

The Dietary Supplement Ingredient Database (DSID): Labeled nutrient distribution in children's multivitamin/mineral (MVM) products

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Abstract

The Nutrient Data Laboratory (NDL) at the USDA investigated the nutrient content of children's MVMs for the Dietary Supplement Ingredient Database (DSID). The National Health and Nutrition Examination Survey (NHANES) 2005-06 was the primary source for identifying products for this study. Based on the reported 147 children's MVMs in the 2005-06 survey, 66 products, representing over 70% of the children's MVM weighted frequencies, were identified for analysis. The number of products in the DSID study containing each of 22 nutrients, and the percentage of products at each labeled level for each nutrient, were compared to the NHANES data subset, to assess the applicability of DSID analytical results to reported MVMs in NHANES. The most commonly labeled levels were the same in both data sets for 20 of the 22 nutrients. For 17 vitamins and minerals, the percentage of product labels containing these nutrients differed by <10% between these two data sets. The percentages of products in the DSID study containing beta carotene, retinol, folic acid, magnesium, and iodine were 11 to 24% higher per nutrient than in NHANES. These differences were mainly due to changing market trends and over sampling of products with high mineral content for analysis. Analytical results for final application to NHANES will be weighted to adjust for these differences. Funding: USDA/ARS & NIH/ODS.

Introduction

The Nutrient Data Laboratory, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, has been working with the Office of Dietary Supplements, National Institutes of Health and other federal agencies to plan and develop a Dietary Supplement Ingredient Database (DSID) to evaluate levels of ingredients in dietary supplement products. The DSID is funded, in large part, by the ODS. The first major product of this research was an analytical study of adult MVMs released in April 2009 as the DSID-1 and is accessible at <http://www.dietarysupplementdatabase.usda.nih.gov/>.

This report compares label information for products purchased for the children's MVM study to the products reported in FDA 2005-06 dietary supplement data file. The objective of this report is to substantiate the applicability of statistical estimates derived from analytical results to reported children's MVMs in NHANES.

Methods and Materials

- 147 children's MVMs products, defined as supplements containing 3 or more vitamins and classified as "infant/pediatric" formulations in NHANES were taken from the NHANES 2005-06 subset.
- Children's MVM products were selected by referencing current market data and NHANES files to identify representative products. Study products represented over 70% of the children's MVM market share according to NHANES weighted frequencies.
- Six purchase locations were designated according to the statistical sampling frame in the states of AL, CA, MI, MO, NY, and OK. Multiple lots of retail products were purchased nationwide and other products were purchased via multi-level marketing and the internet, to obtain 66 total products.
- Samples were chemically analyzed for up to 22 nutrients.
- The percentage of products in the DSID study containing each of 22 nutrients, and the percentage of products at each labeled level for each nutrient were compared to the NHANES subset.

References

1. <http://www.cdc.gov/nchs/nhanes/> Accessed November 2008

Results

Table 1 shows the most common level and minimum and maximum labeled amounts per nutrient per serving for each data set.

- The most common labeled levels were the same in both data sets for all nutrients except retinol and vitamin E.
- For vitamin E, the 2 most common levels were the same in both data sets.
- The most common levels for total vitamin A (beta carotene plus retinol) were the same in both data sets although the most common level for retinol was 1250 IU in the DSID study compared to 2500 IU in the NHANES subset.
- In addition to the nutrients listed, potassium was analyzed in both studies. It was typically present at very low levels in a small number of MVM products.

Figure 1 compares the percentage of children's MVM products containing each nutrient in the two data sets. For 17 vitamins and minerals, the percentage of product labels in each data set containing these nutrients differed by <10%.

- The percentage of products in the DSID study containing beta carotene, retinol, folic acid, iodine, and magnesium were 11 to 24% higher than in the NHANES subset.
- A higher percentage of DSID study products contained certain nutrients compared to the NHANES subset due to planned preference for selection of products with more minerals, in order to obtain more analytical data for the study.

As a specific nutrient example, Figure 2 compares the percentage of products at labeled calcium levels for the DSID study and the NHANES subset. The range of calcium levels for the two data sets was nearly identical. The NHANES subset had more labeled levels for calcium than the products in the DSID study.

Table1: Labeled Nutrient Amount in Children's MVM Products in DSID Study and NHANES 2005-06

Nutrient	Study	Most Common Amount Per Serving	%DV ¹ of Most Common Amount	Range of Labeled Amount Per Serving	Nutrient Unit
Vitamin A	DSID	2500	100	1500 - 5000	
Beta Carotene	DSID	1250	*	65 - 5000	IU
Retinol	DSID	1250	*	1250 - 5000	
Vitamin A	NHANES	2500	100	50 - 5000	
Beta Carotene	NHANES	1250	*	250 - 5000	IU
Retinol	NHANES	2500	*	50 - 5000	
Vitamin C	DSID	60	150	15 - 300	mg
	NHANES	60	150	3 - 300	
Vitamin D	DSID	400	100	2.5 - 400	IU
	NHANES	400	100	1 - 400	
Vitamin E	DSID	15	150	5 - 30	IU
	NHANES	30	300	0.5 - 120	
Thiamin	DSID	1.5	214	0.5 - 5	mg
	NHANES	1.5	214	0.3 - 12	
Riboflavin	DSID	1.7	212	0.6 - 5	mg
	NHANES	1.7	212	0.3 - 5	
Niacin	DSID	13.5	150	2.5 - 25	mg
	NHANES	13.5	150	2.5 - 49	
Vitamin B-6	DSID	2	285	0.4 - 5	mg
	NHANES	2	285	0.3 - 5	
Folic Acid	DSID	400	200	10 - 400	µg
	NHANES	400	200	10 - 400	
Vitamin B-12	DSID	6	200	1.5 - 10	µg
	NHANES	6	200	0.6 - 135	
Calcium	DSID	100	12.5	3 - 200	mg
	NHANES	100	12.5	0.04 - 200	
Iron	DSID	18	180	2 - 18	mg
	NHANES	18	180	2 - 18	
Phosphorus	DSID	100	12.5	7.5 - 100	mg
	NHANES	100	12.5	10 - 133.3	
Iodine	DSID	150	214	12.8 - 150	µg
	NHANES	150	214	12.8 - 770	
Magnesium	DSID	20	10	2 - 50	mg
	NHANES	20	10	2 - 100	
Zinc	DSID	12	150	1.5 - 15	mg
	NHANES	12	150	2 - 16	
Selenium	DSID	20	*	3.75 - 70	µg
	NHANES	20	*	7.5 - 60	
Copper	DSID	2	200	0.05 - 2	mg
	NHANES	2	200	0.05 - 3	
Manganese	DSID	1	*	0.05 - 2	mg
	NHANES	1	*	0.05 - 2	
Chromium	DSID	20	*	5 - 60	µg
	NHANES	20	*	7.5 - 60	

¹ %DV for most common levels for each nutrient were calculated based on FDA labeling guide for the ages "less than 4 years".

* %DV for this nutrient is not established for less than 4 years old.

Figure 1: Percentage of Children's MVM Products Containing Each Nutrient in DSID (n=66) and NHANES 2005-06 (n=147) Studies

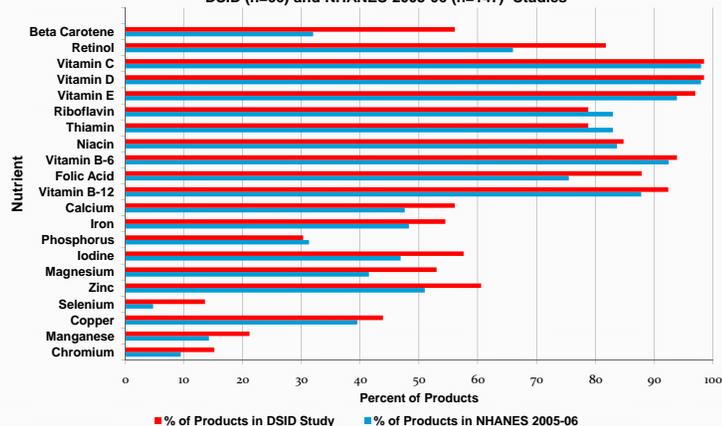
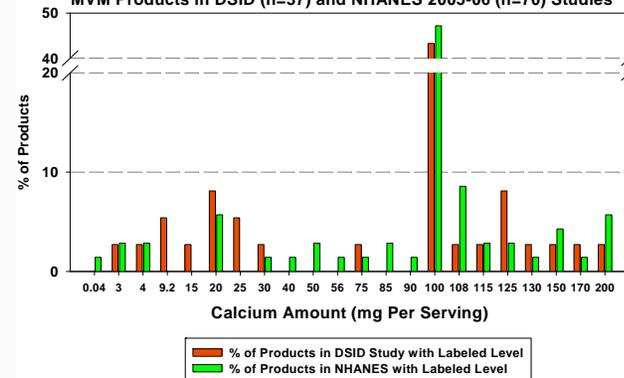


Figure 2: Distribution of Labeled Calcium Levels in Children's MVM Products in DSID (n=37) and NHANES 2005-06 (n=70) Studies



Conclusions and Future Plans

- Statistical estimates derived from analytical data from the DSID study are applicable to the children's MVM products in NHANES 2005-06 for these reasons:
 - The most common labeled levels in both data sets are similar;
 - The percentage of product labels containing each nutrient in both data sets are similar for most nutrients;
 - The ranges of labeled levels are similar in both data sets for most nutrients.
- Children's MVM analytical results will be weighted by market share, as was done for statistical analysis of adult MVM data in DSID-1. Regression analysis with labeled levels as the independent variable will apply DSID analytical results to appropriate children's MVM products in NHANES 2005-06 and 2007-08.