which was not the case previously. Earlier versions used values associated with the full range of 1,000 to 3,200 kcal. This modified approach provides a more consistent rationale across components and avoids having any standard based on a relatively high energy level that, although appropriate for a few age/sex groups, would be extreme for others. This approach did not affect the standard for the Refined Grains component because the least restrictive recommendations were the same for both 1,200 to 2,400 kcal and 1,000 to 3,200 kcal patterns. However, it was used to set the new standards for Added Sugars and Saturated Fats.

Deriving standards from the patterns for the Added Sugars and Saturated Fats components results in a perfect score of 10 corresponding to less than the DGA limit of 10% of energy (≤6.5% for Added Sugars and ≤8% for Saturated Fat). This is because, in each case, the guideline is to consume *less than* 10% of energy from the constituent, and there is evidence to suggest lower intakes may be beneficial.[31,32]

For sodium, the standard for maximum points–≤1.1 g/1,000 kcal–remains unchanged from earlier versions. It is based on the recommended limit of 2,300 mg in the DGA 2015–2020. Although further sodium reduction may yield additional health benefits, deriving a lower target for a maximum HEI-2015 Sodium score was not undertaken because further reduction of sodium intake has been shown to be difficult to achieve, particularly in lower calorie diets.[17,33,34]

Standards for Minimum Scores

For all adequacy components except Fatty Acids, an amount of zero per 1,000 kcal is the standard for a minimum score of zero. Therefore, densities of exactly half the standard for maximum points would translate to a score of half the available points (eg, 5 out of 10).

The Fatty Acids ratio and the densities for moderation components have no such obvious level to serve as the minimum standard. Previous editions set these standards at approximately, but not precisely, the 15th (for Fatty Acids) or 85th (for moderation components) percentiles of 1-day intake distributions, which is wider than the range of usual intakes, from the 2001–2002 National Health and Nutrition Examination Survey.[35] For the HEI-2015, standards for components that carried over from HEI-2010 remain unchanged.

For Added Sugars and Saturated Fats, updated 2011–2012 National Health and Nutrition Examination Survey data[36] were used as a point of reference but not as the sole criterion because, in the case that intakes improved substantially over time, then the standards may no longer be appropriate per other considerations. For this reason, minimum standards for these components are based on professional judgment regarding levels of intake, considering population distributions, interpretability, and face validity-that is, minimum scores are associated with intakes that are considered excessive. For each component, the scores cover most of the range of single-day intakes (data not shown).

In 2005, the Saturated Fats component had three standards, corresponding to scores of 0, 8, and 10. This led to uneven intervals in intake between integers of score values. To address this discrepancy, the scores are distributed evenly for the HEI-2015. A density of twice the maximum standard corresponds to a minimum score of zero. Densities that are 50% greater than the standard receive 5 out of 10 points, and the DGA limit of 10% of energy falls between 7 and 8 points. Because the range between the minimum and maximum standards is close to what it was for HEI-2005, the overall effect of this change is minor.

Added Sugars is a new component, so therefore has no scoring precedent Because the distribution of added sugars intakes is relatively wide, and excessive truncation could be problematic, a density of four times the maximum standard, which corresponds to about the 90th percentile of 1-day intakes, is the standard for a minimum score. Therefore, intakes that are two times greater than the standard will receive 5 out of 10 points. The DGA limit amount of 10% of energy falls between 8 and 9 out of 10 points.

In summary, the scoring standards were maintained, refined, or developed to increase consistency across components in the scoring rationale; promote face validity; follow

precedent when possible; cover a range of intakes; and, when applicable, ensure the DGA level corresponds to a score >7 out of 10.

CALCULATING SCORES

As with previous HEIs, HEI-2015 is designed to be scored from zero to 100, although it is difficult to conceive of a diet that would score as low as zero. The basic steps used in calculating HEI-2015 scores are the same as those for previous versions of the index:

- Identify the set of foods under consideration,
- Determine the amount of each relevant dietary constituent, and
- Derive the pertinent densities and score each HEI component using the relevant standards.

Although these steps are seemingly straightforward, there are complexities involved. For example, the second step requires that the set of foods under consideration be coded and linked to one or more compositional databases, such as the USDA Agricultural Research Service's Food and Nutrient Database for Dietary Studies and the USDA Food Patterns Equivalents Database, and the reported foods be translated into standardized quantities of nutrients and food groups. In step three, densities can be derived in different ways, and the preferred method depends on the research objective (eg, descriptive) and the level of the analysis (environmental vs individual). In the case that analysis is at the individual level, other factors in determining the best method include whether estimates are being made for a single person or group and how data were captured (food frequency questionnaire or single or multiple 24-hour recalls).[37] Kirkpatrick and colleagues[37] review a range of issues that should be considered for examining intakes of groups of persons in research applications of the HEI. The National Cancer Institute website[29] provides basic algorithms, sample code and documentation for several research objectives.

INTERPRETATION OF SCORES

Each version of the HEI is designed to assess concordance with a particular set of DGA Because the emphasis and quantification may differ from version to version and scores from one index are not directly comparable to those of another, it is best to use a single version when tracking trends in dietary quality or comparing between groups.

The HEI measures dietary quality rather than quantity; that is, it evaluates densities rather than absolute amounts. Therefore, to interpret and address low scores, an assessment of the suitability of the energy level as well as an examination of component scores is required. When energy levels are appropriate, low scores can be improved by simultaneously increasing foods from relevant adequacy components and decreasing sources of relevant moderation components. In the case that energy levels are excessive, as is frequently the case in the United States, then low scores for refined grains, added sugars, and/or saturated fats should be addressed first because lower intakes of those components will result in lower energy levels, which in turn will lead to higher scores for all components. Recommendations to increase the amount of fruits, vegetables, whole grains, dairy, and/or protein foods to

increase those component scores, without a concomitant decrease in refined grains, added sugars, and/or saturated fats should only be made if energy levels are insufficient, which is rarely the case in the United States.

The HEI is intended to evaluate a set of foods in relation to the DGA, which provide guidance for the total diet. Evaluating any mix of foods using the HEI produces a set of individual component scores, which can be examined collectively to reveal a *pattern* of diet quality, as well as a total score that represents *a single dimension of overall* diet quality. Figure 4 demonstrates how radar graphs can be used to visualize dietary patterns. Each individual component score is plotted as a percentage of its maximum points on one of the axes; the points are connected, with a line around the perimeter of the graph indicating a perfect score. In addition to a perfect score (dotted line), this graph illustrates how different the patterns of quality can be for two diets with identical total scores of 50 points and highlights the additional information contained in the pattern of component scores vs the overall score. Note that, for the sake of cross-study comparisons, the arrangement of the components should be in the same order. These authors recommend arranging the components as shown.

The resulting numerical scores can be reported in a descriptive analysis, or used in subsequent analyses to examine relationships with other variables. When reporting component or overall scores, it is sometimes helpful to have a way of interpreting them (ie, qualitatively describing adherence to the DGA). For this purpose, a graded approach, as follows, could be used:

- Overall scores of 90 to 100, or component scores that are 90% to 100% of maximum score: A;
- Overall scores of 80 to 89, or component scores that are 80% to 89% of maximum score: B;
- Overall scores of 70 to 79, or component scores that are 70% to 79% of maximum score: C;
- Overall scores of 60 to 69, or component scores that are 60% to 69% of maximum score: D; and
- Overall scores of 0 to 59, or component scores that are 0% to 59% of maximum score: F.

However, the numerical scores are paramount, so grades should be used only to help interpret scores and never alone. Furthermore, these authors do not recommend using grades as a way of categorizing scores for subsequent analyses, because that could present several problems. Most obviously, translating scaled data into categories discards useful information. Also, given the variability in diets, misclassification can result, especially affecting scores at or near cutpoints.

A recommended method for interpreting individuals' scores and providing related guidance remains to be determined. HEI scores of individual dietary intake do not take into consideration whether a person is achieving energy balance, and the dietary assessment tools

used to capture intake information and compute HEI scores may not be measuring usual dietary intake or capturing every component with equal precision. Thus, the translation of scores into practical assessments and advice, such as by a grading system, requires further evaluation.

CONCLUSIONS

The DGA evolve incrementally over time based on scientific evidence, and updates to the HEI are designed to capture that evolution. The HEI-2015 is consequently very much like HEI-2010, with the important difference that saturated fat and added sugars are each tracked separately in the more recent version, and excessive alcohol contribution to energy is not captured separately in the components. This new version also incorporates modifications to the algorithm for legumes. The increased focus in the 2015 DGA on dietary patterns has been an inherent feature of the HEI since 2005, and radar graphs such as those demonstrated here (Figure 4) can be helpful in visualizing such patterns.

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Feature	Rationale
Assesses diet quality with regard to recommendations of the Dietary Guidelines for Americans	The Dietary Guidelines for Americans are the evidence-based foundation for nutrition policy of the US government
Assesses diet—foods and beverages and nutrients from them—and not supplement intake	Is consistent with fundamental premise of Dietary Guidelines for Americans to meet nutrient needs primarily from foods and beverages
Captures balance among food groups, including foods to encourage and foods to reduce	Reflects Dietary Guidelines for Americans Considers gaps between intakes and recommendations
Uncouples dietary quality from quantity, employing a density-based approach	Indicates appropriate mix of, or balance among, food groups Enables application to various levels, including groups of people, environments, food supply
Employs a least restrictive approach to setting standards for maximum scores by using the recommendations that are easiest to achieve among those that vary by age and sex	Results in highest possible scores, with potential error in the same direction for everyone Because very high scores for many components are rare among the US population, the score is optimized for sensitivity to improvement
Requires no single food or commodity to be indispensable to a perfect score	Accommodates a variety of eating patterns, reflecting cultural, ethnic, traditional and personal preferences and tolerances and food costs and availability
Guiding principles for updates of the HEI	
Principle	**Rationale**
Focus on key recommendations of the Dietary Guidelines for Americans, making only changes to the index that have a strong rationale	Stability of the HEI should reflect consistency of recommendations over time Unsubstantiated changes in the HEI may imply emergence of new evidence that does not exist
Limit the number of components	Each component should assess a critical aspect of diet quality
Avoid an unduly complex algorithm	The index should be transparent and straightforward to explain and apply

Figure 1.
Key features of the Healthy Eating Index (HEI) and guiding principles for the updates.

Key recommendations from the DGA	Components of HEI-2015	Comments
Consume a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level	Total Fruits Whole Fruits Total Vegetables Greens and Beans Whole Grains Dairy Total Protein Foods Seafood and Plant Proteins Fatty Acids Refined Grains Sodium Added Sugars Saturated Fats	The comprehensive nature and density basis of the HEI-2015 accounts for all foods and beverages (except alcohol) within a given calorie level
A healthy eating pattern includes: • Fruits, especially whole fruits • A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other • Grains, at least half of which are whole grains • Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages • A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes (beans and peas), and nuts, seeds, and soy products • Oils	Whole Fruits Greens and Beans Whole Grains Dairy Seafood and Plant Proteins Fatty Acids	HEI-2015 includes specific components for fruits, vegetables, grains, dairy, protein foods, and oils HEI-2015 targets subgroups that tend to be lowest in diets of the population, including dark green vegetables and legumes, and seafood and plant proteins
A healthy eating pattern limits: • Saturated fats and *trans* fats, added sugars, and sodium	Saturated Fats Added Sugars Sodium	HEI-2015 includes specific components for saturated fats, added sugars, and sodium, which were quantified in the 2015-2020 DGA *Trans* fats will be removed from the food supply by mid-2018[18]
Key Recommendations that are quantitative are provided for several components of the diet that should be limited. These components are of particular public health concern in the United States, and the specified limits can help individuals achieve healthy eating patterns within calorie limits: • Consume <10% of calories per day from added sugars • Consume <10% of calories per day from saturated fats • Consume <2,300 mg/day sodium • If alcohol is consumed, it should be consumed in moderation—up to 1 drink per day for women and up to 2 drinks per day for men—and only by adults of legal drinking age	Added Sugars Saturated Fats Sodium	In previous HEI versions, alcohol beyond moderate intake was included in the Empty Calories component. However, in HEI-2015, Empty Calories was replaced with the Added Sugars and Saturated Fats components. A separate specific alcohol component was not included in HEI-2015 because the recommendation regarding alcohol applies only to adults, and only a subset of adults consume it. Calories from alcohol continue to be included in total energy calculations used to score the HEI

Figure 2.

Healthy Eating Index-2015 (HEI-2015) components mapped to the key dietary recommendations of the 2015–2020 Dietary Guidelines for Americans (DGA).

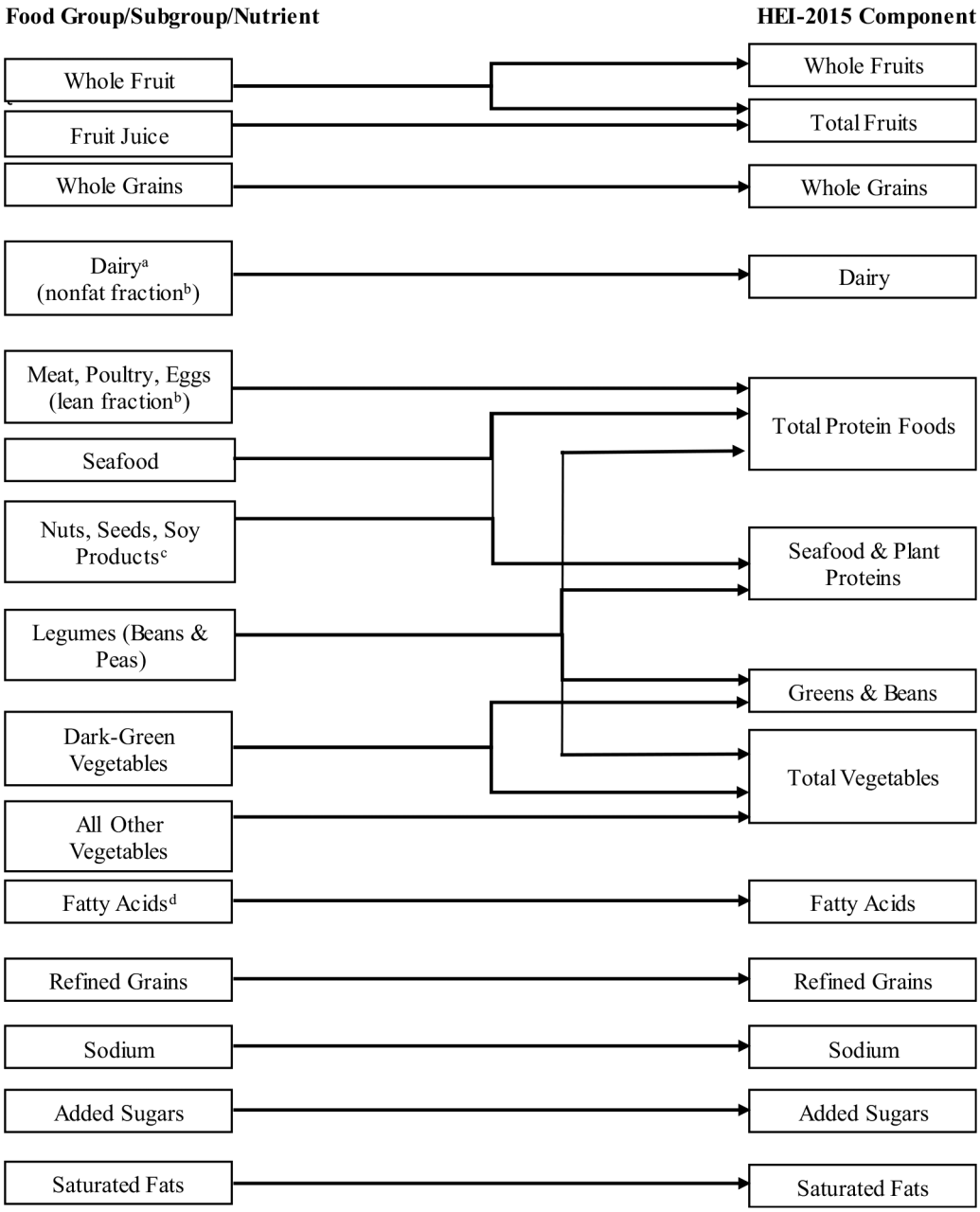

Figure 3.

Food groups, subgroups, and nutrients that contribute to the components of the Healthy Eating Index-2015 (HEI-2015). [a]Includes all milk products, such as fluid milk, yogurt, and cheese, and fortified soy beverages. [b]Saturated fat is counted separately. [c]Includes nuts, seeds, and soy products (other than beverages). [d]Included as a ratio of polyunsaturated and monounsaturated fatty acids to saturated fatty acids.

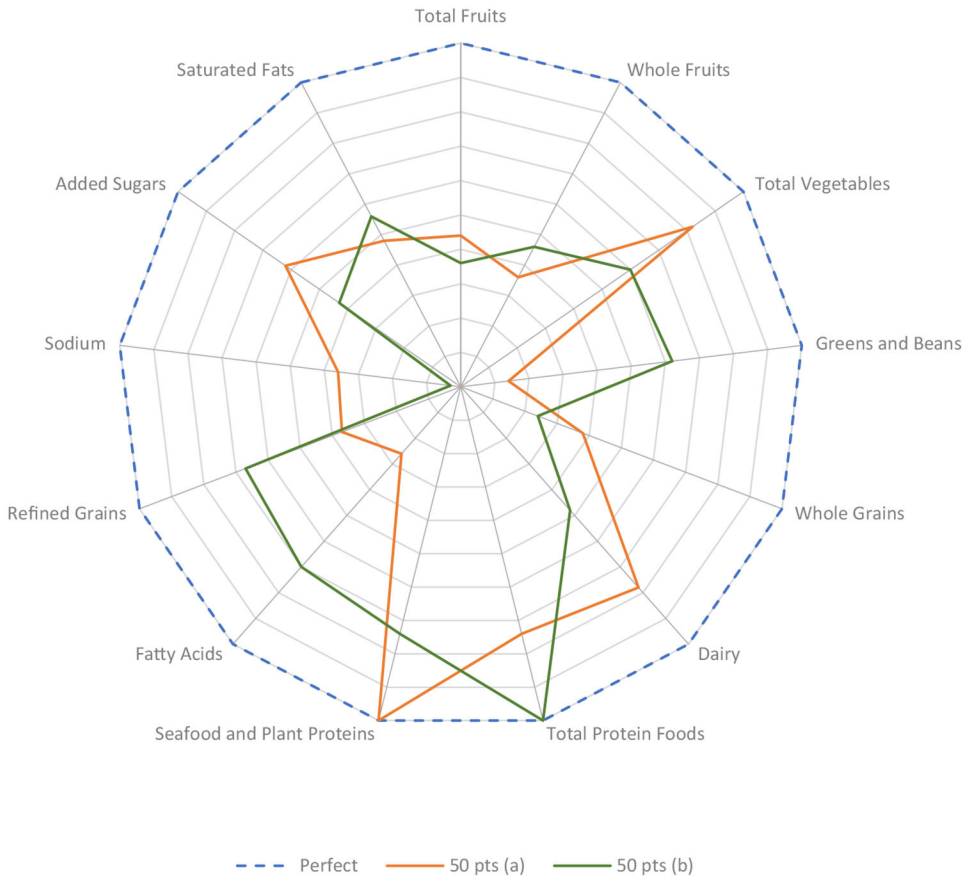

Figure 4.

Radar graph depicting a perfect score (100 points), and two identical total scores (50 points) with different patterns of quality according to Healthy Eating Index-2015 component score.

Table 1.

Healthy Eating Index-2015 components, point values, and standards for scoring

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Adequacy			
Total Fruits	5	≥0.8 c equivalents/1,000 kcal	No fruit
Whole Fruits	5	≥0.4 c equivalents/1,000 kcal	No whole fruit
Total Vegetables	5	≥1.1 c equivalents/1,000 kcal	No vegetables
Greens and Beans	5	≥0.2 c equivalents/1,000 kcal	No dark green vegetables or beans and peas
Whole Grains	10	≥1.5 oz equivalents/1,000 kcal	No whole grains
Dairy	10	≥1.3 c equivalents/1,000 kcal	No dairy
Total Protein Foods	5	≥2.5 oz equivalents/1,000 kcal	No protein foods
Seafood and Plant Proteins	5	≥0.8 c equivalents/1,000 kcal	No seafood or plant proteins
Fatty Acids	10	(PUFAs[a]+MUFAs[b])/SFAs[c] ≥2.5	(PUFAs+MUFAs)/SFAs ≤1.2
Moderation			
Refined Grains	10	≤1.8 oz equivalents/1,000 kcal	≥4.3 oz equivalents/1,000 kcal
Sodium	10	≤1.1 g/1,000 kcal	≥2.0 g/1,000 kcal
Added Sugars	10	≤6.5% of energy	≥26% of energy
Saturated Fats	10	≤8% of energy	≥16% of energy

[a]PUFAs=polyunsaturated fatty acids.

[b]MUFAs=monounsaturated fatty acids.

[c]SFAs=saturated fatty acids.

Table 2.

Healthy Eating Index (HEI) components, point values, and scoring standards for HEI-2005, HEI-2010, and HEI-2015

Component type	Construct	Maximum points	Component	Standard for Maximum Points[a]			Standard for Minimum Score of Zero[a]		
				2005	2010	2015	2005	2010	2015
Adequacy	Fruits	10	Total Fruits	≥0.8 c equivalents (5 points)			No fruit		
			Whole Fruits	≥0.4 c equivalents (5 points)			No whole fruit		
	Vegetables	10	Total Vegetables	≥1.1 c equivalents (5 points)			No vegetables		
			Dark Green and Orange Vegetables and Legumes[b]	≥0.4 c equivalents (5 points)	—		No dark green/ orange vegetables or legumes[b]	—	
			Greens & Beans	—	≥0.2 c equivalents (5 points)		—	No dark green vegetables or beans and peas	
	Grains	10	Total Grains	≥3.0 oz equivalents (5 points)	—		No grains	—	
			Whole Grains[c]	≥1.5 oz equivalents (5 points)	≥1.5 oz equivalents (10 points)		No whole grains		
	Dairy	10	Milk/Dairy[d]	≥1.3 c equivalents (10 points)			No dairy		
	Protein Foods	10	Meat and Beans	≥2.5 oz equivalents (10 points)	—		No meat or beans	—	
			Total Protein Foods	—	≥2.5 oz equivalents (5 points)		—	No protein foods	
			Seafood and Plant Proteins	—	≥0.8 oz equivalents (5 points)		—	No seafood or plant proteins	
	Fats	10	Oils	≥12 g oil (10 points)	—		No oil	—	
		10	Fatty Acids	—	(PUFAs[e]+MUFAs[f])/SFAs[g] ≥2.5 (10 points)		—	(PUFAs+MUFAs)/SFAs ≤1.2	
Moderation	Refined Grains	10	Refined Grains	—	≤1.8 oz equivalents (10 points)		—	≥4.3 oz equivalents	
	Sodium	10	Sodium	≤0.7 g[h] (10 points)	≤1.1 g (10 points)		≥2.0 g[h]		
	Empty Calories	20	SoFAAS[i] (2005) Empty Calories (2010)	≤20% of energy (20 points)	≤19% of energy (20 points)	—	≥50% of energy		—
			Added Sugars	—		≤6.5% of energy (10 points)	—		≥26% of energy

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Component type	Construct	Maximum points	Component	Standard for Maximum Points[a]			Standard for Minimum Score of Zero[a]		
				2005	2010	2015	2005	2010	2015
			Saturated Fats	≤7% of energy[h] (10 points)		≤8% of energy (10 points)	≥15% of energy[h]	—	≥16% of energy

[a] All standards represent amounts per 1,000 kcal (sometimes shown as percentage of energy) except for Fatty Acids.

[b] Legumes includes dry beans and peas.

[c] Whole grains receive a maximum of 5 points in HEI-2005 and 10 points in HEI-2010 and HEI-2015.

[d] Component name was Milk in HEI-2005 and Dairy in HEI-2010 and HEI-2015.

[e] PUFA=polyunsaturated fatty acids.

[f] MUFA=monounsaturated fatty acids.

[g] SFA=saturated fatty acids.

[h] In 2005, the Sodium and Saturated Fats components had three standards each, corresponding to scores of 0, 8, and 10 points.[3] Only minimum and maximum standards are shown here.

[i] SoFAAS=Solid fats, alcohols, and added sugars.