

# Are Recommended Food Groups Adequately Represented in Commercial Meal Kits in the US?

## An Analysis of Nutritional Quality

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### Background

The Dietary Guidelines for Americans (DGA) provide guidance on eating patterns to prevent nutrition-related chronic diseases.<sup>1</sup> Most Americans fall short of the DGA recommendations for the five food groups.

Meal-kits are an approach to traditional meal preparation in which consumers receive a pre-assembled box of ingredients (Fig. 1) and a recipe card (Fig. 2) for preparation at home, serving as a convenient alternative to restaurant meals or pre-packaged convenience foods.<sup>2</sup> Meal-kits have the potential to bridge the gap between current intake patterns and the DGA recommendations. Because there are currently no standards or guidance for meal-kit nutritional quality, the health ramifications of meal-kits are unknown.

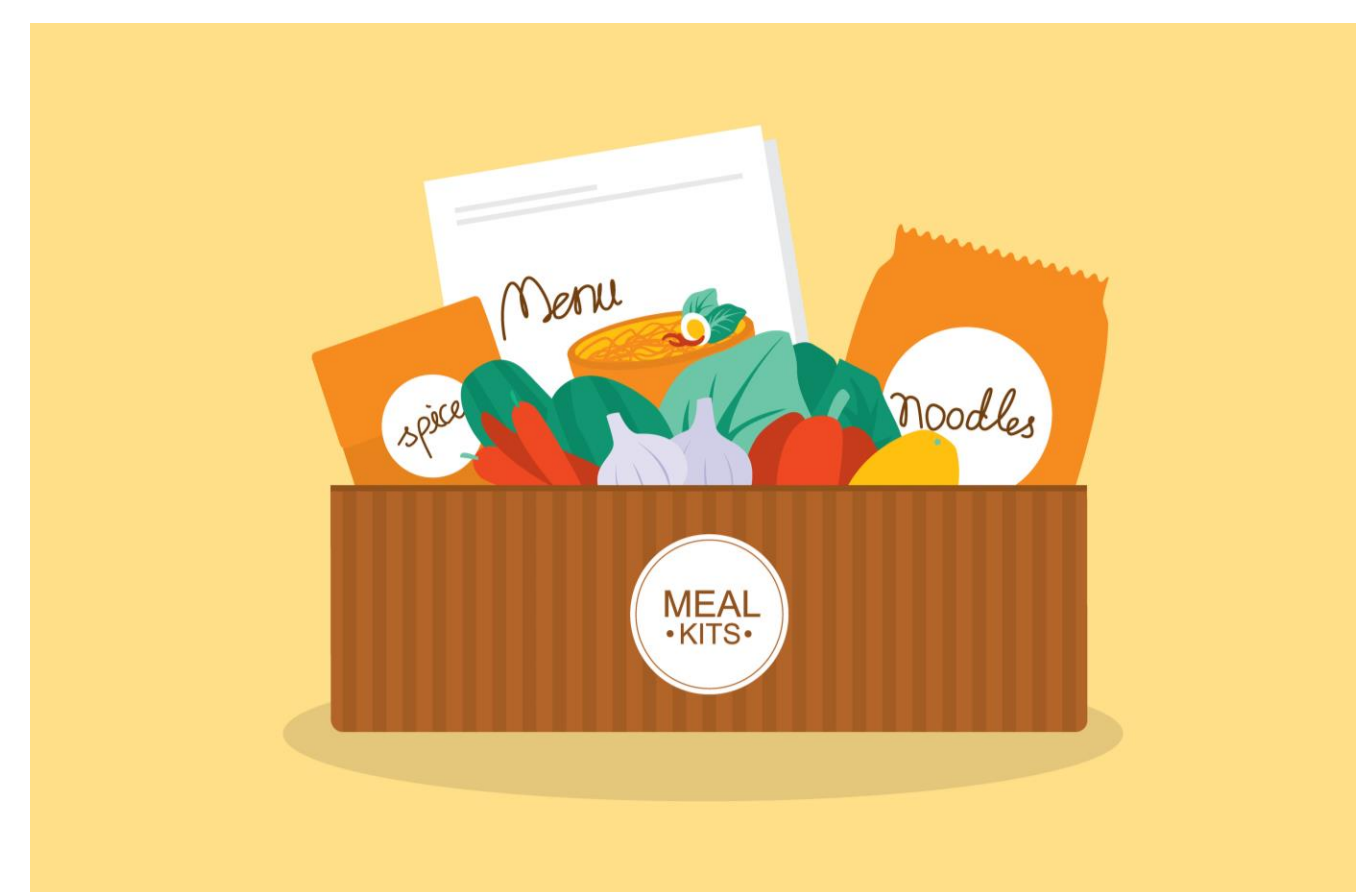


Figure 1 Example of a meal kit containing raw ingredients and a recipe card.

### Purpose

The objective of this study was to evaluate aspects of meal-kit recipe components available to consumers in the United States to determine nutritional quality compared to recommended intake patterns.

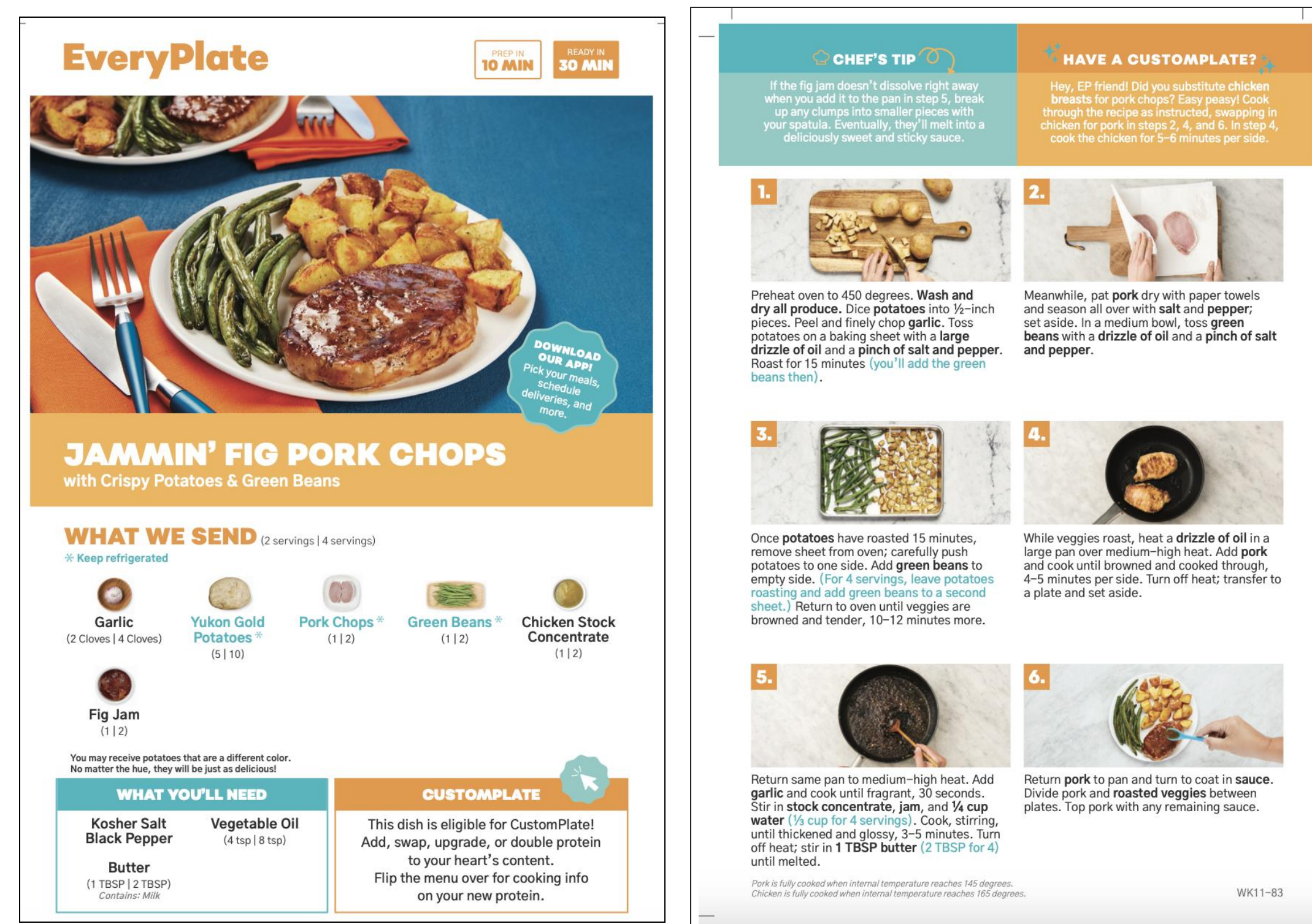
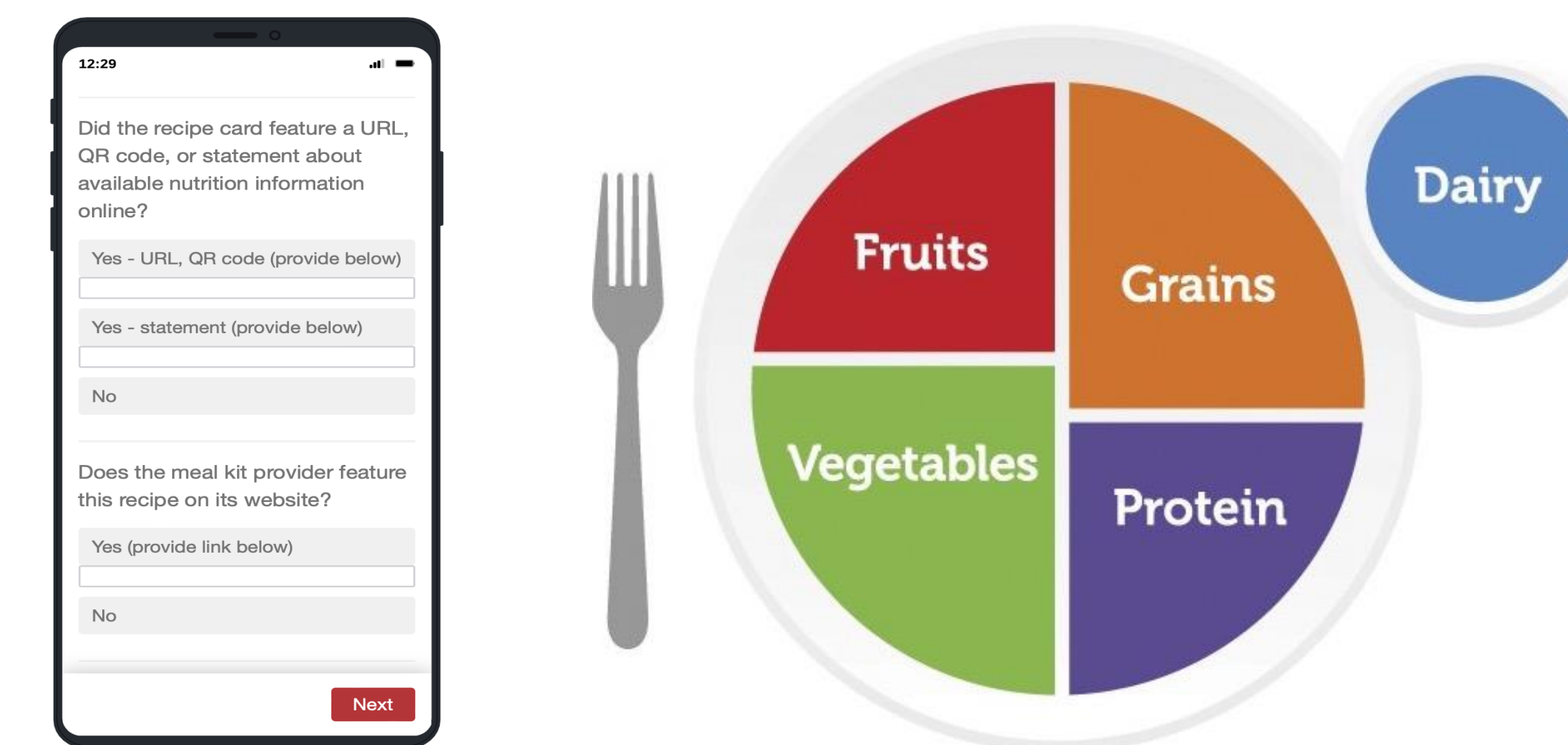


Figure 2 Sample recipe card. Front of the recipe containing ingredient list.

### Methods

Meal-kit recipe cards (n=127) were collected from commercial suppliers in the US (n=11). A data extraction tool was designed in Qualtrics (Qualtrics, January 2023) to capture nutrition information and food groups featured in meal-kit recipes (Fig. 3). Consumer-submitted hard-copy recipe cards, digital recipes from supplier websites, and supplier websites were analyzed (Table 1). PDF images available from supplier websites, consumer-submitted recipe cards, and supplier websites were analyzed. Ingredients were categorized based on food groups (Vegetables, Fruits, Grains, Dairy, Protein Foods, and Oils) outlined by the Dietary Guidelines for Americans Healthy US-Style Dietary Pattern for Ages 2 and Older and MyPlate (Fig. 4, Table 2).<sup>1,3</sup>



Figures 3 & 4 Qualtrics data extraction tool and MyPlate<sup>3</sup>

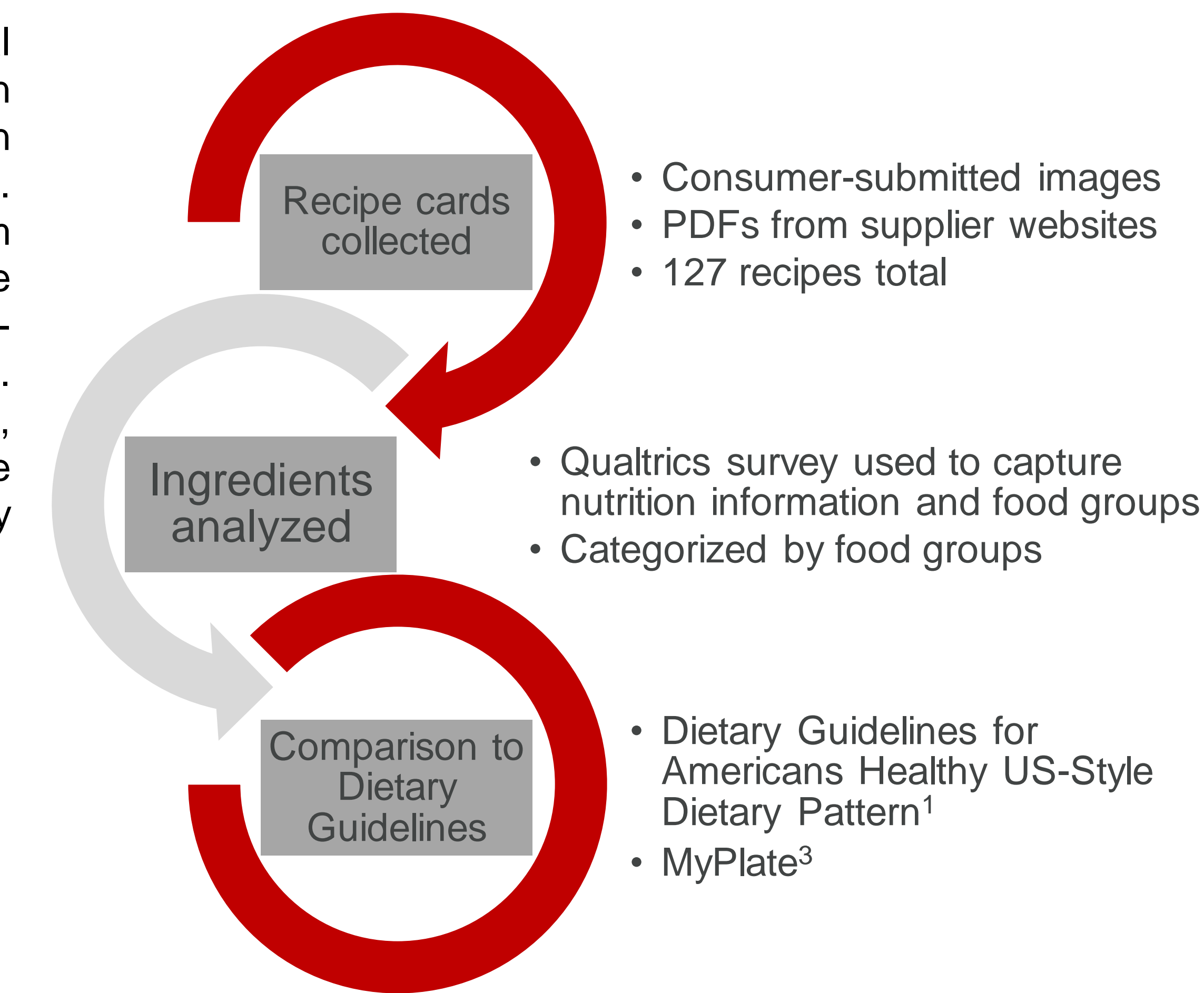


Figure 5 Recipe collection and data extraction workflow.

## Results

Table 1 Meal Kit Providers

Provider	Recipe Cards (n=127)	Recipe Cards (%)
Blue Apron	5	4.0
Dinnerly	9	7.1
EveryPlate	13	10.3
Green Chef	10	7.9
Hello Fresh	34	27.0
Martha Stewart and Marley Spoon	10	7.9
One Potato	10	7.9
Purple Carrot	10	7.9
Safer Plate	10	7.9
Sunbasket	10	7.9

Table 2 Food Groups Present in Recipe Cards

Food Group	Recipe Cards (n=127)	Recipe Cards (%)
Dairy	46	36.2
Grain	96	75.6
Protein	111	87.4
Vegetable	127	100
Fruit	38	29.9
Oils	126	99.2

Overall, meal-kit composition varied when compared with recommendations (Fig. 6). Based on DGA categorization, all recipes (n=127) featured at least one vegetable (55 dark green; 76 red and orange; 102 other). While 29.9% of recipes featured at least one type of fruit (71% citrus), the average amount present only satisfied 9% of the daily recommended amount. Out of 75.6% of recipes that included grains, only 4.7% were whole grains. Dairy was featured in 46 (36.2%) recipes (18.9% featured dairy only; 17.3% contained a combination of dairy and nondairy products). One-fifth (20.5%) of recipes featured only dairy products that do not fulfill the dairy requirement in the DGA such as sour cream, cream cheese, or plant-based dairy alternatives. Most recipes (111/127) featured at least one protein food (11 seafood; 28 included nuts, seeds, and soy products; 87 meat, poultry, or eggs). Nearly one-fourth of recipes (n=30) were vegetarian (featuring no meat or seafood), of which 21 were vegan. All recipes featured at least one source of fat or oil (1 fat only; 53 oil only; 73 fat and oil).

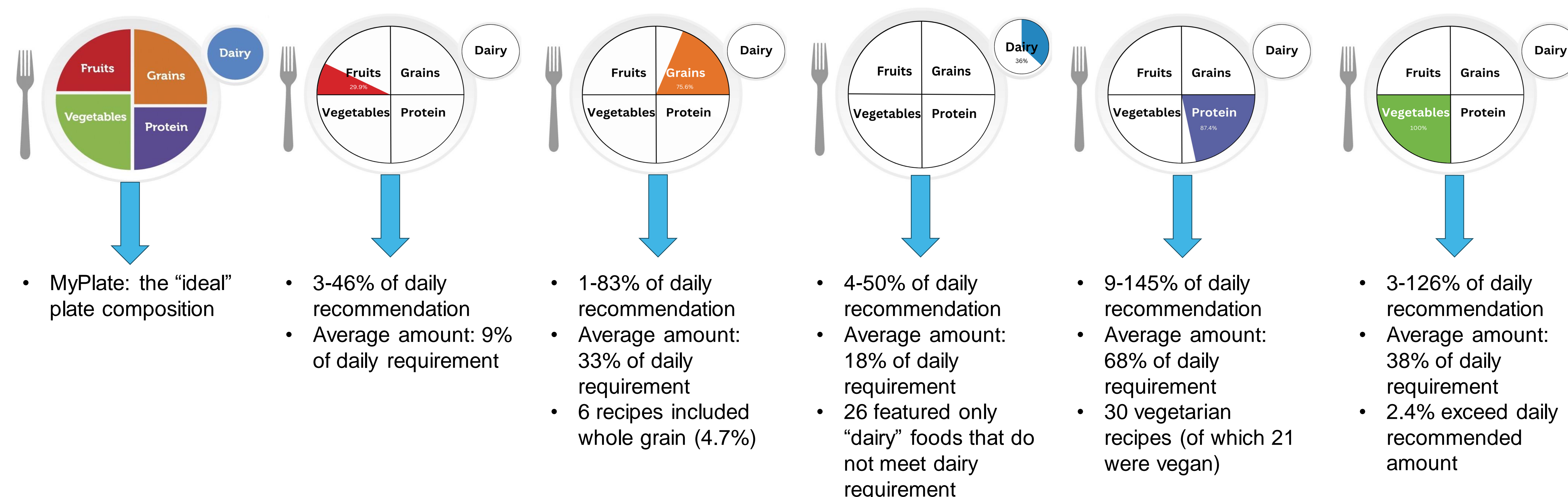


Figure 6 Comparison of MyPlate to food groups present in meal kit recipes and key findings. Colored sections on each plate represent the percentage of recipes featuring the food group. \*For a 2000-calorie diet, the Dietary Guidelines for Americans recommends: 2 cup equivalents fruit, 2.5 cup equivalents vegetables, 6 oz equivalents grain (with 50% whole grains), 3 cup equivalents dairy, and 5.5 oz equivalents protein foods per day.

- Recipes with Vegetables Featured**
  - 15 included "Beans, Peas, Lentils"
  - 40 included "Starchy"
  - 55 included "Dark Green"
  - 76 included "Red & Orange"
  - 102 included "Other"
- Recipes with Protein Featured**
  - 11 included Seafood
  - 28 included Nuts, Seeds, and Soy
  - 87 included Meat, Poultry, or Eggs
- Recipes with Grain Featured**
  - 6 included whole grain
  - 90 included refined grain
- Recipes with Oil and Fat Featured**
  - 1 included fat only (butter)
  - 53 included oil only
  - 73 included fat and oil

## Significance

While most Americans fall short of meeting the recommendations included in the Dietary Guidelines for Americans,<sup>1</sup> meal kits may help introduce missing food groups and encourage dietary diversity. The findings of this study indicate that many food groups are present in meal kits, though the amounts of each food group present fail to meet the recommendation. Further research is needed to guide future meal-kit development to correspond with DGA recommendations to promote health and improve nutrition.

### References

- U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).
- Melville NJ, Redmond EC, Baldwin JEB, Evans EW. Meal-Kit Use in the United Kingdom: Implications for Food Safety. *Food Prot Trends*. 2022;42(6):567-71.
- U.S. Department of Agriculture. [ChooseMyPlate.gov](https://www.myplate.gov/eat-healthy/what-is-myplate) Website. Washington, DC. What is MyPlate. <https://www.myplate.gov/eat-healthy/what-is-myplate>. Accessed June 25, 2023.