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U.S. DEPARTMENT OF AGRICULTURE

Thrifty Food Plan, 2021

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Abbreviations

| Abbreviation | Meaning |
|--------------|---|
| AI | Adequate Intake |
| AMDR | Acceptable Macronutrient Distribution Range |
| CDRR | Chronic Disease Risk Reduction |
| CNPP | USDA Food and Nutrition Service Center for Nutrition Policy and Promotion |
| CPI | Consumer Price Index |
| DRI | Dietary Reference Intakes |
| EER | Estimated Energy Requirement |
| ERS | USDA Economic Research Service |
| FNDDS | USDA Food and Nutrient Database for Dietary Studies |
| FPED | USDA Food Patterns Equivalents Database |
| HEI | Healthy Eating Index |
| IRI InfoScan | Information Resources Inc. Retail Scanner Data |
| NASEM | National Academies of Sciences, Engineering, and Medicine |
| NESR | Nutrition Evidence Systematic Review |
| NHANES | National Health and Nutrition Examination Survey |
| RDA | Recommended Dietary Allowance |
| SNAP | Supplemental Nutrition Assistance Program |
| UL | Tolerable Upper Intake Level |
| UPC | Universal Product Code |
| USDA | U.S. Department of Agriculture |
| WIC | Special Supplemental Nutrition Program for Women, Infants, and Children |
| WWEIA | What We Eat In America |

The Thrifty Food Plan, 2021– In Brief

Background

In response to a Congressional directive,^a the U.S. Department of Agriculture (USDA) conducted an evidence-driven reevaluation of the Thrifty Food Plan, which is the lowest cost of four USDA Food Plans. By law, the cost of the June Thrifty Food Plan serves as the basis for the maximum Supplemental Nutrition Assistance Program (SNAP) benefit allotments in the following Federal fiscal year beginning each October 1st.^b

The first USDA food plan that informed SNAP was the 1962 Economy Food Plan, which was replaced by the Thrifty Food Plan in 1975. The Thrifty Food Plan, 1975 and each of the subsequent Thrifty Food Plan updates over the next 45 years have been cost neutral as a matter of Administrative policy. Therefore, using an optimization model to update these previous editions, USDA's decisions on what inputs and constraints to use in the optimization model were driven by the need to keep the Thrifty Food Plan Market Baskets cost neutral while adjusting for inflation and incorporating changes to dietary guidance and updated information on food composition, consumption patterns, and food

prices. In between these periodic updates, USDA adjusted the cost of the then-current Thrifty Food Plan each month to reflect food-price inflation.

The Agricultural Improvement Act of 2018 (P.L. 115–334, the 2018 Farm Bill) established a new requirement for USDA to reevaluate the Thrifty Food Plan on a regular cycle, using specific criteria. The first reevaluation must occur by 2022 and every 5 years thereafter. The reevaluation must be based on current food prices, food composition data, consumption patterns, and dietary guidance. President Joseph R. Biden committed via Executive Order 14002 to prioritize the review. Prior to the 2018 Farm Bill requirement, updates to the Thrifty Food Plan were at the Secretary's discretion.

The reevaluation process for the Thrifty Food Plan, 2021 was guided by the goal to create Market Baskets that contain a variety of commonly consumed foods and beverages that are lower in price and of higher nutrition quality (or nutrient density) to support healthy meals and snacks at home on a limited budget.

^a U.S. Department of Agriculture, Food and Nutrition Service. P.L. 115–334—Agriculture Improvement Act of 2018. <https://www.fns.usda.gov/aia-2018-amended-pl-116-94>. Accessed June 24, 2021.

^b Section 3(u)(4) of the Food and Nutrition Act of 2008 (7 U.S.C. 2012(u)(4)) generally requires USDA, on October 1 of every year, to adjust the cost of the Thrifty Food Plan to reflect the cost of the Thrifty Food Plan in the preceding June. The June cost used for the October 1 adjustment should be based on the Thrifty Food Plan in effect as of October 1. In other words, during years in which a reevaluation is issued after June but before October 1, such as this year, USDA will determine the June 2021 cost as if it had been based on the Thrifty Food Plan, 2021, and use that June cost to make the October 1, 2021 adjustment.

Results

The Thrifty Food Plan results are conveyed in Market Baskets—that is, weekly amounts (i.e., pounds) from categories of foods and beverages in purchasable forms, and associated costs, to support a healthy diet. Because most Americans do not meet the *Dietary Guidelines for Americans*, the final Market Baskets differ from current consumption patterns but adhere to those patterns as closely as possible within the context of aligning with national dietary guidance.

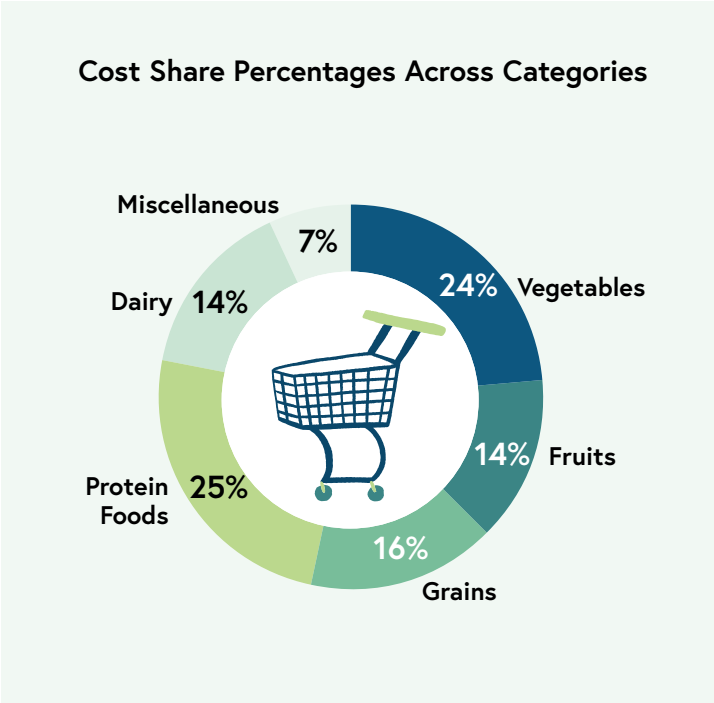
The cost of the *Thrifty Food Plan, 2021* is based

on a reference family of four, defined by law as consisting of a man and a woman, both age 20 through 50 and two children, one age between 6 through 8 and one age 9 through 11.^c Using food prices inflated to June 2021, the cost of the Market Baskets for the reference family is \$835.57 per month, which is a 21.03-percent increase from the previous edition adjusted for current prices.^d This means the reference family of four is provided with an additional \$4.79 per day to support a healthy diet.

Thrifty Food Plan, 2021—Cost Share

The June 2021 Thrifty Food Plan for the reference family is \$835.57, which is based on a "Market Basket" of foods and beverages across 24 categories. The chart shows results from the optimization model, collapsed into the main food/beverage categories, and how much of the total budget went to each category. Details are in the *Thrifty Food Plan, 2021* report.

Households can choose how to spend their SNAP allotments according to their food needs. The Market Baskets simply illustrate how a household could use their resources to purchase foods and beverages that align with dietary guidance and consumer choices, selecting items within each category that are lower in price and higher in nutritional quality.



^c Defined in the section 3(u) of the Food and Nutrition Act of 2008, as amended (P.L. 88–525; previously referred to as Food Stamp Act of 1964 and the Food Stamp Act of 1977).

^d This amount is for the 48 contiguous States and the District of Columbia. Alaska and Hawaii have separate Thrifty Food Plan amounts, which are also undergoing a reevaluation.

A Significant Change

The Thrifty Food Plan, 2021 marks a significant first: instead of imposing a requirement that the Thrifty Food Plan update be cost neutral, USDA, following the 2018 Farm Bill, based its reevaluation entirely on data and evidence on the cost for which resource-constrained households can purchase a healthy, practical diet. This is consistent with the requirements of the 2018 Farm Bill, which in new language amending and going beyond prior legislation specifically called for the reevaluation to be based on current dietary guidance, consumption patterns, food composition data, and current food prices. Incorporating all four factors, as directed by Congress, is irreconcilable with a policy that the Thrifty Food Plan must be cost-neutral. Thus, for the first time in more than 45 years, maintaining cost neutrality did not drive the process. Instead, the Thrifty Food Plan reevaluation process started first with assessing the foods and beverages that make up a healthy, practical diet, then determining a cost at which they could be purchased by resource-constrained households. Lifting the cost-neutrality constraint led to impactful differences in the reevaluation process as it allowed for the use of data and process decisions that yielded results that are more realistic of a family's needs and representative of the U.S. population than previous editions. In addition, while previous updates to the Thrifty Food Plan described the Plan as "minimal cost," USDA believes such a descriptor is no longer appropriate under the 2018 Farm Bill because "minimal cost" is strongly associated with the cost-neutral constraint.

This change comes at a time when the Nation is experiencing the consequences of the established connection between food insecurity—more specifically, *nutrition* insecurity—and poor health. Nutrition security means having consistent access, availability, and affordability of foods and beverages that promote well-being and prevent (and if needed, treat) disease, particularly among our nation's most socially disadvantaged populations.* Long-standing systemic health and social inequities in the United States mean that certain demographic groups, specifically racial and ethnic minority groups, are disproportionately affected by food insecurity, experience higher rates of some diet-related chronic diseases, and have higher rates of death and serious health effects due to living with these diseases. Therefore, one of the goals for the reevaluation was ensuring that there are a range of choices for a broad spectrum of individual circumstances.

* Mozaffarian D, Fleischhacker S, Andrés J. Prioritizing Nutrition Security in the US. JAMA. 2021;325(16):1605–1606. doi: <https://doi.org/10.1001/jama.2021.1915>.

Core to the Thrifty Food Plan reevaluation was an optimization model that selects quantities of foods and beverages in Modeling Categories that, together, represent a nutritious diet, and are subject to a set of constraints. The reevaluation used the same optimization model used for previous editions of the Thrifty Food Plan, with updates to the model's data sources, inputs, and constraints as described in detail in the Thrifty Food Plan, 2021 report. In brief, to create 15 age-sex-based Market Baskets, the model inputs and constraints included:

- Dietary Reference Intakes for nutrients,
- *Dietary Guidelines for Americans* food-group and -subgroup recommendations,
- Consumption patterns,
- Total calories needed by age-sex groups with activity-level considerations,
- Current food prices, and
- Cost limits on the Market Baskets.

The model's output included categories with foods and beverages of higher nutrition quality from lower cost subcategories, and these

categories were converted to the final Market Basket Categories of foods and beverages. Therefore, to achieve a healthy diet at the cost of the Thrifty Food Plan, 2021, it is assumed that food and beverage selections within the Market Basket Categories are lower price, with comparatively lower amounts of added sugars, saturated fat, and sodium. For example, as part of a healthy diet that is also "thrifty," an individual could select lower cost poultry with higher nutritional quality such as chicken breast or, within dairy, fat-free milk or fortified soy beverage with no added sugars.

All of the inputs, constraints, and technical assumptions that went into the optimization model were reviewed to create the Thrifty Food Plan, 2021. Updates and/or changes were made to the data sources, food and beverage categories, inputs, and constraints in consideration of the goals for the reevaluation and where sufficient evidence existed to support such changes. Updated dietary guidance from the *Dietary Guidelines for Americans, 2020-2025* and the National Academies of Sciences, Engineering, and Medicine is reflected.

Conclusion

This reevaluation of the Thrifty Food Plan represents an important step toward supporting food security *and* nutrition security in the United States. For the first time in more than 45 years, the Thrifty Food Plan is not constrained by cost neutrality. The Thrifty Food Plan, 2021 is a result of a thorough reevaluation process to help ensure that it represents the real value of USDA's lowest cost food plan that describes the cost of a healthy, practical diet on a limited budget.

In creating the Thrifty Food Plan, 2021 Market Baskets, USDA reconsidered the existing assumptions and methods used in past editions. USDA's reevaluation was informed by input from subject-matter experts, and a review of existing literature. Where there was insufficient evidence to support changes to the existing assumptions, methods from the previous Thrifty Food Plan, 2006 were carried forward to this edition. The report

also indicates where more research is needed to inform the next reevaluation. A deliberate approach was taken to create Market Baskets that consist of foods and beverages with higher nutrition quality to support healthy eating over time, and that are consistent with the purchasing patterns and consumption patterns of the diverse households in the United States.

The Thrifty Food Plan, 2021 is the first in a series of planned regular updates. As stipulated now by law, USDA must reevaluate the Thrifty Food Plan every 5 years. This provides the opportunity to continuously reevaluate the cost of a nutritious diet and incorporate changes based on current scientific evidence.

The Thrifty Food Plan, 2021

Introduction

As directed by Congress in the 2018 Farm Bill,¹ the U.S. Department of Agriculture (USDA) has reevaluated the Thrifty Food Plan to reflect current dietary guidance and updated data on current food prices, food composition, and consumption patterns. The last update to the Thrifty Food Plan was in 2006. The Thrifty Food Plan, 2021 is the lowest cost of four USDA Food Plans^f that describe how much it costs to eat a healthy diet that aligns

with food-group and -subgroup and nutrient recommendations. It is the basis for the maximum Supplemental Nutrition Assistance Program (SNAP) benefit allotments. The Thrifty Food Plan is a critical element in supporting the Department's goal of supporting food security *and* nutrition security, so that all Americans have consistent and equitable access to affordable foods and beverages that promote their well-being.

The Significance of the Thrifty Food Plan to Nutrition Security

A nutritious diet can help individuals achieve and maintain good health and reduce their risk of chronic disease throughout all stages of life.² A nutritious diet includes nutrient-dense foods and beverages across all food groups, in recommended amounts, and within calorie limits. In today's marketplace, thousands of foods and beverages are available for purchase at retail stores (such as grocery stores), and these range in price and nutrient density.^{3,4} As such, a healthy diet can be achieved at many cost levels, including on a limited budget. The Market Baskets of the Thrifty Food Plan, 2021 outline the types, amounts, and associated costs of nutrient-dense foods and

beverages to purchase to support nutritious meals and snacks at home on a limited budget. The Low-Cost, Moderate-Cost, and Liberal Food Plans each represent a healthy diet at successively higher cost levels.

For the first time in more than 45 years, USDA assessed the foods and beverages that make up a healthy, practical diet first, then determined a reasonable cost at which they could be purchased by resource-constrained households. All previous updates to the Thrifty Food Plan^{5,6} were held to a cost-neutral solution to confirm whether the previous cost—adjusted for food-price

^f The four USDA Food Plans are the Thrifty, Low-Cost, Moderate-Cost, and Liberal Food Plans.

inflation—allowed for the purchase of a nutritious diet. Therefore, while the cost of previous Thrifty Food Plans accounted for inflation of food prices over time, the real value of the food plan remained constant. In this reevaluation, the model was not held to a cost-neutral constraint, which allowed

data and process decisions to reflect current dietary guidance and updated data on food prices, food composition, and consumption patterns, rather than cost neutrality. This results in a low-cost, practical food budget for a household to achieve a healthy diet on a limited budget.

Key Terms Used Throughout the Thrifty Food Plan, 2021

- **Reference family:** A family of four persons consisting of a man and a woman 20 through 50 years, a child 6 through 8 years, and a child 9 through 11 years, as defined in the Food and Nutrition Act of 2008 (P.L. 88–525).⁷
- **Optimization model:** A type of analysis that uses mathematical equations to maximize or minimize an objective function subject to satisfying a set of constraints (e.g., as with the Thrifty Food Plan).
- **Modeling Categories:** Foods and beverages reported *as-consumed* in the What We Eat in America, National Health and Nutrition Examination Survey that are categorized based on similarities in nutrient composition, price, and/or nutrient density. Used in the optimization model to generate a set of categories in amounts that satisfy the model's constraints.
- **Market Basket Categories:** Foods and beverages that are converted and regrouped from the Modeling Categories into amounts in *as-purchased* forms. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.
- **Market Basket:** Weekly amounts of Market Basket Categories from which a variety of nutrient-dense, lower price options can be purchased to support a healthy diet aligned with personal preferences and cultural foodways for 15 age-sex groups.

The Thrifty Food Plan, 2021 has important implications for the millions of Americans who face food insecurity, or lack dependable access to enough food for active, healthy living. The Thrifty Food Plan, and the Economy Food Plan that came before it,⁸ have served as the basis for the maximum SNAP benefit allotments for over 50 years. SNAP is the largest U.S. food assistance program that provides monthly benefits to supplement the food budget of qualifying low-income households to support access to a healthy dietary pattern.⁹ There are nearly 42 million Americans participating in SNAP in Federal fiscal year 2021,¹⁰ and data from the Federal fiscal year 2019 participant characteristics study show the majority (68 percent) are children, people with disabilities, and the elderly.¹¹ For SNAP participants, the Thrifty Food Plan results in a meaningful benefit by providing access to foods and beverages that can support health and well-being and help achieve nutrition security.¹² Nutrition security means having consistent access, availability, and affordability of foods and beverages that promote well-being and prevent (and if needed, treat) disease, particularly among our nation's most socially disadvantaged populations.¹³ Nutrition security differs from a focus on food security by prioritizing the promotion of well-being and prevention and, if needed, treatment of disease.

Food insecurity is known as a contributing factor to poor health, with literature documenting the correlation between lower food security and a higher probability of chronic disease.^{14–18} Today, 6 in 10 Americans have a chronic condition and 4 in 10 Americans have two or more chronic conditions.¹⁹ The United States is also experiencing an epidemic of overweight and obesity, particularly among lower income populations.²⁰ Obesity and other chronic diseases are leading drivers of U.S.

healthcare costs, which in 2019, reached \$3.8 trillion.²¹ Long-standing systemic health and social inequities in the United States mean that certain demographic groups, specifically racial and ethnic minority groups, are disproportionately affected by food insecurity and experience higher rates of some diet-related chronic diseases.²²

Various factors contribute to the prevalence of chronic disease, yet this public health challenge in part stems from the dietary patterns that do not align with dietary guidance. An individual's selection of foods and beverages is influenced by multiple complex and interrelated factors, including individual factors such as socioeconomic status. The Thrifty Food Plan, 2021 estimates the cost of Market Baskets that serve as the basis for a healthy diet, providing an opportunity for individuals to select nutrient-dense foods and beverages that can improve nutrition security. In doing so, the Thrifty Food Plan, 2021 addresses one barrier to achieving a healthy dietary pattern for individuals of lower socioeconomic status.



The Thrifty Food Plan: What It Is, What It Is Not

The Thrifty Food Plan, 2021 reflects current dietary guidance as published in the *Dietary Guidelines for Americans, 2020-2025*² and the National Academies of Sciences, Engineering, and Medicine's (NASEM) Dietary Reference Intakes (DRI).²³⁻²⁵ The Market Baskets are presented for 15 age-sex groups, each with different amounts of foods and beverages, and associated costs, in recognition of the changing nutrient needs across different life stages. The Thrifty Food Plan is but one component of the larger nutrition-assistance landscape. Policies governing the administration of SNAP, such as SNAP eligibility requirements, allowable purchases, or how the SNAP benefit considers income and deductions in the calculation, are not within the scope of the Thrifty Food Plan reevaluation.

The Thrifty Food Plan Market Baskets estimate the weekly cost of a healthy diet across categories of foods and beverages made up of nutrient-dense, lower price options. Individuals and families can select nutrient-dense, lower price options within these categories that align with their personal

preferences and cultural foodways to achieve a healthy diet. The data that inform the analyses are based on specific foods; however, individuals can purchase other nutritious options within the cost of the Thrifty Food Plan through careful selections, such as purchasing foods in season, in bulk, or on sale. As such, the Thrifty Food Plan is not intended to be an item-specific shopping list or a prescriptive diet, but rather a framework to support a healthy diet on a limited budget.

All Thrifty Food Plan updates thus far have used an optimization model. USDA uses the optimization model to assess varying levels of costs for Market Baskets that meet dietary guidance while considering current consumption patterns. The model does not provide one single answer or the optimal cost but instead is used throughout the update process as a basis for assessing various approaches to defining "thrifty" Market Baskets. For this reevaluation, the goal was to develop Market Baskets that would reflect an economical approach to purchasing a variety of nutrient-dense foods and beverages to support a nutritious diet.

The Basis for the Maximum SNAP Benefit Allotment, Defined by Law

The Food and Nutrition Act of 2008 (P.L. 88-525)⁷ defines the value of the SNAP allotment for eligible households as equal to the Thrifty Food Plan, reduced by an amount equal to 30 percent of the household's net income—that is, income remaining after certain allowable deductions. By law, the Thrifty Food Plan SNAP benefit maximum allotment is based on a four-person family consisting of a male and a female between the ages of 20 and

50, one child between the ages of 6 and 8, and one child between the ages of 9 and 11. Defined in the Food and Nutrition Act of 2008, this reference family is used to determine the maximum allotment, which is then adjusted downward for smaller households and upward for larger households using a scaling factor. The Market Baskets provided for the other 11 age-sex groups not included in the reference family (see [Appendix 4](#)) inform research

and education efforts but have no direct relation to the SNAP benefit maximum allotment.

As required by law, the cost of the Thrifty Food Plan is the same across the contiguous 48 States and the District of Columbia and the benefit amount is adjusted based on household size. The Thrifty Food Plan, 2021 considers geographic price variation in the determination of food prices (see [Price of Each of the Modeling Categories](#)), but the Food and Nutrition Act of 2008 prohibits region-specific Thrifty Food Plans, with the exception of calculations for Alaska and Hawaii. For Alaska and Hawaii, per law, USDA estimates separate Thrifty Food Plans, originally determined based on food-consumption and price data collected during 1977–78, and since that time, adjusted biannually to account for changing food prices. The Thrifty Food Plan reevaluation described herein is for the contiguous 48 States and the District of Columbia. The Thrifty Food Plans for Alaska and Hawaii will be updated separately in 2022, with a temporary adjustment applied to those plans this year until the full update occurs (see [Future Considerations and Reevaluations of the Thrifty Food Plan](#)).

The Thrifty Food Plan, 2021 represents foods and beverages that can be purchased and prepared at home. That said, at-home preparation does not mean all foods are assumed to be prepared "from scratch." Convenience and ease of preparation were considered throughout the Thrifty Food Plan, 2021 development process. For example, frozen, precut vegetables or canned, precooked beans are convenience foods that can be prepared with relative ease. Consistent with SNAP regulations, foods that are hot at the point of sale (e.g., hot soups or warm, roasted chicken), consumed away from home (e.g., at restaurants and fast-food establishments), and alcoholic beverages are not included in the Thrifty Food Plan Market Baskets.

USDA adjusts the cost of the Thrifty Food Plan for inflation each month using the U.S. Bureau of Labor Statistics' Consumer Price Index (CPI).²⁶ By law, the June Monthly Cost of Food Report is used to determine the maximum allotment of SNAP benefits for the following Federal fiscal year beginning October 1st. The cost update for the first half of the year (i.e., January through June) informs the maximum SNAP allotment for participants living in Alaska or Hawaii.

History of the Thrifty Food Plan

USDA published the first edition of the Thrifty Food Plan in 1975.⁸ It replaced the 1962 Economy Food Plan, developed as a nutritionally adequate diet at a minimum cost and designed for temporary or emergency use, as the basis for maximum SNAP (previously Food Stamp) allotments. The cost of the initial Thrifty Food Plan was set equal to the cost of the 1962 Economy Food Plan, inflated to 1975 prices, with several important design changes to create practical Market Baskets that could

serve as a more long-term solution, such as less time required for food planning and preparation. The Market Baskets in the Thrifty Food Plan, 1975 represented a minimal-cost diet based on dietary guidance, food-composition data, consumption patterns, and food prices current at the time.

The Thrifty Food Plan was updated in 1983, 1999, and 2006. Each update incorporated changes to dietary guidance and updated information on food composition, consumption patterns, and

food prices, but they were also cost neutral. Thus, all updates were adjusted for inflation, but were otherwise equal to the real value of the Thrifty Food Plan when it was established in 1975. As explained earlier, USDA will not apply the

cost-neutral constraint in light of the 2018 Farm Bill mandating the consideration of current dietary guidance, consumption patterns, food composition data, and current food prices.

The First in a Series of Regular Updates, Reflecting Current Available Evidence

The 2018 Farm Bill now requires USDA to reevaluate the Thrifty Food Plan based on current food prices, food-composition data, consumption patterns, and dietary guidance by 2022 and every 5 years thereafter. President Joseph R. Biden emphasized the commitment to the reevaluation in Executive Order 14002 on January 22, 2021.^{27,28} This is the first reevaluation after the law's

enactment. Future reevaluations of the Thrifty Food Plan every 5 years provide the Department with an opportunity to continuously reevaluate the cost of a nutritious diet and incorporate changes based on current scientific evidence. This 2018 Farm Bill requirement did not constrain the reevaluation to be cost neutral.

Approach to Reevaluating the Thrifty Food Plan

This reevaluation of the Thrifty Food Plan was an iterative process of review and revision conducted by a team of economists, nutrition scientists, and analysts at the Food and Nutrition Service's Center for Nutrition Policy and Promotion (CNPP). Numerous internal and external stakeholders were consulted with throughout the process and USDA followed a rigorous evidence-based process to complete this work. The existing methods, including the data inputs, constraints, technical assumptions, and optimization model were reviewed, and where insufficient evidence existed to indicate that an alternative approach should be used, USDA maintained the existing approach with a plan for more research before the next reevaluation (see [Future Consideration and Reevaluations of the Thrifty Food Plan](#)). These considerations and

changes are documented in detail in the [Methods](#) section of this report.

The Thrifty Food Plan, 2021 reflects the *Dietary Guidelines for Americans, 2020-2025*² and the DRI values.²³⁻²⁵ The process was guided by the central goals of creating Market Baskets that include commonly consumed foods and beverages, including convenience foods, in their nutrient-dense forms at national average prices. Additionally, USDA sought to reflect the cultural foodways of the diverse individuals and families in the United States served by SNAP in selecting the data inputs and in reviewing the constraints and technical assumptions.

The process to update the Thrifty Food Plan began several years ago when CNPP worked in partnership with the USDA Economic Research

Service (ERS) to create a new method to determine food prices.²⁹ Early in the reevaluation process, CNPP reviewed the literature on the Thrifty Food Plan since the last update in 2006. Through this literature review, CNPP identified common themes and critiques related to the Thrifty Food Plan and used these to inform a roundtable discussion held in February 2021 with external subject-matter experts about the methods of the Thrifty Food Plan. Some of the topics identified in the literature and discussed at the Thrifty Food Plan roundtable included: geographic variation in food prices; time associated with preparing nutritious meals for at-home consumption; the need to reevaluate the application of the cost constraint; the need to reflect diverse cultural foodways; and other considerations, such as accounting for costs resulting from household food waste and the need to purchase pantry staples (e.g., herbs and spices). These topics were considered in this reevaluation, as described in the [Methods](#) and [Discussion](#).

Several topics identified in the literature were further reviewed by CNPP's Nutrition Evidence Systematic Review (NESR) analysts in rapid reviews and/or evidence scans to systematically summarize the existing literature. The NESR analysts examined evidence to better understand differences in the prices paid for foods across income levels; the amount of time households spend in food-related activities (e.g., cleaning, shopping, preparation); the relationship between diet quality and income; the relationship between diet quality and cost; and factors that influence the purchase of ready-to-eat foods intended for at-home consumption.³⁰ The NESR work conducted for the Thrifty Food Plan, 2021 is discussed in relevant sections of this report and is available at <https://nesr.usda.gov/usda-food-plans-rapid-reviews-and-evidence-scans>, where more information also can be found on the methodology.

CNPP consulted with economists from ERS on multiple elements of the reevaluation, including the methods for calculating food prices and updating these to reflect current rates of inflation (see [Estimating Food Prices With the Purchase to Plate Price Tool](#) and [Price of Each of the Modeling Categories](#)). Nutrition scientists with the USDA Agricultural Research Service were consulted on the development of the Thrifty Food Plan Modeling Categories (see [Create the Modeling Categories of Foods and Beverages](#)). CNPP also consulted with other experts within the Food and Nutrition Service on the practical implications of the Thrifty Food Plan. USDA hosted a number of listening sessions with SNAP participants as well as local and national advocates, researchers, and policy-makers to gather diverse insights on the Thrifty Food Plan.

Methods

The process to develop the Thrifty Food Plan, 2021 can be described in two phases, each with multiple steps:

- **Phase One:** Identify and prepare data sources, develop the Modeling Categories, and establish the inputs and constraints; and
- **Phase Two:** Run the optimization model and evaluate the solution and create the Thrifty Food Plan Market Baskets.

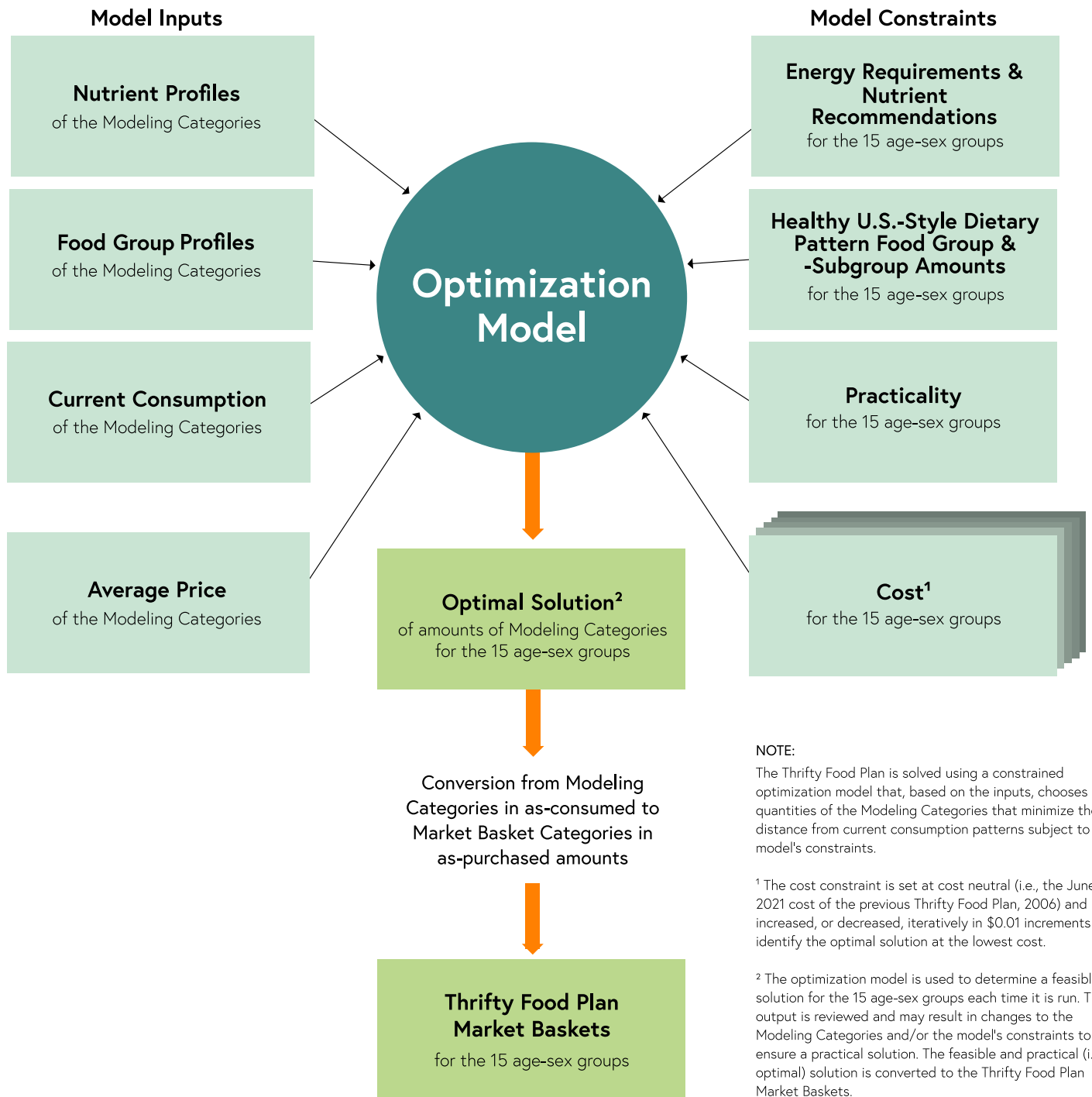
Core to the Thrifty Food Plan reevaluation is an optimization model that selects quantities of food and beverage Modeling Categories that represent a nutritious diet, subject to a set of constraints (see [Figure 1](#)). The same optimization process used for previous editions of the Thrifty Food Plan was applied to this reevaluation, with updates to the model's data sources, inputs, and constraints as described herein. The optimization model was originally developed by USDA economists and its continued use was supported by subject-matter experts who participated in the Thrifty Food Plan roundtable. Changes to the model were made in consideration of the goal to provide Market Baskets of foods and beverages that reflect evidence-based dietary guidance and that accurately represent the cost of a healthy diet for households with a limited budget. For the Thrifty Food Plan, 2021, as with prior updates, dietary constraints that align with current dietary guidance were used. In previous updates, USDA's goal was to create updated Thrifty Food Plan Market Baskets without an increase in cost. In contrast, for this

reevaluation, USDA determined the lowest cost at which categories of foods and beverages that align with a healthy diet could be purchased with an assumption of "thrifty" consumer choices.

The phases and steps describing the process to create the Thrifty Food Plan, 2021 are presented linearly, including the final set of constraints applied to the optimization model. Detail is provided on these constraints to support a transparent and deliberate process. While the process is presented linearly, the approach to creating the Thrifty Food Plan Market Baskets was more iterative. After completing the activities in phase one and running the mathematical optimization process in phase two, initial outputs were reviewed for practicality and variety of foods and beverages included. These initial modeling results led to a return to phase one, including updates to the Modeling Categories and to the model's inputs and constraints.

The sections that follow describe this process, including the iterative steps taken to ensure practical Market Baskets of foods and beverages. Of note, the [Summary of Updates to the Methods for the Thrifty Food Plan, 2021](#) describes how the methods for the Thrifty Food Plan, 2021 compare to the methods for the previous Thrifty Food Plan, 2006⁶ with an explanation of changes made to advance the Thrifty Food Plan development process.

Figure 1. Thrifty Food Plan Optimization Model



Phase One: Identify and Prepare Data Sources, Develop Modeling Categories, and Establish the Inputs and Constraints

Developing the Thrifty Food Plan begins with identifying and preparing the data sources. These data on current consumption patterns, food and beverage prices, and the nutrient composition of foods and beverages are necessary inputs to the optimization model and help to inform the solution given the defined constraints. In addition to preparing the data sources and creating the Modeling Categories, during this initial phase, dietary standards were identified to serve as constraints, including the Healthy U.S.-Style Dietary Pattern food-group and -subgroup amounts that align with

the *Dietary Guidelines for Americans, 2020-2025*, as well as energy requirements and nutrient recommendations that ensure that the final Market Baskets align with NASEM DRI values. Consistent with previous Thrifty Food Plan editions, after review of the initial output, constraints were added to the optimization model to create practical Market Baskets of commonly consumed foods and beverages. As described below, cost also serves as a constraint, limiting the cost of the Thrifty Food Plan Market Baskets subject to the dietary and practicality constraints.

Identify and Update Data Sources

Applying Data From What We Eat in America, National Health and Nutrition Examination Survey

The Thrifty Food Plan, 2021 relies on data and supporting databases from What We Eat in America (WWEIA),³¹ the dietary intake component of the National Health and Nutrition Examination Survey (NHANES). WWEIA, NHANES is the only nationally representative survey of total food and beverage consumption in the United States. NHANES is used by multiple Federal agencies, research organizations, universities, health care providers, and educators to provide nationally representative dietary and nutrition information. The dietary data are collected using the five step, multiple pass, 24-hour dietary recall. The USDA Agricultural Research Service developed the 24-hour dietary recall method—the Automated

Multiple-Pass Method³²—and it is used by trained interviewers to collect participant dietary intake. The Automated Multiple-Pass Method is designed to help participants systematically report their food and beverage intake in great detail while minimizing respondent burden. A standard set of measuring guides is used to help participants report the amount of foods and beverages consumed. The Automated Multiple-Pass Method is designed to enhance complete and accurate food recall using five steps that are applied consistently in data collection.

The process to develop the Thrifty Food Plan considers current consumption patterns using

WWEIA, NHANES in a number of ways. WWEIA, NHANES provides data on current dietary intakes from which the optimization model minimizes deviation. These data also inform the weighted average price and the weighted nutrient profiles of the Modeling Categories that are inputs to

the optimization model (see [Price of Each of the Modeling Categories](#), [Nutrient Profile and Healthy U.S.-Style Dietary Pattern Amounts of Each of the Modeling Categories](#) and [Model Constraints: Practicality](#)).

Applying Data From the Food Patterns Equivalents Database and the Food and Nutrient Database for Dietary Studies

The dietary data collected through the WWEIA, NHANES are linked to two databases used to assess nutrient composition and food-group contribution of foods reported by participants. The USDA Food and Nutrient Database for Dietary Studies³³ (FNDDS) provides information on the nutrient values for foods and beverages, and the USDA Food Patterns Equivalents Database³⁴ (FPED) quantifies the contribution of foods and beverages to food groups and subgroups identified in the USDA Dietary Patterns as well as other food-pattern components. The use of these databases allows for an assessment of how the Modeling Categories in the optimization model's feasible solution compare to the food-group and -subgroup recommendations in the *Dietary Guidelines for Americans, 2020-2025*, as well as the DRI values for each age-sex group.

The FNDDS provides the nutrient values per 100 grams for foods and beverages reported as consumed in the WWEIA, NHANES. Data are available on energy (calories) and 64 nutrients for nearly 9,000 foods and beverages. The nutrient values for the Thrifty Food Plan, 2021 came from FNDDS 2015–16. These FNDDS data reflect the composition of the food supply during the 2015–16 period, which is the same time period the food-price data

were collected. The Thrifty Food Plan, 2006 relied on data generated from the WWEIA, NHANES 2001–02 cycle and used FNDDS 1.0 (2001–02).

The FPED converts foods and beverages in the FNDDS to 37 food-pattern components. The FPED provides the cup (fruit, vegetables, dairy), ounce (grains, protein foods), gram (oils, saturated fat), and teaspoon (added sugars) equivalents of these food-pattern components per 100 grams for each of the foods and beverages included in the FNDDS. The food-pattern components included in the FPED reflect the current food groups and subgroups described in the USDA Dietary Patterns. The FPED 2015–16 was used to determine the food-pattern contributions of the Thrifty Food Plan, 2021. The Thrifty Food Plan, 2006 relied on data generated from the MyPyramid Equivalents Database (now known as FPED). Differences between the MyPyramid Equivalents Database and FPED include new components for 100% fruit juice in addition to whole fruits and a realignment of the FPED orange vegetables component to a red-and-orange-vegetables component. Thus, the food pattern food-group and -subgroup amounts in the Thrifty Food Plan, 2006 are not directly comparable to the Thrifty Food Plan, 2021—but both represent dietary guidance current at the time.

Estimating Food Prices With the Purchase to Plate Price Tool

In preparation for the Thrifty Food Plan reevaluation, USDA created the Purchase to Plate Price Tool²⁹ to estimate prices for foods in the WWEIA, NHANES. The Purchase to Plate Price Tool replaces the 2001–02 Food Price Database³⁵ created for the Thrifty Food Plan, 2006. The methods for estimating prices of foods reported as consumed in the WWEIA, NHANES are documented in detail in Carlson et al., 2020.²⁹ ERS, in conjunction with CNPP, applied these methods using 2015–16 Information Resources Inc. Retail Scanner Data (IRI InfoScan)³⁶ to calculate a nationally representative average price of foods and beverages.

The IRI InfoScan provides weekly transaction data collected through in-store scanners and includes all food items sold by a set of affiliated retailers.³⁷ Store types include grocery stores/supermarkets, mass merchandisers, super stores, convenience stores, drug stores, dollar stores, and defense commissaries in urban, suburban, and rural communities across the United States. These store types are the primary types where SNAP benefits are spent, with data from Federal fiscal year 2020 showing that about 54 percent of SNAP benefits are spent at super stores and 29 percent at supermarkets.³⁸

The IRI InfoScan prices are unit prices, which are imputed by dividing sales by quantity sold. National average unit prices for food and beverage items calculated from these data are based on the total sales and quantity sold of products available in retail stores. Average unit prices are therefore weighted based on market share, which help take into account consumer purchase preferences and/or behaviors (see [Price of Each of the Modeling Categories](#)). For example, the price of beans considers all forms. Most households purchase

canned beans rather than dry, so the amounts and prices for beans reflect that data in the model inputs.

The Purchase to Plate Price Tool estimates prices for foods and beverages reported consumed by participants in WWEIA, NHANES, based on foods and beverages that U.S. consumers purchase in a retail environment (e.g., super store, grocery store, convenience store) other than restaurant, fast food, or a congregate meal site (e.g., school lunch). The WWEIA, NHANES 2015–16 was used to create a list of foods and beverages for which to estimate prices. The FNDDS data were used to translate WWEIA, NHANES 2015–15 foods and beverages reported into their ingredients or maintained as ready-to-eat foods for home consumption. The IRI InfoScan provided value and volume of sales for these ingredients and for foods purchased in their ready-to-eat form. In total, the Purchase to Plate Price Tool identified and priced 3,231 FNDDS foods and beverages in an edible form that were used for the Thrifty Food Plan, 2021. The number of foods and beverages priced represents nearly 97 percent of foods and beverages reported as consumed in the WWEIA, NHANES 2015–16.

The Purchase to Plate Crosswalk was established as a way of linking the Universal Product Codes (UPCs) for food items in the IRI InfoScan to the FNDDS.³⁹ Using the Purchase to Plate Crosswalk involved converting the retail weight of each food item to the edible weight. This conversion was necessary because the FNDDS reports the gram weight of the food in its prepared and/or cooked form, while the IRI InfoScan reports the gram weight of the food in its purchased form. Standard food formulations and conversion factors from the

FNDDS 2015–16 were applied to convert the retail foods represented in the 2015–16 IRI InfoScan data to the edible forms reported in WWEIA, NHANES 2015–16. In making these conversions, the Purchase to Plate Crosswalk accounts for changes in food weight between the retail and edible forms caused by refuse (e.g., removing the peel of a banana), moisture loss, water absorption, and net fat gain/losses during food preparation and cooking. To illustrate, first tuna salad with egg was separated into ingredients: canned tuna, egg with the shell, mayonnaise, celery, pickle relish, and salt. These ingredients were then adjusted for loss in weight due to cooking or preparation (i.e., the loss in moisture in the drained, canned tuna) and refuse (i.e., the leaves and base of the celery stalk, the shell of the egg). Prices were then derived for each of the ingredients in their edible form per 100 grams using the 2015–16 IRI InfoScan data, and then regrouped as the food in its consumed form—tuna salad with egg—and priced per 100 grams.

In the absence of item-level food prices from Federal statistical sources, USDA currently uses data from IRI on research that informs policy and programmatic issues, including the effects of food and nutrition assistance programs on food choices of low-income populations, and the reevaluation of the Thrifty Food Plan. In addition to the IRI InfoScan, collected from retailers, USDA obtains IRI's Consumer Network, collected from a household

panel, called the National Consumer Panel. The Thrifty Food Plan, 2006 used Nielsen's HomeScan data. Subsequently, Nielsen and IRI combined their panels and created the current National Consumer Panel. The IRI InfoScan data was selected for the Thrifty Food Plan, 2021 because of several factors that are of relevance to this project. Specifically, after using IRI's projection factors, the National Consumer Panel underrepresents families with

children and other large households, households headed by persons under age 35, and non-Hispanic Black and Hispanic households when compared to the demographics of the American Community Survey, a large scale survey conducted by the U.S. Census Bureau.³⁶ It has also been shown that food price estimates are lower for the household scanner panel versus the retail scanner data, and certain items are underreported due to respondent burden when compared to other government surveys on food expenditures.^{40,41} In contrast, the IRI InfoScan provides data for a large number of stores, including more than 5 billion transaction records and a mix of both brand-name and private-label products.³⁶

The IRI InfoScan, as released to USDA, does not cover private labels for all retailers, nor does it cover all online transactions that represent a small but growing segment of U.S. grocery sales. Despite these limitations, CNPP and ERS considered the IRI InfoScan as the best source of price data for the Thrifty Food Plan, 2021 instead of the National Consumer Panel because it better reflects prices paid by U.S. households,



including SNAP recipients. With the mandate to reflect current prices in the reevaluation, USDA determined that retail scanner data likely better reflect current prices in today's marketplace. The Purchase to Plate Price Tool uses UPCs that cover 95 percent of all sales in the IRI InfoScan data obtained by USDA.³⁶

In general, retail-scanner data do not include information on the demographic characteristics of the individuals making the purchases. Therefore, unlike the Thrifty Food Plan, 2006, these price data cannot be isolated to low-income shoppers at 130 percent or less of the U.S. poverty threshold. Using data that represent prices paid by all households collected directly from food retailers, rather than low-income households at 130 percent or less of the U.S. poverty threshold, means that a broader

array of foods and beverages purchased by U.S. households and at the range of prices paid, underlies the food-price data used in the optimization model determining the cost of the Thrifty Food Plan, 2021 Market Baskets. This decision also aligns with CNPP's rapid review on prices paid for foods across income levels, conducted by NESR analysts.³⁰ This rapid review of the available literature suggests no clear relationship between income and the prices paid for foods—although the selection of foods may vary—supporting the use of data from households across all income levels. To support the development of "thrifty" Market Baskets, categories of foods and beverages were created based on price and nutrient density (see [Create the Modeling Categories of Foods and Beverages](#)).

Create the Modeling Categories of Foods and Beverages

The mathematical optimization process used to create the Market Baskets relies on categories of foods and beverages that are based on foods reported as consumed in the WWEIA, NHANES. For the Thrifty Food Plan, 2021, the Modeling Categories were designed as groupings of foods and beverages based on similar usage in the United States and by similar nutrient content and price. The Modeling Categories were developed such that recommendations in the *Dietary Guidelines for Americans, 2020-2025* could be met by the Thrifty Food Plan, 2021 Market Baskets, including recommended amounts of food groups and subgroups and limits on added sugars and saturated fat. For example, dividing grains based on whole-grain content allowed the model to select Modeling Categories comprised of whole-grain foods, and therefore meet the recommendation to

consume at least 50 percent of grains as whole grains. The Modeling Categories for the Thrifty Food Plan, 2021 include a wide variety of foods and beverages inclusive of convenient forms and which represent foods and beverages selected by the diverse cultural groups within the United States.

The Modeling Categories were designed using the WWEIA 2015–16 Food Categories⁴² as the foundation. Each food or beverage that can be reported in WWEIA, NHANES and coded using food codes in the FNDDS is assigned to one of the more than 150 mutually exclusive WWEIA Food Categories. The WWEIA Food Categories provide a strong basis for analyzing foods and beverages as consumed in the United States and provide flexibility to regroup categories based on research needs—in this case by higher and lower nutrient

density and, for some categories, by price.

The WWEIA 2015–16 Food Categories were used to align with the WWEIA, NHANES 2015–16 dietary intake data used for the Thrifty Food Plan, 2021.

The WWEIA 2015–16 Food Categories, and food codes within them, were analyzed to determine if higher or lower nutrient-density categories could be created. The energy content, macronutrients, saturated fat, and sodium values, as well as the whole-grain/refined-grain and added-sugars equivalents for foods and beverages were assessed on a 100-gram basis. Based on this review and in consideration of recommendations in the *Dietary Guidelines for Americans, 2020–2025*, as well as the standards for USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)-eligible foods⁴³ and Smart Snacks standards,⁴⁴ the final criteria for higher and lower nutrient-density categories were determined based on added sugars, total sugars, whole grains, saturated fat, and sodium content. For the Thrifty Food Plan, 2006, the criteria were the amounts of whole grains, total fat, solid fat, and/or presence of fat in the food item, which reflected the dietary guidance at that time.

Some WWEIA Food Categories had a broad distribution of nutrients and/or food components and were separated into higher or lower nutrient-density categories. Other WWEIA Food Categories were not separated further due to narrower distributions of nutrients and/or food components, or because applying the criteria would result in too few foods that could be included in the higher or lower nutrient-density categories. In some cases, similar WWEIA Food Categories were combined into one Modeling Category. This approach of

reviewing and recategorizing the WWEIA Food Categories allowed the greatest inclusion of foods and beverages while systematically prioritizing nutrient-dense options.

The refinement of the 2015–16 WWEIA Food Categories for the Thrifty Food Plan, 2021 resulted in 65 Modeling Categories compared to 52 in the Thrifty Food Plan, 2006. Each of the 8,951⁹ FNDDS 2015–16 food codes was grouped into one of the 65 Modeling Categories, with alcoholic beverages, infant formula, baby foods, and not-reconstituted powdered foods omitted. These categories represent the diversity of the U.S. food supply and marketplace with a wide variety of food options and foods in all forms. Pantry staples (e.g., flour, sugar, oils, marinades) are accounted for as ingredients within foods (e.g., oregano added to chicken cacciatore; olive oil used in sautéing vegetables). These are included in various WWEIA Food Categories and as part of several Modeling Categories, including condiments and sauces and sugars.

Once categories of higher and lower nutrient-dense foods and beverages were defined, the price distributions were reviewed, and, where prices varied (e.g., meat, poultry, seafood, cheese, dark-green vegetables, fruit, condiments and sauces [see [Appendix 1](#)]), categories were subdivided based on price. Creating these higher and lower price categories allowed the optimization model to prioritize the lower price foods and beverages for a nutritious diet, that is, by its definition, "thrifty," and provides variety while maintaining a budget constraint for purchasing lower price food items.

Cost categories were created for 30 of the 65 Modeling Categories using the price of the food

⁹ The number of FNDDS codes includes some codes from 2013–14 that were included in analyses supporting the calculation of current consumption patterns (see [Current Consumption Patterns of Each of the Modeling Categories](#)).

codes reported as consumed by individuals ages 1 and older in the WWEIA, NHANES 2015–16 (see [Price of Each of the Modeling Categories](#)). Several key elements of the data were considered in determining which Modeling Categories would be divided by cost. USDA considered which categories were the highest cost drivers, the number of foods that would be defined as higher or low cost, the types of foods that might be distinguished, and whether the intent of the existing Modeling Category would be disrupted. In some cases, cost categories would create distinct categories of food types or forms, or there were too few foods to further assign cost categories. Cost categories were not assigned in these cases. For example, the milk and yogurt categories include fluid milk, lactose-free milk, and fortified soy beverage, as well as yogurt. The application of a lower and higher cost category would disrupt the intent of the category to include all forms and result in a fluid-milk category and higher cost lactose-free alternative and yogurt categories, effectively restricting the amount of these higher priced dairy items in the model solution. Division of the beans, peas, and lentils category disrupts the goal to consider convenient forms, such as canned beans, even though dry beans are a lower prices form. Multiple options for creating higher and lower cost categories based on the distribution of prices within the category were considered. The decision balanced variety, convenience, and cost. USDA ultimately determined to categorize food codes at or below the 35th percentile for price as lower cost, and the remainder (i.e., prices greater than the 35th percentile) as higher cost. This cut point is similar to the cut point used for the Thrifty Food Plan, 2006 of at or below the 33rd percentile but allows for a few more lower priced options in the analyses. In other words, the 35th percentile cut point allowed for the creation of "thrifty" market baskets by isolating higher priced items while still

providing some variety and without being overly limited within each lower cost Modeling Category. For example, if a more restrictive price cutoff was used, common foods such as canned tuna would be in the higher cost category, but it is included in the lower cost seafood Modeling Category defined using the 35th percentile. As the Thrifty Food Plan is the lowest cost of the USDA Food Plans, the 35th percentile cut point allows for the creation of a nutritious food plan for budget-constrained households and the future creation of the Low-Cost, Moderate-Cost, and Liberal Food Plans at successively higher costs.

The subdivision of Modeling Categories based on price is a critical means of creating Market Baskets reflecting economical, or "thrifty," food choices. This is because the optimization model's output, with few exceptions, included the lower price category options. For example, all seafood in the model outputs was from the lower cost seafood Modeling Category—not the higher cost seafood Modeling Category. In summary, 30 of the 65 Modeling Categories were divided into higher and lower cost categories and a total of 95 categories were used in the optimization model.

Dividing food and beverage categories based on price is consistent with the Thrifty Food Plan, 2006. The Thrifty Food Plan, 2006 defined higher and lower cost categories for meat, poultry, and fish. For this reevaluation, the distribution of prices in each Modeling Category was examined to determine where and whether to define higher and lower cost cut points.

For more information on the Modeling Categories for the Thrifty Food Plan, 2021, including a full list of the categories and detailed information on the development and content of each, including those categories divided based on price, see [Appendix 1](#).

Establish the Inputs and Constraints

The optimization model's inputs and constraints were examined during the reevaluation process with the intention of creating Market Baskets of foods and beverages that are practical, include commonly consumed foods in their nutrient-dense forms at average prices, and are not difficult to prepare. The Modeling Categories underlie the optimization model's three data inputs: current consumption patterns, food prices, and food composition (i.e., the nutrient profiles and food-group

and -subgroup amounts drawn from the Healthy U.S.-Style Dietary Pattern in the *Dietary Guidelines for Americans, 2020-2025*). Based on these inputs and the dietary, practicality, and cost constraints applied, the optimization model identifies an output of Modeling Categories that are then converted to the Market Basket Categories represented in the Thrifty Food Plan Market Baskets.

Model Inputs

Current Consumption Patterns of Each of the Modeling Categories

Current consumption patterns serve as the unconstrained optimum—or the ideal solution if no constraints were applied—for the optimization model's objective function (see [Appendix 2](#)). The objective function is one component of the optimization model that is used to generate the Thrifty Food Plan. After the constraints are applied, the optimization model selects a dietary pattern as close to current consumption patterns as possible. Using current consumption patterns as the unconstrained optimum is an imperfect estimate of an individual's food preferences, as it is not equivalent to an individual's preferred consumption pattern given no constraints on budget, food availability, time, or other factors.

In past iterations of the Thrifty Food Plan, current consumption patterns were calculated from WWEIA, NHANES dietary recall data from a sample limited to low-income individuals ages

1 and older. To calculate current consumption patterns for the Thrifty Food Plan, 2021, WWEIA, NHANES dietary recall data from individuals from all incomes with Healthy Eating Index-2015 (HEI)⁴⁵ scores above the unweighted median for each of the 15 age-sex groups were used.

Previous editions of the Thrifty Food Plan considered the dietary intake data of low-income WWEIA, NHANES respondents at 130 percent or less of the U.S. poverty threshold with the rationale that by using these data to inform the model's input, the resultant Market Baskets better reflect realities faced by low-income households. Given the current economic realities of low-income households and the barriers to accessing a healthy diet,⁴⁶ USDA considered the use of these data as inadvertently perpetuating these challenges. It is not possible to know whether the current consumption patterns of low-income households

reflect their preferences, if their choice of foods and beverages results from the budget constraints they face, and if other factors, such as access to transportation or to grocery stores, play a role. It is well established that differences in dietary intakes across income levels exist such that lower income populations typically have diet quality that is marginally lower than higher income populations.^{47–49} This is supported by the rapid review CNPP NESR analysts conducted on the relationship between dietary quality and income that suggests lower income is associated with lower diet quality.³⁰ Despite some limitations and inconsistencies in the literature assessing differences in diet quality across income levels, USDA considered the use of WWEIA, NHANES dietary intake data from all income levels as helping to eliminate barriers to healthy eating and better reflecting the diversity of foods and beverages consumed by U.S. households.

Across all income levels, dietary intakes—as measured by a score of 59 out of 100 using the HEI-2015—are not aligned with recommendations in the *Dietary Guidelines for Americans*.² To help achieve the goal of developing Market Baskets that are practical and consist of lower price foods and beverages that are easy to prepare in their nutrient-dense forms, the unconstrained optimum used in the objective function was the average consumption patterns of a sample of individuals that excluded WWEIA, NHANES respondents with HEI-2015 scores below age- and sex-specific unweighted medians. This practice allows the objective function to deprioritize lower nutrient-density Modeling Categories that tend to be more commonly consumed by individuals with relatively lower diet quality (i.e., by individuals with HEI-2015 scores below age- and sex-specific unweighted medians).

Day-1 dietary recall data from the 2013–14 and 2015–16 cycles of WWEIA, NHANES were combined and used in the calculation of HEI-2015 scores for all WWEIA, NHANES respondents ages 2 and older. Respondents with HEI-2015 scores below the unweighted median for the respective age-sex group were excluded from the calculation of current average consumption for the Modeling Categories. The HEI-2015 is not applicable to individuals younger than age 2. As such, all respondents age 1 who were reported as not receiving human milk or infant formula in the WWEIA, NHANES 2013–14 and 2015–16 were included in the calculation of average consumption for children age 1.

After excluding respondents with HEI-2015 scores below the unweighted median within each age-sex group, the modified sample of combined WWEIA, NHANES 2013–14 and 2015–16 data had median HEI-2015 scores that were approximately 10 points higher than median HEI-2015 scores for the full WWEIA, NHANES 2015–16 sample. The median HEI scores for the full WWEIA, NHANES 2015–16 sample ranged from 45 to 53 across the age-sex groups for ages 2 and older, and median HEI scores for the modified WWEIA, NHANES sample ranged from 54 to 62. Average consumption of more nutrient-dense Modeling Categories such as whole grains and fruit were higher in the modified sample, and amounts of less nutrient-dense options such as sugar-sweetened beverages were lower across most age-sex groups. This supports the use of the modified WWEIA, NHANES 2013–14 and 2015–16 sample of individuals with marginally higher diet quality, based on self-report dietary intake data, as a way to create Market Baskets of food and beverage items that include a variety of nutrient-dense options without suggesting unrealistic deviations from current consumption patterns.

After identifying the modified sample of 2013–14 and 2015–16 WWEIA, NHANES respondents, the reported average consumption amounts for each of the Modeling Categories were adjusted to account for some amount of food loss and waste that is inherent to an individual or household. Food loss, or the amount of edible food, postharvest, that is available for human consumption and is not consumed for any reason, is accounted for in several ways.⁵⁰ First, inherent loss due to cooking or preparation (i.e., food shrinkage and refuse) is accounted for at the individual food or ingredient level in the calculation of food prices (see [Estimating Food Prices With the Purchase to Plate Price Tool](#)). Next, the current consumption amounts account for some food waste that occurs as a result of households' behaviors within each of the Modeling Categories.

As with previous editions of the Thrifty Food Plan, a 5-percent food-waste-adjustment factor was applied to account for plate waste and/or foods that may go uneaten before they spoil. This 5-percent food-waste-adjustment factor, in addition to accounting for inherent food loss and waste in the input data, is a modest measure of food loss. Because the definitions of food loss and waste are complex, with great variability in how the measures are defined and reported,⁵¹ a precise estimate of food waste at the household level is

Price of Each of the Modeling Categories

In the past, the price data and consumption shares used in calculating the price of Modeling Categories were gathered only from those below 130 percent of Federal Poverty Guidelines. Thus, the foods that could be included in the market baskets were constrained to only those purchases

difficult to assess. Estimates of food waste at the consumer level have a wide range that depend in part on the food efficiency of the household, with some estimates at approximately 20 percent or higher.^{50, 52} The 5-percent food-waste-adjustment factor was assessed for potential change based on current household practices and in recognition of the relevance for households with young children that are encouraged to introduce a variety of foods multiple times to increase the likelihood of food acceptance. Ultimately, the decision was made to retain the existing methods because of lack of sufficient evidence to support an alternative. The food-waste-adjustment factor provides an allowance for some extra food to account for food waste without perpetuating the nutritional, economic, and environmental implications of food loss.

To apply the food-waste-adjustment factor, the average consumption per 100 grams of each of the Modeling Categories for the 15 age-sex groups is increased by 5 percent. Coinciding with this 5-percent increase to the average consumption is a 5-percent increase of the lower and upper bounds of the model's nutrient recommendations that act as constraints, including the calorie level of the Healthy U.S.-Style Dietary Pattern that best aligns with the population level Estimated Energy Requirement (EER) (see [Model Constraints](#)).

made and foods consumed by low-income consumers. It is unknown whether the purchase and consumption data reflected preferences or if those data simply reflected a highly constrained budget and those shoppers would have selected other items had their budget been less

constrained. In analyzing the data for the 2021 reevaluation, USDA considered price data from all incomes and consumption shares from a broader income range (i.e., consumption shares of those above 350 percent of Federal Poverty Guidelines were removed). Doing so allowed preferences of shoppers who were budget-conscious but were not as constrained as only the lowest income consumers. Removing the "high-income" group removed the selections of those for whom budget constraints likely weigh less into their decision-making. For example, canned tuna has a greater consumption share among households with incomes less than 350 percent of the Federal Poverty Guidelines than all households; as such, the price of the tuna is weighted more in the seafood Modeling Category. The decision was based on USDA's standard practice of dividing the NHANES, WWEIA data into low-, middle-, and high-income groups, based on the respondents' poverty-income ratio. The highest income group was removed to reflect the decisions of cost-conscious purchasing without constraining the data to only those with the most constrained budgets, whose purchases may not reflect preferences but instead reflect the limits of their constrained budgets. This approach is consistent with USDA's use of above 350 percent of the Federal Poverty Guidelines to stratify higher income families in other NHANES, WWEIA analyses. For example, the data tables USDA analyzes using NHANES, WWEIA are coded into "low income" (less than 130 percent of Federal Poverty Guidelines), "middle income" (131 percent to 350 percent of Federal Poverty Guidelines), and "high income" (350 percent or higher of Federal Poverty Guidelines). The Thrifty Food Plan analysis used this definition of high income to be consistent with the practice of using the NHANES, WWEIA data and how USDA has

categorized the data in previous USDA analyses using the NHANES, WWEIA data.^{53–56}

This approach also is supported by the CNPP NESR rapid review on the relationship between income and prices paid for food, which suggests income is more strongly associated with shopping behaviors (i.e., the types of foods purchased) than prices faced (i.e., the prices paid for the same foods and beverages across income levels).³⁰

To better reflect current food prices, USDA adjusted the 2015–16 national average prices to June 2021 relative prices using the U.S. Bureau of Labor Statistics' CPI for food, a component of the all-items CPI that measures the changes in retail prices of food items. For the



Thrifty Food Plan, 2006, USDA ran the optimization model using food prices data from 2001–02 and then adjusted the cost of the final Thrifty Food Plan Market Baskets using the CPIs. Although price inflation for food at home remained modest between 2015 and 2020,⁵⁷ this new step allowed for current prices to be considered in the model calculation.

To apply the CPI to the 2015–16 national average prices, first, the CPI that most closely approximated the Modeling Category was selected. For example, the CPI for eggs was used to inflate the Thrifty Food Plan's egg category; and the CPI for nonfrozen, noncarbonated juices and drinks was used to inflate the price of the 100% juice category. In some cases, there was no close match between the CPI and a Modeling Category. In these cases, the next higher aggregation of the CPI was used. For example, the CPI for fresh vegetables was used to inflate the more granular red-and-orange-vegetables category, as a CPI for the red-and-orange-vegetables subgroup does not exist. For other Modeling Categories, namely mixed dishes, there is not an available CPI, and in these cases the overall CPI for food at home was applied. Next, an inflation adjustment factor for each food

or beverage within the Modeling Category was created using the matched CPI code. The inflation adjustment factor for each food or beverage was calculated as the seasonally adjusted June 2021 CPI value, divided by the weighted average of the annual 2015 and 2016 CPI values, with the weights applied based on the purchase volume of the food or beverage as observed in the 2015–16 national average prices.

In the calculation of weighted average price, foods and beverages with missing prices were excluded, as were price outliers, defined using a standard definition for outliers as any food or beverage item with a price more than 1.5 interquartile ranges above the third quartile. Removing outliers resulted in removing foods at higher prices in the respective food categories, such as removing lobster from the seafood Modeling Category and raw arugula from the dark-green-vegetables Modeling Category. The weighted average prices also reflect adjustments to account for the removal of table salt as an ingredient in select foods, as described in the section [Nutrient Profile and Healthy U.S.-Style Dietary Pattern Amounts of Each of the Modeling Categories](#).

Nutrient Profile and Healthy U.S.-Style Dietary Pattern Amounts of Each of the Modeling Categories

The nutrient content and the food-group and -subgroup amounts from the Healthy U.S.-Style Dietary Pattern inform the optimization model's selection of a nutritious diet. The weighted average nutrient content of each of the Modeling Categories per 100 grams was calculated using the FNDDS 2015–16. The weighted average nutrient

profile was based on the weighted average consumption of each food item within it, after excluding foods with missing prices and outliers. Weights for the food items were based on the average consumption of foods and beverages reported as sourced from stores for individuals ages 1 and older in the WWEIA, NHANES 2015–16

with household incomes less than 350 percent of the Federal Poverty Guidelines, in line with the weighted average price of the Modeling Categories.

The FNDDS is designed with the purpose of estimating nutrient intakes reflective of current consumption patterns in the United States. In the case of sodium, the database reflects the ubiquitous nature of sodium in the food supply, both from commercially prepared and home-prepared foods. Currently, the sodium intake of nearly all age-sex groups far exceeds the Chronic Disease Risk Reduction (CDRR) level defined by NASEM.²⁵ To help the Market Baskets meet the sodium constraint, foods that could be home prepared and include table salt as an ingredient (i.e., meat, poultry, seafood, staple grains [rice, pasta, cooked grains], eggs, cooked cereal, beans, dark-green vegetables, other vegetables, red and orange vegetables, and starchy vegetables) were assumed to be prepared without this added salt. Adjustments were made to the nutrient values for sodium in the FNDDS 2015–16 database for these foods by removing the salt ingredient and the average prices for these foods were adjusted accordingly. In total, table salt was removed from 1,599 FNDDS 2015–16 food codes out of the 4,096 possible food codes with table salt listed as an ingredient. This assumption resulted in a reduced estimate of the sodium content of these foods in comparison to the estimates in FNDDS 2015–16. However, the salt content of ready-to-eat or ready-to-heat foods, such as jarred sauces, canned goods, and baked goods, was held at the level given in the FNDDS 2015–16. Hence, sodium remained in foods if it

were naturally occurring or in foods purchased in forms with added sodium.

The USDA Dietary Patterns profile for each of the Modeling Categories also serves as an input into the model. This profile includes the weighted average contributions of items in the Modeling Category to each USDA Dietary Pattern component: ounce or cup equivalents of grains (whole and refined), vegetables (dark green; red and orange; beans, peas, and lentils; starchy; and other vegetables), fruits (whole and 100% juice), dairy, and protein foods (meats, poultry, eggs; seafood; nuts, seeds, and soy products). The USDA Dietary Patterns profile for each of the Modeling Categories also includes the amounts of oils, saturated fat, and added sugars. Many food categories include equivalents for only one Dietary Pattern component; for example, fat-free milk contributes only to the dairy group. Other food categories contribute to more than one component; for example, some mixed dishes (e.g., lasagna) contribute to the grains, vegetables, dairy, and protein foods groups.

Using Food Prices To Calculate the Price of Modeling Categories

The 2015–16 national average prices used to calculate the price of the foods and beverages included in the Modeling Categories are obtained directly from retailers, and so these data are not limited to prices paid by low-income households. USDA took several steps to ensure the calculation of weighted average price of each Modeling Category informing the analyses reflect the intent of the Thrifty Food Plan, that is, to represent the cost of a nutritious, practical diet for households with a limited budget.

First, price outliers were excluded: Higher price food items, such as lobster, are not included in the calculation of the price of each Modeling Category.

Next, higher and lower price categories were created, where appropriate: Modeling Categories were divided at the 35th percentile where there was (1) a broad price distribution within the category; (2) a sufficient number of foods within the category; and (3) further categorization that did not create categories based on food type (e.g., fluid milk vs. lactose-free alternatives and yogurt) or form (e.g., canned vs. dried beans). Lower cost is defined as foods and beverages at or below the 35th percentile of prices, and higher cost is defined as greater than the 35th percentile of prices so the optimization model is able to prioritize lower priced foods and beverages, with few exceptions. Thirty of the 65 categories were divided into higher and lower priced Modeling Categories.

Finally, the higher income households were excluded from the weighted average Modeling Category price: The food and beverage choices of higher income households (those above 350 percent of the Federal Poverty Guidelines) are not included in the weighted average price of each of the Modeling Categories.

Together, these refinements enable the model to meet dietary guidance with a variety of foods within categories while selecting from lower price categories that reflect budget-conscious purchasing.

Model Constraints

Healthy U.S.-Style Dietary Pattern Food-Group and -Subgroup Amounts

The Healthy U.S.-Style Dietary Pattern at the assigned calorie level for each of the 15 age-sex groups serves as the primary dietary constraint for the Thrifty Food Plan, 2021. As such, the Thrifty Food Plan Market Baskets must provide the amounts and limits for food groups and subgroups and other dietary components that make up healthy dietary patterns.

The Healthy U.S.-Style Dietary Pattern translates nutrient recommendations in the *Dietary Guidelines for Americans, 2020-2025* into food-group and -subgroup recommendations within a range of calorie levels. The Healthy U.S.-Style Dietary Pattern is designed to meet a person's nutrient needs while not exceeding calorie requirements and while staying within limits for overconsumed dietary components such as added sugars, saturated fat, and sodium. Additionally, it is designed to not exceed the Tolerable Upper Intake Level (UL) or CDRR level for nutrients set by NASEM. The Healthy U.S.-Style Dietary Pattern meets—and in many cases, exceeds—nutrient needs for the age-sex groups for which the calorie levels are intended. There are a few exceptions for nutrient recommendations that are difficult to achieve through food and beverages alone, such as vitamin D.

Energy Requirements

Establishing the calorie needs for each of the age-sex groups allows for the corresponding calorie level of the Healthy U.S.-Style Dietary Pattern and the DRI values to be assigned as

The Healthy U.S.-Style Dietary Pattern replaces CNPP's former MyPyramid Food Guidance System used for the Thrifty Food Plan, 2006. When compared to the MyPyramid Food Guidance System, the Healthy U.S.-Style Dietary Pattern reflects adjustments to the vegetable subgroups that were adopted in the *Dietary Guidelines for Americans, 2010*.⁵⁸ Tomatoes and red peppers (sweet and hot) were aggregated with orange vegetables to create a red-and-orange-vegetables subgroup. The recommended amounts for each vegetable subgroup were redistributed such that dark-green vegetables and beans, peas, and lentils (formerly legumes) amounts were reduced when compared to their amounts in the MyPyramid Food Guidance System. The Healthy U.S.-Style Dietary Pattern also reflects current guidance for seafood consumption, with amounts ranging from 2 to 10 ounces per week across the 12 calorie levels intended for ages 2 and older as compared to the previous MyPyramid Food Guidance System that did not include a recommended amount of seafood. For the first time, the *Dietary Guidelines for Americans, 2020-2025* included guidance for infants and toddlers and a Healthy U.S.-Style Dietary Pattern for toddlers ages 12 through 23 months, which was implemented in this reevaluation.

dietary constraints. EER equations established by NASEM were used to determine the specific calorie needs for each of the 15 age-sex groups. The EER equations provide estimated amounts of

calories needed based on age, sex, height, weight, and level of physical activity. For the Thrifty Food Plan, 2021, methods of the previous Thrifty Food Plan were maintained and current anthropometric data were used to estimate calorie needs based on the median heights and median weights and assumed low-active physical activity for the six adult age-sex groups and for individuals ages 12 through 19. For the children ages 2 through 11, the use of median heights and weights in the EER equations were maintained, and an active level of physical activity was assumed as compared to the low-active physical activity level assumed for these age groups in the Thrifty Food Plan, 2006. The assumption of an active physical activity level for children ages 2 through 11 is consistent with how calorie standards were set for the school meals programs.^{59,60} For toddlers ages 12 through 23 months, an estimate of 1,000 calories was used, which represents the highest estimate for energy needs in the age group.

Different factors influence individual energy needs, including body weight and physical activity level, and assumptions made about these factors influence estimated requirements for use at a population level in the calculation of the Thrifty Food Plan. For example, estimations can be based on reference, healthy weights (i.e., to achieve a healthy body mass index) or, current median or average body weights that, for many age-sex groups, reflect a body mass index defined as overweight. Assumptions about physical activity can be defined as sedentary, low active, active, or very active. The use of median heights and median body weights is an approach used to represent population-level EER because, by definition, these height and weight values are set exactly in the

middle of the overall distribution. An assumption of low-active physical activity for individuals ages 12 and older was maintained as data show this most accurately characterizes the current U.S. population, including those living below the poverty threshold where data show only 13 percent meet the recommendations for daily physical activity.⁶¹ In doing so, the calorie levels for the age-sex groups reflect current realities, providing sufficient energy to support current weight status and activity levels at the population level. Using a higher activity level may overestimate energy needs and potentially exacerbate overweight and obesity and its related health problems, such as cardiovascular disease and type 2 diabetes, particularly among minority populations, which are disproportionately affected by these conditions.⁶²

The body weights of Americans have increased since USDA developed the Thrifty Food Plan, 2006 Market Baskets.^{20,63} Overall, compared to the previous Thrifty Food Plan, the updated anthropometric data and use of an active physical activity level for children under age 12 result in an increase of about 600 calories per day (200 calories each for the children and for the adult male)—from 8,600 to 9,200 total calories—provided in the Thrifty Food Plan, 2021 Market Baskets for the reference family of four. Across all age-sex groups, the assumptions made regarding height, weight, and physical activity level may result in more calories than required for some individuals and fewer calories than required for others. Future reevaluations should continue to explore which assumptions to make about weight and physical activity to estimate calorie levels to reduce food insecurity, while also supporting health and disease prevention.

Nutrient Recommendations

The Thrifty Food Plan Market Baskets are designed to meet the nutrient requirements established and updated by NASEM (see [Appendix 3](#)). These quantitative requirements and/or limits—known as the DRIs—exist for macronutrients (i.e., protein, carbohydrate, and fats), micronutrients (e.g., vitamin C, iron, sodium) and other food components (e.g., dietary fiber). The DRI values (Recommended Dietary Allowances [RDA] or Adequate Intakes [AI]) were applied as constraints in the optimization model, as was done in the Thrifty Food Plan, 2006. There is potentially some redundancy in applying these nutrient constraints, as the USDA Dietary Patterns are intended to meet a person's essential nutrient needs. Eliminating these nutrient requirements as constraints and only applying the recommended food-group and -subgroup amounts in the USDA Dietary Patterns was considered as an option to simplify the optimization model without jeopardizing the nutritional integrity of the Market Baskets. However, nutrient constraints were necessary to ensure the nutritional adequacy of the Market Baskets.

The Thrifty Food Plan, 2021 considers the RDA or AI for 18 micronutrients as constraints for the 15 age-sex groups. The lower limits of the nutrient constraints were set at 100 percent of the quantitative requirements for the following: vitamin A, vitamin B-6, vitamin B-12, vitamin C, vitamin K, thiamin, riboflavin, niacin, folate, choline, calcium, copper, iron, magnesium, phosphorus, zinc,^h potassium, and sodium. The lower limit for vitamin E is 85 percent of the RDA, and no constraint for

vitamin D was included in the model, because adequacy of these micronutrients is difficult to achieve through dietary intake alone. During analyses, Market Baskets for the 15 age-sex groups were reviewed to ensure that the amounts of vitamin E and vitamin D were similar to that included in the Healthy U.S.-Style Dietary Pattern (see [Results: The Thrifty Food Plan, 2021 Market Baskets](#)).

The upper limits of the nutrient constraints were set at the UL, which are available for: vitamin A, vitamin B-6, vitamin C, folic acid, vitamin E, choline, copper, calcium, iron, phosphorus, and zinc. The limit for sodium is defined as the CDRR, or the intake above which intake reduction is expected to reduce chronic disease risk. However, even with adjustments to sodium in the FNDDS 2015–16 described earlier, the optimization model could not generate Thrifty Food Plan Market Baskets with sodium levels equal to the CDRR because of the high current consumption amounts and ubiquitous nature of sodium in the food supply (both commercially and home-prepared foods). Instead, the sodium limit was set at the median reported consumption amounts in WWEIA, NHANES 2015–16 for the 15 age-sex groups, values that are higher than the CDRR. This is the same approach used for the sodium constraint in the Thrifty Food Plan, 2006. The Acceptable Macronutrient Distribution Range (AMDR) for protein, carbohydrates, and fats—including total fat, linoleic acid, and alpha-linolenic acid—was also applied. The DRI for dietary fiber is applied as 14 grams per 1,000 calories.

^h The upper intake limit for zinc is increased by 10 percent for children ages 2 to 3.

Practicality

To prevent the inclusion of an amount of any one Modeling Category that meets the specified inputs and constraints but is far in excess of current consumption, upper limits were applied. For example, foods such as eggs or beans, peas, and lentils may be a cost-efficient way to meet some of the nutrient constraints, but Market Baskets with amounts of eggs or beans, peas, and lentils far in excess of current consumption are impractical. These limit constraints were applied to the Healthy U.S.-Style Dietary Pattern recommended food groups and subgroups, to FPED groups with no direct corresponding recommended intake amount, to individual food categories, and to the proportion of calories from breakfast foods.

The WWEIA, NHANES 2013–16 distributions of intakes for FPED food pattern components informed the constraints for food groups and subgroups with and without recommended amounts. For the FPED components corresponding to Healthy U.S.-Style Dietary Pattern food-group and -subgroup recommendations, an upper limit was set as the 95th percentile of reported dietary intake. The upper limit constraints on FPED food pattern components were applied to dairy, vegetables and the vegetable subgroups (i.e., dark green; red and orange; beans, peas, and lentils; starchy; and other), fruits, and grains.

For many of the food groups and subgroups (e.g., dark green vegetables, whole grains), the 95th percentile of intake for some or all age-sex groups fell below the recommended intake amount that was set as the lower bound. In these cases, the recommended intake amount remained as the lower bound, but instead of the 95th percentile of consumption, the upper bound was set at the recommended intake amount plus 10 percent. The

additional 10 percent above the recommended intake amount is necessary to provide the optimization model with a range of values at which to solve.

Categories for which there is no direct corresponding Healthy U.S.-Style Dietary Pattern intake recommendation because amounts are in the aggregate (i.e., meat, poultry, eggs [combined as one protein foods subgroup: meat, poultry, eggs]; nuts and seeds, and soy [combined as one protein foods subgroup: nuts, seeds, soy products]) were constrained so that the Thrifty Food Plan Market Baskets provide a greater variety of foods in amounts customarily consumed. For individuals ages 2 and older, represented by 14 age-sex groups, meat, poultry, nuts and seeds, and soy were each constrained to fall within the 25th to 95th percentile of consumption, and eggs to the 25th to 75th percentile of consumption, based on the distribution of WWEIA, NHANES 2013–16 dietary intake data for these FPED food pattern components. For children age 1, meat, poultry, and soy were each constrained to fall within the 25th to 95th percentile of consumption, and nuts and seeds to the 25th to 75th percentile of consumption. The constraint for eggs was set at the recommended intake amount in the Healthy U.S.-Style Dietary Pattern for children age 1 (see [Appendix 3](#)).

Distribution of intakes are not available for all categories (e.g., snack foods, mixed dishes, and beverages). Modeling Categories that do not directly correspond to a FPED food pattern component were therefore limited to amounts no more than two standard deviations above the average amount of usual intake reported as consumed in WWEIA, NHANES 2013–16.

For greater diversity in the resulting Market Baskets and to better reflect the distribution of foods consumed at different eating occasions, the total number of calories associated with the breakfast eating occasion across all of the Modeling Categories was limited to 23 percent, the amount reported in the WWEIA, NHANES 2015–16 plus 5 percent.

Finally, some practicality constraints were applied to specific age-sex groups. Children under age 4 were prevented from having popcorn in the final

Market Baskets because this food is a known choking hazard. Coffee and tea are a source of some nutrients (e.g., potassium) but do not contribute to meeting the food-group recommendations applied as dietary constraints and would not be included in the Market Basket without a practicality constraint applied. A majority of adults in the United States consumes coffee or tea,⁶⁴ so the Market Baskets for adults ages 20 and older contain a minimum of 1 cup per day of coffee or tea.

Cost

The optimization model requires that a cost constraint be set in order to solve for the cost of a diet that fulfills all of the dietary and practicality constraints while considering current consumption patterns. For the Thrifty Food Plan, 2021, the cost constraint was increased in \$0.01 increments (or decreased in the case of the child age 1) from cost

neutral (i.e., the June 2021 cost of the Thrifty Food Plan, 2006) to identify the lowest cost at which the model solved for the 15 age-sex groups based on all the inputs and after meeting the dietary and practicality constraints (see [Run the Optimization Model and Evaluate the Solution](#)).

Phase Two: Run the Optimization Model and Evaluate the Solution, Create the Thrifty Food Plan Market Baskets

After preparing the data sources, creating the Modeling Categories, and identifying the inputs and constraints, the optimization model is used to determine a feasible solution for the 15 age-sex groups, consisting of Modeling Categories per 100 grams, which are the basis of the Market Baskets. Early iterations of the data inputs produced various feasible solutions, which were examined by a team of CNPP nutrition scientists and analysts for practicality. Based on these reviews, the analysis team returned to phase one, adjusting the Modeling Categories and/or the constraints to allow a diversity of foods to be included in the solution. For example, in one early iteration, the recommended consumption amount for the protein foods subgroup meat, poultry, and eggs was fulfilled only by eggs. While there is no specific individual recommendation for eggs, poultry, and meat for ages 2 and older, the contribution of eggs

was limited to the 25th to the 75th percentiles of intake and meat and poultry to the 25th to the 95th percentiles of intake to achieve greater variety in the optimization model's solution and the resulting Market Baskets.

The optimization model's final output of Modeling Categories for the 15 age-sex groups was converted to as-purchased amounts of Market Basket Categories of the Thrifty Food Plan, 2021 Market Baskets. The as-purchased forms for the Thrifty Food Plan Market Baskets are a purchasable set of categories that account for the amount of food that should be purchased (i.e., forms of foods inclusive of refuse such as stems, peels, bones) to maintain the goal of a healthy dietary pattern with a variety of nutrient-dense foods and beverages that fall within a range of current consumption.

Run the Optimization Model and Evaluate the Solution

As with previous Thrifty Food Plans, CNPP programmed the model in the General Algebraic Modeling System (GAMS Software Corp., Fairfax, VA), making several updates for the Thrifty Food Plan, 2021. In addition to updating the optimization model to reflect the current inputs and constraints, the logarithmic form of the objective function used in 2006 was updated to a sum of squared differences functional form. In practice, these logarithmic and sum of squared

differences functional forms achieve similar results, and both are acceptable methods of solving the constrained nonlinear optimization problem. The previous logarithmic form of the objective function is designed to penalize a negative deviation from current consumption patterns (i.e., the Market Basket contains *less* than the amount of a food or beverage typically consumed) more than a positive deviation from current consumption patterns (i.e., the Market Basket contains *more* than the

amount of a food or beverage typically consumed). This logarithmic functional form is based on the theory that consumers react differently to losses (i.e., negative deviation) and gains (i.e., positive deviation), with the value of losses greater than the value of gains. The simpler sum of squared differences functional form is a strictly convex function. In combination with a set of linear constraints, this guarantees a unique solution to the optimization model.

The application of the cost constraint for the Thrifty Food Plan, 2021 also differs from the previous iteration. For the Thrifty Food Plan, 2006, USDA sought to determine whether the inflation-adjusted cost of the previous Thrifty Food Plan was sufficient for the purchase of a nutritious diet. During the iterative process, food and beverage categories, inputs, and constraints were

tested to identify whether a cost-neutral solution to the Thrifty Food Plan could be reached. For the Thrifty Food Plan, 2021, USDA applied the cost

constraint after determining the food and beverage categories, inputs, and dietary and practicality constraints. As a result, the model yielded the lowest cost solution consistent with these factors.

To apply this approach, USDA first attempted to solve at the June 2021 Market Basket cost for the previous Thrifty Food Plan, 2006 (i.e., cost neutral).⁶⁵ At this cost level, no feasible solutions were found for ages 2 and older. Thereafter, the cost constraint was increased in \$0.01 increments for the 14 age-sex groups representing individuals ages 2 and older until a feasible solution was identified. A feasible solution was achieved for the 1-year-old child at the June 2021 cost of the Thrifty Food Plan, 2006, and thereafter, the cost constraint was decreased in \$0.01 increments up to the point where a feasible solution was no longer identified. Each age-sex group was allowed to reach feasibility at different cost levels versus trying to determine a single cost increase for all age-sex groups.

In early iterations of the optimization model, quantities of the Modeling Categories were provided that met the dietary (i.e., energy requirements, nutrient recommendations, and the Healthy U.S.-Style Dietary Pattern amounts) and cost constraints, but these goals were achieved through a limited number of Modeling Categories and in amounts that were not in a range of reasonable consumption. The design of the optimization model is such that without additional constraints for practicality (i.e., a range of typical consumption), the solution includes only a limited number of foods considered highly efficient (e.g., beans) at meeting one or more of the model's constraints, such as cost or nutrient requirements. The solution converted to the Thrifty Food Plan, 2021 Market



Baskets included a quantity and diversity of foods and beverages that could be made into

nutrient-dense meals and snacks for the diverse U.S. households served by the SNAP.

Convert the Optimal Solution to Thrifty Food Plan Market Basket Amounts

The output of the optimization model provides quantities of the Modeling Categories that meet the dietary, cost, and practicality constraints and that consider current consumption patterns for each of the 15 age-sex groups. These categories include foods and beverages in the forms people consume (as consumed), rather than the forms people buy (as purchased). The as-consumed forms of foods and beverages must be converted to forms of foods that can be purchased by households for the final Thrifty Food Plan Market Baskets. This conversion of as-consumed to as-purchased form includes accounting for foods that need to be disaggregated into purchasable ingredients and accounting for any refuse (e.g., stems, peels, bone) or moisture/fat gains and losses. For some foods such as ready-to-eat breads, precut produce, and milk, the as-consumed and as-purchased forms are the same. For these examples, there is no disaggregation into ingredients and no refuse that must be accounted for. Foods like frozen pizza or canned soups include multiple ingredients but are purchased as a single item, therefore, they would not be disaggregated into their ingredients. However, in the example of a canned soup, a conversion factor is applied to account for soups that are purchased in a condensed form. Still other foods like baked macaroni and cheese or arroz con pollo represent a mixture of multiple ingredients that are purchased separately and conversion factors are applied to account for the as-purchased form of the ingredients.

The disaggregated foods and beverages from the Modeling Categories were regrouped into 24 Market Basket Categories in their as-purchased form. This disaggregation allows the final purchasable Market Basket Categories to account for single foods from multiple Modeling Categories. For example, poultry that was modeled as a single food and poultry that comes from mixed dishes are both included in the poultry Market Basket Category. Foods that cannot be disaggregated, such as canned soups or frozen pizza, are regrouped into the Market Basket Category pre-prepared entrees and side dishes. This regrouping and consolidation of foods into Market Basket Categories, whereby similar foods are grouped and converted into as-purchased (versus as-consumed) form, illustrate how households can purchase foods in the marketplace in order to obtain the suggested consumption patterns in the Thrifty Food Plan, 2021.

The process to convert foods and beverages from the as-consumed to as-purchased form relied on the Purchase to Plate Ingredient Crosswalk. This tool, developed by ERS in collaboration with CNPP, utilizes the USDA nutrient and food group databases (i.e., FNDDS, FPED, USDA National Nutrient Database for Standard Reference) as a way of assigning nutrient values to the ingredients that make up a specific food item. The Purchase to Plate Ingredient Crosswalk provides the as-purchased amounts of each ingredient needed to yield 100

grams of the food in its as-consumed form. After coding the ingredients of the food and beverage items using the Purchase to Plate Crosswalk, each ingredient in its as-purchased form was assigned to one of the 24 Market Basket Categories created based on similarity of the food or beverage item and where possible, alignment with the food groups and subgroups in the USDA Dietary Patterns. Foods that cannot be disaggregated into multiple components—such as frozen pizza—are categorized as pre-prepared entrees and side dishes that need minimal preparation. Foods containing pantry staples were disaggregated,

and those staples were assigned to a condiment category in the final Market Basket.

The Thrifty Food Plan, 2021 Market Basket Categories of foods and beverages in the as-purchased form for each of the 15 age-sex groups are presented in [Appendix 4](#). Because the maximum benefit allotment for SNAP is based on a reference family, the [Results](#) and [Discussion](#) sections of this report address the revised Thrifty Food Plan, 2021 Market Basket amounts for this reference family.

Summary of Updates to the Methods for the Thrifty Food Plan, 2021

The methods for the Thrifty Food Plan, 2021 reflect the reevaluation with a goal for Market Baskets to consist of nutrient-dense foods and beverages that support healthy dietary patterns and that are consistent with the purchasing patterns and consumption patterns of the diverse households in the United States. All of the inputs, constraints, and technical assumptions that go into the optimization model to create the Thrifty Food Plan were reviewed. Through this process, updates and/or changes to the data sources, food and beverage categories, inputs, and constraints were made in consideration of the goals for the Thrifty Food Plan, 2021 and where sufficient evidence existed to support such changes.

The Thrifty Food Plan, 2021 reflects updated dietary guidance from the *Dietary Guidelines for Americans, 2020-2025* and NASEM. It also relies on recent data from the WWEIA, NHANES and the Purchase to Plate Price Tool—a replacement

for the 2001–02 Food Price Database used for the previous Thrifty Food Plan. These methods are consistent with the approach to update the previous Thrifty Food Plans. Also consistent with the previous Thrifty Food Plan is the factor for food loss and waste (see [Current Consumption Patterns of Each of the Modeling Categories](#)) and how pantry staples are accounted for within the Thrifty Food Plan Market Baskets (see [Create the Modeling Categories of Foods and Beverages](#)). Insufficient evidence was found to support changes to these technical assumptions and so the Thrifty Food Plan, 2021 Market Baskets carry forward the methods from the Thrifty Food Plan, 2006. The optimization model used to generate the Thrifty Food Plan, 2021 is also largely consistent with previous versions except for an update from the logarithmic form of the objective function to a sum of squared differences functional form (see [Appendix 2](#)).

Changes were made to data sources which were

used for the optimization model's inputs; the food and beverage categories; the current consumption pattern serving as the unconstrained optimum; and to the cost constraint.

First, regarding the data sources used for the Thrifty Food Plan, 2021, the WWEIA, NHANES 2015–16 dietary intake data come from all households, rather than being limited to a sample of low-income households. The data used to determine the prices of foods and beverages are obtained directly from retailers through the 2015–16 IRI InfoScan, not collected from low-income households, and so these data are not limited to prices paid by low-income households. The new Modeling Categories were then created, which consider the nutrient density of the foods and beverages as well as a consideration of their prices (e.g., price distribution, number of foods in a category). Specifically, Modeling Categories were created that grouped foods and beverages based on those at or below the 35th percentile of prices or those greater than the 35th percentile of prices and by saturated fat, added sugars, sodium, and/or whole-grain content, and higher income households were excluded from the calculation of the weighted average Modeling Category price. To ensure the Thrifty Food Plan, 2021 reflects current food prices, the food-prices data were adjusted for inflation prior to running the optimization model. These departures from the Thrifty Food Plan, 2006 methods aim to allow for a greater variety of food choices and a wider range of current food prices informing the Thrifty Food Plan Market Baskets.

Next is the current consumption pattern from which the optimization model attempts to limit deviations, known as the unconstrained optimum. The Thrifty Food Plan, 2021 considers the unconstrained optimum as the reported intakes

of WWEIA, NHANES 2013–16 respondents with HEI-2015 scores above the unweighted median, rather than considering only the reported intakes of low-income households at or below 130 percent of the U.S poverty threshold.

Finally, there was not a predetermined cost constraint. Rather than setting the constraint at the inflation-adjusted cost of the preceding Thrifty Food Plan, the cost constraint was allowed to increase as needed to solve at the lowest cost possible based on the inputs and constraints identified.

The methods used for the Thrifty Food Plan, 2021 respond to the fundamental purpose of this update: to determine the cost of a nutritious diet for resource-constrained households that is practical and includes a variety of nutrient-dense foods and beverages. To put it another way, a healthy diet is represented by Market Baskets that are considered to be "thrifty," as the lowest cost of four USDA food plans.

Results: The Thrifty Food Plan, 2021 Market Baskets

The Market Baskets of the Thrifty Food Plan, 2021 are represented by categories of foods and beverages in the amounts—and associated costs—that make up a healthy diet. Each of the Market Basket Categories includes a variety of commonly consumed food and beverage items, created from the Modeling Categories used for the mathematical optimization process, that can be purchased in nutrient-dense forms to prepare healthy meals and snacks on a limited budget (see [Methods](#)).

To achieve a healthy diet at the cost of the Market Baskets of the Thrifty Food Plan, 2021 requires some planning and preparation, as the foods and beverages are intended for at-home consumption (see [The Thrifty Food Plan: What It Is, What It Is Not](#)). However, this does not assume that all foods are prepared "from scratch," as many convenient forms of food are included in the analyses—and reflected in the resulting Market Baskets. The Market Baskets provide flexibility to make food and beverage selections within each of the categories based on individual and cultural

preferences, suggesting weekly quantities of the categories based on current dietary guidance, food prices, and consumption patterns. The cost of the Thrifty Food Plan, 2021 assumes selections within the categories will be lower price options but with flexibility to select some higher price items on occasion (e.g., when a higher price item is in season or on sale).

The sections that follow discuss the cost and quantities of the Market Basket Categories that comprise the Market Baskets for the reference family of four. The Market Basket Categories represent foods and beverages in the forms people purchase, and so the quantities reflect the weights of foods in their retail forms (e.g., bananas with the peel, moisture in raw poultry). The Market Baskets for each of the 15 age-sex groups are presented separately in [Appendix 4](#).

Thrifty Food Plan Market Basket: Cost for the Reference Family of Four

The cost of the Thrifty Food Plan, 2021 Market Baskets for the reference family of four—at June 2021 prices—is \$835.57 per month.ⁱ Compared to the inflation-adjusted cost of the previous Thrifty Food Plan, 2006 at June 2021 prices, this

represents an increase of 21.03 percent for the reference family of four (30.39 percent for the male age 20 through 50 years; 17.67 percent for the female age 20 through 50 years; 15.50 percent for the child age 6 through 8 years; 18.40 percent

ⁱ The monthly cost is calculated by multiplying the weekly cost by 4.333.

for the child age 9 through 11 years). Translated to what it means for the reference family of four, the Market Baskets are an increase of approximately \$145.19 per month (approximately \$36.30 per month for each of the four family members)—or about \$1.20 per person per day—compared to the June 2021 cost of the previous Thrifty Food Plan.

The difference in cost between the previous edition and this Thrifty Food Plan, 2021 can be attributed to updates USDA implemented to create Market Baskets of foods and beverages that reflect current dietary guidance and updated data on current food prices, food composition, and consumption patterns, without a cost-neutrality constraint. Three of the updates USDA implemented for the Thrifty Food Plan, 2021 contributed to the increase in cost of the resulting Market Baskets.

First is the change from using food price data collected from low-income households, used for the Thrifty Food Plan, 2006, to using data collected directly from major U.S. retailers with prices paid by all households in the IRI InfoScan as released to USDA (see [Price of Each of the Modeling Categories](#)).

The second key change impacting a cost difference

is the assigned calorie levels for the reference family. As described in the [Methods](#), higher median weights for adults and the change to an active physical activity level for children under age 12 result in a total of 600—or 7 percent—additional calories per day in the Thrifty Food Plan, 2021 Market Basket for the reference family as compared to the amount provided in the Thrifty Food Plan, 2006.

Finally, updated guidance in the *Dietary Guidelines for Americans* impacts costs. In particular, the recommendation for the age-sex groups in the reference family to consume 8 to 10 ounces of seafood per week based on calorie needs (see [Appendix 3](#)) resulted in more seafood being provided in the Market Baskets to meet the seafood subgroup recommendation. Seafood is one of the most expensive Modeling Categories with a weighted average price of \$1.98 per 100 grams for the higher cost category and \$1.08 per 100 grams for the lower cost category. Other changes in the distribution of vegetable subgroups and protein food subgroups may also relate to shifts in the cost, but seafood has the most notable cost implications.

Thrifty Food Plan Market Basket: Market Basket Category Amounts and Expenditure Shares

The Thrifty Food Plan, 2021 Market Baskets provide the recommended food-group and -subgroup amounts in the *Dietary Guidelines for Americans, 2020-2025 Healthy U.S.-Style Dietary Pattern* (see [Appendix 3](#)). These recommended food-group and -subgroups amounts were applied as constraints in the optimization model. The practicality constraints imposed for this Thrifty Food Plan, 2021 ensure

that food-group and -subgroup recommendations are met with a range of food categories, rather than with a limited set of foods. Additionally, the practicality constraints limit any one food group or subgroup from being provided in an amount that exceeds the range of current consumption (see [Methods](#)).

The Market Baskets provide macronutrients within

the AMDR as recommended by NASEM, and 18 micronutrients are provided at or above the RDA or AI but below the UL (see [Appendix 3](#)). Two micronutrients are below the RDA, specifically vitamin E and vitamin D, because as discussed in the *Dietary Guidelines for Americans*, these nutrient recommendations are harder to achieve from foods and beverages alone. The Market Baskets provide between 89 and 100 percent of the vitamin E RDA for the reference family members (9 to 16 milligrams per day), and between 60 and 80

percent of the vitamin D RDA (9 to 12 micrograms per day). The amounts of vitamin E and vitamin D provided in the Market Baskets are above mean intakes of 8.7 milligrams per day for vitamin E and 4.9 micrograms per day of vitamin D.⁶⁶ Sodium is provided in amounts between the 25th and 50th percentiles of usual intake for the adult reference family members and between the 10th and 25th percentiles of usual intake for the child reference family members.

The Thrifty Food Plan, 2021 describes the cost of a nutritious, practical diet that is composed of food and beverage selections that are lower price and higher nutrient density.

What are nutrient-dense foods and beverages? Nutrient-dense foods and beverages provide vitamins, minerals, and other health promoting components and have little added sugars, saturated fat, and sodium. Vegetables; fruits; whole grains; seafood; eggs; beans, peas, and lentils; unsalted nuts and seeds; fat-free and low-fat dairy products; and lean meats and poultry—when prepared with no or little added sugars, saturated fat, and sodium—are nutrient-dense foods.

What does it mean to select lower price foods and beverages? The Market Baskets present categories of foods and beverages and provide households with flexibility to make selections within those categories based on individual and cultural preferences. Choosing lower priced fluid milk most of the time and higher priced yogurt occasionally is one example of how a household can purchase the allotted amount of dairy at the cost of the Thrifty Food Plan, 2021.

The amounts of the Market Basket Categories of foods and beverages are presented in [Table 1](#). The Market Baskets are presented individually for the 15 age-sex groups in [Appendix 4](#).

The Market Basket Categories were created based on the Modeling Categories and in consideration of the food group and subgroups in the *Dietary Guidelines for Americans, 2020-2025*. For example, the Market Basket Category nuts, seeds, and soy products—part of the larger protein foods Market Basket Category—contains four Modeling Categories: processed soy products; nuts and seeds (subdivided based on higher and lower nutrient density); and nut and seed butters. Some Market Basket Categories (e.g., seafood) represent only one Modeling Category (e.g., seafood).

Market Basket Categories include foods in the forms (e.g., canned, frozen, fresh, ready-to-serve) people typically purchase. For example, the foods comprising many of the mixed dishes in the Modeling Categories presented in [Appendix 1](#) are represented as their ingredients in the Market Basket Categories such that those ingredients may be purchased in order to prepare the mixed dishes. To illustrate, a peanut butter and jelly sandwich with its peanut butter, jelly, and whole-wheat bread is divided among the Market Basket Categories of nuts, seeds, and soy products; sauces, condiments, jams, honey, sugars, spices; and whole-grain staple grains, respectively.

As described in the [Methods](#), the optimization model analyzes the Modeling Categories in as-consumed amounts. The amounts of foods in the Market Basket Categories are provided in as-purchased amounts. This conversion is important because it allows for the analyses to determine amounts to consume to meet the nutrition constraints, while the Market Baskets reflect the amounts to purchase to be able to achieve a healthy diet.

The model's output included Modeling Categories with foods and beverages of higher nutrient density and lower price. Therefore, although not specified in the final Market Basket Category descriptions or in [Table 1](#), to achieve a healthy diet at the cost of the Thrifty Food Plan, 2021, it is assumed that selections within the Market Basket categories are lower price and with comparatively lower amounts of added sugars, saturated fat, and sodium (i.e., nutrient dense). For example, it is assumed that an individual will select lower priced, higher nutrient-density poultry as part of the Market Basket's protein category; or, higher nutrient density nonfat fluid milk or fortified soy beverage as part of the Market Basket's dairy category.

Table 1. Thrifty Food Plan Market Basket for reference family^a of four, June 2021: aggregate quantities, costs, and cost shares of Market Basket Categories^b in weekly amounts

| Market Basket Categories | Quantity^c of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^d | Cost share of each Market Basket Category (%)^e |
|---|--|---|--|
| Vegetables | 35.37 | 46.11 | 23.91 |
| Dark-green vegetables | 3.23 | 5.88 | 12.75 |
| Red and orange vegetables | 8.28 | 12.63 | 27.40 |
| Beans, peas, lentils ^f | 6.06 | 5.42 | 11.75 |
| Starchy vegetables | 10.64 | 12.71 | 27.56 |
| Other vegetables | 7.16 | 9.47 | 20.54 |
| Fruits | 26.91 | 26.90 | 13.95 |
| Whole fruit | 17.76 | 19.48 | 72.42 |
| 100% fruit juice | 9.15 | 7.42 | 27.58 |
| Grains | 14.13 | 30.67 | 15.91 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 6.70 | 16.17 | 52.73 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^g | 1.12 | 3.33 | 10.87 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 5.65 | 8.91 | 29.04 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.66 | 2.26 | 7.37 |
| Dairy | 41.30 | 27.94 | 14.49 |
| Low- and non-fat milk, yogurt, soy alternatives ^h | 25.48 | 14.95 | 53.51 |
| Higher fat milk, yogurt, soy alternatives ⁱ | 15.13 | 10.27 | 36.76 |
| Cheese | 0.70 | 2.72 | 9.73 |
| Protein foods | 16.18 | 47.45 | 24.61 |
| Meats | 2.26 | 8.96 | 18.88 |
| Poultry | 6.89 | 17.31 | 36.49 |
| Eggs | 2.12 | 3.33 | 7.02 |
| Seafood | 2.94 | 12.80 | 26.97 |
| Nuts, seeds, soy products | 1.97 | 5.05 | 10.64 |

| Market Basket Categories | Quantity ^c of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^d | Cost share of each Market Basket Category (%) ^e |
|--|--|---|--|
| Miscellaneous | 7.05 | 13.76 | 7.14 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 1.51 | 3.71 | 26.94 |
| Coffee and tea | 1.63 | 2.23 | 16.17 |
| Table fats and oils | 1.71 | 4.11 | 29.88 |
| Sauces, condiments, jams, honey, sugars, spices | 1.64 | 2.33 | 16.90 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.57 | 1.39 | 10.10 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 140.94 | 192.84 | 100% |

^a The reference family of four is defined as consisting of four persons: a man and a woman age 20 through 50, a child age 6 through 8, and a child age 9 through 11.

^b Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased* forms. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^c Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^d The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^e For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^f Nearly all selections within this subcategory are assumed to be canned beans.

^g Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^h Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

ⁱ Higher fat milk, yogurt, and soy alternatives (whole or 2% and/or >0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

The Thrifty Food Plan, 2021 Market Basket Categories are grouped as vegetables, fruits, grains, dairy, protein foods, and miscellaneous. Each of these categories is discussed below in relation to the Market Baskets provided for the reference family of four.

Vegetables are distributed across five subgroups as reflected in current dietary guidance (i.e., dark green; red and orange; beans, peas, lentils; starchy; and other vegetables). Starchy vegetables are provided in an amount greater than the other vegetable subgroups, reflecting the relatively lower price of the foods within this category and their efficiency at meeting the model's nutrient and cost constraints. Foods within this category include potatoes and potato products (e.g., potato wedges, mashed potatoes), plantains, and corn. Many of these foods are included in the typical diet of U.S. households, and so the amount included in the Market Basket also reflects their current consumption. The cost share of vegetables is about 24 percent of the total Market Basket cost, with starchy vegetables and red and orange vegetables (e.g., carrots, sweet potatoes) making up the greatest proportions of this share. The pounds of beans, peas, and lentils included in the Market Baskets reflects an assumption that households will purchase canned beans that have a higher density in comparison to dry beans, because of the canned liquid included.

Fruit is distributed across the two Market Basket categories of whole fruit (i.e., fresh, frozen, canned, dried) and 100% juice as approximately 14 percent of the weekly Market Basket cost for the reference family. The majority of the cost (about 72 percent) of the fruit category is allocated toward whole fruit. Within

the whole fruit category, the cost reflects mainly raw fruit, with an assumption that most choices are of lower price varieties such as bananas, apples, peaches, and oranges. Higher price fruits such as cherries, passion fruit, and raspberries can be selected, but to remain within the cost of the total Thrifty Food Plan, 2021 Market Basket, adjustments would need to be made, such as selecting all low-price options within other Market Basket categories or buying fruit when it is on sale or in season.

Grains make up about 16 percent of the Market Basket cost for the reference family. Of the total amount of grains, about 64 percent of the quantity share comes from whole-grain sources in the Market Basket categories of whole-grain staple grains such as rice, pasta, breads and tortillas, and, whole-grain cereals such as oatmeal and ready-to-eat varieties. The remaining 36 percent of the grains quantity share comes from refined-grain categories that include refined staple grains, of which most are enriched, and a category that includes other grain-based foods such as crackers,



pretzels, tortilla chips, and ready-to-eat cereals that are less nutrient dense. The largest cost share within the grains category is attributed to the whole-grain staple grains category, which also has the largest consumption share of any grains category in the Market Baskets. As such, it is assumed that the household makes most grain-based food purchases within this category, with flexibility to select some refined-grain foods from the other categories. When refined grains are selected, choices should be enriched.

Dairy is represented by three categories that make up about 14 percent of the cost share. The majority of dairy is allocated to the low- and non-fat milk, yogurt, and fortified soy alternatives category. Dairy products within this category include skim or 1% fat varieties with 0 grams of added sugars, or less than 3.3 grams of added sugars/100 grams for nonfat, unsweetened soy beverages. Although milk, yogurt, and fortified soy beverages are combined as one subcategory, it's assumed the vast majority of the category amount is selected as fluid milk or fortified soy beverage, because these provide a relatively lower cost way of meeting nutrient needs as compared to yogurt. The cost allocation for all dairy foods is such that a household can exclusively purchase the lower price versions of fortified soy beverages, instead of fluid cow's milk, yogurt, and cheese, and still achieve the dairy recommendation. A relatively small amount is allocated to cheese which reflects the nutrient composition of foods within this category that are typically higher in sodium and in saturated fat compared to other dairy foods, as well as being higher in price.

Protein foods are represented by meat; poultry; eggs; seafood; and nuts, seeds, and soy products. Protein foods comprise about 25 percent of the total Market Basket cost. Of these, there is a higher amount of poultry provided as compared to the amounts of meat; eggs; seafood; and nuts

(including nut butters), seeds, and soy products. Meat is generally more expensive than poultry, and the June 2021 prices used in the analyses are higher for meat than for poultry, thereby playing a role in the relative proportions of these protein foods within the Thrifty Food Plan, 2021 Market Baskets. As noted above, seafood is provided in an amount that meets recommendations for the reference family, at a cost of \$12.80 per week. Selections within the seafood category are assumed to be lower price, such as tilapia or canned tuna. The *Dietary Guidelines for Americans, 2020-2025* recommend consuming seafood lower in methylmercury, and tilapia and canned light tuna are lower price options that are lower in methylmercury. The cost allocation for protein foods is such that the Healthy Vegetarian Dietary Pattern, a lacto-ovo vegetarian dietary pattern outlined in the *Dietary Guidelines for Americans, 2020-2025*, can still be accomplished within the cost of the Thrifty Food Plan, 2021.

Foods and beverages not otherwise classified are included in the miscellaneous Market Basket Category. These foods make up about 7 percent of the total Market Basket quantity share and about 7 percent of the total Market Basket cost. Many of the foods and beverages within the miscellaneous categories are a lower nutrient density and/or are relatively higher price per 100 grams. As such, a limited amount can be selected and included as part of the nutritious diet intended by the Thrifty Food Plan, 2021 Market Baskets. Detail on these categories is provided below:

- *Pre-prepared entrees and side dishes* includes foods which could not be further subdivided into ingredients, because the as-purchased and as-consumed forms are the same, and the foods do not fit within another category. Examples include canned soups, frozen pizzas, and frozen tortellini.

- *Coffee and tea* includes higher nutrient density varieties (i.e., without added sugars) and lower nutrient density varieties (i.e., with added sugars) and are only provided for the adult reference family members.
- *Table fats and oils* includes margarine, spreads, vegetable oils, salad dressings, whipped topping, and cream and cream substitutes.
- *Sauces, condiments, jams, honey, sugars, spices* includes items such as catsup, mustard, salsa, gravy, olives, dips, pickles and pickled vegetables, jelly, pancake syrup, chocolate syrup, cinnamon, and oregano.
- *Other foods and beverages* includes regular and diet soft drinks, ice cream, pudding, cakes, cookies, granola bars, doughnuts, chocolate candy bars, hard candy, and marshmallows.

The Market Baskets of the Thrifty Food Plan, 2021 are designed to reflect current dietary guidance in the *Dietary Guidelines for Americans, 2020-2025*. The Thrifty Food Plan Market Baskets are not prescriptive, and there is no requirement for a household to spend the SNAP benefit allotment according to the food and beverage categories outlined. However, if foods and beverages selections within these categories are lower price, and consumed in their nutrient dense forms, individuals and families can achieve a healthy diet on a limited budget.

Comparing the Thrifty Food Plan, 2021 Market Baskets With Current Consumption Patterns and To Previous Market Baskets

The Agriculture Improvement Act of 2018 directed USDA to consider several factors in the reevaluation of the Thrifty Food Plan, including current consumption patterns and current dietary guidance (in this case, the *Dietary Guidelines for Americans, 2020-2025* and the NASEM DRI values). These two discrete goals—considering current consumption patterns and current dietary guidance—are not fully compatible, as most individuals do not consume a diet that aligns with current dietary guidance. Ultimately, the optimization model's dietary constraints are more influential than the current consumption patterns from which the model attempts to limit deviation. Therefore, food-group and -subgroup recommendations in the *Dietary Guidelines for Americans, 2020-2025* are met, even if this means some are provided in amounts higher (e.g., dark-green vegetables) or lower (e.g., refined grains) than is typically consumed.

The HEI-2015 is a metric with 13 components used to assess how well a set of foods aligns with the *Dietary Guidelines for Americans*.⁶⁷ The HEI-2015 can be used to assess current dietary intakes as well as the Thrifty Food Plan, 2021 Market Baskets. Current dietary intakes or amounts provided in the Market Baskets equal to or better than the standards set for each of the 13 components are assigned a maximum score. Maximum HEI-2015 component scores range from 5 to 10 points. Scores between the minimum (i.e., zero) and maximum component standards are scored proportionately. Scores for each component are summed to create a total maximum HEI-2015 score of 100 points. Nine of the 13 HEI-2015 components assess

adequacy components (i.e., Total Fruit, Whole Fruit, Total Vegetables, Greens and Beans, Whole Grains, Dairy, Fatty Acid Ratio). The remaining four components assess dietary components that should be consumed in moderation (i.e., Refined Grains, Sodium, Saturated Fat, Added Sugars). For the adequacy components, higher scores reflect higher intakes. For the moderation components, higher scores reflect lower intakes because lower intakes are more desirable. A radar plot, as shown in [Figure 2](#), displays information about each component score simultaneously. The outer edge of the radar plot's "wheel" (or end of the "spoke") represents a score that is 100 percent of the maximum score for that component, while the center of the circle represents a score of 0 percent of the score for any component.

Total HEI-2015 scores based on WWEIA, NHANES 2013–16 dietary intake data for the age groups representing each reference family member range from 52 to 59 points out of 100 total possible points. The Thrifty Food Plan, 2021 Market Baskets for the age groups representing each reference family member range from 93 to 98 points out of 100, indicating that the Market Baskets accomplish the goal of aligning with the *Dietary Guidelines for Americans, 2020-2025*. Radar plots in [Figure 2](#) illustrate the HEI-2015 component scores that reflect current dietary intakes compared to the Market Basket component scores. In some cases, the component scores for the Market Baskets fall short of the maximum. Using children ages 6 through 8 in [Figure 2](#) as an example, the radar plot indicates this age group has a low component score for both

Refined Grains and Whole Grains, because current intakes of refined grains exceed the recommendation and intakes of whole grains are far below the recommendation. However, the constraints applied to the optimization model ensured that food-group recommendations and limits on added sugars and saturated fat were achieved. The Market Basket for the 6- through 8-year-old child therefore includes grains of which at least 50 percent are whole grains and an amount of refined grains that aligns with dietary guidance. At the highest calorie levels, the food component amount per 1,000 calories may not achieve a perfect HEI component score even though it achieves the recommendations of the Healthy U.S.-Style Dietary Pattern.

More generally, comparing the Thrifty Food Plan, 2021 Market Baskets to reported average consumption for the reference family in the WWEIA, NHANES 2013–16 shows that the Thrifty Food Plan Market Basket contains more fruits, vegetables, whole grains, dairy, and seafood; and less meat, refined grains, and miscellaneous foods, such as desserts, sweets, and candies. Notably, the amount of table fats and oils and sauces and condiments provided in the Market Basket is similar to the amount reported as typically purchased by SNAP households.⁶⁸

Comparing the Thrifty Food Plan, 2021 Market Baskets to the previous Thrifty Food Plan, 2006 Market Baskets is challenged by the updates that were made during this reevaluation, in particular, updated Modeling Categories and Market Basket Categories. Understanding how dietary guidance has changed since the previous Thrifty Food Plan, 2006 helps illustrate differences in the Market Baskets at a broad level. Some of the recommendations in the *Dietary Guidelines for Americans, 2020-2025* did not exist in the MyPyramid Food Guidance System that the previous Thrifty Food

Plan is based on, and the reevaluated Thrifty Food Plan reflects this in three major ways.

First, the total protein foods recommendation has not changed since the Thrifty Food Plan, 2006 was published; however, the inclusion of seafood as a protein foods subgroup recommendation results in a redistribution of other protein foods (i.e., meat; poultry; eggs; nuts, seeds, and soy products) contributing to the total.

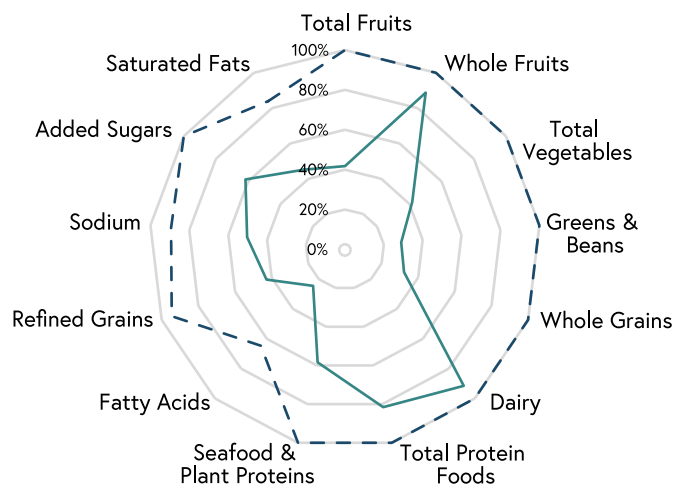
Additionally, the recommended amount of total vegetables is unchanged, but red and orange vegetables are now grouped as a vegetable subgroup, as opposed to red vegetables being included in the other vegetables subgroup under the previous MyPyramid Food Guidance System. This means more red and orange vegetables are included in the Thrifty Food Plan, 2021 Market Baskets as compared to the previous edition.

Finally, the MyPyramid Food Guidance System recognized beans as contributing to protein foods (known as meat and beans) and to vegetables. The Healthy U.S.-Style Dietary Patterns used for the Thrifty Food Plan, 2021 recognize beans as contributing to *either* the vegetable group or the protein foods group, but not at the same time (i.e., beans contribute to one or the other). The difference in categorization as well as difference in constraints applied allowed for substantially more beans to be included in the Thrifty Food Plan, 2006 Market Baskets. The previous Thrifty Food Plan Market Baskets included 4.89 pounds per week of canned and dry beans for the reference family. The amount of beans, peas, and lentils included in the Thrifty Food Plan, 2021 Market Baskets for the reference family is 6.06 pounds per week. While there are more pounds of beans in the as-purchased form, it is actually less beans in the as-consumed form. The Thrifty Food Plan, 2006 included a combined

16.8 cup equivalents per week of beans, peas, and lentils in as-consumed form for the reference family compared to 10.4 cup equivalents per week in the Thrifty Food Plan, 2021. This is a reflection of a difference in the form beans are expected to be purchased. Specifically, in past Thrifty Food Plans, some or all beans were expected to be purchased dry. In the Thrifty Food Plan, 2021 nearly all (99 percent) are assumed to be purchased as canned varieties, which reflect current consumer behavior.

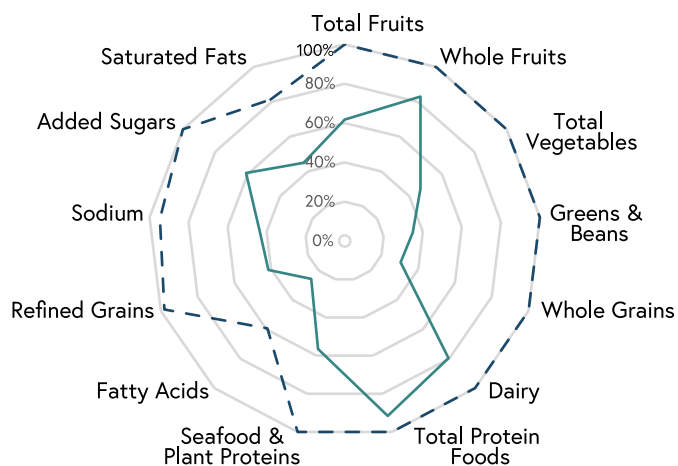
The Market Baskets of the Thrifty Food Plan, 2021 are designed to reflect current dietary guidance in the *Dietary Guidelines for Americans, 2020-2025*. The Thrifty Food Plan Market Baskets are not prescriptive, and there is no requirement for a household to spend the SNAP benefit allotment according to the food and beverage categories outlined. However, if foods and beverages within these categories are purchased and consumed in their nutrient-dense forms, individuals and families can achieve a healthy diet on a limited budget.

Figure 2.



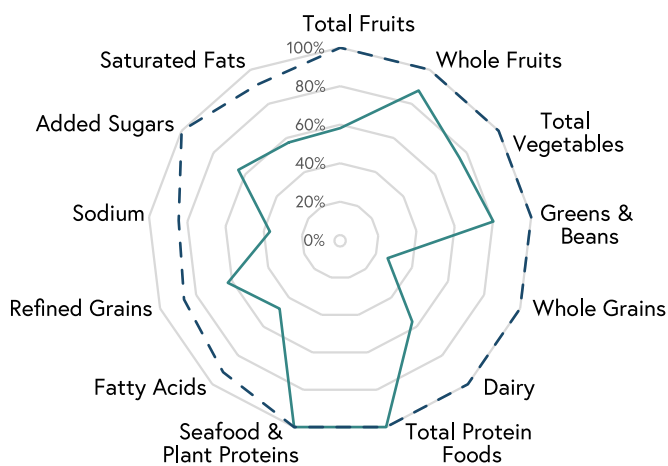
For children ages 6 through 8:

- Reported Dietary Intake (Total HEI-2015 Score=53)
- - TFP Market Basket (Total HEI-2015 Score=93)



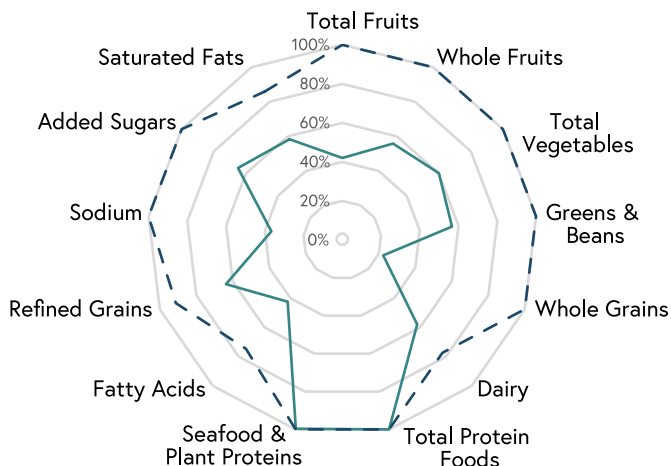
For children ages 9 through 11:

- Reported Dietary Intake (Total HEI-2015 Score=51)
- - TFP Market Basket (Total HEI-2015 Score=93)



For females ages 20 through 50:

- Reported Dietary Intake (Total HEI-2015 Score=60)
- - TFP Market Basket (Total HEI-2015 Score=97)



For males ages 20 through 50:

- Reported Dietary Intake (Total HEI-2015 Score=55)
- - TFP Market Basket (Total HEI-2015 Score=93)

Radar plots depicting diet quality, according to Healthy Eating Index-2015 component scores, for: (a) reported dietary intake (solid blue lines; source: What We Eat in America, National Health and Nutrition Examination Survey data from 2013–16 day 1 dietary intake data, weighted) and (b) the Thrifty Food Plan, 2021 Market Baskets (dotted blue lines), for children ages 6 through 8 and 9 through 11 and females and males ages 20 through 50.

Abbreviations: HEI-2015=Healthy Eating Index-2015, TFP=Thrifty Food Plan.

Discussion

The Thrifty Food Plan, 2021: A Reflection of the Cost of a Nutritious Diet

The Thrifty Food Plan, June 2021 cost for the reference family is \$192.84 per week or \$835.57 per month. The cost is 21.03 percent higher than the June 2021 cost of the previous Thrifty Food Plan, 2006. Put another way, each member of the reference family receives an increase of approximately \$36.30 per month, \$8.38 per week, and \$1.20 per day. The cost increase reflects the culmination of the decisions implemented in the reevaluation that include a shift from using food prices data that reflect the purchases of low-income households to data that reflect purchases of all households with prices collected directly from retailers;³⁶ the EER⁶⁹ determined based on current median body weight⁶³ and an assumption of active physical activity levels for children; and updates to dietary guidance² that have occurred since the last reevaluation. With these changes, the Thrifty Food Plan, 2021 reflects the current reality of foods and beverages purchased and consumed by U.S. households for a healthy diet, at a cost that translates to approximately \$6.89 per person per day.

The increase in the Thrifty Food Plan, 2021 is consistent with household food spending trends based on the Consumer Expenditure Survey using 2019 data.⁷⁰ The average U.S. household spent 59 percent more on food than the Thrifty Food Plan, 2006 provided for their household size. The poorest 20 percent of households (income <\$22,488/

year), most of whom are eligible to participate in SNAP, spent 27 percent more on food than the previous Thrifty Food Plan provided for its size. Of note, all households report spending on food at home and away from home; thus, these data are not a direct comparison to the adequacy of the Thrifty Food Plan, 2006, which is intended for the purchase of foods for at-home consumption.

The Current Population Survey data used in USDA's Household Food Security in the United States report shows that both food-secure and food-insecure households typically spend more than the amount provided in the Thrifty Food Plan, 2006, with higher spending associated with lower food insecurity.⁷¹ When benefits increased under the American Recovery and Reinvestment Act (ARRA) in 2009,⁷² the prevalence of food insecurity fell by 2.2 percentage points after implementation of the 13.6-percent ARRA SNAP benefit increase. The prevalence of very low food security, the more severe form of food insecurity, fell by 2.0 percentage points during the same period.

Research does not suggest a simple relationship between food spending and nutritional quality of diets. Notably, the quality of diets overall in the United States, even among households with relatively unconstrained food resources available, falls far short of the *Dietary Guidelines for Americans, 2020-2025* recommendations.² That said, there

is evidence of a correlation between increased food spending and diet quality, as measured by the HEI-2015.³⁰ Access to adequate resources to support food spending is by no means the only factor that positively influences diet quality, but it is a necessary prerequisite.

The Thrifty Food Plan, 2021 Market Baskets meet the *Dietary Guidelines for Americans, 2020-2025*² as well as nutrient recommendations²³⁻²⁵ for each age-sex group. Several Market Basket Categories are in amounts that achieve the food-group and -subgroup recommendations and thus may be in amounts that are higher than average consumption of these foods. For example, seafood intake in

the U.S. population is far below recommended levels, but the quantity in the Market Basket is an amount intended to achieve current dietary recommendations. Similarly, in general, intakes of total vegetables and vegetable subgroups are far below recommended levels; the Thrifty Food Plan, 2021 Market Baskets provide amounts greater than typically consumed. The Thrifty Food Plan, 2021 prioritizes meeting dietary guidance, recognizing that most people in the United States, regardless of income level, need to shift current consumption patterns to support a healthy diet.

Practical Application of the Thrifty Food Plan, 2021

As the basis for the maximum SNAP allotment, the cost of the Thrifty Food Plan Market Baskets for the reference family of four is intended to support a nutritious diet for low-income Americans. The efficiency and effectiveness of SNAP as a critical component of the nutrition safety net—enabling the purchase of necessary food—is well documented.^{55,71,73,74} Given the well-established connection between diet and health, the benefit allotment must be sufficient to support both food security and nutrition security through the purchase of nutrient-dense foods and beverages that reflect an overall healthy diet.¹⁹

Across all income levels, eating patterns in the United States are nowhere near alignment with the *Dietary Guidelines for Americans*.² Constraints on available time can make it challenging for people to adopt and maintain a healthy dietary pattern, even with adequate resources to support it. Time spent preparing and cooking food is a reality for all

American households; however, evidence suggests higher income households tend to spend less time on food-at-home-related activities than lower income families.³⁰ Evidence specific to households participating in SNAP suggests that participants spent more time on food-related activities than nonparticipants.³⁰ The Thrifty Food Plan, 2021 helps to address this challenge through its Market Baskets of foods and beverages, some of which are in their most convenient forms (e.g., ready-to-eat breakfast cereals and canned beans) that can be easily prepared at home.

With the release of the Thrifty Food Plan, 2021, CNPP will provide resources to support diverse, low-income households in making healthy food choices. This includes developing sample menus that provide examples of how the Thrifty Food Plan, 2021 Market Baskets can be translated into practical meals and snacks. These menus are not intended to be prescriptive; rather, they are meant

to provide professionals with a few examples of how a household could make healthy meals and snacks that meet their personal preferences and

cultural traditions or foodways within their cost and time constraints. These and more materials will be available at [MyPlate.gov](https://www.myplate.gov) starting late 2021.

Future Considerations and Reevaluations of the Thrifty Food Plan

The Thrifty Food Plan, 2021 is the first in a series of planned regular updates. As stipulated by law,¹ USDA must reevaluate the Thrifty Food Plan every 5 years. Throughout the 5-year cycle to reevaluate the Thrifty Food Plan, the cost is adjusted to reflect inflation using the CPI for specific food items.²⁶ Each of the 24 Market Basket Categories for the Thrifty Food Plan has a corresponding CPI or set of corresponding CPIs that are applied on a monthly basis to update the cost of the Market Baskets for the 15 age-sex groups. The first monthly cost update to the Thrifty Food Plan, 2021 will be calculated in August 2021 and will represent the cost of a nutritious diet with prices current as of July 2021. More information on the monthly cost of food report is available at: [FNS.usda.gov/TFP](https://fns.usda.gov/TFP).

USDA's review of the literature and engagement with subject-matter experts and external stakeholders helped to inform the Thrifty Food Plan, 2021. USDA considered topics raised in regard to the Thrifty Food Plan for this reevaluation and will continue to assess these topics that require additional evidence to inform future reevaluations. In reevaluating the Thrifty Food Plan for future editions, USDA will consider evidence available at the time, with changes to the assumptions or methods made only when those changes are appropriate and supported by sufficient research.

The topic of time to purchase and prepare foods is often raised in relation to the Thrifty Food Plan. Time to prepare food is accounted for indirectly in the Thrifty Food Plan, 2021 in the determination of weighted average prices of the Modeling Categories. These prices for foods and beverages include the price of convenience and ready-to-eat foods (e.g., pasta sauce in a jar, canned beans, bread) and do not assume an individual or household prepares all components of meals and snacks from scratch. Food prices are weighted toward the more commonly purchased items within a category. For example, since ready-to-serve orange juice is selected more frequently than frozen orange juice concentrate, the difference is accounted for in the weighted average price of the corresponding Modeling Category, in this case, 100% juice. USDA believes that this approach is preferable to a separate monetary adjustment for time spent preparing or obtaining food at this time. It is not clear what an appropriate additional monetary adjustment would be based upon. Also, the value of time spent in food-related activities does not logically translate to SNAP benefits since these can only be used to purchase foods and beverages for at-home consumption and are not intended to compensate for time spent in food-related activities. USDA will continue to evaluate this area for future editions of the Thrifty Food Plan to determine if there is

evidence to support additional updates to the existing methods.

Additional topics that USDA will continue to monitor in the future, taking an evidence-based approach informed by research, include:

- The adjustment factor for the cost of household food loss/waste;
- Accounting for online food and beverage transactions in the food prices data;
- Assumptions about physical activity and body weight in the calculations of EER that correspond to the assigned calorie level of the Thrifty Food Plan Market Baskets;
- The approach to determining higher and lower price food and beverage Modeling Categories for the optimization model;
- How best to reflect current consumption patterns and diverse dietary preferences in the optimization model while still incorporating dietary guidance current at the time;
- Potential improvements to account for mixed dishes (e.g., pizza, sandwiches, casseroles) in the methods supporting the Thrifty Food Plan's Market Baskets development;
- The units used in presenting the Thrifty Food Plan Market Baskets (i.e., the reexamination of units other than pounds and ounces);
- The incorporation of consumer research during the reevaluation to test the feasibility and practicality of the market baskets; and,
- How best to scale the Thrifty Food Plan to individuals and families not representing the reference family.

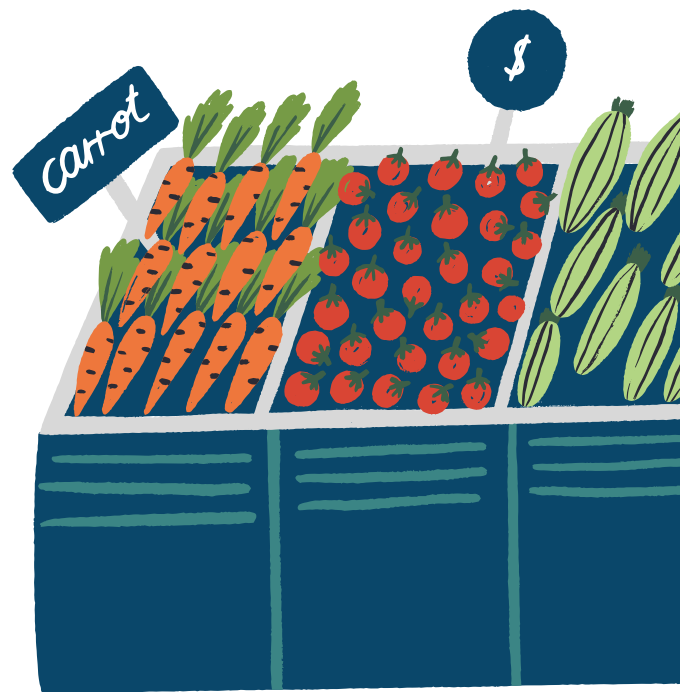
Reevaluation of the Thrifty Food Plan begins the process to reevaluate the three other USDA Food Plans: the Low-Cost, Moderate-Cost, and Liberal Food Plans, which represent a nutritious diet at successively higher costs. As with the Thrifty Food Plan, the reevaluation of these food plans will inform research, education, and policy.

USDA will also begin reevaluating the Thrifty Food Plans for Alaska and Hawaii, the first time a reevaluation has occurred since the plans were created in the late 1970s. This reevaluation effort will consider the consumption patterns of individuals living in these diverse geographic areas and the unique food prices they face. The complete reevaluation effort will be completed by December 2022. In the interim, USDA will estimate the Thrifty Food Plans for the first half of Federal fiscal year 2022 for Alaska and Hawaii by applying factors to the Thrifty Food Plan, 2021. The factors will be based on the average difference between the June Thrifty Food Plan for the contiguous United States and first half of year Thrifty Food Plans for Alaska and Hawaii over the past 5 years. Additionally, at the direction of Congress,⁷⁵ USDA has begun researching methods to calculate a Thrifty Food Plan applicable to Puerto Rico, where food benefits are currently provided through a block-grant program (Nutrition Assistance Program),⁷⁶ in contrast to SNAP, a mandatory spending program. Information about these reevaluation efforts will be made available at: [FNS.usda.gov/TFP](https://fns.usda.gov/TFP).

A Step Toward Nutrition Security

Effective October 1, 2021, the Thrifty Food Plan, 2021 will serve as the basis for the maximum SNAP benefit allotments. For the first time in more than 40 years, the reevaluation of the Thrifty Food Plan represents an increase in the real value, not simply an adjustment for inflation, of USDA's lowest cost food plan that describes how much it costs to eat a healthy diet that aligns with food-group and nutrient recommendations. As a result, participating

SNAP households will receive additional support to access a healthy diet, in line with the Department's goal of strengthening the nutrition safety net and supporting food and nutrition security for U.S. households.



Appendixes

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Appendix 1. Thrifty Food Plan, 2021

Modeling Categories and Description of Foods

The Modeling Categories were designed to prioritize higher nutrient-dense foods (i.e., those with less added sugars, saturated fat, and/or sodium) and consider prices while allowing for food diversity in the resultant Market Basket.

The Modeling Categories of foods and beverages were created by using WWEIA Food Categories as a foundation, which provided a strong basis for assessing foods and beverages as consumed and allowed for easy regrouping of categories into smaller or larger groups based on nutrient density. Each WWEIA Food Category is linked to food codes within the FNDDS³³—the nutrient database used to analyze foods reported in WWEIA, NHANES.³¹

The analysis used the WWEIA Food Categories 2015–16⁴² to align with the WWEIA, NHANES 2015–16 dietary intake data used for this Thrifty Food Plan reevaluation. Alcoholic beverages, infant formulas, and baby foods were excluded from consideration. Alcohol is prohibited from being purchased with SNAP dollars.

FNDDS 2015–16 food codes within the WWEIA Food Categories 2015–16 were analyzed to determine if higher or lower nutrient density categories could be created. In general, subdivision of categories was done based on the added sugars, whole grain, saturated fat, and/or sodium content, to align with the *Dietary Guidelines for Americans, 2020-2025*,² as well as the standards for WIC-Eligible Foods⁴³ and Smart Snacks

Standards.⁴⁴ This approach allowed for the greatest inclusion of foods while systematically prioritizing nutrient-dense foods into model inputs in order to support nutrition security.

Food codes and descriptions from FNDDS 2015–16, along with the following nutrients and dietary components from the FPED 2015–16,³⁴ were used to develop the Modeling Categories:

- Saturated fat in g/100 g,
- Sodium in mg/100 g,
- Whole grains in oz eq/100 g,
- Refined grains in oz eq/100 g, and
- Added sugars in g/100 g (converted from tsp eq/100 g).

Some WWEIA Food Categories were not subdivided due to narrower distributions of saturated fat, sodium, or added sugars. In some cases, such as cheese and cured meats, categories were not broken out because they had multiple nutrients or food components that would exclude most foods from being categorized as higher nutrient density. In other cases, similar WWEIA Food Categories were combined into one Modeling Category, such as combining various desserts into a single *Other desserts* category.

This approach resulted in 65 Modeling Categories of foods and beverages, some of which were further broken out into higher and lower cost categories as outlined in [Table A1.1](#) below. This

table includes detailed information on each Modeling Category, including the category name, criteria for inclusion, mean price and range of prices for the foods within the category (on an as-consumed basis), and sample foods or beverages in the category. Standard food formulations and conversion factors were applied to convert the retail foods from an as-purchased form to the edible forms reported in WWEIA, NHANES. In making these conversions, changes in food weight were accounted for between the retail and edible forms caused by refuse, moisture loss/gain, and fat loss/gain during food preparation.

The sample foods or beverages in a category may have the same descriptions in both a higher and a lower nutrient density category because of their differing nutrient content. For example, yogurt of the same description will be in both the higher and lower nutrient density categories because of different fat content and the use of added sugars. Likewise, there are many variations in the very large number of egg omelet or scrambled egg food codes: those with cheese or without, those with tomatoes or dark-green vegetables or not, and so forth. The form in which the omelet is eaten will alter the nutrient profile of the food, in particular, the sodium content. Thus, based on the inclusion criteria of sodium, omelets will appear as examples for both the *Mixed dishes—eggs*, higher nutrient density and lower nutrient density categories.

The food code descriptions included in the table are from the FNDDS and are meant to show the range of foods within each category. As much as possible, similar foods were listed together in a category. Of note, brand names listed are from the FNDDS.

A summary of the inclusion criteria per 100 g for the Modeling Categories are provided below and in [Table A1.1](#):

- *Grains*: Cereals, both cooked and ready-to-eat, were subdivided by whole-grain ($\geq 50\%$) or refined-grain ($> 50\%$) content and total sugars content. The WWEIA Food Categories for ready-to-eat cereals used total sugar > 21.2 g/100 g for higher sugar cereals and ≤ 21.2 g total sugars/100 g for lower sugar cereals. The ≤ 21.2 g total sugars/100 g value is a Federal requirement for WIC-eligible dry cereal and is found in 7 CFR Part 246.10. For consistency, this cutoff for total sugars was applied to cooked cereals as well as ready-to-eat cereals. In addition to cereals, staple grains were subdivided by whole-grain or refined-grain content.
- *Fruit*: Fruit was subdivided by added sugars (0 or > 0 g) and/or saturated fat (≥ 0.5 g or < 0.5 g) content. The cut point of 0.5 g saturated fat per 100 g was chosen as it was a natural cutoff between fruit without ingredients contributing saturated fat and fruit with those ingredients, such as candied apples, fried fruit, and fruit with dressing and whipped cream. The highest saturated fat value in the higher nutrient density category was for raw guava (0.27 g/100 g).
- *Dairy*: Cow's milk and yogurt were subdivided by fat (whole, 2%; or nonfat, 1%) and/or added sugars (0 or > 0 g). For children age 1 only, cow's milk and yogurt were subdivided based on added sugars, with all plain milk and yogurt included in one Modeling Category. Nonfat, unsweetened soy beverage was included as higher nutrient density; it contains a small amount of added sugars (< 3.3 g).
- *Protein foods*: Meat and poultry were subdivided by saturated fat (> 4.5 g or ≤ 4.5 g⁷⁷) and added sugars (0 or > 0 g). Nuts and seeds were only subdivided by added sugars content (0 or > 0 g).

- *Popcorn*: Popcorn was subdivided by added sugars (0 or >0 g) and/or saturated fat (≥ 7 g or <7 g) content. The cutoff value of 7 g saturated fat was chosen as a cut point based on the amount in popcorn when "butter" was added for flavoring.
- *Beverages*: Coffee and tea, fruit drinks, and soft drinks were subdivided by added sugars (0 or >0 g) content.

Once categories of higher and lower nutrient-dense foods and beverages were defined and price outliers, such as lobster, arugula, and similar high-priced items, were removed, price distributions were reviewed and some categories were subdivided based on price. Cost categories were created using the price of the food codes reported as consumed by individuals ages 1 and older in the

WWEIA, NHANES 2015–16. The cost categories divided food codes at or below the 35th percentile of prices or greater than the 35th percentile of prices for 30 of the 65 Modeling Categories, noted below in [Table A1.1](#). Since the optimization model's output included the lower cost category options, with few exceptions, the table provides the mean price of the lower cost category and lower price examples. The price range of the entire category (including both the lower and higher cost categories) is provided as a way to briefly illustrate the overall price distribution of the category compared to the mean price of the lower cost that represents the 0 to 35th percentile of prices.

Table A1.1. Thrifty Food Plan Modeling Categories and descriptions of foods

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|---|--|---|
| 100% juice ^c (from WWEIA categories) | 0.17 (0.13–0.37) | Lower cost: orange juice, apple juice/cider, grapefruit juice, cranberry juice blend (100% juice) |
| Beans, peas, lentils (with/without fat; no other main ingredients) | 0.31 (0.17–0.34) | Beans (white, black, brown, fava, pink, pinto, and kidney), dried peas (cowpeas, chickpeas, and split peas), lentils, edamame, noodles made with soy or mung beans |
| Biscuits, muffins, quick breads (from WWEIA categories) | 0.70 (0.33–1.43) | Biscuits, scones, cornbread, hushpuppies, muffins, pancakes, waffles, French toast, pumpkin bread |
| Butter and animal fats (from WWEIA category) | 0.90 (0.84–1.23) | Butter, light butter, honey butter, animal fat/drippings, lard, fat back, ghee |
| Candy (from WWEIA categories) | 1.15 (0.59–2.22) | Chocolate; caramels; candy bars; fudge; marshmallows; hard candy; chocolate-, sugar-, and yogurt-covered nuts and raisins; gumdrops; gummies; fruit snacks/leather; low-calorie candy Items brought in from <i>Savory Snacks</i> include: chocolate- and yogurt-covered pretzels |
| Cereals; higher nutrient density (≤21.2 g total sugars/100 g AND ≥50% whole grains) | 0.24 (0.06–1.31) | Regular/quick/instant/flavored oatmeal with or without fat added in cooking or milk, puffed millet or wheat, shredded wheat, Fiber One cereals, Malt-O-Meal Puffed Wheat or Toasted Oat cereal, Cheerios, Weetabix Whole Wheat cereal, Chex cereals, Grape-Nuts cereals, Nutty Nuggets, Kix, Nature's Path Organic Flax Plus, Wheaties, Great Grains Double Pecan Whole Grain cereal, Total, Quaker Oatmeal Squares, Post Banana Nut Crunch cereal, All-Bran Complete Wheat Flakes, Plain/Cinnamon Life, homemade granola, Alpen, Health Valley Fiber 7 Flakes, Frosted Mini-Wheats, Alpha-Bits |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|---|--|--|
| Cereals; lower nutrient density (>21.2 g total sugars/100 g AND/OR >50% refined grains) | 0.55 (0.03–1.14) | Puffed rice, cream of wheat/rice/rye, corn/hominy grits, oat bran cereal, cornmeal mush, Upma, cooked hominy, plain wheat germ, Corn Flakes, Malt-O-Meal Crispy Rice, Rice/Cocoa Krispies, Crispy Brown Rice Cereal, Crispy Rice, Rice Flakes, Product 19, Special K, Kashi GOLEAN, Puffins, Honey Bunches of Oats, reduced-sugar Cinnamon Toast Crunch, Post Maple Pecan Crunch cereal, Kashi Heart to Heart, Fruit & Fibre (fiber), Reduced-sugar Frosted Flakes, Honey Nut Clusters, reduced-sugar Trix, Mueslix, reduced-sugar Cocoa Puffs, Cinnamon/Chocolate/Honey Nut Chex, All-Bran Bran Buds, Kellogg's Granola with Raisins, Cracklin' Oat Bran, Raisin bran, Honey Nut/Frosted Cheerios, Golden Grahams, Reese's Peanut Butter Puffs cereal, Lucky Charms, Apple Jacks, Cap'n Crunch, Froot Loops, Alpha-Bits with marshmallows |
| Cheese ^c (from WWEIA categories) | 0.82 (0.47–2.62) | Lower cost: American cheese (regular, nonfat), processed cheese food, processed cream cheese product (nonfat), American/cheddar cheese spread, American/Swiss blend cheese, Mexican blend cheese, queso fresco, queso añejo, queso asadero, Mozzarella sticks (breaded and baked, fried), cottage cheese (lowfat or 1–2% fat) with or without fruit, creamed cottage cheese, ricotta, imitation cheese |
| Coffee and tea; higher nutrient density (0 g added sugars/100 g) | 0.05 (0.02–0.16) | Coffee: unsweetened or with low-calorie sweetener, with nonfat milk Tea: hot or iced tea, brewed/bottled and unsweetened or with low-calorie sweetener |
| Coffee and tea; lower nutrient density (>0 g added sugars/100 g) | 0.13 (0.05–1.03) | Coffee: Turkish, Cuban, macchiato, café con leche, latte, café mocha, iced, frozen coffee drinks; lightened, sweetened, bottled/canned coffee Tea: hot or iced tea, brewed/bottled and sweetened; tea/lemonade blends |
| Condiments and sauces ^c (from WWEIA categories) | 0.46 (0.24–2.01) | Lower cost: catsup, mustard, barbecue sauce, soy sauce (regular and reduced sodium), green and red salsa, pico de gallo, dill pickles, relish, vinegar, onion dip, vegetable dip, cheese sauce, enchilada sauce, white sauce, alfredo sauce, gravy (milk, mushroom, beef, meat, poultry), pickled beets, lemon juice |
| Crackers; higher nutrient density (≥50% whole grains) | 1.09 (0.43–2.69) | Wheat, whole-wheat, multigrain, corn, and gluten-free crackers; toast thins; rice/popcorn cakes |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|--|--|--|
| Crackers; lower nutrient density (0 g whole grains OR >50% refined grains) | 0.85 (0.55–1.90) | Cheese, rice, saltine, oyster, water, and sandwich (peanut butter/cheese) crackers; bread sticks; croutons; matzo; crispbread; pita/bagel chips; crunchy chow mein noodles |
| Cured meat (from WWEIA categories) | 1.31 (0.39–3.67) | Bacon, Canadian bacon, jerky, cured pork and ham, prosciutto, frankfurters, sausage, lunch meats, pepperoni, liverwurst, corned beef, bacon bits |
| Dark-green vegetables ^c (from WWEIA categories) | 0.49 (0.25–1.25) | Lower cost: broccoli, spinach, collards, mustard greens, turnip greens, cilantro |
| Diet beverages (0 g added sugars/100 g) | 0.10 (0.02–0.19) | Diet soft drinks, diet fruit-flavored drinks, diet energy drinks Items brought in from <i>Flavored or carbonated water</i> include: unsweetened carbonated waters |
| Eggs (with/without fat; no other main ingredients) | 0.36 (0.31–0.41) | Omelet, scrambled eggs, fried eggs, egg whites, and egg substitutes with/without fat; game eggs |
| Fried starchy vegetable products (from WWEIA categories) | 0.83 (0.27–1.94) | Regular, reduced-fat, and fat-free white potato chips; potato puffs and sticks; hash browns; home and French fries; tater tots; fried plantains |
| Fruit drinks; higher nutrient density (0 g added sugars/100 g) | 0.21 (0.10–0.47) | Regular, light and diet fruit juice drinks; unsweetened coconut water; 40–50% juice/water beverages |
| Fruit drinks; lower nutrient density (>0 g added sugars/100 g) | 0.10 (0.05–0.3) | Fruit nectars, regular and light fruit juice drinks, fruit punch, lemonade, sweetened coconut water |
| Fruit; higher nutrient density ^c (0 g added sugars/100 g AND <0.5 g saturated fat/100 g) | 0.33 (0.21–1.71) | Lower cost: <i>Raw</i> —apple, banana, orange, tangerine, tangelo, watermelon, honeydew melon, cantaloupe, grapefruit, peach, nectarine, pear, lime, persimmon, fruit salad. <i>Cooked/canned</i> —unsweetened applesauce, peach in juice, pineapple in juice, fruit cocktail in juice/water |
| Fruit; lower nutrient density ^c (>0 g added sugars/100 g AND/OR ≥0.5 g saturated fat/100 g) | 0.36 (0.31–1.51) | Lower cost: <i>Raw</i> —none. <i>Cooked/canned</i> —sweetened applesauce, sweetened fruit cocktail, sweetened peach, sweetened pear, sweetened strawberries, cranberry sauce |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|---|--|---|
| Margarine, oils, cream, cream substitutes (from WWEIA categories) | 0.51 (0.25–1.14) | Margarine/spread, butter/margarine blend, and shortening; light, half & half, and heavy cream; cream substitute; whipped cream/topping; regular, reduced fat, light, and fat free sour cream; cream cheese, mayonnaise; all vegetable oils; salad dressings |
| Meat; higher nutrient density ^c (≤4.5 g saturated fat/100 g AND 0 g added sugars/100 g) | 1.15 (0.61–3.36) | Lower cost: pork chop (baked, broiled, stewed, fried), pork (cut not specified, fried), pork roast, pork steak/cutlet (baked, broiled, fried), beef liver, gizzard |
| Meat; lower nutrient density ^c (>4.5 g saturated fat/100 g AND/OR >0 g added sugars/100 g) | 0.97 (0.69–3.22) | Lower cost: pork roast, pork spareribs with barbecue sauce, ground pork, pork steak/cutlet (baked, broiled), pork chop (breaded and baked, broiled, fried), beef steak (breaded and baked, fried), beef pot roast |
| Milk and yogurt; higher nutrient density ^d (plain/flavored nonfat/1% milk; milk and non-whole milk yogurt with 0 g added sugars/100 g; soy beverage with <3.3 g added sugars/100 g) | 0.13 (0.10–0.69) | Low-fat (1%) and nonfat regular or lactose-free milks; flavored milk and hot chocolate made with 1% or nonfat milk and no added sugars; evaporated fat free milk; kefir; plain, flavored, and fruit yogurts; nonfat and light soy beverage; nonfat chocolate soy beverage |
| Milk and yogurt; lower nutrient density (plain whole/2% milk; or those and yogurt with >0 g added sugars/100 g; whole milk-based yogurt; soy beverage with ≥3.3 g added sugars/100 g, and milk-based beverages with added sugars) | 0.15 (0.10–0.80) | Whole and 2% regular or lactose-free milks; whole and 2% flavored, evaporated, and sweetened condensed milks; hot chocolate; milk shakes; ice cream soda; eggnog; plain, flavored, and fruit yogurts; regular and light chocolate soy beverage; soy yogurt |
| Milk substitutes, nutritional beverages, and smoothies ^e (from WWEIA categories) | 0.35 (0.13–0.64) | Almond milk, rice milk, coconut milk, hot chocolate, fruit and vegetable smoothies, horchata, atole, Boost, Carnation Instant Breakfast, Ensure, Glucerna, protein shake, Muscle Milk, Slim Fast, nutritional drink or meal replacement |
| Mixed dishes—beans, peas, lentils; higher nutrient density ^{e, f} (< median sodium content/100 g in WWEIA category) | 0.27 (0.27–0.50) | Lower cost: refried beans (canned, traditional style; or made with oil) |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|--|--|---|
| Mixed dishes—beans, peas, lentils; lower nutrient density ^{c, f} (> median sodium content/100 g in WWEIA category) | 0.24 (0.23–0.52) | Lower cost: baked beans, pork and beans, Boston baked beans, chile beans or barbecue beans or ranch style beans or Mexican-style beans |
| Mixed dishes—eggs; higher nutrient density ^c (< median sodium content/100 g in WWEIA category) | 0.38 (0.29–0.49) | Eggs, omelets, egg salad, deviled eggs, soufflé, huevos rancheros, egg substitute |
| Mixed dishes—eggs; lower nutrient density ^c (> median sodium content/100 g in WWEIA category) | 0.58 (0.48–0.63) | Eggs, omelets, egg salad, eggs Benedict, egg substitute |
| Mixed dishes—grain-based; higher nutrient density ^{c, f} (< median sodium content/100 g in WWEIA categories) | 0.22 (0.14–1.77) | Lower cost: macaroni and cheese (from box mix), whole-grain or regular pasta with tomato/meat/poultry sauce and/or vegetables, pasta with vegetables (no sauce), meat-filled ravioli (canned), flavored pasta, pasta salad, flavored rice mixture, Spanish rice, rice and beans, dirty rice, rice with beans and tomatoes, brown rice with vegetables, white rice with vegetables or lentils |
| Mixed dishes—grain-based; lower nutrient density ^{c, f} (> median sodium content/100 g in WWEIA categories) | 0.48 (0.17–1.77) | Lower cost: pasta with tomato meat sauce, pasta with tomato sauce and/or cheese, lasagna with meat/poultry, whole-grain or regular pasta with cream sauce, pasta with cream sauce and poultry or seafood, cheese-filled ravioli, pasta salad with meat, regular or cornmeal dressing with poultry and vegetables, soft taco with meat/chicken and beans, burrito with meat/chicken and beans, meatless burrito with beans, tamale with meat, gordita with meat, fajita with chicken and vegetables, chimichanga with meat, taco or tostada with beans, rice pilaf, flavored rice with cheese, flavored rice and pasta, vegetable or cheese dumpling, biscuit with gravy, bread stuffing |
| Mixed dishes—meat, poultry, seafood; higher nutrient density ^{c, f} (< median sodium content/100 g in WWEIA categories) | 0.44 (0.22–1.67) | Lower cost: beef stew, beef/poultry with vegetables, poultry with rice/noodles and vegetables, beef/poultry and rice/noodles, beef or chicken curry, sausage gravy |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|---|--|--|
| <p>Mixed dishes—meat, poultry, seafood; lower nutrient density ^{c, f}</p> <p>(> median sodium content/100 g in WWEIA categories)</p> | <p>0.59 (0.40–1.48)</p> | <p>Lower cost: tuna salad with egg, chicken or turkey salad (with or without egg), ham/pork salad, chicken or turkey or beef pot pie, meat loaf, beef and macaroni with cheese sauce, chili con carne with beans (canned), chili con carne with or without poultry and with or without beans, poultry with mushroom soup mixture, beef and noodles mixture, chopped sirloin with mashed potatoes and vegetable (frozen meal), chicken and noodles with vegetable and dessert (frozen meal), pork and vegetables, corned beef hash, codfish ball/cake, chicken or turkey with dumplings, chicken or turkey cacciatore, chicken or turkey parmigiana, chicken or turkey a la king, gumbo with rice</p> |
| <p>Mixed dishes—sandwiches; higher nutrient density ^{c, f}</p> <p>(< median sodium content/100 g in WWEIA categories)</p> | <p>0.50 (0.42–2.31)</p> | <p>Lower cost: peanut butter and regular or reduced sugar jelly sandwich on wheat or whole-wheat or white bread, peanut butter sandwich on wheat or whole-wheat or white bread, peanut butter and jelly sandwich (frozen, without crust), cheddar cheese sandwich on whole-wheat or white bread, grilled cheddar cheese sandwich on wheat or whole-wheat or white bread, vegetable sub sandwich, pepperoni and salami sub sandwich; burrito/taco/quesadilla with egg, potato or beans, and breakfast meat; burrito/taco/quesadilla with egg, burrito/taco/quesadilla with egg and potato</p> |
| <p>Mixed dishes—sandwiches; lower nutrient density ^{c, f}</p> <p>(> median sodium content/100 g in WWEIA categories)</p> | <p>0.58 (0.52–2.56)</p> | <p>Lower cost: hot dog (beef, beef and pork, meat and poultry, chicken or turkey) on white bun/bread, hot dog with chili on white bun, grilled American cheese sandwich on wheat or whole wheat or white bread, chicken fillet sandwich, pig in a blanket, corn dog, egg and bacon on biscuit, steak sandwich on biscuit, fish sandwich on bun, burrito/taco/quesadilla with egg and breakfast meat</p> |
| <p>Mixed dishes—vegetables; higher nutrient density ^{c, f}</p> <p>(< median sodium content/100 g in WWEIA categories)</p> | <p>0.31 (0.23–2.24)</p> | <p>Lower cost: potato salad with or without egg, baked potato with sour cream, mashed potatoes (from fresh or dry mix), home fries with peppers and onions, green beans (creamed or with cheese sauce), candied sweet potato, coleslaw with coleslaw dressing, vegetable curry, stewed potatoes with tomatoes, vegetables with tomato sauce, okra (batter-dipped, fried)</p> |
| <p>Mixed dishes—vegetables; lower nutrient density ^{c, f}</p> <p>(> median sodium content/100 g in WWEIA categories)</p> | <p>0.36 (0.21–1.69)</p> | <p>Lower cost: baked potato with meat or cheese, scalloped potatoes (from fresh or dry mix), spaghetti sauce with or without meat, homemade spaghetti sauce with vegetables, green bean salad, green beans with mushroom sauce, creamed corn (canned), vegetables with soy or tomato sauce, coleslaw with fat free dressing</p> |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|---|---|--|
| Nut and seed butters (from WWEIA category) | 0.57 (0.53–2.19) | Peanut, almond, cashew, and sesame butters |
| Nuts and seeds; higher nutrient density (0 g added sugars/100 g) | 1.48 (0.31–3.47) | Nuts and seeds without added sugars, unsalted and salted nuts |
| Nuts and seeds; lower nutrient density (>0 g added sugars/100 g) | 1.11 (0.76–2.99) | Honey-roasted nuts, sweetened coconut, marzipan, nut mixtures with chocolate |
| Other desserts (from WWEIA categories) | 0.43 (0.22–1.38) | Regular and lower fat ice cream, frozen yogurt, sundae, frozen novelties, sherbet, frozen juice bars, pudding, custard, flan, Barfi, haupia, zabaglione, gelatin dessert, ice pops, snow cone, cottage cheese with gelatin, rice dessert |
| Other vegetables and vegetable combinations ^c (from WWEIA categories) | 0.33 (0.23–1.22) | Lower cost: iceberg lettuce, green beans, onions, celery, green peppers, cucumbers, mixed vegetables, summer squash, radish, green beans and potatoes, stew type vegetables, cabbage (red, green, Chinese), sauerkraut, jicama, turnip, rutabaga, cactus |
| Pizza; higher nutrient density ^{c, f} (< median sodium content/100 g in WWEIA category) | 0.82 (0.68–1.87) | Lower cost: thin or medium crust frozen pizza with meat, cheese pizza with thin crust (frozen), cheese pizza with whole wheat thin crust, pizza with meat and vegetables and thin or thick crust (frozen) |
| Pizza; lower nutrient density ^{c, f} (> median sodium content/100 g in WWEIA category) | 0.68 (0.63–1.18) | Lower cost: pizza rolls, pizza with meat and fruit and thick crust, pizza with extra cheese or meat and thick crust, pizza with pepperoni and thin crust, pizza with meat and vegetables and thick crust (frozen), pizza with meat (not pepperoni) and thick crust (frozen), pizza with extra meat and thin or regular crust |
| Popcorn; higher nutrient density (0 g added sugars/100 g AND <7 g saturated fat/100 g) | 1.04 (0.46–2.69) | Air-popped popcorn, popcorn popped in oil, low-fat popcorn |
| Popcorn; lower nutrient density (>0 g added sugars/100 g OR ≥7 g saturated fat/100 g) | 0.74 (0.63–1.84) | Buttered popcorn, regular or fat-free caramel-coated popcorn with/without nuts |
| Poultry; higher nutrient density ^c (≤4.5 g saturated fat/100 g AND 0 g added sugars/100 g) | 0.71 (0.31–1.36) | Lower cost: chicken breast (baked, broiled, grilled, sauteed, fried), chicken drumstick (baked, broiled, grilled, stewed, sauteed), chicken leg (baked, broiled, fried), chicken nuggets/patty |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|--|--|---|
| Poultry; lower nutrient density ^c (>4.5 g saturated fat/100 g AND/OR >0 g added sugars/100 g) | 0.80 (0.35–1.69) | Lower cost: chicken breast with sauce (grilled), chicken wings (plain), chicken thigh (coated and fried), chicken thigh with sauce (grilled), chicken drumstick/leg with sauce, chicken with barbecue sauce |
| Pretzels/snack mix (from WWEIA categories) | 0.79 (0.60–1.59) | Hard/soft salted/unsalted/cheese-filled pretzels, snack mixes (e.g., party mix), wasabi peas, soy nuts |
| Processed soy products (from WWEIA category) | 1.21 (0.59–2.84) | Tofu, soyburger, meatless bacon, meatless patties/links/balls, meatless chicken, meatless hot dogs, meatless lunch meat, meatless sandwich spread, vegetarian burgers/pot pies/chili/stew/loaf and other mixtures |
| Red and orange vegetables ^c (from WWEIA categories) | 0.35 (0.33–0.84) | Lower cost: carrots, sweet potato |
| Seafood ^c (from WWEIA categories) | 1.08 (0.59–4.25) | Lower cost: canned tuna, canned mackerel, fish stick/patty/nugget, cod, haddock, tilapia, catfish, whiting, restructured seafood, sardines, squid |
| Snack bars (from WWEIA categories) | 1.45 (0.88–2.22) | Protein bars, granola bars, chewy bars, meal replacement bars, nutrition bars |
| Soft drinks (>0 g added sugars/100 g) | 0.13 (0.09–0.78) | Sweetened soft drinks, energy drinks, and sports drinks |
| Soups; higher nutrient density ^{c, f} (< median sodium content/100 g in WWEIA category) | 0.12 (0.05–0.63) | Lower cost: tomato soup (canned), tomato noodle soup (canned), instant ramen noodle soup (regular or reduced fat and sodium), chicken noodle soup (from dry mix), chunky chicken/turkey noodle soup (canned), chicken or turkey noodle soup (reduced sodium, canned), split pea and ham soup, vegetable noodle soup (reduced sodium, canned), vegetable beef soup with or without noodles, bean soup with macaroni (canned), pepperpot soup, sopa de tortilla, pozole, vegetable broth, chicken or turkey broth |
| Soups; lower nutrient density ^{c, f} (> median sodium content/100 g in WWEIA category) | 0.29 (0.18–0.71) | Lower cost: chicken/turkey/beef noodle soup (canned or home recipe), vegetable beef soup (canned), Manhattan clam chowder (canned), bean soup (canned), chunky chicken or turkey vegetable soup with noodles (canned), chunky vegetable beef soup (canned), cream of potato or vegetable soup (canned), French onion soup, onion soup (from dry mix), chicken or turkey gumbo soup (canned), beef broth |

| Thrifty Food Plan Modeling Category (inclusion criteria) | Mean price (price range) per 100 g (\$) ^a | Sample WWEIA food code descriptions included in the Modeling Category ^b |
|--|---|--|
| Staple grains; higher nutrient density ^c (≥50% whole grains) | 0.42 (0.14–1.15) | Lower cost: whole-wheat bread, whole-grain white bread, whole-wheat spaghetti, brown rice, quinoa |
| Staple grains; lower nutrient density ^c (>50% refined grains) | 0.25 (0.08–1.24) | Lower cost: white bread, wheat or cracked wheat bread, hot dog or hamburger bun, potato bread, oatmeal bread, oat bran bread, Italian/Grecian/Armenian bread, hard roll, multigrain bagel, wheat bagel with raisins, bagel with fruit (not raisins), corn or wheat flour tortilla, bolillo roll, egg noodles, gluten free pasta, chow fun rice noodles, white or yellow rice, couscous |
| Starchy vegetables ^c (from WWEIA categories) | 0.29 (0.21–0.68) | Lower cost: potato, corn, lima beans, plantain, cassava |
| Sugars (from WWEIA categories) | 0.43 (0.14–1.98) | White, brown, maple, cinnamon, and powdered sugar; honey; molasses; sugar substitutes, pancake and maple syrup; fruit syrup; chocolate syrup; butterscotch/marshmallow topping; pie filling; jelly/jam/preserves Item brought in from <i>Nuts and Seeds</i> : peanut butter and jelly (jarred, striped product) |
| Sweet bakery products (from WWEIA categories) | 0.85 (0.39–1.97) | Cakes, pies, cookies, brownies, doughnuts, pastries, cinnamon bun, coffee cake, cheesecake, fritters, Pannetone, Pan Dulce, tiramisu, Pocky, sopaipilla, baklava, basbousa, Danish, moon cake, doughnuts, graham crackers, mochi |
| Tortilla, corn, other chips (from WWEIA categories) | 1.07 (0.79–1.96) | Regular and lower fat tortilla chips; corn chips/puffs/twists; cheese puffs/twists; onion-flavored rings; shrimp, vegetable, plantain, taro, rice, and sweet potato chips |

^a Prices are on an as-consumed basis and are an aggregate price. Standard food formulations and conversion factors were applied to convert foods from an as-purchased to edible form. Changes caused by refuse and moisture/fat loss/gain during food preparation were accounted for in food weight.

For categories that were divided by cost (indicated in the first column with footnote c), the mean price is that of the lower cost category (i.e., the 0 through 34th percentile of cost). The price range includes both the lower and higher cost categories.

^b The same food descriptions may appear in both a higher and a lower nutrient-density category because of their differing nutrient content. Brand names are listed in the FNDDS. For categories that were divided by cost (indicated in the first column with footnote c), the sample food descriptions are for the lower cost groups.

^c Category was separated into higher and lower cost groups.

^d The Modeling Category milk and yogurt; higher nutrient density is different for the 1-year-old than for other age-sex groups. All levels of fat (whole, 2%, 1%, and fat-free) versions of plain milk and yogurt are included. A key recommendation for this age is to avoid foods and beverages with added sugars. In addition, low- and non-calorie sweeteners, which can also be called high-intensity sweeteners, are not recommended for children younger than age 2. Whole milk is appropriate before age 2 since there is no limit on saturated fat in this age group. The mean price per 100 g for this category is \$0.12 (range \$0.10–0.69).

^e The Modeling Category *milk substitutes, nutritional beverages, and smoothies* was not included in analyses for children age 1.

^f Category was modeled as higher sodium (lower nutrient-density) and lower sodium (higher nutrient-density) based on the median amount of sodium per 100 grams.

Appendix 2. Description of the Thrifty Food Plan Optimization Model

The Thrifty Food Plan is solved by a constrained optimization model that selects quantities of the Modeling Categories for the Thrifty Food Plan (see [Appendix 1](#))—with foods and beverages in as-consumed form—that are the basis of the Market Baskets for the 15 age-sex groups (see [Appendix 4](#)). The model chooses quantities of the Modeling Categories that minimize the objective function subject to dietary (energy requirements, nutrient recommendations, and the Healthy U.S.-Style Dietary Pattern amounts from the *Dietary Guidelines for Americans, 2020-2025*), practicality, and cost constraints.

The objective function (1) is a strictly convex, nonlinear function that minimizes the distance between the quantity x_i of the Modeling Category i , and, average consumption c_i , weighted by the expenditure shares of each category (2), where p_i is the national average price. The model is run separately for each of the 15 age-sex groups.

The solution is subject to a cost constraint (3), dietary constraints (4) (5), and practicality constraints (6) (7). The solution has to stay within a cost constraint C that is incrementally increased until a feasible solution is reached. The model solution has to fulfill dietary constraints (4) on the minimum amounts (D_k^{LB}) and maximum amounts (D_k^{UB}) of the EER and the DRI values for each age-sex group, where $d_{i,k}$ is the amount of nutrient k in food or beverage category i (see [Appendix 3](#)). For the dietary constraint (5), the amount for each Healthy U.S.-Style Dietary Pattern food-group and -subgroup has to fall between a lower bound (F_l^{LB}) and an upper bound (F_l^{UB}), where $f_{i,l}$ is the contribution of each food or beverage category i to each food group or

subgroup l . Upper bounds for food groups and subgroups were set at the 95th percentile of intake based on WWEIA, NHANES 2013–16 data, or at the Healthy U.S.-Style Dietary Pattern amount where the recommendation exceeded the 95th percentile of usual intake. Lower bounds were set at the recommended amount in the Healthy U.S.-Style Dietary Pattern assigned to the age-sex group. Foods for which there is no direct corresponding recommendation (e.g., meats, poultry, eggs—a combined protein foods subgroup) had to be at least at the 25th percentile and no more than the 95th percentile of usual intake based on WWEIA, NHANES 2013–16 to ensure practicality. Several additional practicality constraints (6) (7) were applied that limit amounts for some Modeling Categories to less than or equal to a category-specific upper bound U_i (6) or impose minimum amounts L_i on other categories (7). These are detailed in the [Methods](#), where there is also additional information about how the optimization model was operationalized for the Thrifty Food Plan, 2021.

$$(1) \min_{x_i} \sum_i \beta_i (x_i - c_i)^2$$

Where:

$$(2) \beta_i = \frac{p_i c_i}{\sum_i p_i c_i}$$

Subject to:

$$(3) \sum_i x_i p_i \leq C$$

$$(4) D_k^{LB} \leq \sum_k x_i d_{i,k} \leq D_k^{UB}$$

$$(5) F_l^{LB} \leq \sum_i x_i f_{i,l} \leq F_l^{UB}$$

$$(6) x_i \leq U_i$$

$$(7) x_i \geq L_i$$

Appendix 3. Dietary Constraints Applied to the Thrifty Food Plan Optimization Model

The Thrifty Food Plan is generated with an optimization model (see [Figure 1](#)) that chooses quantities of the Modeling Categories that minimize the objective function subject to the dietary, practicality, and cost constraints. The dietary constraints applied to the Thrifty Food Plan, 2021 (energy requirements, nutrient recommendations, and the Healthy U.S.-Style Dietary Pattern amounts) are presented here. In the optimization model, these

dietary constraint values are adjusted to account for the food-waste adjustment factor. To apply the food-waste adjustment factor, the lower and upper bounds of the dietary constraints are adjusted by 5 percent to account for plate waste and/or foods that may go uneaten before they spoil. For more information on the practicality and cost constraints applied to the Thrifty Food Plan, 2021, see [Methods](#).

Energy Requirements for the 15 Age-Sex Groups

The Modeling Categories for the Thrifty Food Plan support calorie needs for weight maintenance for the 15 age-sex groups. Establishing calorie needs for each age-sex group allows for the corresponding calorie level of the Healthy U.S.-Style Dietary Pattern and DRI values to be assigned. The process to calculate the energy requirement for the Thrifty Food Plan Market Baskets for the 15 age-sex groups involves three steps:

1. **Calculate the EER for each age-sex group.** The total number of calories a person needs each day varies depending on the person's age, sex, height, weight, and level of physical activity. The EER was calculated for all age-sex groups (other than *1 year, male/female*) using the equations established by NASEM.⁶⁹ The calculations relied on median height and

weight⁶³ for the age-sex group and assumed an active level of physical activity for children ages 2 through 11 and a low-active level of physical activity for ages 12 and older.

2. **Assign each age-sex group to the nearest Healthy U.S.-Style Dietary Pattern calorie level.** The Healthy U.S.-Style Dietary Pattern² has four calorie levels for toddlers ages 12 through 23 months: 700, 800, 900, and 1,000. The highest calorie level was assigned to the *1 year, male/female* age-sex group. The Healthy U.S.-Style Dietary Pattern has 12 calorie levels for ages 2 and older: 1,000; 1,200; 1,400; 1,600; 1,800; 2,000; 2,200; 2,400; 2,600; 2,800; 3,000; and 3,200. Each age-sex group was assigned a calorie level by rounding the calculated EER for each group to the nearest calorie level.

3. **Calculate the lower and upper bounds of the constraint.** The energy requirement constraint has a narrow range around the target calorie level, with lower and upper bounds corresponding to 99.5 percent and 100.5 percent of the assigned calorie level, respectively. [Table A3.1](#)

provides detailed information about the energy requirements applied in the Thrifty Food Plan optimization model. It lists the age-sex groups and, for each group, the assigned Healthy U.S.-Style Dietary Pattern calorie level and the lower and upper bounds of the constraint.

Nutrient Recommendations for the 15 Age-Sex Groups

The Thrifty Food Plan Market Baskets are designed to align with nutrient recommendations established by NASEM and which are known as DRI values.^{23–25} These nutrient recommendations include the RDA (i.e., the average daily level of intake sufficient to meet the nutrient requirements of nearly all healthy people) or AI amounts (established when evidence is insufficient to develop an RDA), and the UL (i.e., the maximum daily intake unlikely to

cause adverse health effects) that exist for macronutrients, vitamins, and minerals. The DRI values were applied as constraints in the optimization model, with the RDA or AI as a lower bound and the UL as an upper bound. [Table A3.2](#), [Table A3.3](#), and [Table A3.4](#) list the DRI values for each age-sex group for macronutrients, minerals, and vitamins, respectively.

Healthy U.S.-Style Dietary Pattern Food-Group and -Subgroup Amounts for the 15 Age-Sex Groups

The Healthy U.S.-Style Dietary Pattern is designed to meet nutrient needs while not exceeding calorie requirements and while staying within limits for overconsumed dietary components, such as added sugars, saturated fat, and sodium. The amounts of food groups and subgroups within the Pattern are based on nutrient and *Dietary Guidelines for Americans, 2020-2025* recommendations.² The Healthy U.S.-Style Dietary Pattern food-group and -subgroup amounts were applied as lower bound constraints in the optimization model. Therefore, the Thrifty Food Plan Market Baskets for the 15 age-sex groups provide at least the recommended

amount for each food group and subgroup for the corresponding calorie level of the Healthy U.S.-Style Dietary Pattern. For more information, see [Methods](#).

Table A3.1. Energy requirement constraint for each Thrifty Food Plan age-sex group

| | M/F 1 | M/F 2-3 | M/F 4-5 | M/F 6-8 | M/F 9-11 | M 12-13 | F 12-13 | M 14-19 | F 14-19 | M 20-50 | F 20-50 | M 51-70 | F 51-70 | M 71+ | F 71+ |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Assigned Healthy U.S.-Style Dietary Pattern calorie level (kcal) | 1,000 | 1,400 | 1,600 | 1,800 | 2,200 | 2,400 | 2,000 | 3,000 | 2,200 | 3,000 | 2,200 | 2,600 | 2,000 | 2,400 | 1,800 |
| Lower and upper bound of the model constraint (kcal) | 995 1,005 | 1,393 1,407 | 1,592 1,608 | 1,791 1,809 | 2,189 2,211 | 2,388 2,412 | 1,990 2,010 | 2,985 3,015 | 2,189 2,211 | 2,985 3,015 | 2,189 2,211 | 2,587 2,613 | 1,990 2,010 | 2,388 2,412 | 1,791 1,809 |

Note: The values presented in **Table A3.1** do not reflect the 5-percent food waste adjustment factor applied in the optimization model.

Abbreviations: F=Female, M=Male.

Table A3.2. Nutrient recommendation constraint for each Thrifty Food Plan age-sex group: macronutrients

| Macronutrient | Lower and upper bounds of the model constraint | M/F 1 | M/F 2-3 | M/F 4-5 | M/F 6-8 | M/F 9-11 | M 12-13 | F 12-13 | M 14-19 | F 14-19 | M 20-50 | F 20-50 | M 51-70 | F 51-70 | M 71+ | F 71+ |
|-------------------------------------|--|-------|---------|---------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|-------|-------|
| Protein (g) | AMDR: 5-20% kcal ages 1-3 | 12.5 | 18 | 40 | 45 | 55 | 60 | 50 | 75 | 55 | 75 | 55 | 65 | 50 | 60 | 45 |
| | 10-30% kcal ages 4-18 10-35% kcal ages 19+ | 50 | 70 | 120 | 135 | 165 | 180 | 150 | 225 | 165 | 263 | 193 | 228 | 175 | 210 | 158 |
| Carbohydrate (g) | AMDR: 45-65% kcal | 112.5 | 158 | 180 | 203 | 248 | 270 | 225 | 338 | 248 | 338 | 248 | 293 | 225 | 270 | 203 |
| | | 162.5 | 228 | 260 | 293 | 358 | 390 | 325 | 488 | 358 | 488 | 358 | 423 | 315 | 390 | 293 |
| Fiber (g) | AI: 14 g/1,000 kcal ^a | 14.0 | 19.6 | 22.4 | 25.2 | 30.8 | 33.6 | 28.0 | 42.0 | 30.8 | 42.0 | 30.8 | 36.4 | 28.0 | 33.6 | 25.2 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Added sugars (kcal) | DGA: <10% kcal 2+ years ^b | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | 20 | 140 | 160 | 180 | 220 | 240 | 200 | 300 | 220 | 300 | 220 | 260 | 200 | 240 | 180 |
| Total lipid (g) | AMDR: 30-40% kcal ages 1-3 25-35% kcal ages 4-18 20-35% kcal ages 19+ | 33.3 | 47 | 44 | 50 | 61 | 67 | 56 | 83 | 61 | 67 | 49 | 58 | 44 | 53 | 40 |
| | | 44.4 | 62 | 62 | 70 | 86 | 93 | 78 | 117 | 86 | 117 | 86 | 101 | 78 | 93 | 70 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Saturated fatty acids (kcal) | DGA: <10% kcal 2+ years ^c | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | N/A | 140 | 160 | 180 | 220 | 240 | 200 | 300 | 220 | 300 | 220 | 260 | 200 | 240 | 180 |
| 18:2 linoleic acid (g) | AI: 5-10% kcal | 5.6 | 7.8 | 8.9 | 10.0 | 12.2 | 13.3 | 11.1 | 16.7 | 12.2 | 16.7 | 12.2 | 14.4 | 11.1 | 13.3 | 10.0 |
| | | 11.1 | 15.6 | 17.8 | 20.0 | 24.4 | 26.7 | 22.2 | 33.3 | 24.4 | 33.3 | 24.4 | 28.9 | 22.2 | 26.7 | 20.0 |
| 18:3 linolenic acid (g) | AI: 0.6-1.2% kcal | 0.7 | 0.9 | 1.1 | 1.2 | 1.5 | 1.6 | 1.3 | 2.0 | 1.5 | 2.0 | 1.5 | 1.7 | 1.3 | 1.6 | 1.2 |
| | | 1.3 | 1.9 | 2.1 | 2.4 | 2.9 | 3.2 | 2.7 | 4.0 | 2.9 | 4.0 | 2.9 | 3.5 | 2.7 | 3.2 | 2.4 |

Note: The values presented in **Table A3.2** do not reflect the 5-percent food waste adjustment factor applied in the optimization model.

Abbreviations: AI=Adequate Intake; AMDR=Acceptable Macronutrient Distribution Range; DGA=Dietary Guidelines for Americans, 2020-2025; F=Female; M=Male; N/A=Not Applicable.

^a *Fiber* has a lower bound of 14 g/1,000 kcal and no upper bound because no UL has been established.

^b *Added sugars* have an upper bound of <10 percent of kcal for individuals ages 2 and older based on the recommendation in the DGA. The DGA recommends children under age 2 avoid added sugars. However, because there is some amount of added sugars inherent to the foods and beverages in the current food supply, the optimization model could not solve with the upper limit for added sugars set at zero for children under age 2. Therefore, the upper limit was set at 2 percent to allow some flexibility for the model. The 2 percent upper limit is not intended as a dietary recommendation for this age-sex group.

^c *Saturated fatty acids* has an upper bound of <10 percent of kcal for ages 2 and older based on recommendations in the DGA. There is no established limit on saturated fatty acids for children under age 2; thus, there is no upper limit applied as a dietary constraint.

Table A3.3. Nutrient recommendation constraint for each Thrifty Food Plan age-sex group: minerals

| Mineral | Lower and upper bounds of the model constraint ^a | M/F | M/F | M/F | M/F | M/F | M | F | M | F | M | F | M | F | M | F |
|------------------------|---|-------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | 2-3 | 4-5 | 6-8 | 9-11 | 12-13 | 12-13 | 14-19 | 14-19 | 20-50 | 20-50 | 51-70 | 51-70 | 71+ | 71+ |
| Calcium (mg) | RDA | 700 | 700 | 1,000 | 1,000 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,000 | 1,000 | 1,000 | 1,200 | 1,200 | 1,200 |
| | UL | 2,500 | 2,500 | 2,500 | 2,500 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 2,500 | 2,500 | 2,000 | 2,000 | 2,000 | 2,000 |
| Copper (mg) | RDA | 0.34 | 0.34 | 0.44 | 0.44 | 0.70 | 0.70 | 0.70 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| | UL | 1 | 1 | 3 | 3 | 5 | 5 | 5 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 10 |
| Iron (mg) | RDA | 7 | 7 | 10 | 10 | 8 | 8 | 8 | 11 | 18 | 8 | 18 | 8 | 8 | 8 | 8 |
| | UL | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| Magnesium (mg) | RDA ^b | 80 | 80 | 130 | 130 | 240 | 240 | 240 | 420 | 360 | 420 | 320 | 420 | 320 | 420 | 320 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Phosphorus (mg) | RDA | 460 | 460 | 500 | 500 | 1,250 | 1,250 | 1,250 | 1,250 | 1,250 | 700 | 700 | 700 | 700 | 700 | 700 |
| | UL | 3,000 | 3,000 | 3,000 | 3,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 |
| Potassium (mg) | AI ^c | 2,000 | 2,000 | 2,300 | 2,300 | 2,500 | 2,500 | 2,300 | 3,400 | 2,600 | 3,400 | 2,600 | 3,400 | 2,600 | 3,400 | 2,600 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Sodium (mg) | AI | 800 | 800 | 1,000 | 1,000 | 1,200 | 1,200 | 1,200 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| | Median intake ^d | 1,899 | 1,899 | 2,611 | 2,611 | 3,172 | 3,377 | 2,960 | 3,808 | 2,807 | 4,188 | 3,072 | 3,913 | 2,848 | 3,431 | 2,589 |
| Zinc (mg) | RDA | 3 | 3 | 5 | 5 | 8 | 8 | 8 | 11 | 9 | 11 | 8 | 11 | 8 | 11 | 8 |
| | UL | 7 | 7 ^e | 12 | 12 | 23 | 23 | 23 | 34 | 34 | 40 | 40 | 40 | 40 | 40 | 40 |

Note: The values presented in Table A3.3 do not reflect the 5-percent food waste adjustment factor applied in the optimization model.

Abbreviations: AI=Adequate Intake; F=Female; M=Male; N/A=Not Applicable; RDA=Recommended Dietary Allowance; UL=Tolerable Upper Intake Level.

^a The lower bound is 100 percent of the RDA or AI and the upper bound is the UL, when available, with the exceptions noted.

^b *Magnesium* has a lower bound of 100 percent of the RDA, and no upper bound because no UL has been established for magnesium from food sources.

^c *Potassium* has a lower bound of 100 percent of the AI and no upper bound because no UL has been established.

^d *Sodium* has an upper bound of less than the median intake amount for each age-sex group based on WWEIA, NHANES 2015–16 data (see [Methods](#)).

^e The upper bound on *zinc* for M/F 2–3 was increased by 10 percent because the optimization model was not able to achieve a solution for this age-sex group at the upper limit for zinc.

Table A3.4. Nutrient recommendation constraint for each Thrifty Food Plan age-sex group: vitamins

| Vitamin ^a | Lower and upper bounds of the model constraint ^b | M/F | M/F | M/F | M/F | M/F | M | F | M | F | M | F | M | F | M | F |
|---|---|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | 2-3 | 4-5 | 6-8 | 9-11 | 12-13 | 12-13 | 14-19 | 14-19 | 20-50 | 20-50 | 51-70 | 51-70 | 71+ | 71+ |
| Vitamin A (mcg RAE or preformed vitamin A^c) | RDA | 300 | 300 | 400 | 400 | 600 | 600 | 600 | 900 | 700 | 900 | 700 | 900 | 700 | 900 | 700 |
| | UL | 600 | 600 | 900 | 900 | 1,700 | 1,700 | 1,700 | 2,800 | 2,800 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Thiamin (mg) | RDA ^d | 0.5 | 0.5 | 0.6 | 0.6 | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.2 | 1.1 | 1.2 | 1.1 | 1.2 | 1.1 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Riboflavin (mg) | RDA ^e | 0.5 | 0.5 | 0.6 | 0.6 | 0.9 | 0.9 | 0.9 | 1.3 | 1.0 | 1.3 | 1.1 | 1.3 | 1.1 | 1.3 | 1.1 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Niacin (mg) | RDA ^f | 6 | 6 | 8 | 8 | 12 | 12 | 12 | 16 | 14 | 16 | 14 | 16 | 14 | 16 | 14 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Vitamin B-6 (mg) | RDA | 0.5 | 0.5 | 0.6 | 0.6 | 1.0 | 1.0 | 1.0 | 1.3 | 1.3 | 1.3 | 1.3 | 1.7 | 1.5 | 1.7 | 1.5 |
| | UL | 30 | 30 | 40 | 40 | 60 | 60 | 60 | 80 | 80 | 100 | 100 | 100 | 100 | 100 | 100 |
| Folate (mcg DFE) | RDA ^g | 150 | 150 | 200 | 200 | 300 | 300 | 300 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Folic acid (mcg) | UL ^h | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | 300 | 300 | 400 | 400 | 600 | 600 | 600 | 800 | 800 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |

| Vitamin ^a | Lower and upper bounds of the model constraint ^b | M/F | M/F | M/F | M/F | M/F | M | F | M | F | M | F | M | F | M | F |
|----------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | 2–3 | 4–5 | 6–8 | 9–11 | 12–13 | 12–13 | 14–19 | 14–19 | 20–50 | 20–50 | 51–70 | 51–70 | 71+ | 71+ |
| Vitamin B-12 (mcg) | RDA ⁱ | 0.9 | 0.9 | 1.2 | 1.2 | 1.8 | 1.8 | 1.8 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Vitamin C (mg) | RDA | 15 | 15 | 25 | 25 | 45 | 45 | 45 | 90 | 75 | 90 | 75 | 90 | 75 | 90 | 75 |
| | UL | 400 | 400 | 650 | 650 | 1,200 | 1,200 | 1,200 | 1,800 | 1,800 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Vitamin E (mg AT) | RDA ^j | 5.1 | 5.1 | 5.95 | 5.95 | 9.35 | 9.35 | 9.35 | 12.75 | 12.75 | 12.75 | 12.75 | 12.75 | 12.75 | 12.75 | 12.75 |
| | UL | 200 | 200 | 300 | 300 | 600 | 600 | 600 | 800 | 800 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Vitamin K (mcg) | AI ^k | 30 | 30 | 55 | 55 | 60 | 60 | 60 | 120 | 90 | 120 | 90 | 120 | 90 | 120 | 90 |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Choline (mg) | AI | 200 | 200 | 250 | 250 | 375 | 375 | 375 | 550 | 400 | 550 | 425 | 550 | 425 | 550 | 425 |
| | UL | 1,000 | 1,000 | 1,000 | 1,000 | 2,000 | 2,000 | 2,000 | 3,000 | 3,000 | 3,500 | 3,500 | 3,500 | 3,500 | 3,500 | 3,500 |

Note: The values presented in Table A3.4 do not reflect the 5-percent food waste adjustment factor applied in the optimization model.

Abbreviations: AI=Adequate Intake; AT=Alpha-Tocopherol; DFE=Dietary Folate Equivalents; F=Female; IU=International Units; M=Male; N/A=Not Applicable; RAE=Retinol Activity Equivalents; RDA=Recommended Dietary Allowance; UL=Tolerable Upper Intake Level.

^a Vitamin D is not presented in Table A3.4. The optimization model did not include a quantitative requirement for vitamin D because sufficiency of this nutrient is difficult to achieve through food sources alone. The final Market Baskets for the 15 age-sex groups provide amounts of vitamin D similar to that included in the Healthy U.S.-Style Dietary Pattern (see [Results](#)).

^b The lower bound is 100 percent of the RDA or AI and the upper bound is the UL, when available, with the exceptions noted.

^c Vitamin A has a lower bound measured in mcg as RAE, and an upper bound measured in mcg as preformed vitamin A.

^d Thiamin has a lower bound of 100 percent of the RDA and no upper bound because no UL has been established.

^e Riboflavin has a lower bound of 100 percent of the RDA and no upper bound because no UL has been established.

^f *Niacin* has a lower bound of 100 percent of the RDA and no upper bound because no UL has been established for niacin from food sources.

^g *Folate* has a lower bound of 100 percent of the RDA and no upper bound because no UL has been established for naturally occurring folate from food sources.

^h *Folic acid* has an upper bound of <UL as a synthetic nutrient and no lower bound.

ⁱ *Vitamin B-12* has a lower bound of 100 percent of the RDA and no upper bound because no UL has been established.

^j *Vitamin E* has a lower bound of 85 percent of the RDA because sufficiency of this nutrient is difficult to achieve from food sources alone. The final Market Baskets for the 15 age-sex groups provide amounts of vitamin E similar to that included in the Healthy U.S.-Style Dietary Pattern (see [Results](#)).

^k *Vitamin K* has a lower bound of 100 percent of the AI and no upper bound because no UL has been established.

Table A3.5. Healthy U.S.-Style Dietary Pattern food-group and -subgroup amounts^a constraint for each Thrifty Food Plan age-sex group^b

| Food group or subgroup | M/F 1 | M/F 2-3 | M/F 4-5 | M/F 6-8 | M/F 9-11 | M 12-13 | F 12-13 | M 14-19 | F 14-19 | M 20-50 | F 20-50 | M 51-70 | F 51-70 | M 71+ | F 71+ |
|---|----------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|------------|
| Vegetables (cup eq/day) | 1 | 1.5 | 2 | 2.5 | 3 | 3 | 2.5 | 4 | 3 | 4 | 3 | 3.5 | 2.5 | 3 | 2.5 |
| Dark-green vegetables (cup eq/wk) | 0.5 | 1.0 | 1.5 | 1.5 | 2.0 | 2.0 | 1.5 | 2.5 | 2.0 | 2.5 | 2.0 | 2.5 | 1.5 | 2.0 | 1.5 |
| Red and orange vegetables (cup eq/wk) | 2.5 | 3.0 | 4.0 | 5.5 | 6.0 | 6.0 | 5.5 | 7.5 | 6.0 | 7.5 | 6.0 | 7.0 | 5.5 | 6.0 | 5.5 |
| Beans, peas, lentils (cup eq/wk) | 0.5 | 0.5 | 1.0 | 1.5 | 2.0 | 2.0 | 1.5 | 3.0 | 2.0 | 3.0 | 2.0 | 2.5 | 1.5 | 2.0 | 1.5 |
| Starchy vegetables (cup eq/wk) | 2.0 | 3.5 | 4.0 | 5.0 | 6.0 | 6.0 | 5.0 | 8.0 | 6.0 | 8.0 | 6.0 | 7.0 | 5.0 | 6.0 | 5.0 |
| Other vegetables (cup eq/wk) | 1.5 | 2.5 | 3.5 | 4.0 | 5.0 | 5.0 | 4.0 | 7.0 | 5.0 | 7.0 | 5.0 | 5.5 | 4.0 | 5.0 | 4.0 |
| Fruits^c (cup eq/day) | 1 | 1.5 | 1.5 | 1.5 | 2 | 2 | 2 | 2.5 | 2 | 2.5 | 2 | 2 | 2 | 2 | 1.5 |
| Grains (oz eq/day) | 3 | 5 | 5 | 6 | 7 | 8 | 6 | 10 | 7 | 10 | 7 | 9 | 6 | 8 | 6 |
| Whole grains (oz eq/day) | 2 | 2.5 | 3 | 3 | 3.5 | 4 | 3 | 5 | 3.5 | 5 | 3.5 | 4.5 | 3 | 4 | 3 |
| Refined grains ^d (oz eq/day) | 1 | 2.5 | 2 | 3 | 3.5 | 4 | 3 | 5 | 3.5 | 5 | 3.5 | 4.5 | 3 | 4 | 3 |
| Dairy^e (cup eq/day) | 2 | 2.5 | 2.5 | 2.5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| Food group or subgroup | M/F 1 | M/F 2-3 | M/F 4-5 | M/F 6-8 | M/F 9-11 | M 12-13 | F 12-13 | M 14-19 | F 14-19 | M 20-50 | F 20-50 | M 51-70 | F 51-70 | M 71+ | F 71+ |
|--------------------------------------|-----------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Protein foods (oz eq/day) | 2 | 4 | 5 | 5 | 6 | 6.5 | 5.5 | 7 | 6 | 7 | 6 | 6.5 | 5.5 | 6.5 | 5 |
| Meats, poultry, eggs (oz eq/wk) | n/a | 19 | 23 | 23 | 28 | 31 | 26 | 33 | 28 | 33 | 28 | 31 | 26 | 31 | 23 |
| Meats, poultry (oz eq/wk) | 7.75 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Eggs (oz eq/wk) | 2.25 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Seafood (oz eq/wk) | 2-3 | 6 | 8 | 8 | 9 | 10 | 8 | 10 | 9 | 10 | 9 | 10 | 8 | 10 | 8 |
| Nuts, seeds, soy products (oz eq/wk) | 1.25 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 4 |
| Oils (g/day) | 13 | 17 | 22 | 24 | 29 | 31 | 27 | 44 | 29 | 44 | 29 | 34 | 27 | 31 | 24 |

^a Definitions and quantity equivalents for each food group and subgroup are defined in Appendix 3 of the *Dietary Guidelines for Americans, 2020-2025*.

^b The values in the table are lower bounds, with the noted exception of *refined grains* (see footnote d); the values in the table do not include the 5-percent food waste adjustment factor applied in the optimization model.

^c *Fruit* includes whole fruit and 100% juice. One half or more of the total amount of fruit is required to come from whole fruit (fresh, frozen, canned, dried).

^d *Refined grains* values are upper bounds, meaning the amount presented is the maximum allowed in the output of the optimization model for the 15 age-sex groups.

^e *Dairy* includes milk, yogurt, and cheese, and/or lactose-free versions and fortified soy beverages and soy yogurt as alternatives. For the age-sex groups ages 2 and older, one half or more of the total amount of dairy is required to come from the Modeling Category: milk and yogurt; higher nutrient density.

Appendix 4: Thrifty Food Plan Market Baskets for the 15 Age-Sex Groups

The Market Baskets of the Thrifty Food Plan, 2021 are represented by categories of foods and beverages in the amounts and associated costs that make up a healthy diet for 15 age-sex groups. The Market Basket Categories include a variety of commonly consumed food and beverage items, created from the Modeling Categories used for the mathematical optimization process that can be purchased in nutrient-dense forms to prepare healthy meals and snacks on a limited budget.

The Market Basket Categories were created based on the Modeling Categories and in consideration of the food group and subgroups in the *Dietary Guidelines for Americans, 2020-2025*. The Market Basket Categories include foods in the forms (e.g., canned, frozen, fresh, ready-to-serve) people typically purchase.

The mathematical optimization model used to generate the Thrifty Food Plan, 2021 favored the Modeling Categories that included foods and beverages with higher nutrient density and lower

cost. Therefore, it is assumed that most food and beverage selections within these categories are lower cost and with comparatively lower amounts of added sugars, saturated fat, and sodium (i.e., nutrient dense).

The Thrifty Food Plan, 2021 Market Baskets for the 15 age-sex groups—ages 1, 2–3, 4–5, 6–8, 9–11, males 12–13, females 12–13, males 14–19, females 14–19, males 20–50, females 20–50, males 51–70, females 51–70, males 71 and older, and females 71 and older—are presented in Tables A4.1 to A4.15 (see [Directory of Tables in this Appendix](#)). For more information about the development of the Thrifty Food Plan, 2021 Market Baskets, see [Methods](#).

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Table A4.1. Thrifty Food Plan Market Basket for children age 1, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 4.03 | 5.46 | 25.31 |
| Dark-green vegetables | 0.28 | 0.51 | 9.28 |
| Red and orange vegetables | 0.97 | 1.24 | 22.75 |
| Beans, peas, lentils ^e | 0.86 | 0.77 | 14.15 |
| Starchy vegetables | 1.13 | 1.30 | 23.87 |
| Other vegetables | 0.79 | 1.64 | 29.95 |
| Fruits | 3.51 | 3.55 | 16.44 |
| Whole fruit | 1.71 | 1.87 | 52.74 |
| 100% fruit juice | 1.81 | 1.68 | 47.26 |
| Grains | 1.22 | 3.16 | 14.66 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.88 | 2.11 | 66.59 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.10 | 0.29 | 9.12 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.08 | 0.11 | 3.54 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.16 | 0.66 | 20.75 |
| Dairy | 7.57 | 4.06 | 18.83 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 1.57 | 0.92 | 22.54 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.97 | 3.02 | 74.27 |
| Cheese | 0.03 | 0.13 | 3.19 |
| Protein foods | 1.34 | 3.73 | 17.28 |
| Meats | 0.08 | 0.36 | 9.65 |
| Poultry | 0.67 | 1.68 | 44.93 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.27 | 0.42 | 11.32 |
| Seafood | 0.24 | 1.03 | 27.60 |
| Nuts, seeds, soy products | 0.09 | 0.24 | 6.50 |
| Miscellaneous | 0.63 | 1.62 | 7.49 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.32 | 0.79 | 48.63 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.08 | 0.19 | 11.52 |
| Sauces, condiments, jams, honey, sugars, spices | 0.17 | 0.22 | 13.69 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.07 | 0.42 | 26.16 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 18.29 | 21.58 | 100 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.2. Thrifty Food Plan Market Basket for children age 2–3, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 4.89 | 7.79 | 23.74 |
| Dark-green vegetables | 0.38 | 0.70 | 9.01 |
| Red and orange vegetables | 1.18 | 2.55 | 32.66 |
| Beans, peas, lentils ^e | 0.65 | 0.60 | 7.68 |
| Starchy vegetables | 1.55 | 1.61 | 20.63 |
| Other vegetables | 1.12 | 2.34 | 30.02 |
| Fruits | 5.09 | 5.56 | 16.95 |
| Whole fruit | 5.09 | 5.56 | 100.00 |
| 100% fruit juice | 0.00 | 0.00 | 0.00 |
| Grains | 2.12 | 4.59 | 13.99 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.06 | 2.54 | 55.27 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.00 | 0.00 | 0.00 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.94 | 1.50 | 32.65 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.12 | 0.56 | 12.09 |
| Dairy | 9.42 | 6.14 | 18.69 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 4.85 | 2.85 | 46.40 |
| Higher fat milk, yogurt, soy alternatives ^h | 4.52 | 3.08 | 50.13 |
| Cheese | 0.05 | 0.21 | 3.47 |
| Protein foods | 2.51 | 7.54 | 22.98 |
| Meats | 0.36 | 1.64 | 21.80 |
| Poultry | 1.09 | 2.74 | 36.29 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.42 | 0.66 | 8.70 |
| Seafood | 0.48 | 2.11 | 27.94 |
| Nuts, seeds, soy products | 0.15 | 0.40 | 5.27 |
| Miscellaneous | 0.62 | 1.20 | 3.66 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.12 | 0.31 | 26.25 |
| Coffee and tea | 0.00 | 0.00 | 0.00 |
| Table fats and oils | 0.18 | 0.42 | 35.20 |
| Sauces, condiments, jams, honey, sugars, spices | 0.29 | 0.44 | 36.43 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.02 | 0.03 | 2.12 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 24.64 | 32.83 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.3. Thrifty Food Plan Market Basket for children age 4–5, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|---|--|---|--|
| Vegetables | 5.72 | 7.73 | 21.75 |
| Dark-green vegetables | 0.59 | 1.08 | 13.96 |
| Red and orange vegetables | 1.43 | 2.36 | 30.52 |
| Beans, peas, lentils ^e | 0.86 | 0.77 | 9.97 |
| Starchy vegetables | 1.65 | 1.94 | 25.11 |
| Other vegetables | 1.19 | 1.58 | 20.45 |
| Fruits | 4.84 | 5.21 | 14.66 |
| Whole fruit | 4.32 | 4.73 | 90.73 |
| 100% fruit juice | 0.52 | 0.48 | 9.27 |
| Grains | 2.80 | 5.80 | 16.32 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.52 | 3.67 | 63.30 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.00 | 0.00 | 0.00 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.22 | 1.95 | 33.65 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.06 | 0.18 | 3.05 |
| Dairy | 9.63 | 5.80 | 16.33 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 9.55 | 5.62 | 96.92 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.06 | 0.09 | 1.63 |
| Cheese | 0.02 | 0.08 | 1.45 |
| Protein foods | 3.23 | 9.71 | 27.32 |
| Meats | 0.56 | 2.20 | 22.63 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Poultry | 1.31 | 3.30 | 34.04 |
| Eggs | 0.41 | 0.65 | 6.74 |
| Seafood | 0.64 | 2.79 | 28.70 |
| Nuts, seeds, soy products | 0.30 | 0.77 | 7.90 |
| Miscellaneous | 0.62 | 1.28 | 3.61 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.20 | 0.53 | 41.02 |
| Coffee and tea | 0.00 | 0.00 | 0.00 |
| Table fats and oils | 0.20 | 0.47 | 36.45 |
| Sauces, condiments, jams, honey, sugars, spices | 0.22 | 0.29 | 22.54 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.00 | 0.00 | 0.00 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 26.85 | 35.53 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.4. Thrifty Food Plan Market Basket for children age 6–8, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 7.06 | 10.38 | 26.18 |
| Dark-green vegetables | 0.59 | 1.07 | 10.33 |
| Red and orange vegetables | 2.12 | 4.09 | 39.46 |
| Beans, peas, lentils ^e | 1.04 | 0.93 | 8.99 |
| Starchy vegetables | 1.95 | 2.49 | 23.99 |
| Other vegetables | 1.35 | 1.79 | 17.23 |
| Fruits | 4.82 | 5.20 | 13.11 |
| Whole fruit | 4.21 | 4.63 | 89.04 |
| 100% fruit juice | 0.61 | 0.57 | 10.96 |
| Grains | 2.75 | 6.00 | 15.13 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.27 | 3.08 | 51.34 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.33 | 0.98 | 16.32 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.08 | 1.73 | 28.91 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.07 | 0.21 | 3.43 |
| Dairy | 8.91 | 5.93 | 14.95 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 4.53 | 2.65 | 44.75 |
| Higher fat milk, yogurt, soy alternatives ^h | 4.29 | 2.90 | 48.87 |
| Cheese | 0.09 | 0.38 | 6.38 |
| Protein foods | 3.17 | 9.46 | 23.88 |
| Meats | 0.52 | 1.99 | 21.04 |

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|--|--|---|--|
| Poultry | 1.30 | 3.27 | 34.57 |
| Eggs | 0.41 | 0.65 | 6.91 |
| Seafood | 0.64 | 2.79 | 29.43 |
| Nuts, seeds, soy products | 0.30 | 0.76 | 8.05 |
| Miscellaneous | 1.22 | 2.68 | 6.75 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.58 | 1.56 | 58.12 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.24 | 0.56 | 20.82 |
| Sauces, condiments, jams, honey, sugars, spices | 0.37 | 0.53 | 19.92 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.03 | 0.03 | 1.15 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 27.94 | 39.64 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.5. Thrifty Food Plan Market Basket for children age 9–11, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 8.23 | 10.59 | 23.17 |
| Dark-green vegetables | 0.82 | 1.49 | 14.07 |
| Red and orange vegetables | 1.87 | 2.60 | 24.52 |
| Beans, peas, lentils ^e | 1.44 | 1.28 | 12.10 |
| Starchy vegetables | 2.41 | 2.98 | 28.10 |
| Other vegetables | 1.70 | 2.25 | 21.22 |
| Fruits | 6.70 | 6.72 | 14.71 |
| Whole fruit | 4.57 | 5.01 | 74.59 |
| 100% fruit juice | 2.13 | 1.71 | 25.41 |
| Grains | 3.36 | 7.13 | 15.61 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.58 | 3.81 | 53.39 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.28 | 0.82 | 11.52 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.44 | 2.29 | 32.12 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.07 | 0.21 | 2.98 |
| Dairy | 11.15 | 7.37 | 16.13 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 5.69 | 3.33 | 45.24 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.36 | 3.63 | 49.23 |
| Cheese | 0.10 | 0.41 | 5.53 |
| Protein foods | 3.88 | 11.47 | 25.10 |
| Meats | 0.55 | 2.13 | 18.56 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Poultry | 1.85 | 4.64 | 40.42 |
| Eggs | 0.41 | 0.65 | 5.65 |
| Seafood | 0.73 | 3.16 | 27.57 |
| Nuts, seeds, soy products | 0.35 | 0.89 | 7.80 |
| Miscellaneous | 1.20 | 2.41 | 5.27 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.28 | 0.65 | 27.01 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.40 | 1.03 | 42.82 |
| Sauces, condiments, jams, honey, sugars, spices | 0.48 | 0.69 | 28.69 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.03 | 0.04 | 1.48 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 34.52 | 45.70 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.6. Thrifty Food Plan Market Basket for males age 12–13, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 8.16 | 10.36 | 21.23 |
| Dark-green vegetables | 0.82 | 1.49 | 14.42 |
| Red and orange vegetables | 1.82 | 2.53 | 24.41 |
| Beans, peas, lentils ^e | 1.44 | 1.28 | 12.39 |
| Starchy vegetables | 2.39 | 2.79 | 26.95 |
| Other vegetables | 1.70 | 2.26 | 21.82 |
| Fruits | 6.47 | 6.79 | 13.92 |
| Whole fruit | 5.39 | 5.92 | 87.17 |
| 100% fruit juice | 1.08 | 0.87 | 12.83 |
| Grains | 3.74 | 8.26 | 16.93 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.65 | 3.99 | 48.25 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.44 | 1.30 | 15.69 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.51 | 2.42 | 29.30 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.14 | 0.56 | 6.77 |
| Dairy | 10.85 | 6.97 | 14.29 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 5.55 | 3.25 | 46.70 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.27 | 3.55 | 51.00 |
| Cheese | 0.03 | 0.16 | 2.30 |
| Protein foods | 4.18 | 12.18 | 24.97 |
| Meats | 0.45 | 1.72 | 14.08 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Poultry | 2.17 | 5.45 | 44.77 |
| Eggs | 0.41 | 0.65 | 5.37 |
| Seafood | 0.79 | 3.44 | 28.23 |
| Nuts, seeds, soy products | 0.36 | 0.92 | 7.55 |
| Miscellaneous | 2.06 | 4.23 | 8.66 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.50 | 1.32 | 31.34 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.44 | 1.06 | 24.97 |
| Sauces, condiments, jams, honey, sugars, spices | 0.70 | 1.08 | 25.46 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.41 | 0.77 | 18.22 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 35.46 | 48.78 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.7. Thrifty Food Plan Market Basket for females age 12–13, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 6.41 | 8.83 | 20.80 |
| Dark-green vegetables | 0.59 | 1.07 | 12.14 |
| Red and orange vegetables | 1.70 | 2.36 | 26.67 |
| Beans, peas, lentils ^e | 1.04 | 0.93 | 10.48 |
| Starchy vegetables | 1.73 | 2.69 | 30.43 |
| Other vegetables | 1.36 | 1.79 | 20.29 |
| Fruits | 6.27 | 6.87 | 16.18 |
| Whole fruit | 6.27 | 6.87 | 100.00 |
| 100% fruit juice | 0.00 | 0.00 | 0.00 |
| Grains | 2.74 | 6.02 | 14.17 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.27 | 3.08 | 51.12 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.33 | 0.98 | 16.31 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.07 | 1.74 | 28.91 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.07 | 0.22 | 3.66 |
| Dairy | 10.88 | 7.07 | 16.65 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 5.57 | 3.26 | 46.16 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.26 | 3.56 | 50.30 |
| Cheese | 0.05 | 0.25 | 3.53 |
| Protein foods | 3.53 | 10.55 | 24.84 |
| Meats | 0.60 | 2.28 | 21.59 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Poultry | 1.49 | 3.75 | 35.52 |
| Eggs | 0.41 | 0.65 | 6.20 |
| Seafood | 0.69 | 3.01 | 28.55 |
| Nuts, seeds, soy products | 0.33 | 0.86 | 8.15 |
| Miscellaneous | 1.45 | 3.13 | 7.36 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.57 | 1.49 | 47.69 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.25 | 0.61 | 19.67 |
| Sauces, condiments, jams, honey, sugars, spices | 0.38 | 0.54 | 17.39 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.26 | 0.48 | 15.25 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 31.29 | 42.47 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.8. Thrifty Food Plan Market Basket for males age 14–19, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|---|--|---|--|
| Vegetables | 11.70 | 15.06 | 24.56 |
| Dark-green vegetables | 1.00 | 1.83 | 12.18 |
| Red and orange vegetables | 2.40 | 3.33 | 22.10 |
| Beans, peas, lentils ^e | 2.14 | 1.90 | 12.65 |
| Starchy vegetables | 3.67 | 4.40 | 29.19 |
| Other vegetables | 2.50 | 3.60 | 23.88 |
| Fruits | 8.75 | 8.27 | 13.49 |
| Whole fruit | 4.17 | 4.59 | 55.51 |
| 100% fruit juice | 4.59 | 3.68 | 44.49 |
| Grains | 4.85 | 10.84 | 17.68 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 2.15 | 5.19 | 47.90 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.46 | 1.36 | 12.58 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.93 | 2.98 | 27.49 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.31 | 1.30 | 12.02 |
| Dairy | 13.72 | 8.57 | 13.98 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 8.24 | 4.84 | 56.47 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.47 | 3.70 | 43.22 |
| Cheese | <0.01 | 0.03 | 0.31 |
| Protein foods | 5.22 | 15.38 | 25.08 |
| Meats | 0.62 | 2.70 | 17.56 |
| Poultry | 2.78 | 6.97 | 45.33 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.49 | 0.77 | 5.01 |
| Seafood | 0.85 | 3.69 | 23.98 |
| Nuts, seeds, soy products | 0.49 | 1.25 | 8.12 |
| Miscellaneous | 1.59 | 3.19 | 5.21 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.28 | 0.70 | 21.91 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.54 | 1.27 | 39.65 |
| Sauces, condiments, jams, honey, sugars, spices | 0.55 | 0.82 | 25.77 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.23 | 0.40 | 12.676 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 45.83 | 61.32 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.9. Thrifty Food Plan Market Basket for females age 14–19, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 8.46 | 11.94 | 24.48 |
| Dark-green vegetables | 0.93 | 1.73 | 14.48 |
| Red and orange vegetables | 1.91 | 2.66 | 22.26 |
| Beans, peas, lentils ^e | 1.44 | 1.29 | 10.82 |
| Starchy vegetables | 2.26 | 3.02 | 25.29 |
| Other vegetables | 1.92 | 3.24 | 27.41 |
| Fruits | 7.03 | 6.65 | 13.64 |
| Whole fruit | 3.13 | 3.53 | 52.98 |
| 100% fruit juice | 3.90 | 3.13 | 47.02 |
| Grains | 3.19 | 7.64 | 15.66 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.59 | 3.84 | 50.30 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.27 | 0.81 | 10.56 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.89 | 1.37 | 17.99 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.44 | 1.62 | 21.15 |
| Dairy | 11.40 | 6.82 | 13.98 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 11.25 | 6.62 | 97.10 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.16 | 0.20 | 2.86 |
| Cheese | <0.01 | <0.01 | 0.04 |
| Protein foods | 3.87 | 12.14 | 24.89 |
| Meats | 0.80 | 3.36 | 27.70 |
| Poultry | 1.64 | 4.13 | 33.99 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.32 | 0.52 | 4.26 |
| Seafood | 0.73 | 3.16 | 26.04 |
| Nuts, seeds, soy products | 0.38 | 0.97 | 8.00 |
| Miscellaneous | 1.52 | 3.58 | 7.34 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.41 | 1.04 | 28.92 |
| Coffee and tea | <0.01 | <0.01 | <0.01 |
| Table fats and oils | 0.47 | 1.05 | 29.25 |
| Sauces, condiments, jams, honey, sugars, spices | 0.27 | 0.35 | 9.69 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.38 | 1.15 | 32.14 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 35.47 | 48.77 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.10. Thrifty Food Plan Market Basket for males age 20–50, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|---|--|---|--|
| Vegetables | 11.73 | 14.62 | 24.51 |
| Dark-green vegetables | 1.00 | 1.83 | 12.52 |
| Red and orange vegetables | 2.37 | 3.30 | 22.58 |
| Beans, peas, lentils ^e | 2.15 | 1.91 | 13.10 |
| Starchy vegetables | 3.80 | 4.39 | 29.99 |
| Other vegetables | 2.41 | 3.19 | 21.81 |
| Fruits | 8.75 | 8.26 | 13.85 |
| Whole fruit | 4.16 | 4.58 | 55.41 |
| 100% fruit juice | 4.59 | 3.68 | 44.59 |
| Grains | 4.88 | 10.16 | 17.03 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 2.32 | 5.59 | 54.99 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.30 | 0.88 | 8.64 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 2.17 | 3.39 | 33.39 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.10 | 0.30 | 2.99 |
| Dairy | 11.12 | 7.06 | 11.84 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 5.71 | 3.35 | 47.36 |
| Higher fat milk, yogurt, soy alternatives ^h | 5.39 | 3.64 | 51.60 |
| Cheese | 0.02 | 0.07 | 1.03 |
| Protein foods | 4.94 | 14.49 | 24.29 |
| Meats | 0.76 | 3.05 | 21.09 |
| Poultry | 1.87 | 4.69 | 32.41 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.72 | 1.12 | 7.73 |
| Seafood | 0.85 | 3.69 | 25.47 |
| Nuts, seeds, soy products | 0.75 | 1.93 | 13.31 |
| Miscellaneous | 3.32 | 5.06 | 8.49 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.27 | 0.61 | 12.12 |
| Coffee and tea | 1.46 | 1.35 | 26.71 |
| Table fats and oils | 0.64 | 1.52 | 30.06 |
| Sauces, condiments, jams, honey, sugars, spices | 0.53 | 0.78 | 15.37 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.42 | 0.80 | 15.73 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 44.74 | 59.65 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.11. Thrifty Food Plan Market Basket for females age 20–50, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 8.35 | 10.52 | 21.98 |
| Dark-green vegetables | 0.82 | 1.49 | 14.15 |
| Red and orange vegetables | 1.91 | 2.64 | 25.12 |
| Beans, peas, lentils ^e | 1.44 | 1.29 | 12.23 |
| Starchy vegetables | 2.48 | 2.85 | 27.14 |
| Other vegetables | 1.70 | 2.25 | 21.35 |
| Fruits | 6.636 | 6.72 | 14.05 |
| Whole fruit | 4.82 | 5.26 | 78.30 |
| 100% fruit juice | 1.828 | 1.46 | 21.70 |
| Grains | 3.14 | 7.38 | 15.43 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.53 | 3.70 | 50.12 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.22 | 0.66 | 8.88 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.96 | 1.49 | 20.17 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.43 | 1.54 | 20.83 |
| Dairy | 10.13 | 7.59 | 15.85 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 9.55 | 5.62 | 74.11 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.08 | 0.10 | 1.37 |
| Cheese | 0.49 | 1.86 | 24.52 |
| Protein foods | 4.19 | 12.03 | 25.14 |
| Meats | 0.43 | 1.79 | 14.84 |
| Poultry | 1.87 | 4.71 | 39.16 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.58 | 0.91 | 7.55 |
| Seafood | 0.73 | 3.16 | 26.28 |
| Nuts, seeds, soy products | 0.57 | 1.46 | 12.17 |
| Miscellaneous | 1.31 | 3.61 | 7.55 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.38 | 0.89 | 24.57 |
| Coffee and tea | 0.17 | 0.87 | 24.18 |
| Table fats and oils | 0.43 | 1.00 | 27.69 |
| Sauces, condiments, jams, honey, sugars, spices | 0.25 | 0.32 | 8.96 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.08 | 0.53 | 14.60 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 33.74 | 47.86 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.12. Thrifty Food Plan Market Basket for males age 51–70, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|---|--|---|--|
| Vegetables | 10.65 | 12.09 | 23.05 |
| Dark-green vegetables | 1.02 | 1.86 | 15.41 |
| Red and orange vegetables | 2.26 | 3.14 | 25.97 |
| Beans, peas, lentils ^e | 1.79 | 1.59 | 13.17 |
| Starchy vegetables | 3.68 | 2.97 | 24.56 |
| Other vegetables | 1.91 | 2.52 | 20.88 |
| Fruits | 7.10 | 6.62 | 12.64 |
| Whole fruit | 3.16 | 3.46 | 52.30 |
| 100% fruit juice | 3.94 | 3.16 | 47.70 |
| Grains | 4.38 | 8.93 | 17.03 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 2.32 | 5.61 | 62.78 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.00 | 0.00 | 0.00 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.96 | 3.04 | 34.09 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.10 | 0.28 | 3.14 |
| Dairy | 11.76 | 7.00 | 13.34 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 11.67 | 6.87 | 98.22 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.088 | 0.12 | 1.72 |
| Cheese | <0.01 | <0.01 | 0.07 |
| Protein foods | 4.90 | 14.27 | 27.21 |
| Meats | 0.79 | 3.24 | 22.71 |
| Poultry | 1.54 | 3.88 | 27.17 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.85 | 1.32 | 9.24 |
| Seafood | 0.79 | 3.44 | 24.10 |
| Nuts, seeds, soy products | 0.93 | 2.40 | 16.79 |
| Miscellaneous | 1.45 | 3.52 | 6.72 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.24 | 0.51 | 14.377 |
| Coffee and tea | 0.17 | 0.87 | 24.80 |
| Table fats and oils | 0.67 | 1.61 | 45.71 |
| Sauces, condiments, jams, honey, sugars, spices | 0.28 | 0.36 | 10.12 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.09 | 0.18 | 5.01 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 40.24 | 52.43 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.13. Thrifty Food Plan Market Basket for females age 51–70, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 7.00 | 8.82 | 19.85 |
| Dark-green vegetables | 0.56 | 1.07 | 12.17 |
| Red and orange vegetables | 1.78 | 2.47 | 27.97 |
| Beans, peas, lentils ^e | 1.29 | 1.15 | 13.07 |
| Starchy vegetables | 2.00 | 2.31 | 26.16 |
| Other vegetables | 1.37 | 1.82 | 20.63 |
| Fruits | 6.36 | 7.01 | 15.78 |
| Whole fruit | 5.86 | 6.61 | 94.28 |
| 100% fruit juice | 0.50 | 0.40 | 5.72 |
| Grains | 2.38 | 5.60 | 12.61 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.53 | 3.70 | 65.99 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.02 | 0.05 | 0.91 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.61 | 0.94 | 16.83 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.22 | 0.91 | 16.27 |
| Dairy | 11.02 | 7.09 | 15.96 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 10.63 | 6.26 | 88.22 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.24 | 0.28 | 3.98 |
| Cheese | 0.15 | 0.55 | 7.80 |
| Protein foods | 4.04 | 11.53 | 25.96 |
| Meats | 0.43 | 1.80 | 15.57 |
| Poultry | 1.56 | 3.91 | 33.90 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.67 | 1.05 | 9.08 |
| Seafood | 0.69 | 3.01 | 26.12 |
| Nuts, seeds, soy products | 0.69 | 1.77 | 15.33 |
| Miscellaneous | 1.87 | 4.37 | 9.84 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.34 | 0.78 | 17.81 |
| Coffee and tea | 0.17 | 0.87 | 19.98 |
| Table fats and oils | 0.47 | 1.05 | 24.10 |
| Sauces, condiments, jams, honey, sugars, spices | 0.22 | 0.28 | 6.41 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 0.66 | 1.39 | 31.70 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 32.66 | 44.42 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.14. Thrifty Food Plan Market Basket for males age 71 and older, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 9.13 | 10.37 | 20.67 |
| Dark-green vegetables | 0.82 | 1.49 | 14.38 |
| Red and orange vegetables | 1.95 | 2.71 | 26.12 |
| Beans, peas, lentils ^e | 1.72 | 1.53 | 14.78 |
| Starchy vegetables | 2.92 | 2.36 | 22.76 |
| Other vegetables | 1.72 | 2.28 | 21.97 |
| Fruits | 6.74 | 6.76 | 13.46 |
| Whole fruit | 4.62 | 5.05 | 74.82 |
| 100% fruit juice | 2.12 | 1.70 | 25.18 |
| Grains | 3.59 | 7.43 | 14.81 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 2.06 | 4.93 | 66.34 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | <0.01 | <0.01 | <0.01 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.45 | 2.25 | 30.31 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.09 | 0.25 | 3.34 |
| Dairy | 12.36 | 7.35 | 14.65 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 12.27 | 7.23 | 98.31 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.08 | 0.12 | 1.69 |
| Cheese | 0.00 | 0.00 | 0.00 |
| Protein foods | 5.60 | 15.86 | 31.60 |
| Meats | 0.68 | 2.79 | 17.60 |
| Poultry | 2.33 | 5.85 | 36.87 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Eggs | 0.85 | 1.32 | 8.33 |
| Seafood | 0.79 | 3.44 | 21.68 |
| Nuts, seeds, soy products | 0.96 | 2.46 | 15.53 |
| Miscellaneous | 0.96 | 2.41 | 4.81 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.09 | 0.23 | 9.47 |
| Coffee and tea | 0.17 | 0.87 | 36.23 |
| Table fats and oils | 0.45 | 0.99 | 41.05 |
| Sauces, condiments, jams, honey, sugars, spices | 0.25 | 0.32 | 13.24 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | <0.01 | <0.01 | <0.01 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 38.37 | 50.18 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

Table A4.15. Thrifty Food Plan Market Basket for females age 71 and older, June 2021: quantities, costs, and cost shares of Market Basket Categories^a in weekly amounts

| Market Basket Categories | Quantity^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$)^c | Cost share of each Market Basket Category (%)^d |
|---|--|---|--|
| Vegetables | 9.56 | 15.59 | 31.78 |
| Dark-green vegetables | 1.70 | 3.16 | 20.27 |
| Red and orange vegetables | 2.44 | 4.63 | 29.72 |
| Beans, peas, lentils ^e | 0.91 | 0.82 | 5.29 |
| Starchy vegetables | 2.26 | 2.27 | 14.54 |
| Other vegetables | 2.25 | 4.71 | 30.19 |
| Fruits | 4.61 | 5.22 | 10.64 |
| Whole fruit | 4.57 | 5.18 | 99.29 |
| 100% fruit juice | 0.04 | 0.04 | 0.71 |
| Grains | 2.45 | 5.61 | 11.43 |
| Whole-grain staple grains (e.g., rice, pasta, breads, tortillas) | 1.53 | 3.66 | 65.29 |
| Whole-grain cereals (e.g., oatmeal, ready-to-eat cereal) ^f | 0.00 | 0.00 | 0.00 |
| Refined-grain staple grains (e.g., rice, pasta, breads, tortillas) | 0.72 | 1.11 | 19.79 |
| Refined-grain other (e.g., cereals, crackers, snacks) | 0.21 | 0.84 | 14.91 |
| Dairy | 11.43 | 6.94 | 14.15 |
| Low- and non-fat milk, yogurt, soy alternatives ^g | 11.19 | 6.59 | 94.86 |
| Higher fat milk, yogurt, soy alternatives ^h | 0.22 | 0.27 | 3.91 |
| Cheese | 0.02 | 0.09 | 1.23 |
| Protein foods | 3.67 | 11.48 | 23.40 |
| Meats | 0.53 | 1.89 | 16.47 |

| Market Basket Categories | Quantity ^b of each Market Basket Category (lbs) | Cost of each Market Basket Category (\$) ^c | Cost share of each Market Basket Category (%) ^d |
|--|--|---|--|
| Poultry | 1.19 | 3.85 | 33.50 |
| Eggs | 0.69 | 1.06 | 9.23 |
| Seafood | 0.64 | 2.79 | 24.27 |
| Nuts, seeds, soy products | 0.63 | 1.90 | 16.53 |
| Miscellaneous | 2.48 | 4.22 | 8.60 |
| Pre-prepared entrees and side dishes (e.g., soups, frozen entrees, pizza) | 0.26 | 0.67 | 15.93 |
| Coffee and tea | 0.17 | 0.87 | 20.71 |
| Table fats and oils | 0.23 | 0.54 | 12.76 |
| Sauces, condiments, jams, honey, sugars, spices | 0.16 | 0.21 | 5.01 |
| Other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars) | 1.66 | 1.92 | 45.59 |
| Total (Vegetables, Fruits, Grains, Dairy, Protein Foods, Miscellaneous) | 34.21 | 49.05 | 100.00 |

^a Market Basket Categories are foods and beverages that are converted and regrouped from the Modeling Categories for the Thrifty Food Plan into amounts in *as-purchased forms*. The Market Basket Categories are based primarily on food groups and subgroups included in the *Dietary Guidelines for Americans, 2020-2025*.

^b Quantities are presented as pounds for all Market Basket Categories. For some Market Basket Categories (e.g., low- and non-fat milk, yogurt, and soy alternatives), the amount in pounds can be converted to an approximate amount in fluid ounces by multiplying by 15.34.

^c The cost reflects the cost of the Thrifty Food Plan, 2021 at June 2021 prices. Market Basket Category costs may not sum to the total cost due to rounding. USDA updates the cost monthly to account for food-price inflation. The Monthly Cost of Food Report is available at: <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

^d For the Market Basket Categories vegetables, fruit, grains, dairy, protein foods, and miscellaneous, the amounts shown represent the percent of the total Market Basket cost. For the subcategories within each of these (e.g., whole fruit and 100% fruit juice that make up the fruits Market Basket Category), the amounts shown represent the percent of the Market Basket Category cost.

^e Nearly all selections within this subcategory are assumed to be canned beans.

^f Most selections within this subcategory are assumed to be ready-to-eat cereal and the remainder is cooked breakfast cereals (e.g., oatmeal).

^g Low- and non-fat milk, yogurt, and soy alternatives (skim or 1% and 0 g added sugars; <3.3 g added sugars were permitted for nonfat, unsweetened soy beverage). Most selections within this category are assumed to be fluid milk choices that are lower in cost compared to other items within this category.

^h Higher fat milk, yogurt, and soy alternatives (whole or 2% and 0 g added sugars). Most selections within this category are assumed to be whole and 2% fluid milk choices that are lower in cost compared to other items within this category.

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