Selection of adult multivitamin/mineral products for comprehensive analytical nutrient content study for the Dietary Supplement Ingredient Database (DSID)

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DSID Dietary Supplement Ingredient Database — A U.S. Government Initiative

Abstract 530.10

DSID Overview

The Nutrient Data Laboratory (NDL) at the U.S. Department of Agriculture is collaborating with the Office of Dietary Supplements at the National Institutes of Health, the National Center for Health Statistics at the Centers for Disease Control and Prevention, and the National Institute of Standards and Technology (NIST) to develop the Dietary Supplement Ingredient Database (DSID), an analytically supported database of dietary supplement ingredient information. With the high prevalence of dietary supplement use in the U.S., evaluating the actual composition of these products has become important in order to obtain accurate dietary intake information for research purposes[1].

Multivitamin/mineral (MVM) products were chosen for the initial studies because these dietary supplements are most commonly reported in the National Health and Nutrition Examination Survey (NHANES)[2].

More information is available at www.ars.usda.gov/dsid

Pilot Study Accomplishments

Pilot studies have been conducted to:

- Develop procedures for assessing current NHANES dietary supplement information, market share and sales channel information for development of sampling plans;
- Develop protocols for purchasing and shipping of products and analytical samples;
- Identify qualified laboratories and laboratory methods for handling and analysis of samples and to assess quality control procedures for the analysis of dietary supplement products; and
- Determine whether a systematic relationship exists between label values and analyzed values for nutrients in MVM products and assess the variability for analytical nutrient values among products labeled at the same level.

Objectives of this Analytical Adult Multivitamin/mineral (MVM) Study

- To provide nationally representative estimates for priority nutrients in commonly reported adult MVM products
- To assess variability in specific products based upon a geographic and channel sampling plan

Method to Identify Representative Dietary Supplement Products

An independent marketing firm was consulted to provide data regarding general population usage of MVM products. The current market data, collected in May 2006, included data from about 5050 respondents who had been pre-identified as MVM users from the firm's existing panel of 55,000 adults. The questionnaire is summarized below.

U.S. Population Multivitamin Usage Questionnaire (Summary)

(Screener Question 1) Which of the following products have you used in the past 6 months? Please select all that apply. ***[If "multivitamins" was not selected, the questionnaire process was terminated for that respondent.]***

Question 1. Please indicate which of the following brands of multivitamins/minerals you have used in the past 6 months. A multivitamin/mineral is defined as a supplement containing 3 or more vitamins or minerals. Please select all that apply. ***[150 brands plus "other" were listed.]***

Question 2. (Asked if more than one brand was chosen in Question 1.) Which of the following brand of multivitamins/minerals is your primary brand? Please select only one response. ***[The same 150 brands plus "other" were listed.]***

Question 3. Thinking about the primary brand of multivitamins you just chose, please indicate where you most often purchase this multivitamin/mineral. Please select only one response. ***[9 market channel choices were listed.]***

Question 4. You mentioned _____ is the primary multivitamin/mineral brand you use. Please indicate which type of multivitamin/mineral the brand is. Please select only one response. ***[Choices on questionnaire included Standard Adult, High Potency, Mature/Senior, Womens, Mens, and "other".]***

Market Share Data Results and Applications

Market Channel Summary

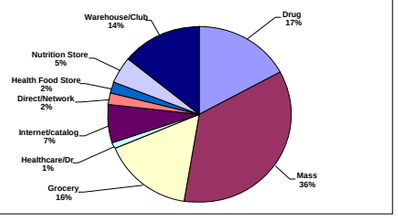
Data results from the questionnaire are:

i. nationally representative of the U.S. population and weighted to U.S. census

ii. statistically valid to +/-1.4% at the 95% confidence level.

Distribution channels were reported by purchasers of adult MVMs in proportions shown in Figure 1.

Figure 1. Market Share Percentages by Channel for Adult MVM Products



Use of Market Share Data

•Identification of specific products

After data collection, each product brand and type named in the survey was matched to a specific product name. For example, for "brand QRS" and "mature" named by a respondent, "QRS Senior Multi" was identified to purchase.

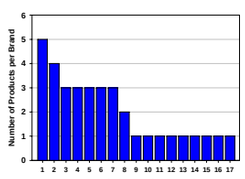
•Comparison with 2 national surveys to determine products for study

These market-share data for adult MVM products were ranked by product and compared to prevalence and frequency of intake from the NHANES 2001-02 and the Multiethnic Cohort (MEC) study of supplements reported in Hawaii and California[3], to assure that the most commonly reported products in these national surveys were included in this analytical adult MVM study.

Products per brand

The resulting list of 35 products in the study represent over 55% of the reported adult MVM products in the U.S. according to the national market-share data. Figure 2 shows the number of brands and products within a brand that were chosen for this study.

Figure 2. Distribution of Products per Brand among 35 Commonly Reported Adult MVM Products



•Determination of market share per product and by channel

Locations in six different areas of the country were identified for purchase of each of the 35 identified products. A statistically based sampling frame for the collection of representative samples at each location was developed. The market-share data obtained from the questionnaire were used to determine the market share for each brand. Within each brand the market share by channel was then determined. The market-share for each brand in this group was between 1 and 25% of the total market share for adult MVMs, with the exception of 1 product that was included due to its prominence in the MEC survey.

Sampling Plan Discussion

Each brand showed a brand-specific distribution of market channels. The location pickups that were assigned are shown in Table 1 using one brand as an example.

Table 1. Brand "A" Sampling Plan

Channel	Channel Examples	Channel Market Share for Brand A	Number of Samples from Channel	Specific Store Chosen for Brand A Purchase	Geographic Assignment
Mass Merchandiser	K-Mart, Target, Meijer	39%	2	Wal-Mart Target	Texas Minnesota
Grocery Store	Cub, Rainbow, Giant	26%	2	Safeway Kroger	California Virginia
Drug Store	Rite-Aid, Longs	21%	1	CVS	Georgia
Warehouse/ Club Store	BJ's, Sam's, United	12%	1	Costco	Maryland
Nutrition Store	GNC, Vitamin Shoppe	2%	0	NA	NA
Internet/ Catalog	Puritan's Pride	0	0	NA	NA
Health Food Store	Wild Oats, Whole Foods	0	0	NA	NA
Direct/Network	Amway, Shaklee	0	0	NA	NA
Healthcare Practitioner	local doctor	0	0	NA	NA

Products were purchased in each of the six locations and sent to NDL. Samples (n=208) were repackaged at NDL and shipped to qualified contract laboratories in 14 shipments with a planned distribution of products and lots between batches. Twenty-two nutrients were analyzed using validated methods and rigorous quality control measures. The 11 vitamins analyzed were folic acid, vitamin C, riboflavin, thiamin, niacin, vitamin B6, vitamin B12, retinol, beta-carotene, vitamin E (alpha-tocopherol), and vitamin D. The 11 minerals analyzed were calcium, iron, phosphorus, potassium, copper, selenium, chromium, manganese, magnesium, zinc, and iodine. Results of the laboratory data are being evaluated, comparing the analytical value for each nutrient in each product lot to the labeled level.

Future Plans

Results from this analytical study will be used to determine actual content per nutrient for each product and estimate the variability within and among products. Regression analysis will be applied to analytical results to evaluate its potential for estimating nutrient levels in adult MVM products reported in NHANES. Additional analytical sampling may be conducted to develop or confirm regression equations. Factors and patterns in product descriptors and in nutrient data will be studied to determine what MVM characteristics can be used to identify additional categories to optimize extrapolation of data.

Statistical applications of the data will be used for planning future studies.

A comprehensive relational database will be developed as a platform for the release of the DSID, incorporating the needs of researchers and other major stakeholders in a publicly accessible format.

References

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