Chapter 2

Key Nutrient Analysis Concepts

CHAPTER OBJECTIVES

After reading this chapter, you will understand how to:

- **Define the Child Nutrition (CN) Database.**
- **Explain what constitutes a school week for a nutrient analysis.**
- **Discuss weighted and simple averages**
- **Summarize the yield factor method used for recipe analysis**
- **Explain the difference between whole foods and fortified foods.**

Overview of the Software Database (including the Child Nutrition (CN) Database)

A critical element in meeting SMI nutrition standards depends on having an accurate nutrient analysis. In cooperation with the USDA's Agricultural Research Service (ARS), FNS developed the CN Database to provide accurate, reliable, and centralized nutrient data for analysis of school meals. All USDA-approved software includes the CN Database.

The **CN Database** contains the nutrient profiles of food items commonly used in SFAs/schools and contains only those nutrients that are monitored by the Child Nutrition Program. The CN Database includes:

- Selected food items from the USDA Nutrient Database for Standard Reference;
- USDA commodity foods;
- Nutrient profiles for USDA quantity recipes for schools;
- Many brand name commercially prepared foods provided by food industry; and
- Yield information from USDA's *Food Buying Guide for Child Nutrition Programs*.

These files are *locked*, which means the information in these files may be accessed and copied, but may not be altered by the local user.

Database requirements for USDA-approved nutrient analysis software programs:

- Software must contain the most current version of the CN Database.

- The software may include brand name food items with nutrient data that has been supplied directly to the software vendors by food industry. The user must be able to differentiate between food industry items in the CN Database and food industry items added by the software developers.

- Foods and recipes added by the software vendor or by the user must have the source designated as "Local."

All Foods Are Included in the Nutrient Analysis

All food or menu items offered in a reimbursable meal, *including condiments*, are included in the nutrient analysis and count toward meeting the nutrient standards for the meal. However, foods that are considered *Foods of Minimal Nutritional Value* (FMNV) under 7 CFR Parts 210 and 220, Appendices B (i.e., chewing gum, soda water, water ices, and certain candies) are included in the nutrient analysis calculations only if they are used as a garnish in a menu item. For example, even though jelly beans are a food of FMNV, a menu planner would include them in the nutrient analysis if they are used as a cake decoration.

Appendix C provides more information on Foods of Minimal Nutritional Value.

What about foods served to students with special needs?

1. When food or menu item substitutions are made for students with special dietary needs, the meals **are not** included in the nutrient analysis.
2. If food or menu items served to students with special dietary needs are the same menu items served to entire age/grade group, only modified for texture, the food or menu items **are** included in the nutrient analysis.

Nutrients Calculated "As Consumed" or "Edible Form"

YIELD FACTOR METHOD

A method for nutrient analysis of recipes that requires that each raw recipe ingredient be converted and entered in the recipe database as ready-to-serve or cooked. If the database does not include raw to cooked yield for a specific ingredient, use the yield data from USDA's *Food Buying Guide for Child Nutrition Programs* to convert from the raw to the cooked form.

The basis of nutrient analysis for SMI is to calculate the nutrients in the finished food products as they will be consumed by students. It is important to note that recipes for nutrient analysis, including the ingredients used in the recipes, may be very different from the standardized recipe that the cook uses in food production. This is because many of the ingredients in a standardized food production or cook's recipe may be in the "as purchased" form such as raw ground beef, raw chopped onions and raw green pepper for a meatloaf – which will then be prepared or cooked from scratch in the school kitchen(s). The nutrient content of foods may vary greatly depending on the method of preparation. As foods cook, they may lose moisture and nutrients. All ingredients in recipes prepared "from scratch" must be entered into the computer using the Yield Factor Method to account for the changes in nutrient values due to preparation and cooking.

The Yield Factor Method will be explained in more detail during the discussion of the procedures for entering recipes in Chapter 7 .

Nutrients Averaged over the School Week

For SFAs/schools using NSMP and for State agencies monitoring Food-Based Menu Planning, menus will be analyzed over a school week.

Definition of School Week

For the purposes of nutrient analysis, a school week represents a normal school week of five consecutive days. To accommodate weeks that are either shorter or longer than the five consecutive days, the analyzed week should contain a minimum of three consecutive days and a maximum of seven consecutive days. When school lunches are offered less than three times in a week, combine these menus with either the previous week's menus or the subsequent week's menus.

For example, during the week of Thanksgiving, an SFA/school serves lunch only two days that week. Those two days could be combined with either the week before or the week after Thanksgiving. The same situation might arise around other holiday periods or during the first and last weeks of school.

Weighted Averages

National School Lunch Program (NSLP) and School Breakfast Program (SBP) regulations require *weighted averages* for conducting nutrient analyses.[1] A weighted nutrient analysis gives more weight to nutrients in popular foods that are more frequently *selected* by students. Weighted analyses allows for a greater contribution of nutrients to come from menu items that are selected more often and less nutrient contribution from those menu items selected less often. More discussion of weighted averages will be provided in Chapter 8.

Simple Averages

Simple averages is an alternate method for projecting the numbers of each menu or food item, in contrast to weighted averages, which gives more weight to nutrients that are more frequently selected by students. For nutrient analysis, simple averages means giving equal weight to every item offered to the student within each menu choice. More discussion of simple averages will be provided in Chapter 8

Option to Combine Breakfast and Lunch Analyses

Regulations permit only those SFAs using nutrient-based menu planning approaches and weighted nutrient analysis to combine the breakfast and lunch analyses. State agencies

CAUTION
Combining the nutrient analyses of breakfast and lunch may make it more difficult to identify and target menus that need modification to meet the nutrient standards.

[1] Public Law 108-265 (June 30, 2004) amended section 9 (f)(5) of the Richard B. Russell National School Lunch Act by extending the waiver of the requirement to conduct weighted averages through September 30, 2009.

may not combine breakfast and lunch analyses when evaluating food-based menu planning approaches.

Some USDA-approved software programs have the capability of combining breakfast and lunch analyses. The analysis for breakfast and lunch can be combined *only if weighted averaging is done* for both breakfast and lunch because the combined analysis must be proportionate to the levels of participation in lunch and breakfast.

If the menu planner uses weighted analysis and would like to combine the breakfast and lunch analyses, then software with this capability should be selected. Contact your software representative or review the information at USDA's Web site to determine if a particular software program includes this function.

Whole Foods Versus Fortification

SMI nutrient standards do not include all nutrients for which Recommended Dietary Allowances (RDA) have been established – only protein, calcium, iron, vitamin A, and vitamin C. Menus that include foods that naturally contain sufficient quantities of these nutrients generally contain sufficient levels of other essential nutrients. Thus, monitoring protein, calcium, iron, vitamin A, and vitamin C levels using the nutrient standards should ensure that a child's *overall nutrient needs* are met.

CAUTION
Excessive use of highly fortified foods to meet nutrient targets may result in shortages of some essential nutrients.

USDA cautions that the use of *highly fortified foods* to meet the nutrient standards may result in inadequate levels of other essential nutrients. In addition, research indicates that for optimum health, humans need biologically active compounds (including flavenoids, carotenoids, and other phytonutrients) that occur in whole foods (e.g., fruits, vegetables, and whole grains). This research is still in its early stages and there is much to be learned, but we do know that whole foods

are needed to obtain adequate levels of the full range of essential nutrients.

Therefore, USDA is committed to the dietary guideline that recommends meals be comprised of a **variety** of foods that provide naturally occurring nutrients, rather than formulated foods which have been artificially fortified. Whole foods are necessary to obtain essential nutrients.