Dietary Patterns and Health: Insights From NESR Systematic Reviews to Inform the Dietary Guidelines for Americans

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ABSTRACT
This perspective article shares unique insights from the extensive experience of the US Department of Agriculture Nutrition Evidence Systematic Review branch in conducting systematic reviews on dietary patterns and health outcomes to inform the Dietary Guidelines for Americans. Methodological approaches for reviewing dietary patterns research are described, including approaches to operationalizing definitions and analyzing labeled dietary patterns. The review also describes techniques for synthesizing dietary patterns research across life stages in systematic reviews that inform food-based, federal dietary guidance. Current research activities and recommendations for how to improve or address gaps in dietary patterns research in the future are also discussed.

Key Words: dietary patterns, dietary guidelines, NESR, Nutrition Evidence Systematic Review, nutrition policy

INTRODUCTION
Recent editions of the Dietary Guidelines for Americans (DGAs) have focused on consuming a healthy dietary pattern.1,2 This focus represents a shift from emphasizing individual nutrients, foods, or food groups as nutrition experts increasingly recognize that people eat foods and nutrients in diverse combinations, as a dietary pattern, over the course of any given day, week, or year.2 A dietary pattern represents the combination of foods and beverages that individuals habitually consume. This combined dietary pattern—rather than isolated foods and nutrients—may better predict overall health status and disease risk because the components act synergistically.

The DGAs are updated by the US Departments of Agriculture (USDA) and Health and Human Services (HHS) at least every 5 years on the basis of the current body of scientific evidence on diet and health that is relevant to the US population.3 Since 1985, each update to the DGAs has been informed by the scientific report of a Dietary Guidelines Advisory Committee (DGAC), an external, independent group of nationally recognized scientific experts.3 Recent DGACs have used 3 complementary approaches to review the science of diet and health—systematic reviews, food pattern modeling, and data analysis. The DGAC’s systematic reviews are conducted with support from USDA’s Nutrition Evidence Systematic Review (NESR) Branch of the Nutrition Guidance and Analysis Division, Center for Nutrition Policy and Promotion, Food and Nutrition Service.4 The NESRs are defined as gold-standard evidence synthesis projects that answer nutrition questions of public health importance using systematic, transparent, rigorous, and protocol-driven methods to search for, evaluate, synthesize, and grade the strength of the eligible body of evidence.3

Since 2010, NESR has collaborated with various expert groups to conduct systematic reviews to determine whether dietary patterns are related to health outcomes across life...
stages. The findings from these systematic reviews consistently demonstrate that a healthy dietary pattern is associated with numerous beneficial health outcomes, including those related to reduced all-cause mortality, cardiovascular disease, overweight and obesity, type 2 diabetes, bone health, and certain types of cancer (breast and colorectal). Dietary patterns commonly associated with health benefits are characterized by relatively higher vegetables, fruits, legumes, whole grains, low-fat or nonfat dairy, lean meats and poultry, seafood, nuts, and unsaturated vegetable oils, and lower in red and processed meats, sugar-sweetened foods and beverages, and refined grains. This systematic review also indicates that dietary patterns that are characterized by higher consumption of red and processed meats, sugar-sweetened foods and beverages, and refined grains are associated with adverse health outcomes.

This article shares insights from NESR’s extensive experience conducting systematic reviews on the relationship between dietary pattern consumption and health across life stages to inform the DGAs. Methodological approaches for reviewing dietary patterns research are described, and NESR’s approach to operationalizing a definition for dietary patterns is discussed. The review also describes techniques for synthesizing dietary patterns research across life stages in systematic reviews that inform food-based, federal dietary guidance. Finally, recommendations are provided for how to improve and address gaps in dietary patterns research.

### Dietary Pattern Research Methods and Considerations

Methods that are used to examine dietary patterns in the scientific literature include *a priori*, *a posteriori*, combination or hybrid approaches, and randomized controlled trials (RCTs). These methods, described below, have different strengths and limitations to consider when synthesizing a body of evidence consisting of studies that employ different methodologies.

*A priori* methods assess adherence to a predefined dietary pattern using either indexes and/or scores. These predefined patterns are established through various means and may be based on existing dietary recommendations and regional or cultural foodways or can be generated by investigators on the basis of existing scientific evidence. As one example, the Healthy Eating Index (HEI) examines the alignment of specific foods with the US DGAs’ key recommendations. In this hypothesis-driven approach, a participant receives a score for individual foods, food components, and/or nutrients that comprise the pattern. Scoring systems typically award points (positive, neutral, or negative) depending on the health-promoting nature of the component. Scoring may be based on sex-specific medians or absolute intakes above or below cutoff values. Scores on the components are then summed, and this total score reflects adherence to the predetermined dietary pattern.

Strengths of this methodological approach are that they are often based on established, existing patterns and reflect multiple dimensions of the diet within a single score. Additional advantages of using an *a priori* approach include ease of computation, reproducibility, and comparability of scores across studies. This approach is particularly useful when analyzing the risk of diet-related chronic disease across populations or cultures. However, the *a posteriori* approach has limitations, including a simplistic focus on only select types and amounts of dietary components, often with limited specificity. Some researchers may pre-specify energy intake or examine patterns independent of energy intake. There also may be concerns regarding correlations between different dietary components within a pattern. Subjectivity can be introduced when researchers make modifications to preexisting patterns, even if to represent cultural or regional variations of dietary intake better. In addition, studies that use these methods are often designed to evaluate the impacts of consuming a pattern that is based on existing guidance or a known dietary pattern rather than to define the ideal or most healthy dietary pattern. Finally, the categorization of adherence to indexes/scores in an analysis can be challenging. It is customary for many studies to calculate quantiles on the basis of the study population’s exposure distribution. Although these categorizations can help to understand diet-health relationships, they can pose several challenges, including difficulty in comparing these different cut-points and synthesizing them in a systematic review. For example, participants may have the same overall score within a quantile but achieved that score from consuming different combinations of the dietary components, thus a different dietary pattern, within an index/score.

*A posteriori* methods can be used to determine the optimal representation of foods/food combinations from study participants’ dietary intake data. The most commonly used *a posteriori* methods (factor analysis and cluster analysis) mathematically reduce a list of foods or foods groups to reach a combination of foods/food groups that explain or predict the outcome. A smaller number of principal components or factors (ie, items with higher factor loadings) represent the dietary pattern, which is often labeled at the discretion of researchers. A participant’s score for each of the factors represents their dietary pattern. In the case of clustering methods, participants are clustered or aggregated into separate, exclusive groups on the basis of similar dietary intakes. One advantage of these data-driven methods is that the level of specificity within foods/food group factors or clusters is typically greater than what is possible from *a priori* approaches. However, subjectivity in labeling and determining the number of factors that comprise a pattern makes it challenging to reproduce and compare patterns across different populations. Notably, dietary patterns derived from these methods are population-specific to the study and, thus, can be less generalizable between studies. In addition, the factors driving the pattern tend to be focused on without necessarily looking at all components overall.
Several other methods are used to assess dietary patterns, although \textit{a priori} and \textit{a posteriori} are the most common.\textsuperscript{12,16} Other methods, sometimes referred to as hybrid, can include reduced rank regression, treeclet transformation, and interventions in which participants are assigned to consume experimental dietary patterns. Reduced rank regression and treeclet transformation are techniques that use a combination of methods.\textsuperscript{17} Dietary patterns may also be examined by assigning participants to consume a specific or different diets. These experimental studies often have smaller sample sizes and shorter durations, particularly for controlled-feeding studies in which participants receive all or some of the foods from the dietary pattern to consume. Some dietary patterns are defined by avoidance of specific food groupings, such as animal products (ie, vegan, vegetarian dietary patterns), though these studies often lack a description of which foods/food groups are consumed. In addition, it is possible for a dietary pattern to be examined using a variety of the methods described above. One example with a growing public health interest is the consumption of ultraprocessed food (UPF) and beverages using a dietary pattern lens. Study investigators may assign participants to consume dietary patterns that are either higher or lower in UPF, examine a dietary pattern with varying amounts of UPF via adherence scores (\textit{a priori} method) on the basis of a particular classification system, or derive a dietary pattern consisting of UPF by using factor/cluster analysis (\textit{a posteriori} method) then label the pattern as ultraprocessed. Given the many different methods used to assess dietary patterns, NESR has developed strategies for facilitating the synthesis of diverse bodies of evidence that apply all these methods.

\section*{THE NESR APPROACH TO DEFINING AND SYNTHESIZING DIETARY PATTERNS}

The NESR branch defines dietary patterns as the “quantities, proportions, variety, or combination of different foods, drinks, and nutrients (when available) in diets, and the frequency with which they are habitually consumed.”\textsuperscript{7} Studies must meet this definition to be included in NESR systematic reviews that examine evidence on dietary patterns (Table 1). At the core of this definition is the need for studies to describe the foods and beverages consumed in the dietary pattern. Given that the findings from NESR reviews inform federal food-based guidance, it is critical to have a definitive understanding of what foods and beverages comprise patterns that are associated with health outcomes. Therefore, studies that do not meet this definition and lack a description of the foods and beverages consumed are excluded from NESR systematic reviews. Because of the inconsistency in how researchers define dietary patterns, NESR convened a workshop with a panel of dietary pattern experts in 2011 to develop this definition.\textsuperscript{7} Since that workshop, NESR has worked with 5 different expert groups to implement this definition successfully and consistently in more than 40 systematic reviews on dietary patterns and health that have informed the past 3 editions of the DGAs.

The synthesis process involves combining, comparing, and contrasting data to examine whether dietary patterns were related to outcomes in the populations of interest.\textsuperscript{39} Overarching themes in reported results, similarities and differences within and across the body of evidence, and factors that impacted the relationship of interest are determined and described. Important commonalities and distinctions in dietary pattern components between studies, along with any related inconsistencies in results, are fully documented. To facilitate synthesis, NESR constructs evidence tables to present a body of evidence according to features that are most useful in understanding their results. The result of evidence synthesis is the development of conclusion statements, which are written as an answer to the systematic review question.\textsuperscript{39}

Synthesizing dietary patterns research is complex for several reasons. Considerable variation is common within and between the different methods used to study dietary patterns. For instance, researchers may assign different labels to dietary patterns that share similar/identical components or, conversely, apply the same label to dietary patterns comprised of different components. Unlike examining the impact of an individual food source in the diet on health, examining how dietary patterns relate to health requires consideration of all dietary components collectively. To handle this challenge, the NESR team meticulously investigates and presents each component of every dietary pattern studied across the body of evidence clearly and consistently (see Table 2 and Supplementary Table). The NESR team identified and met the need to develop an inventory that quickly, easily, and comprehensively illustrates the alignment and distinctions of components between indexes/scores. It helps visualize studies that use the same index/score (in different populations) or different indexes/scores within the same population. It is also helpful in tracking slight, moderate, and substantial modifications made to scores used between studies within a body of evidence. For dietary patterns derived or defined by other methods, NESR uses similar tables. Then, emphasis throughout the synthesis is placed on similar dietary pattern characteristics rather than dietary pattern names or labels. Posing another challenge, methodological diversity can contribute to variations in the reported effect measures across studies and prevent statistically combining data from included studies, although this issue is not unique to dietary patterns. The NESR process overcomes this diversity within and between approaches by ensuring a thorough assessment of all evidence, which includes considering the degree of similarity in both effect direction and magnitude, certainty in the effect estimates, and risk of bias across the body of evidence.\textsuperscript{40} All approaches to examining dietary patterns have different strengths and limitations described earlier in the manuscript.
A powerful aspect of NESR synthesis is that examining evidence from all approaches allows the strengths and limitations (eg, reproducibility) within one approach to complement and balance those from others.

**Table 1. Summary of NESR’s Systematic Reviews on Dietary Patterns and Health Outcomes Across the Lifespan**

<table>
<thead>
<tr>
<th>Project</th>
<th>Expert Group</th>
<th>Dietary Pattern-related Systematic Reviews</th>
</tr>
</thead>
</table>
| Dietary Patterns Systematic Reviews    | Dietary Patterns Technical Expert Collaborative | • Dietary patterns and body weight or risk of obesity<sup>7</sup>  
• Dietary patterns and risk of cardiovascular disease<sup>7</sup>  
• Dietary patterns and risk of type 2 diabetes<sup>1</sup>  
• Dietary patterns and risk of breast cancer<sup>6</sup>  
• Dietary patterns and risk of prostate cancer<sup>6</sup>  
• Dietary patterns and risk of lung cancer<sup>6</sup>  
• Dietary patterns and risk of colorectal cancer<sup>6</sup>  
• Dietary patterns and risk of bone health<sup>6</sup>  
• Dietary patterns and risk of dementia/cognitive decline/Alzheimer’s disease<sup>9</sup>  
• Dietary patterns and risk of depression<sup>6</sup>  
• Dietary patterns and risk of congenital anomalies<sup>6</sup>  
• Types and amounts of CFB and bone health<sup>18,19,a</sup>  
• Types and amounts of CFB and growth, size, body composition, and risk of overweight and obesity<sup>19,20,a</sup>  
• Types and amounts of CFB and development milestones<sup>22,23,a</sup>  
• Dietary patterns before and during pregnancy and risk of hypertensive disorders of pregnancy<sup>24</sup>  
• Dietary patterns before and during pregnancy and risk of gestational diabetes mellitus<sup>34</sup>  
• Dietary patterns before and during pregnancy and gestational age at birth<sup>20</sup>  
• Dietary patterns before and during pregnancy and gestational age and sex-specific birth weight<sup>20</sup>  
• Dietary patterns and risk of breast cancer<sup>26</sup>  
• Dietary patterns and risk of prostate cancer<sup>26</sup>  
• Dietary patterns and risk of lung cancer<sup>26</sup>  
• Dietary patterns and risk of colorectal cancer<sup>26</sup>  
• Dietary patterns and risk of bone health<sup>27</sup>  
• Dietary patterns and neurocognitive health<sup>26</sup>  
• Dietary patterns in children/adolescents and risk of cardiovascular disease<sup>29</sup>  
• Dietary patterns in children/adolescents and risk of type 2 diabetes<sup>30</sup>  
• Dietary patterns in children/adolescents and growth, size, body composition, and risk of overweight and obesity<sup>31</sup>  
• Dietary patterns and sarcopenia<sup>32</sup>  
• Dietary patterns and all-cause mortality<sup>33</sup>  
• Dietary patterns during pregnancy and gestational weight gain<sup>34</sup>  
• Dietary patterns during lactation and postpartum weight loss<sup>35</sup>  
• Dietary patterns during lactation and human milk composition and quantity<sup>36</sup>  
• Dietary patterns during lactation and developmental milestones in the child<sup>37</sup>  
• Maternal diet during pregnancy and lactation and risk of child food allergies and atopic allergic diseases<sup>38,a</sup> |
| 2015 DGAC Systematic Reviews           | 2015DGAC                             |                                                                                                           |
| Pregnancy and Birth to 24 Months Systematic Review Project | Complementary Feeding Technical Expert Collaborative | • Dietary patterns and risk of breast cancer<sup>6</sup>  
• Dietary patterns and risk of prostate cancer<sup>6</sup>  
• Dietary patterns and risk of lung cancer<sup>6</sup>  
• Dietary patterns and risk of colorectal cancer<sup>6</sup>  
• Dietary patterns and risk of bone health<sup>6</sup>  
• Dietary patterns and risk of dementia/cognitive decline/Alzheimer’s disease<sup>9</sup>  
• Dietary patterns and risk of depression<sup>6</sup>  
• Dietary patterns and risk of congenital anomalies<sup>6</sup>  
• Types and amounts of CFB and bone health<sup>18,19,a</sup>  
• Types and amounts of CFB and growth, size, body composition, and risk of overweight and obesity<sup>19,20,a</sup>  
• Types and amounts of CFB and development milestones<sup>22,23,a</sup>  
• Dietary patterns before and during pregnancy and risk of hypertensive disorders of pregnancy<sup>24</sup>  
• Dietary patterns before and during pregnancy and risk of gestational diabetes mellitus<sup>34</sup>  
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• Dietary patterns and risk of prostate cancer<sup>26</sup>  
• Dietary patterns and risk of lung cancer<sup>26</sup>  
• Dietary patterns and risk of colorectal cancer<sup>26</sup>  
• Dietary patterns and risk of bone health<sup>27</sup>  
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• Dietary patterns during lactation and developmental milestones in the child<sup>37</sup>  
• Maternal diet during pregnancy and lactation and risk of child food allergies and atopic allergic diseases<sup>38,a</sup> |
| 2020 DGAC Systematic Reviews           | 2020DGAC                             |                                                                                                           |

CFB indicates complementary food and beverages; DGAC, Dietary Guidelines Advisory Committee; NESR, Nutrition Evidence Systematic Review.

<sup>a</sup>These reviews examined dietary patterns within broader interventions/exposures of either complementary feeding or maternal diet.

**DIETARY PATTERNS ACROSS LIFE STAGES**

Dietary intake is complex and has the potential to change throughout the lifespan<sup>36</sup>. This is especially important for studies that assess dietary patterns at baseline and follow participants over several years, sometimes decades. In general, dietary patterns are relatively stable during childhood<sup>57</sup>, adolescence<sup>58,59</sup>, young adulthood (for women)<sup>64</sup>, and adulthood<sup>56,61–63</sup> during pregnancy<sup>64</sup>,
<table>
<thead>
<tr>
<th>Name of Index/Score</th>
<th>Mediterranean Diet Score&lt;sup&gt;31&lt;/sup&gt;</th>
<th>MIND&lt;sup&gt;32&lt;/sup&gt;</th>
<th>HEI-2015; HEI-2020; HEI-2020-Toddlers&lt;sup&gt;33&lt;/sup&gt;</th>
<th>DASH Score&lt;sup&gt;44&lt;/sup&gt;</th>
<th>hPDI&lt;sup&gt;15,46&lt;/sup&gt;</th>
<th>APDQS&lt;sup&gt;47&lt;/sup&gt;; Pediatric&lt;sup&gt;48&lt;/sup&gt;</th>
<th>Paleolithic Score&lt;sup&gt;49&lt;/sup&gt; or Evolutionary-Concordance Score&lt;sup&gt;50&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>0–9</td>
<td>0–15</td>
<td>0–100</td>
<td>8–40</td>
<td>0–85</td>
<td>0–132</td>
<td>14–70</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Vegetables (+)</td>
<td>Vegetables (+), green leafy vegetables (+)</td>
<td>Total vegetables (+), greens and beans (+)</td>
<td>Vegetables (not potatoes) (+)</td>
<td>Vegetables (+)</td>
<td>Green (+) and other vegetables (+), tomatoes (+)</td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Potatoes (+m)</td>
<td>–</td>
</tr>
<tr>
<td>Legumes</td>
<td>Legumes (+)</td>
<td>Beans (+)</td>
<td>Included in vegetables; fish</td>
<td>–</td>
<td>–</td>
<td>Legumes (+)</td>
<td>Fried potatoes (-)</td>
</tr>
<tr>
<td>Fruit</td>
<td>Fruit, nuts (+)</td>
<td>Berries (+)</td>
<td>Total fruit (+), whole fruit (+)</td>
<td>Fruit and fruit juice (+)</td>
<td>–</td>
<td>Fruit (+)</td>
<td>Legumes (+), soy products (+)</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Fruit juice (-)</td>
<td>Fruit (+), avocado (+)</td>
</tr>
<tr>
<td>Nuts</td>
<td>Included in fruit</td>
<td>Nuts (+)</td>
<td>Whole grains (+)</td>
<td>Whole grains (+)</td>
<td>–</td>
<td>Fruit juices (-)</td>
<td>–</td>
</tr>
<tr>
<td>Cereals, grains unspecifed</td>
<td>Cereals (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Nuts and legumes (+)</td>
<td>Nuts (+)</td>
</tr>
<tr>
<td>Refined grains</td>
<td>–</td>
<td>–</td>
<td>Refined grains (-)</td>
<td>–</td>
<td>–</td>
<td>Refined grains (-)</td>
<td>–</td>
</tr>
<tr>
<td>Fish</td>
<td>Fish (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Fish or seafood (-)</td>
<td>–</td>
</tr>
<tr>
<td>Seafood, shellfish</td>
<td>Seafood (+)</td>
<td>Seafood (+)</td>
<td>Seafood and plant proteins (+)</td>
<td>–</td>
<td>–</td>
<td>Shellfish (+m)</td>
<td>–</td>
</tr>
<tr>
<td>Fish, other</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Fried fish (-)</td>
<td>–</td>
</tr>
<tr>
<td>Red, processed meat</td>
<td>Red and processed meat (-)</td>
<td>Red meat (-)</td>
<td>Total protein foods (+)</td>
<td>Red and processed meat (-)</td>
<td>–</td>
<td>High-fat meat (-), organ meats (-)</td>
<td>–</td>
</tr>
<tr>
<td>White, poultry, lean meat</td>
<td>Poultry (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Lean meat (+m)</td>
<td>–</td>
</tr>
<tr>
<td>Eggs</td>
<td>–</td>
<td>Cheese (-)</td>
<td>Dairy (+)</td>
<td>Low-fat dairy (+)</td>
<td>–</td>
<td>Eggs (-)</td>
<td>–</td>
</tr>
<tr>
<td>Dairy, other</td>
<td>Dairy products (-)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Dairy (-)</td>
<td>–</td>
</tr>
<tr>
<td>Dairy, low-fat/nonfat</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Low-fat dairy (+)</td>
</tr>
<tr>
<td>Dairy, whole/high fat</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Whole-fat dairy (-)</td>
<td>–</td>
</tr>
<tr>
<td>Sugars, added</td>
<td>Pastries and sweets (-)</td>
<td>Added sugars (-)</td>
<td>SSBs (-)</td>
<td>–</td>
<td>–</td>
<td>SSBs, artificially sweetened beverages (+), sweets and desserts (+)</td>
<td>–</td>
</tr>
<tr>
<td>Fats, unsaturated, oils</td>
<td>MUFA/SFA (+)</td>
<td>Olive oil (+)</td>
<td>PUFA+MUFA/SFA (+)</td>
<td>–</td>
<td>–</td>
<td>Vegetable oil (+)</td>
<td>–</td>
</tr>
<tr>
<td>Fats, other</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Margarine (+m)</td>
<td>–</td>
</tr>
<tr>
<td>Fats, saturated, animal</td>
<td>–</td>
<td>Butter, stick margarine (-)</td>
<td>SFA (-)</td>
<td>–</td>
<td>–</td>
<td>Butter (-), fried foods (-)</td>
<td>–</td>
</tr>
<tr>
<td>Alcohol</td>
<td>Alcohol (+m)</td>
<td>Wine (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Beer, wine, liquor (+)</td>
<td>–</td>
</tr>
<tr>
<td>Sodium</td>
<td>–</td>
<td>Sodium (-)</td>
<td>Sodium (-)</td>
<td>Sodium (-)</td>
<td>–</td>
<td>Salty snacks (-)</td>
<td>–</td>
</tr>
<tr>
<td>Tea, coffee</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Tea and coffee (+)</td>
<td>–</td>
</tr>
<tr>
<td>Other</td>
<td>Fried/fast food (-)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Chocolate, diet soft drinks each (+m)</td>
<td>Calcium from nondairy food (+)</td>
</tr>
<tr>
<td>Name of Index/Score</td>
<td>Global Diet Quality Score (GDQS), or Modified Prime Diet Quality Score&lt;sup&gt;51&lt;/sup&gt;</td>
<td>France, PNNS-GS&lt;sup&gt;52&lt;/sup&gt;</td>
<td>Dutch Healthy Diet Index 2015&lt;sup&gt;53&lt;/sup&gt;</td>
<td>Japan, Okinawan Diet Score&lt;sup&gt;54&lt;/sup&gt;</td>
<td>Australia, Healthy Eating Index for Australian Adults (HEIFA)&lt;sup&gt;55&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score</td>
<td>0–49, or 46.5</td>
<td>0–15</td>
<td>0–140</td>
<td>0–16</td>
<td>0–100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>Dark green (+), deep orange (+), cruciferous (+), other vegetables (+)</td>
<td>Vegetables and fruit (+)</td>
<td>Vegetables (+)</td>
<td>Other vegetables (+m)</td>
<td>Vegetables (+), variety (+), legumes, starchy, orange/red, other (+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td>–</td>
<td>Included in grains</td>
<td>–</td>
<td>Sweet potato (+)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td>White roots, tubers (–)</td>
<td>–</td>
<td>–</td>
<td>Potatoes (–)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>Legumes (+)</td>
<td>–</td>
<td>Legumes (+)</td>
<td>Legumes (+)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit juice</td>
<td>Citrus (+), deep orange (+), and other fruit (+)</td>
<td>Included in vegetables</td>
<td>Fruit (+)</td>
<td>Fruit (–)</td>
<td>Included with vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuts</td>
<td>Juices (–)</td>
<td>–</td>
<td>–</td>
<td>Nuts (+)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole grains</td>
<td>Nuts, seeds (+)</td>
<td>–</td>
<td>–</td>
<td>Nuts and seeds (–)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereals, grains</td>
<td>–</td>
<td>Bread, cereals, potatoes, and legumes (+m)</td>
<td>–</td>
<td>Wheat, barley, other grains (+)</td>
<td>Whole grains (+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refined grains</td>
<td>Refined grains, baked foods (–)</td>
<td>–</td>
<td>Replace refined with whole grain products (–)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>Fish/shellfish (+)</td>
<td>–</td>
<td>Fish (+)</td>
<td>Fish (–)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seafood, shellfish</td>
<td>Seafood (–)</td>
<td>–</td>
<td>Seafood (–)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red, processed meat</td>
<td>Red meat (–), processed meat (–)</td>
<td>Meat and poultry, seafood, and eggs (+m)</td>
<td>Red meat (–) processed meat (–)</td>
<td>Meat (including poultry) (–)</td>
<td>Meat and meat alternatives (not processed) (+m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, poultry, lean meat</td>
<td>Poultry, game (+)</td>
<td>–</td>
<td>–</td>
<td>Eggs (–)</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>Eggs (+)</td>
<td>–</td>
<td>Dairy products (+m)</td>
<td>Dairy (–)</td>
<td>Dairy and dairy alternatives (+m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy, other</td>
<td>Low-fat dairy (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy, high fat</td>
<td>High-fat dairy (–)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugars, added</td>
<td>SSBs (–), sweets, ice cream (–)</td>
<td>Sweetened foods (–), soda (vs water) (–)</td>
<td>–</td>
<td>Sugars (–)</td>
<td>Added sugars (–)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fats, unsaturated, oils</td>
<td>Oils, liquid (+)</td>
<td>Vegetable fat (+)</td>
<td>Margarines, oils (replace butter, hard fats) (+)</td>
<td>Oils (–)</td>
<td>PUFA (+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fats, saturated, animal</td>
<td>–</td>
<td>Added fat (–)</td>
<td>–</td>
<td>–</td>
<td>SFA (–)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>–</td>
<td>Alcohol (+m)</td>
<td>Alcohol (–)</td>
<td>Flavors and alcohol (–)</td>
<td>Alcohol (+m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>–</td>
<td>Salt (–)</td>
<td>Sodium (–)</td>
<td>–</td>
<td>Sodium (–)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tea, coffee</td>
<td>–</td>
<td>Tea (+), filtered coffee (–)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Purchased deep fried foods (–)</td>
<td>Physical activity (+)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

APDQS indicates A Priori Diet Quality Score; DASH, Dietary Approaches to Stop Hypertension; DQI, Diet Quality Index; GDQS, Global Diet Quality Score; HEI, Healthy Eating Index; HEIFA, Healthy Eating Index for Australian Adults; hPDI, Healthy Plant-Based Diet Index; MIND, Mediterranean-DASH Intervention for Neurodegenerative Delay Diet; MUFA, monounsaturated fatty acid; PDI, Plant-based diet index; PNNS-GS, Programme National Nutrition Sante Guideline Score; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid.

Note: (+) indicates positively scored/higher intake, (–) indicates negatively scored/lower intake, and (+m) indicates positively scored if moderate/neutral.
and from preconception to postpartum, although some of these periods are particularly prone to changes in dietary intake. However, variation in the stability of dietary patterns may occur in certain life stages, such as during infancy and toddlerhood, and within certain subgroups, such as individuals with overweight or obesity.

Many of the key challenges in synthesizing dietary patterns research are similar at all life stages and have been detailed above. The following section highlights these challenges and insights across specific life stages within the context of NESR systematic reviews that examine the consumption of dietary patterns during early childhood, middle through late childhood, adulthood and older adulthood, and pregnancy.

Infants and Toddlers

Dietary exposures during infancy and toddlerhood are integral to growth and development, with the potential to affect health later in life. Dietary patterns in the context of complementary foods and beverages were examined in NESR systematic reviews within the Pregnancy and Birth to 24 Months Project. In one of those reviews, dietary patterns consumed from birth up to 24 months of age and weight-related outcomes across the lifespan were examined in 11 of the included articles. Dietary pattern approaches used by study authors were as follows: a priori methods in 2 articles, a posteriori methods in 5 articles, and other methods in 4 articles, including 1 RCT. Although several of the dietary patterns studied were intended to align with complementary feeding guidelines, they differed in key components, such as baby cereal and commercial baby food. Reported results and the dietary patterns studied were less generalizable to the American population because dietary recommendations for infants and toddlers have changed over time and differ between countries. In addition, studies included in that review lacked specificity of foods/food group components such as sweet foods or snacks. Furthermore, labels subjectively assigned to some patterns carried judgments, such as inappropriate or inadequate.

Children and Adolescents

Dietary pattern consumption from age 2 to 19 years and growth, size, body composition, and risk of obesity were examined in 12 articles from prospective cohort studies included in a recent NESR systematic review (see Table 3). Various dietary pattern methods were used: 5 articles used a priori, 6 used a posteriori, and 1 used other (reduced rank regression) approaches. The review concluded that dietary patterns lower in fruits, vegetables, whole grains, and low-fat dairy while being higher in added sugars, refined grains, fried potatoes, and processed meats were associated with higher fat-mass index and body mass index later in adolescence. A challenge with evidence at this life stage is that dietary assessment methods are often not validated for use in younger populations. In addition, fewer studies are available during this life stage for the outcomes examined, so conclusions drawn from systematic reviews tend to be limited in strength relative to other life stages.

Adults and Older Adults

In reviews conducted by the 2020 DGAC, with support from NESR, more than 500 articles were identified and included in reviews that examined consumption of dietary patterns in adulthood and older adulthood in relation to all-cause mortality, bone health, cancer, cardiovascular disease, neurocognitive health, obesity, sarcopenia, and/or type 2 diabetes. The systematic review examining dietary patterns and all-cause mortality provides an illustrative example of considerations highlighted throughout this manuscript. In that review, dietary pattern consumption and all-cause mortality were examined in 141 articles. All approaches mentioned earlier were used to define dietary patterns: more than 100 of the articles used an a priori approach, and 1 RCT examined a Mediterranean diet compared with control/habitual diets. Factor and cluster analyses were used in 25 articles, and other methods were used in 11 articles. Several diets were defined by avoidance of animal products or level of UPF consumption. Across the body of evidence, there were varying levels of specificity within and between dietary pattern components. For example, some scored low-fat dairy products positively, whereas others scored dairy products negatively. Many dietary patterns included an alcoholic beverage component, but some only specified certain types of alcoholic beverages, such as red wine. Select foods/groups, such as legumes and nuts, were scored differently as their own, individual component or within other components. Some dietary patterns were labeled differently but represented the same dietary pattern, such as the Paleolithic and evolutionary-discordance scores. Multiple dietary patterns were assigned the same label, such as "Prudent", and were characterized by both similar and different food components. Therefore, it is always important to examine the individual components that constitute a particular dietary pattern, even when dietary patterns share a similar label or name.

Evidence synthesis in that review, as described earlier in this paper, focused on the commonalities in foods/beverages comprising the dietary patterns instead of their labels, diet types, or nutrient profiles. Despite the methodological diversity, reported relationships were consistent when looking collectively across the body of evidence. Dietary patterns associated with lower all-cause mortality risk had more similarities than differences and were relatively high in vegetables, fruits, whole grains, legumes (nuts), fish or lean meat such as poultry, and unsaturated fats and relatively low in red and processed meat or meat and meat products.

Pregnancy

How dietary pattern consumption during pregnancy relates to gestational weight gain (GWG) was examined in a recent NESR systematic review that included 24 articles.
methods, and 5 articles used a posteriori factor/cluster analysis. In addition, 2 trials randomized participants to ≥ 1 dietary pattern, and 1 article used reduced rank regression. Irrespective of the dietary pattern methods used, there was general consistency in results reported across studies.

The evidence highlighted that a lower risk of excessive weight gain was associated consistently with certain dietary patterns consumed during pregnancy. These patterns were higher in vegetables, fruits, nuts, legumes, and fish and lower in added sugars and red and processed meat. However, grains or dairy components were not consistently associated with GWG, partly because of how these foods were described in the body of evidence. For example, dairy was classified as beneficial (eg, low-fat dairy, skim milk products, low to moderate amounts of dairy) in some studies and detrimental (eg, high-fat dairy) in others. Furthermore, some studies classified dairy as either beneficial or detrimental on the basis of the amount consumed. Grains were also inconsistently defined in this body of evidence, with some studies categorizing grains as beneficial (eg, cereals, whole grain bread, fiber-rich whole grain) and others classifying them as detrimental (eg, refined grains, presliced bread). Inconsistencies in how studies reported grains and dairy prevented the understanding of how these food groups contributed to dietary patterns that were associated with GWG.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

Each new edition of the DGAs must be based on the current scientific evidence on diet and health, and each edition is informed by the scientific report of its respective DGAC. The systematic reviews described previously are just one of the scientific approaches used by the DGAC to review the science on important diet and health-related scientific questions. These systematic reviews are complemented by food pattern modeling and data analysis. Food pattern modeling is defined as “a series of analyses that illustrate how changes to the amounts or types of foods and beverages in a dietary pattern might affect meeting nutrient needs across the U.S. population.” Data analysis is defined as “a collection of analyses that uses national data sets to describe the current health and dietary intakes in the U.S. population—data that helps make the Dietary Guidelines practical, relevant, and achievable.” As a final step in its work, the DGAC integrates the findings across all the scientific questions they answered using these 3 approaches. The DGAC’s report thoroughly documents this integration of evidence and serves as the basis for the DGAC’s advice to USDA and HHS when developing the next edition of the DGAs.

In their integration of evidence, the 2020 DGAC found that the data reviewed supported a lifespan approach because it reinforces the importance of implementing dietary patterns that are most associated with nutrient adequacy, energy balance, and reduced risk of diet-related chronic health conditions.

Achieving goals at each life stage not only supports health at that point in time but also provides a sound basis for transitioning to the next life stage from a position of nutritional advantage. Integrating the evidence reviewed for the topics addressed in this report, the 2020 DGAC concludes that every life stage provides an opportunity to make food choices that promote health and well-being, achieve and maintain appropriate weight status, and reduce the risk of diet-related chronic disease. In summarizing the findings of the dietary pattern reviews, the DGAC also noted that a “powerful aspect of using a dietary patterns approach is that it enables multiple adaptations to fit cultural, personal, and individual needs and preferences in food choices.”

After each DGAC completes its work, a writing team of federal nutrition scientists from USDA and HHS with expertise in the DGAs and related research and programs, as well as specialists with expertise in communicating nutrition information, develop the next edition of the DGAs.

Every new edition of the DGAs builds on the previous one. The scientific justification for any revisions to a previous edition is grounded in the DGAC’s scientific report that informs the new edition, as well as comments from the public and federal agencies. The 2020–2025 DGAs provides 4 overarching guidelines:

1. Follow a healthy dietary pattern at every life stage.
2. Customize and enjoy nutrient-dense food and beverage choices to reflect personal preferences, cultural traditions, and budgetary considerations.
3. Focus on meeting food group needs with nutrient-dense foods and beverages and stay within calorie limits. The core elements of a healthy dietary pattern include (1) vegetables of all types (including dark green; red and orange; beans, peas, and lentils; starchy; and other vegetables); (2) fruits, especially whole fruit; (3) grains, at least half of which are whole grain; (4) dairy, including fat-free or low-fat milk, yogurt, and cheese, and/or lactose-free versions and fortified soy beverages and yogurt as alternatives; (5) protein foods, including lean meats, poultry, and eggs; seafood; beans, peas, and lentils; and nuts, seeds, and soy products; and (6) oils, including vegetable oils and oils in food, such as seafood and nuts.
4. Limit foods and beverages higher in added sugars, saturated fat, and sodium, and limit alcoholic beverages.

Dietary patterns research has advanced the development of dietary guidance in many ways. In nutrition, it is not possible to remove, add, or adjust a dietary component in isolation, and dietary patterns research allows for considering all aspects of the diet that are consumed. Although consumers may have questions about the relationship between individual foods and health, dietary patterns research illustrates that the totality of the diet must be considered.
<table>
<thead>
<tr>
<th>Life Stage</th>
<th>Existing Evidence</th>
</tr>
</thead>
</table>
| Infants and toddlers | - No conclusion could be made about the relationship between distinct dietary patterns during the complementary feeding period and growth, size, body composition, and/or prevalence/incidence of malnutrition, overweight, or obesity.  
- There is insufficient evidence to draw a conclusion about the relationship between the types or amounts of CFB consumed and developmental milestones.  
- Insufficient evidence is available to draw conclusions about the relationship between the types and/or amounts of complementary foods and beverages consumed and bone health. |
| Children and adolescents | - Insufficient evidence is available to determine the relationship between dietary patterns consumed in children and bone health.  
- Limited evidence suggests that dietary patterns in children and adolescents that emphasize a higher intake of vegetables, fruits, whole grains, and fish and lower intake of SSBs, processed meat, and sweets are associated with lower blood pressure and blood lipid levels, including LDL, HDL, and triglycerides later in life. |
| Adults and older adults | - Strong evidence demonstrates that dietary patterns in adults and older adults characterized by vegetables, fruits, legumes, nuts, whole grains, rated vegetable oils, and fish, lean meat, or poultry when meat was included are associated with decreased risk of all-cause mortality. These patterns were also relatively low in red and processed meat, high-fat dairy, and refined carbohydrates or sweets. Some of these dietary patterns also included alcoholic beverages in moderation. (Grade: Strong)  
- Moderate evidence indicates that a dietary pattern higher in fruits, vegetables, legumes, nuts, whole grains, nuts, and legumes, and fish, and lower in meats (particularly processed meats), SSBs, and sweets are associated with favorable bone health outcomes in adults, primarily decreased risk of hip fracture. (Grade: Moderate)  
- Moderate evidence indicates that dietary patterns rich in vegetables, fruits, and whole grains and lower in animal-source foods and refined carbohydrates are associated with reduced risk of postmenopausal breast cancer. The data regarding these dietary patterns and premenopausal breast cancer risk point in the same direction, but the evidence is limited as fewer studies include premenopausal breast cancer. (Consistent with the 2015 DGAC, with the exception of alcohol)  
- Moderate evidence indicates that dietary patterns higher in vegetables, fruits, legumes, whole grains, lean meats, seafood, and low-fat dairy; and low in red and processed meats, saturated fat, SSBs, and sweets relative to other dietary patterns are associated with lower risk of colon and rectal cancer. Moderate evidence also indicates that dietary patterns that are higher in red and processed meats, French fries, potatoes, and sources of sugars (eg, SSBs, sweets, and dessert foods) are associated with a greater colon and rectal cancer risk. (Consistent with the 2015 DGAC, with the exception of alcohol)  
- Limited evidence suggests that dietary patterns containing more frequent servings of vegetables, fruits, seafood, grains and cereals, legumes, and lean vs higher fat meats and lower fat or nonfat dairy products may be associated with lower risk of lung cancer, primarily among former smokers and current smokers.  
- Limited evidence suggests no relationship between dietary patterns and the risk of prostate cancer.  
- Limited evidence suggests that dietary patterns containing vegetables, fruits, unsaturated vegetable oils and/or nuts, legumes, and fish or seafood consumed during adulthood are associated with a lower risk of age-related cognitive impairment and/or dementia. (Grade: Limited)  
- Insufficient evidence is available to determine the relationship between dietary patterns and sarcopenia in older adults. (Grade: Grade not assignable)  
- The 2020 DGAC conducted a systematic evidence scan and confirmed that the conclusion drawn by the 2015 Dietary Guidelines Advisory Committee generally reflects the current state of the science: Strong and consistent evidence demonstrates that dietary patterns associated with decreased risk of cardiovascular disease are characterized by higher consumption of vegetables, |
Dietary patterns research, to date, has been particularly valuable for informing qualitative guidance on diet and health—highlighting the central tenets of a healthy dietary pattern. Currently, food pattern modeling complements the systematic reviews to elucidate the quantitative recommendations that meet nutrient needs and reflect findings from the systematic reviews. More quantitative descriptions in dietary patterns research could help with the development of future DGAs, such as refining specific food groups and subgroup recommendations. In addition, future analyses that explore if certain components of the dietary pattern are particularly important at certain stages of life or drivers of dietary pattern—health relationships would be helpful to inform guidance development—and subsequently support implementation and communication efforts. Moreover, there is a growing body of literature linking dietary pattern components with health outcomes, in particular UPF. To inform recommendations for Americans, further research that clarifies the assessment, classification, attributes, and categorization of UPF relative to the degree and level of processing and formulation within the context of the US food supply could be valuable. Furthermore, advancements in dietary patterns research to explore not just the what and how much but also other aspects, particularly when foods are consumed over a day, will be relevant for providing public nutrition guidance.

An exciting element of NESR’s work with dietary patterns research that has been valuable in informing dietary guidance is the remarkable consistency in conclusion statements drawn across health outcomes, populations examined, and life stages. For example, there are more similarities than differences across the components of dietary patterns positively associated with health. This consistency has resulted in dietary guidance for overall health—and precludes the need for different recommendations for each diet-related disease or condition. In addition, a benefit of decades of research exploring dietary patterns by food groupings/components is that the patterns have been assessed in a wide range of populations with comparable results. This consistency has allowed the DGAs to provide a framework for healthy eating that can be tailored on the basis of various considerations—such as preferences, culture, or budget. In addition, as illustrated in

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**Table 3. (Continued)**

<table>
<thead>
<tr>
<th>Life Stage</th>
<th>Existing Evidence</th>
</tr>
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<tbody>
<tr>
<td>Pregnancies</td>
<td>Fruits, whole grains, low-fat dairy, and seafood, and lower consumption of red and processed meat, and lower intakes of refined grains, and sugar-sweetened foods and beverages relative to less healthy patterns. Regular consumption of nuts and legumes and moderate consumption of alcohol are also shown to be components of a beneficial dietary pattern in most studies. Randomized dietary intervention studies have demonstrated that healthy dietary patterns exert a clinically meaningful impact on cardiovascular risk factors, including blood lipids and blood pressure. In addition, research that includes specific nutrients in their description of dietary patterns indicates that patterns that are lower in saturated fat, cholesterol, and sodium and richer in fiber, potassium, and unsaturated fats are beneficial for reducing cardiovascular disease risk. (2015 DGAC Grade: Strong)</td>
</tr>
<tr>
<td></td>
<td>The 2020 DGAC reviewed newly published evidence using a systematic evidence scan and determined that the conclusion drawn by the 2015 DGAC generally reflects the current state of science: Moderate evidence indicates dietary patterns emphasizing vegetables, fruits, and whole grains; seafood and legumes; moderate in dairy products (particularly low and nonfat dairy) and alcohol; lower in meats (including red and processed meats), and low in sugar-sweetened foods and beverages, and refined grains are associated with favorable outcomes related to body weight (including lower BMI, waist circumference, or percent body fat) or risk of obesity. Components of the dietary patterns associated with these favorable outcomes include higher intakes of unsaturated fats and lower intakes of saturated fats, cholesterol, and sodium. (2015 DGAC Grade: Moderate)</td>
</tr>
</tbody>
</table>

BMI indicates body mass index; CFB, complimentary food and beverages; DGAC, Dietary Guidelines Advisory Committee; HDL, high-density lipoprotein; LDL, low-density lipoprotein; NESR, Nutrition Evidence Systematic Review; SSB, sugar-sweetened beverage.
the case studies above, NESR systematic reviews have consistently demonstrated the core elements that make up a healthy dietary pattern across life stages. The consistencies observed across more than 40 NESR systematic reviews on dietary patterns and health illustrate the strength of the evidence informing the DGAs and providing confidence in the resulting guidance.

Over the past 15 years, NESR has conducted a range of systematic reviews on dietary patterns and health using rigorous methodology to provide a critical source of evidence that informs the DGAs. The NESR systematic reviews include careful consideration of factors that may interact with diet to affect health, which helps ensure that the DGAs provide the most comprehensive recommendations possible. NESR’s extensive experience with reviews on dietary patterns across the lifespan provides a valuable perspective to researchers on how to define dietary patterns and synthesize evidence. However, additional research is needed to propel the field forward. For instance, the first edition of the HEI-Toddlers-2020 was recently developed to help explore the dietary patterns of toddlers aged 12–23 months. In addition, the newest version of the HEI-2020, which researchers may use to assess alignment with the 2020–2025 edition of the DGAs, is also published.

Policymakers and professionals use the DGAs in the nutrition and public health fields to help Americans consume a healthy diet that meets nutrient needs. Given that adherence to the DGAs remains low, with an average score on the HEI of 59 out of 100 possible points across the US population, this step of implementing the DGAs is critical. The DGAs inform numerous federal food, nutrition, and health policies, programs, and nutrition education materials. The information in the DGAs is also used by a range of entities to inform public health nutrition efforts—including state and local governments, schools, the food industry, other businesses, community groups, and media. The process to develop the 2025–2030 edition of the DGAs has begun. The 2025 DGAC will examine the relationship between diet and health across all life stages, including a continued focus on reviewing the evidence on dietary patterns and health outcomes. For the first time, the 2025 DGAC’s review will include examining the relationship between dietary patterns with varying amounts of UPF and growth, body composition, and risk of obesity (https://nesr.usda.gov/protocols). They will also use a health equity lens across their evidence review to ensure factors such as socioeconomic position, race, ethnicity, and culture are described and considered on the basis of the information provided in the scientific literature and data. This will help HHS and USDA ensure that the resulting recommendations in the DGAs are relevant to people with diverse racial, ethnic, socioeconomic, and cultural backgrounds.

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SUPPLEMENTARY DATA

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