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Research and Professional Briefs

Nutritional Quality of Emergency Foods

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ABSTRACT

Food insecurity is associated with increased risk of diet-related disease. A key initiative of the Oregon Food Bank is to improve nutritional quality of emergency foods. The purpose of this study was to categorize products distributed by the Oregon Food Bank into food groups by pounds (as-purchased) and MyPyramid units (edible portion). Using a "MyPyramid Day" to describe the number of units required daily from each food group for a 2,000-kcal/day reference diet, we calculated the number of MyPyramid Days distributed in 1 year (2004-2005) by the Oregon Food Bank. Of the 36.4 million pounds of food analyzed, 24.2 million (66%) fell into MyPyramid (grains, fruit, vegetables, meat/beans, and milk), with the remaining categorized as condiments/baking supplies (2.48 M, 7%), discretionary calories (2.91 M, 8%), combination foods (2.87 M, 8%), and variety/unknown (3.96 M, 11%). Fewer MyPyramid Days were distributed (in millions of MyPyramid Days) from the fruit (5.85 M) and milk (5.95 M) groups than were foods from the grains (10.02 M), meat/beans (9.99 M), and vegetables (10.25 M) groups. A MyPyramid Day is useful for measuring distribution of foods from MyPyramid food groups. However, the utility of these results depends on whether a food assistance network has the capacity to improve quality through increased distribution of foods (either from donations or purchases) from specific food groups. Results can be used to identify foods to target for increase in food resource development efforts to improve the overall nutritional quality of foods provided to recipients.

J Am Diet Assoc. 2011;111:573-576.

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Manuscript accepted: October 18, 2010.

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0002-8223/$36.00

doi: 10.1016/j.jada.2011.01.007

Currently, food insecurity is a serious problem in Oregon and the nation. The term *food insecurity* is defined by the Life Science Research Office Federation of American Societies for Experimental Biology as "any time nutritionally adequate and safe foods or the ability to acquire acceptable foods is limited" (1). Food insecurity was present in an average of 11.4% of US households and 11.6% of Oregon households during 2004-2006, the period in which this study was done. In 2008, 13.1% of Oregon households were food-insecure, compared to 12.2% nationally. Households with children experience food insecurity at almost twice the rate of households without children, regardless of the year examined (2).

Food-insecure populations experience higher rates of chronic conditions, such as heart disease, diabetes, high blood pressure, and obesity (3,4). These same populations are associated with inadequate nutrient intakes of vitamin C, potassium, fiber, fruits, and vegetables (5); poorer overall health; and functionality limitations (6). Children living in food-insecure households experience increased rates of hospitalization (7), iron-deficiency anemia (8), behavior problems (9), depression and suicide attempts (10), and poor academic and social development trajectories (11). Based on these findings, reducing the rates of food insecurity is an urgent public health concern.

Individuals living in food-insecure households employ a progressive series of coping strategies to maintain a food supply, including buying food in bulk, eating the same thing all week long, and utilizing low-cost ingredients in meals. Households increase their food supply through private and public food assistance. Participation by low-income households in US Department of Agriculture Food and Nutrition Service programs like the Special Supplemental Food Program for Women, Infants, and Children; School Breakfast and Lunch; and the Supplemental Nutrition Assistance Program (formerly food stamps) is associated with increased consumption of key nutrients, lower body mass index (calculated as kg/m^2), and a reduction in the severity of poverty (12-14). Hungry families can turn to emergency foods when other sources of food assistance have been exhausted. Working families, children, and individuals who are elderly, retired, or disabled are most likely to need emergency food (15). Nationally, >2 billion pounds of emergency foods are distributed yearly to >25 million Americans, with about 36% of recipient households reporting at least one household member younger than 18 years of age (15).

Food banks are charitable organizations that receive large quantities of food from wholesalers, manufacturers, individuals, and government sources and distribute these resources to smaller organizations like food pantries and soup kitchens. These agencies use cash donations from individuals and businesses to purchase needed foods and

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invite donations of foods in short supply. Food pantries differ from food banks because they are smaller and supply foods to clients on a direct-service level. Receipt of emergency foods is strongly associated with food insecurity: food-insecure homes are 17 times more likely to use food pantry services than food-secure homes (16).

The quantity of foods distributed and the vulnerability of the population relying on these foods suggests attention to nutritional quality is warranted. In the past, emergency food nutrition analysis efforts have primarily been focused on the nutritional assessment of individual food boxes. To date, only one study has explored nutritional quality based on inventory data (17). The Food Bank of Delaware evaluated pounds of emergency food obtained during a 4-month period. Using an outcome measure they termed *people provided the minimum recommended*, researchers determined, by food group, the minimum number of individuals they could serve with foods received through the Food Bank. During the study year, Food Bank of Delaware provided the least number of people the minimum recommended from the milk group and the greatest number from the vegetable group (17). Analysis of food bank inventories for nutritional quality, rather than individual food boxes provided on a direct-service level by food pantries, provides food banks with baseline and ongoing data on emergency food warehouse inventory.

Between 1995 and 2005, emergency food distribution in Oregon increased >200%. The Oregon Food Bank is the primary provider of emergency foods for the state, distributing approximately 37 million pounds of food to local agencies between July 1, 2004 and June 30, 2005 (18). The Oregon Food Bank network experienced an additional 15% increase in demand for food boxes between July 1 and December 31, 2008.

Recently, the United States has experienced an economic downturn that resulted in increased unemployment rates. Participation in the Oregon Supplemental Nutrition Assistance Program has increased by 35% and >240,000 Oregonians eat meals from an emergency food box each month. Requests by individuals and families for emergency food assistance increased 14% in 2009 and >20% in some Oregon counties. The need to provide food-insecure households with access to nutritious foods is more urgent than ever. Given the growing volume of food distributed and number of nutritionally vulnerable families served, a goal to increase nutritional quality of those foods is prudent.

The purpose of this study was to develop a procedure for analyzing nutritional quality of emergency foods in Oregon and elsewhere. The procedure uses a measurement unit called a "MyPyramid Day," based on the 2005 Dietary Guidelines for Americans (DGA) (19) and MyPyramid (20). Building on work done by the Food Bank of Delaware, which analyzed food bank inventory by food group (17), our study objectives were to refine existing food bank inventory analysis procedures to establish baseline MyPyramid Day measures of distribution from food groups by an emergency food network and analyze food products distributed during a 1-year period by the Oregon Food Bank warehouse.

METHODS

The 2005 DGA and MyPyramid were used as the food group standards for the analysis of 36.4 million pounds of food distributed by the Oregon Food Bank in a 1-year period (2004-2005). Totals were measured daily by trained Oregon Food Bank inventory staff, using standard inventory tracking database software and calibrated scales. Each item was assigned to one of nine food groupings: five groups from MyPyramid (Grains, Fruit, Vegetables, Milk, and Meat/Beans) and four additional groups: Variety (miscellaneous canned, boxed, and fresh foods, food group unknown), Condiments (including baking supplies, coffee, and tea), Discretionary (desserts, soda, and snack foods), and Combination (noodle casseroles, soups and one-dish meals). Although Combination and Variety foods (and to a lesser degree, Condiments and Discretionary) likely contain ingredients that contribute to the five MyPyramid foods, inventory lists lacked sufficient detail to quantify the contribution(s). Therefore, they were not included in the five food groups.

MyPyramid food units were converted from as-purchased form into edible portion. For example, every pound of raw, bone-in/skin-on turkey yields 0.53 lb of edible, cooked turkey meat. Totals for MyPyramid food groups were calculated in edible portions, using units of measure from MyPyramid. Cups/cup-equivalents were used to quantify foods from the fruit, vegetables, and milk food groups, while ounces/ounce-equivalents were used for grains and meat/beans food groups. Using turkey as an example, 0.53 lb (edible portion) of turkey is approximately 9 oz, or 9 MyPyramid units from the meat/beans food group (21,22).

A 2,000-kcal reference diet was selected to generate information about the mix of MyPyramid foods distributed. A unit of measure defined as a MyPyramid Day was used to describe the number of units needed from each MyPyramid food group for the reference diet per day. The requirements for 1 day included 6 oz/oz-equivalents grains, 2 cups/cup-equivalents fruit, 2.5 cups/cup-equivalents vegetables, 3 cups/cup-equivalents milk, and 5.5 oz/oz-equivalents meat/beans. Foods from the four additional food groups were calculated in as-purchased pounds only. Percentages of foods by as-purchased weight were generated for MyPyramid foods (collectively), Variety, Condiments, Discretionary, and Combination, and were expressed as a percent of the total as-purchased pounds.

RESULTS AND DISCUSSION

Of the 36.4 million pounds of food distributed from the Oregon Food Bank warehouse in 1 year, about 24.2 million as-purchased pounds (66%) were from the five MyPyramid food groups. About 12.2 million as-purchased pounds (34%) were Variety, Condiments, Discretionary, and Combination foods (Figure 1). Among the MyPyramid food groups, fruit and dairy were distributed in smaller quantities than meat/beans, grains, and vegetables (Figure 2).

Although MyPyramid helps American's individualize the volume of food needed from each food group according to age, sex, and activity level, there is no one common unit of measure for all food groups (eg, cups). A MyPyramid

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