Part D. Chapter 9: Nutrient Profile Development

Introduction

Systematic reviews provide scientific evidence to support a link between dietary patterns and health outcomes. Food pattern modeling (FPM) is a complementary process that translates this evidence into dietary patterns that meet nutritional needs across the life span. A strength of FPM is that it can help define quantitative dietary patterns that simultaneously reflect population dietary intakes (in nutrient-dense forms), include components of health-promoting diets identified via evidence from systematic reviews, and meet energy and nutrient needs. FPM can also be used to illustrate how hypothetical changes to the quantities or types of foods and beverages in an existing dietary pattern, such as the 2020 USDA Healthy U.S.-Style Dietary Pattern (HUSS), might improve and/or worsen nutrient adequacy of the pattern across diverse age groups and life stages.

The *Dietary Guidelines for Americans, 2020-2025* includes 3 dietary patterns developed by previous Dietary Guidelines Advisory Committees to align with systematic review evidence on diet and health outcomes and achieve nutrient recommendations established in the Dietary Reference Intakes (DRI) from the National Academies of Sciences, Engineering, and Medicine (NASEM), with few exceptions (e.g., vitamins D and E).[1-6] The 2020-2025 USDA Dietary Patterns include:

- Healthy U.S.-Style Dietary Pattern for Toddlers Ages 12 Through 23 Months
- Healthy U.S.-Style Dietary Pattern for Ages 2 and Older
- Healthy Vegetarian Pattern for Toddlers Ages 12 Through 23 Months
- Healthy Vegetarian Pattern for Ages 2 and Older
- Healthy Mediterranean-Style Dietary Pattern for Ages 2 and Older

FPM facilitates balancing recommendations for nutrients and dietary components commonly underconsumed and overconsumed in the U.S. population. FPM analyses use a theoretical framework in which modeled patterns and corresponding nutrients are examined for the lowest estimated energy requirements for each age-sex group given reference heights and weights with an assumption that higher calorie levels would also meet the strata-specific nutrient needs. The calorie levels specified and modeled for each age-sex group must simultaneously meet recommendations for energy, nutrients, and other dietary components while not exceeding recommendations to limit added sugars, saturated fat, and sodium. Thus, modeling the nutrient-dense versions of the foods and beverages is important to achieve and maintain this balance.

The nutrient-dense foods modeled in FPM are called nutrient-dense representative foods because they are paired with or represent an item cluster (**Box D.9.1**) of similar foods. Representative foods that are selected for each item cluster are the forms with little saturated fat and little or no added sugars, where possible. For example, a boiled egg is the representative food for the eggs item cluster, which also contains other similar foods such as fried or scrambled eggs prepared in butter, oil, or margarine. To better

represent forms of foods with the least amounts of sodium, salt is removed from the underlying recipes in the USDA Food and Nutrient Database for Dietary Studies (FNDDS), with the assumption that salt is added during food preparation at home, rather than sodium inherent to the food itself or salt added in commercial preparation. In addition, the *Dietary Guidelines* recommendations are intended to be practical and equitable such that all individuals of varying racial and ethnic groups and income levels may implement the patterns with foods that are accessible and commonly consumed. Thus, FPM is also used to evaluate whether the modeled patterns and the underlying assumptions of nutrients provided by foods and beverages in each food group are representative of variations in dietary intakes for different population groups. **Box D.9.1** provides more detailed descriptions of key FPM terms.

Box D.9.1: Key Terms

Established Nutritional Goals: The established nutritional goals (hereafter referred to in this chapter as "goals") for food pattern modeling (FPM) analyses are defined as the Estimated Energy Requirement (EER) for energy,[7] less than 10 percent of energy from saturated fat, less than 10 percent of energy from added sugars,[8] lower than the Chronic Disease Risk Reduction intakes (CDRR) for sodium,[3] and 90 percent of the Recommended Dietary Allowance (RDA), or Adequate Intake (AI) when an RDA is not established.[2-4]

Nutrient-Dense Representative Foods: For purposes of USDA's FPM, each item cluster is assigned a nutrient-dense representative food which are those foods or beverages that represent the forms with the least amounts of added sugars, saturated fat, and sodium. The nutrient composition of the nutrient-dense representative food is used to represent the nutrient composition of the entire item cluster when calculating the nutrient profile for a food group or subgroup.

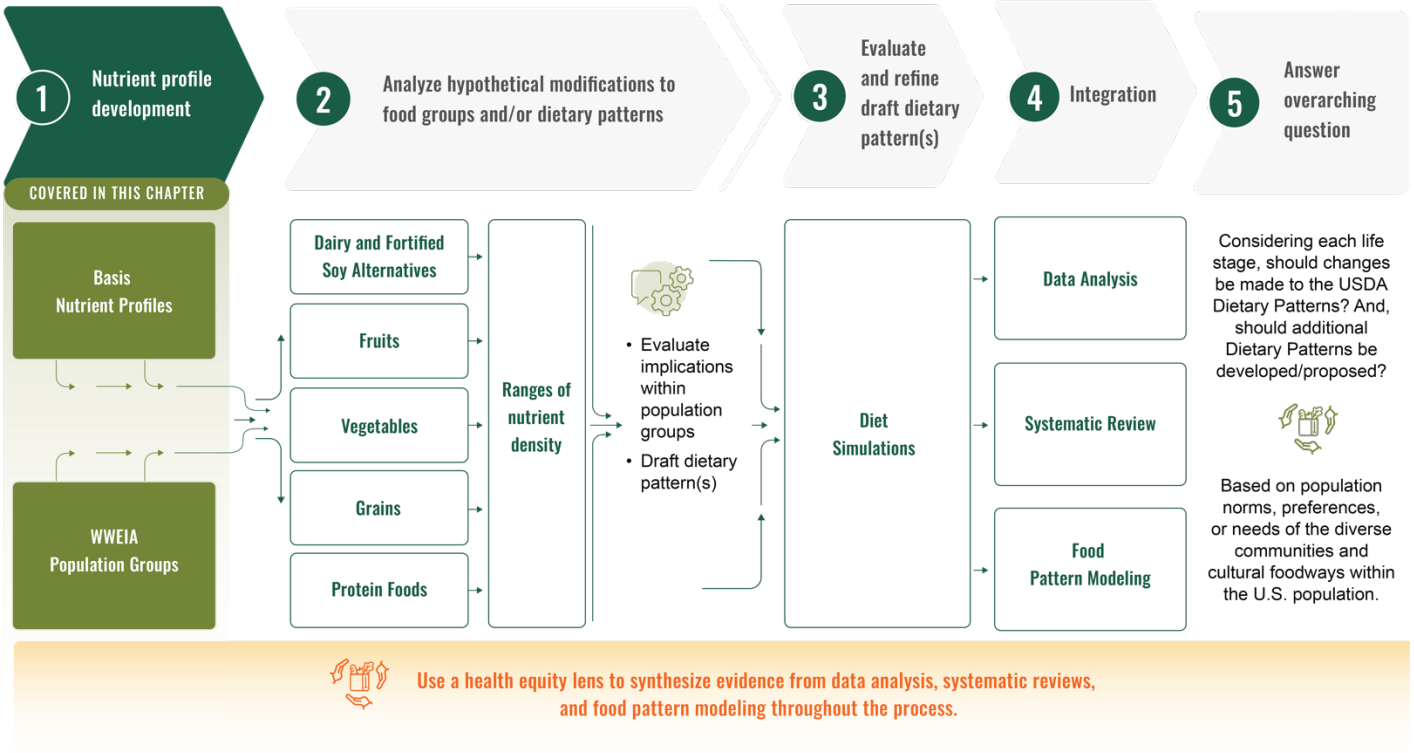
Item Clusters: Identified groupings of the same or similar foods or beverages that make up each food group and subgroup. Item clusters are used to calculate the weighted average consumption for use in calculating a nutrient profile for each food group and subgroup used in USDA FPM.

Nutrient Profiles: The proportional nutrient composition from the item clusters that represent each food group and subgroup from the variety of foods in each food group in their nutrient-dense forms. The nutrient profiles are based on a weighted average of nutrient-dense forms of foods (i.e., a composite of nutrient-dense forms of foods and beverages within a food group or subgroup). The calculated weighted average considers a range of foods and beverages reported by individuals in the United States, but are modeled using nutrient-dense forms, and results in a food pattern that can be adapted to fit an individual's preferences.

This chapter describes the multi-phased approach that considered evidence from 2 FPM protocols: 1) Basis Nutrient Profiles and 2) What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES) Population Groups (**Figure D.9.1**). These protocols were developed to inform whether

the existing or the revised methods would be used to develop the food group nutrient profiles for all subsequent FPM analyses by the 2025 Dietary Guidelines Advisory Committee (Committee).

FIGURE D.9.1
2025 FOOD PATTERN MODELING PROCESS



Nutrient Profile Development: Basis Nutrient Profiles

The nutrient profile that is derived to represent the nutritional contribution of each food group and subgroup to the overall pattern is based on the nutrient composition of the foods or beverages in their nutrient-dense forms, proportional to their consumption in a given population. Specifically, the nutrient profiles are based on a weighted average of foods and beverages consumed by all individuals ages 1 year and older in WWEIA, NHANES, and represented by a form of the food with the least amounts of added sugars, saturated fat, and/or sodium. As such, all foods and beverages within food groups and subgroups are matched to a nutrient-dense representative food, which will be referred to as representative foods, to estimate its energy and nutrients.

Nutrient-dense versions of foods and beverages were used in previous FPM analyses (i.e., representative foods); however, prior Committees and public comments suggested additional modeling considerations to examine whether foods and beverages of lower nutrient density should also contribute toward the calculations of nutrient profiles. Most item clusters include similar foods or beverages with a range of added sugars, saturated fat, or sodium. For example, cooked carrots could be prepared with or without salt, butter, or a brown sugar glaze. The nutrient-dense representative food for this item cluster is a steamed carrot with no added salt, fat, or sugar. The inclusion of foods regardless of their nutrient density is straightforward when nutrient-dense versions (without added sugars, saturated fat, or sodium) are

present and can be selected as the representative food. However, for some item clusters, a majority of the included foods may be lower in nutrient density and the selection of a nutrient-dense representative food, even if it has the least added sugars, saturated fat, or sodium, may be less in alignment with the purpose to model nutrient-dense forms of foods and beverages. For example, a lower-fat or reduced-sugar ice cream could be used as a representative food for "ice creams" in developing the overall nutrient profile for Dairy and Fortified Soy Alternatives. Alternatively, ice cream could be excluded from the development of the Dairy and Fortified Soy Alternatives nutrient profile altogether.

This chapter describes the examination of alternative approaches for calculating nutrient profiles that considers—for the first time—which, if any, foods lower in nutrient density should be excluded from the foods contributing to the nutrient profile calculations. Analysis results inform which nutrient profile calculation method are used in subsequent FPM analyses.

Nutrient Profile Development: WWEIA Population Groups

The nutrient profile of each food group has previously been developed to reflect the dietary intakes of the total U.S. population overall, and within age groups. The Committee, through its health equity lens, proposed population group-specific nutrient profiles by race, Hispanic origin, and socioeconomic position using income measures related to federal assistance program eligibility. The population groups identified as those with data publicly available in WWEIA, NHANES include:

- Population groups by race and/or Hispanic origin
    - Non-Hispanic Black
    - Non-Hispanic Asian
    - Non-Hispanic White
    - Hispanic (Mexican American and Other Hispanic)
- Population groups for household income as a percentage of the federal poverty level
    - <131 percent poverty
    - ≤185 percent poverty
    - 186 to 350 percent poverty
    - >350 percent poverty

The Committee was concerned that the development of nutrient profiles based on intakes of the total U.S. population may obscure important differences from a health equity perspective, such as food access, preferences and choices, and cultural foodways, among others. Thus, consideration of the representativeness of the proportions of foods and beverages reported among individual population groups, other than among age, is a new direction (**Box D.9.2**). Recognizing this potentially informative diversity in intakes among population groups, the analytic plan for the WWEIA Population Groups protocol included nutrient profiles that were derived according to a group's proportions of foods and beverages

within food groups and subgroups. Findings from these analyses were then evaluated to inform the degree of generalizability of the nutrient profiles based on the total U.S. population.

Addressing these 2 important goals—the nutrient density of the nutrient profiles and the generalizability of the nutrient profiles—informed development of the nutrient profiles for each food group and subgroup used in subsequent FPM analyses. This aimed to ensure that the dietary pattern(s) that are ultimately proposed by the Committee to the Departments are nutrient dense, practical, and representative of foods commonly consumed by diverse U.S. population groups.

Box D.9.2: Representation in Food Pattern Modeling

This Committee's food pattern modeling work considered an expansion of the methods used by the 2020 Dietary Guidelines Advisory Committee to develop nutrient profiles. This expansion applied a health equity lens that broadened representation of foods and beverages consumed in the United States by considering the dietary intakes of additional individual population groups. The Committee carried forward methods to develop nutrient profiles using the dietary intakes of the total U.S. population and considered expansion of methods using individual population group-specific nutrient profiles by race, Hispanic origin, and socioeconomic position using income measures related to federal assistance program income eligibility. The results of these analyses provided the Committee with confidence in the underlying nutrient profiles used for all analyses in **Part D. Chapter 10: Food Group and Subgroup Analysis** and led the Committee to add an additional step in which the population group specific nutrient profiles were applied when evaluating its proposed dietary pattern that is presented in **Part E. Chapter 1: Overarching Advice to the Departments.** Representation in food pattern modeling is also extensively discussed in **Part D. Chapter 11: Diet Simulations**. Health equity considerations that were applied across the Committee's work, including for food pattern modeling, are further described in **Part C. Methodology.**

Both the Basis Nutrient Profiles and WWEIA Population Groups analyses were conducted prior to implementing the other FPM protocols (**Figure D.9.1**) so that findings could inform all subsequent analyses. As a result, the nutrient profiles developed represent nutrient-dense foods that are foods commonly consumed by diverse U.S. population groups by race, Hispanic origin, and income to improve the utility and generalizability of proposed dietary patterns in the population.

List of Questions

1. Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns?[9]

2. What are the differences between nutrient profiles calculated using the dietary intakes of the total U.S. population and population groups?[10]

Methodology

FPM methodology is briefly described in **Part C: Methodology** (see section titled Food Pattern Modeling).

Review of the Science

Question 1: Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns?

Approach to Answering Question: Food Pattern Modeling

Summary Statement

The exclusion of foods and beverages of lower nutrient density from the calculations used to establish food group and subgroup nutrient profiles for food pattern modeling provided less energy, added sugars, and saturated fat, with limited implications for other nutrients. The revised methodology that excluded desserts, candies, and other sweets from the calculation of nutrient profiles was used in subsequent FPM analyses. Exclusion of these foods results in nutrient profiles that align better with the intent to model nutrient-dense foods and beverages as part of a healthy dietary pattern.

Summary of the Evidence

To develop and refine the process to determine which foods and beverages of lower nutrient density to consider for exclusion from the nutrient profiles in FPM, the Committee reviewed a summary of FPM approaches used by scientists in other countries including Canada, Australia, Japan, United Kingdom, Ireland, and Denmark.[11] Although reviewing the approaches from other countries was insightful, the methods did not fully align with the goals of the proposed analyses.

The Committee discussed ways to empirically define foods lower in nutrient density, including existing methods applied in other USDA modeling and in the FDA draft Dietary Guidance Statements.[12] Neither of these approaches were well-suited to apply to FPM nutrient profile development. Another method entailed an empirical definition for outliers of foods and beverages, i.e., those containing quantities of added sugars, saturated fat, and/or sodium that fell outside the 75th percentile within the food group or subgroup. However, identified outliers among the nutrient-dense representative foods were not meaningful. Added sugars, saturated fat, and sodium do not have normal distributions among the representative foods in a food group or subgroup as most representative foods have little to none of these food components. For example, when nearly all representative foods have zero added sugars, a food with any added sugars above zero could be identified as an outlier. Therefore, the foods and beverages of lower nutrient density were identified using the WWEIA food categories.[13] with the additional consideration of their place in

dietary patterns, as many were desserts, candies, and other sweets outside of the existing *Dietary Guidelines* recommendations to consume nutrient-dense foods and beverages from each food group.

The Committee discussed the contribution of added sugars, saturated fat, and sodium in main dishes, but there were concerns that removal of main dish categories (e.g., mixed dishes) could be too restrictive and would impact many cultural dishes from proportionally contributing to nutrient profile calculations. In addition, these main dishes are disaggregated into their ingredients and assigned to item clusters with nutrient-dense representative foods that align with existing *Dietary Guidelines* recommendations to consume foods in nutrient-dense forms.

The Committee discussed excluding foods from nutrient profiles based on their sodium content, but several limitations and concerns were noted, including the limited availability in the food supply of lower-sodium versions. Unlike added sugars, for which the top sources are clustered in sugar-sweetened beverages – which are not included in calculating nutrient profiles – and desserts and sweets, sodium content can vary within food categories and is ubiquitous across many categories of food, making it difficult to isolate categories of foods for exclusion. Additionally, nutrient-dense representative foods already exclude, where possible, the addition of salt assumed to be added during food preparation at home. Ultimately, the Committee decided that foods would not be removed on the basis of sodium alone. Based on this rationale, the following WWEIA Food Categories[13] were excluded from the calculation of the revised nutrient profiles:

- 1402 Milk shakes and other dairy drinks
- 5502 Cakes and pies
- 5504 Cookies and brownies
- 5506 Doughnuts, sweet rolls, pastries
- 5702 Candy containing chocolate
- 5704 Candy not containing chocolate
- 5802 Ice cream and frozen dairy desserts
- 5804 Pudding
- 5806 Gelatins, ices, sorbets
- 8802 Sugars and honey
- 8806 Jams, syrups, toppings
- 9012 Baby food: snacks and sweets

Using this list of WWEIA Food Categories, 508 FNDDS food codes were excluded based on their category assignment, which also removed 11 associated item clusters.

Applying these food and beverage exclusions had minimal impact on the resulting composition of the nutrient profiles, with little to no change for most of the food group and subgroup profiles. There were small

implications for the nutrient profile of Dairy and Fortified Soy Alternatives when milk shakes, ice cream, and frozen yogurt were excluded from contributing to item clusters for foods and beverages. Specifically, there were small, proportional decreases in fluid milk in the food group, due to the removal of the fluid milk contributed by these removed foods, resulting in a proportional increase in the contribution of cheese. Given that the energy per cup equivalent (cup eq) for cheese with a representative food as fat-free cheese varieties is lower than the energy per cup eq as fat-free milk; these proportional shifts lead to a modest decrease in the estimated energy (17 kcal) per cup eq for Dairy and Fortified Soy Alternatives. Further, this proportional reduction of fluid milk has modest reductions in the content of calcium, vitamin A, D, and sodium per cup eq.

The exclusion of desserts and sweets impacted the nutrient profile estimates for the Refined Grains and decreased the proportions of their affiliated item clusters (e.g., refined grains with flour). The exclusion of grain-based desserts and shifts in proportional contributions of item clusters led to decreases of ~0.5 g of added sugars and 4 kcal per ounce equivalent of refined grains. These negligible changes in the nutrient profile estimates for Refined Grains are as expected, given that nutrient-dense representative foods used to calculate nutrient profiles are intended to be in forms with no or little added sugars and the majority of the proportional contribution to refined grains is breads, rice, and pasta.

All analyses and a summary of results by age, sex, and life stage can be found in the Basis Nutrient Profiles FPM Report at: https://www.dietaryguidelines.gov/2025-advisory-committee-report/food-pattern-modeling

Question 2: What are the differences between nutrient profiles calculated using the dietary intakes of the total U.S. population and population groups?

Approach to Answering Question: Food Pattern Modeling

Summary Statement

The evaluation of nutrient profiles specific to individual population groups demonstrated some differences in the proportions of specific foods and beverages that contributed to the calculation of nutrient profiles, but had limited differences on the overall macronutrient and micronutrient composition of the nutrient profiles. No changes were made to the nutrient profiles used in subsequent food pattern modeling analyses based on this evaluation. Instead, the individual population group nutrient profiles were used as part of the final synthesis to evaluate proposed pattern(s) against nutritional goals using the:

1. Nutrient profiles for the total population; and
2. Nutrient profiles for individual population groups classified by race, Hispanic origin, and socioeconomic position using income measures related to federal assistance program income eligibility.

Summary of the Evidence

The 2020 Dietary Guidelines Advisory Committee evaluated possible differences in the nutrient profiles through a life stage approach, which was consistent with their overarching examination of the evidence across all life stages. An analysis was conducted in which nutrient profiles were based on the proportions of foods consumed specific to each life stage, including infants and young children up to age 24 months, children ages 2 through 3 years, children and adolescents ages 4 through 18 years, adults ages 19 through 70 years, and older adults ages 71 years and older.[14,15] The Committee noted that the different intake proportions by life stage could be related to lifestyle and socialization patterns for each age group. The 2025 Committee's work emphasized health equity and, throughout FPM analyses, aimed to consider variation in dietary intakes in the population. Further, calculation of nutrient profiles was completed using foods and beverages reported by individuals categorized based on racial and/or ethnic group and socioeconomic position using income measures related to federal assistance program income eligibility, which allowed additional insights for the purpose of assessing generalizability of FPM analyses. The dietary intake data from WWEIA, NHANES have publicly available variables for race and/or ethnicity as well as income measures. These categories, however, do not represent all individuals in the population and considerable heterogeneity exists within each subgroup identified for this analysis that may not be fully accounted for. Additional population groups would also be relevant to consider; however, this analysis represents a step toward accounting for variation in dietary intake, will potentially inform the subsequent protocols such as the diet simulations protocol, and may generate hypotheses for future FPM work.

To determine whether nutrient profiles based on dietary intakes of the total U.S. population ages 1 year and older are generalizable to individual population groups, separate nutrient profiles were calculated based on each group's proportional intakes of foods and beverages.

Resulting nutrient profiles indicate that the proportions of fluid milk, yogurt, and cheese in the Dairy and Fortified Soy Alternatives food group were different for non-Hispanic Asians such that milk and yogurt were higher, and cheese was lower, compared with other groups. For non-Hispanic Blacks, proportions of milk and yogurt were the lowest and cheese highest. Differences were also observed across income categories, with higher-income groups having higher proportional intakes of cheese and yogurt and lower proportional intakes of fluid milk, compared with other income groups. The estimated proportional intakes contributed to small variations in nutrient profiles (e.g., cheese has lower energy per cup eq compared to milk and yogurt; fluid milk has greater quantities of vitamin A and D and calcium per cup eq than yogurt or cheese).

Additionally, the proportions of item clusters within the Refined Grain and Whole Grain Food Subgroups were notably different among individuals classified as non-Hispanic Asian. In this group, white rice contributed a larger proportion to the Refined Grains nutrient profile, resulting in higher folate, but lower vitamin A and calcium. However, a lower proportion of ready-to-eat breakfast cereals within Whole Grains produced a nutrient profile lower in vitamins A and D, folate, and potassium. Other differences in nutrient profiles of Refined and Whole Grains by population group by income categories indicated less notable variation.

All analyses and a summary of results by age, sex, and life stage can be found in the WWEIA Population Groups FPM Report at : https://www.dietaryguidelines.gov/2025-advisory-committee-report/food-pattern-modeling

Discussion

Nutrient Profile Development: Basis Nutrient Profiles

The decision to exclude a selection of less nutrient-dense foods from the calculation of nutrient profiles aligns with existing dietary guidance to focus on meeting food group needs with nutrient-dense foods and beverages. The food group nutrient profiles were calculated based on proportional intakes of foods reported in WWEIA, NHANES, which includes foods from a variety of cultural foodways and reflects actual eating patterns, reflected in nutrient-dense forms. Although some food categories (i.e., desserts, candies, and other sweets) were excluded, this does not suggest that foods and beverages lower in nutrient density no longer contribute to a given food group or subgroup as variability in nutrient composition exist within each food group. Other foods that may be lower in nutrient density (e.g., canned fruit in syrup) were not excluded from proportionally contributing to nutrient profiles as the nutrient-dense representative food (e.g., canned fruit in 100% juice) aligns with existing dietary guidance to consume canned, frozen, or fresh fruits in nutrient-dense versions. The Committee noted challenges with excluding main dishes (e.g., burgers, sandwiches, grain-based mixed dishes) that are top food category sources of saturated fat and sodium in the U.S. population. While the principle was to use mostly nutrient-dense foods, not excluding main dishes that are sources of saturated fat and sodium makes nutrient profile calculation more realistic to what people are eating.

Ultimately, exclusions of desserts and sweets had limited impact on the overall nutrient profile of the HUSS pattern. Where implications were most notable—on energy and certain nutrients in the profiles for Dairy and Fortified Soy Alternatives and Refined Grains—such implications were small. The Committee noted that variation exists between the nutrient-dense representative foods used in calculating nutrient profiles. With rapid changes in formulation in the food supply, the food composition data available in FNDDS may not fully capture the variation of foods by, for example, commercial formulation or home preparation at the individual level. Nutrient composition may vary within a given food, with potential further variation by climate, location, and cultivar, which can create large ranges in nutrient content. Therefore, any small changes in nutrient profile could fall within normal variation in nutrient content of the individual foods, so results should be interpreted with caution.

Nutrient Profile Development: WWEIA Population Groups

After the FPM methodology was adapted with the decision to exclude certain foods and beverages lower in nutrient density from the calculation of nutrient profiles, the Committee evaluated the use of dietary intake data from individual population groups.

If the nutrient profiles of subgroup-based food and beverage patterns differed among individual population groups or were appreciably different from the nutrient profile of the total population, this situation would provide rationale to consider additional approaches, including using multiple population-specific nutrient profiles in all subsequent FPM analyses to improve generalizability to the diverse U.S. population.

As expected, variation was present in the proportions of different foods and beverages when the FPM was conducted according to the dietary intake data for a given WWEIA population group. However, these differences only minimally impacted the overall nutrient profile results, likely due to the modest differences in the proportions and because the representative foods for the item clusters did not change. The Committee concluded that the consistency in nutrient profiles using WWEIA population group dietary intake data provided sufficient rationale to proceed with the single nutrient profile for the U.S. population. However, the Committee decided to add another review step in the synthesis phase that used the nutrient profiles from individual population groups to avoid the possibility of exacerbating inadequacies among nutrients of concern.

There were caveats to these analyses that the Committee hopes will stimulate future research. First, the Committee was limited to the individual population groups for which publicly available NHANES data were available. While the Committee considered these demographic population groups to be a robust test of generalizability, the results of the analyses were not intended to be comprehensive for the diverse groups living in the United States. Furthermore, the individual population group categories themselves are broad. For example, individual population groups include individuals who may have heterogenous dietary intakes related to differences in region of origin. It is challenging to examine these cultural differences due to limitations in sample size.

Another caveat to these analyses was the estimation of dietary intakes that represent commonly consumed foods by diverse U.S. population groups. The sampling scheme for NHANES is meant to be representative of the general U.S. population, but some groups are underrepresented in the survey. Therefore, foods that are unique to individual population groups may not be fully included in the food composition database. Future expansion of the food composition databases will provide further opportunities to test the generalizability of the nutrient profile calculations.

Next Steps in the 2025 FPM Process

This chapter described the nutrient profile development stage described in **Figure D.9.1**. As a result of the variations noted in the exclusion of foods and beverages with lower nutrient density, the revised nutrient profile described in this chapter was then used for subsequent FPM analyses, as described in **Part D. Chapter 10: Food Group and Subgroup Analysis.** Moving toward the final synthesis analyses,

proposed hypothetical changes to food groups and/or dietary patterns were examined against nutritional goals. The Committee also used population group-specific nutrient profiles during the final synthesis phase to test proposed patterns against nutritional goals while considering variation in dietary intakes.

References

1. Dietary Guidelines Advisory Committee. *Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and the Secretary of Health and Human Services*. Washington, DC: U.S. Department of Agriculture, Agricultural Research Service; 2020. https://doi.org/10.52570/DGAC2020
2. Institute of Medicine. *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids*. Washington, DC: The National Academies Press; 2005. https://doi.org/10.17226/10490
3. National Academies of Sciences, Engineering, and Medicine. *Dietary Reference Intakes for Sodium and Potassium*. Washington, DC: The National Academies Press; 2019. https://doi.org/10.17226/25353
4. National Academies of Sciences, Engineering, and Medicine. *Dietary Reference Intakes for Calcium and Vitamin D*. Washington, DC: The National Academies Press; 2011. https://doi.org/10.17226/13050
5. Institute of Medicine. *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*. Washington, DC: The National Academies Press; 2006. https://doi.org/10.17226/11537
6. Institute of Medicine. *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc*. Washington, DC: The National Academies Press; 2001. https://doi.org/10.17226/10026
7. National Academies of Sciences, Engineering, and Medicine. *Dietary Reference Intakes for Energy*. Washington, DC: The National Academies Press; 2023. https://doi.org/10.17226/26818
8. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025, 9th Edition*. Washington, DC: U.S. Department of Agriculture; 2020. https://www.dietaryguidelines.gov/
9. Taylor CA, Eicher-Miller HA, Abrams SA, et al. *Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns? Food Pattern Modeling Report*. November 2024. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition and Economic Analysis Branch.2024;doi: https://doi.org/10.52570/DGAC2025.FPM01
10. Taylor CA, Talegawkar SA, Abrams SA, et al. *What are the differences between nutrient profiles calculated using the dietary intakes of the total U.S. population and population groups? Food Pattern Modeling Report*. *What are the differences between nutrient profiles calculated using the dietary intakes of the total U.S. population and population groups? Food Pattern Modeling Report.* November 2024. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition and Economic Analysis Branch.2024;doi: https://doi.org/10.52570/DGAC2025.FPM02
11. Davis KA, Esslinger K, Elvidge Munene LA, St-Pierre S. International approaches to developing healthy eating patterns for national dietary guidelines. *Nutr Rev*. Jun 1 2019;77(6):388-403. doi:https://doi.org/10.1093/nutrit/nuy058
12. U.S Department of Health and Human Services, Food and Drug Administration, Center for Food Safety and Applied Nutrition. *Questions and Answers About Dietary Guidance Statements in Food Labeling: Guidance for Industry Draft Guidance*. 2023. https://www.fda.gov/media/166342/download"Draft
13. U.S. Department of Agriculture, Agricultural Research Service. *What We Eat in America Food Categories 2017-2018*. 2020. www.ars.usda.gov/nea/bhnrc/fsrg
14. 2020 Dietary Guidelines Advisory Committee and Food Pattern Modeling Team. *Food Pattern Modeling Report: Under 2 Years of Age*. Washington, DC: U.S. Department of Agriculture; 2020. *2020 Dietary Guidelines Advisory Committee Project*. https://www.dietaryguidelines.gov/sites/default/files/2020-07/FoodPatternModeling_Report_Under2Years.pdf
15. 2020 Dietary Guidelines Advisory Committee and Food Pattern Modeling Team. *Food Pattern Modeling Report: Ages 2 Years and Older*. Washington, DC: U.S. Department of Agriculture; 2020. *2020 Dietary Guidelines Advisory Committee Project*. https://www.dietaryguidelines.gov/sites/default/files/2020-07/FoodPatternModeling_Report_2YearsandOlder.pdf