

Variability of the Nutrient Composition of Multivitamin Supplements

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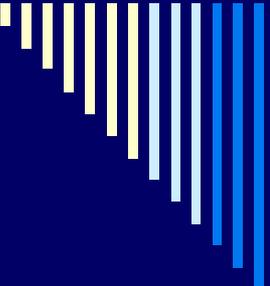
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Cancer Research Center of Hawaii

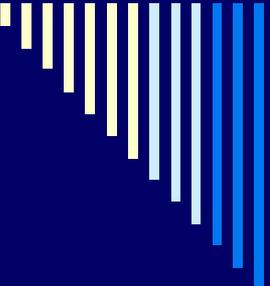
University of Hawaii





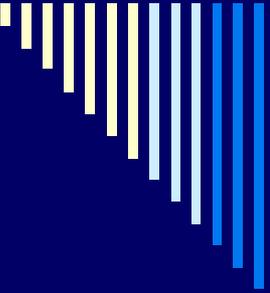
Objectives

- To examine the variability in nutrient composition among multivitamin supplements.
 - To examine the variability in nutrient intakes from multivitamins supplements among users.
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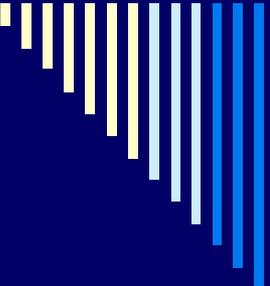
Subjects

- In 1993-1996, the Hawaii-Los Angeles Multiethnic Cohort was established to study diet and cancer.
 - The cohort consists of >215,000 adults aged 45-75 years.
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Subjects

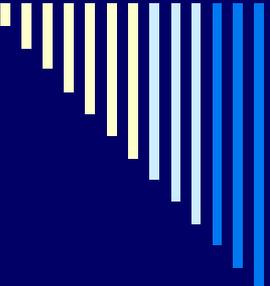
- Of participants from Hawaii, 86,733 completed a follow-up questionnaire in 1999-2001.
 - Japanese Americans (44%), Caucasians (33%), Native Hawaiians (13%)
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Multivitamin supplement use among men at the baseline (1993-1996)

- Any supplement – 58%
- **Multivitamin – 48%**
- Vitamin A – 12%
- Vitamin C – 37%
- Vitamin E – 26%
- Beta-carotene – 8%
- Calcium – 15%
- Iron – 8%
- Selenium – 3%

Footnote et al, *Am J Epidemiol* 2003



Multivitamin supplement use among women at the baseline (1993-1996)

- Any supplement – 72%
- **Multivitamin – 56%**
- Vitamin A – 12%
- Vitamin C – 43%
- Vitamin E – 32%
- Beta-carotene – 10%
- Calcium – 44%
- Iron – 14%
- Selenium – 3%

Footnote et al, *Am J Epidemiol* 2003

Multivitamin questionnaire at the follow-up (1999-2001)

8. DID YOU TAKE ANY MULTIVITAMINS OR MULTIVITAMINS WITH MINERALS DURING THE LAST YEAR? (at least once a week)

No Yes



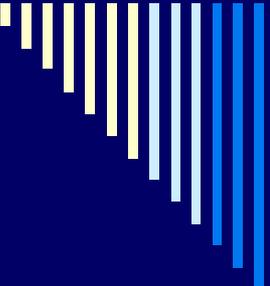
IF YES, WRITE IN THE BRAND AND NAME OF EACH ONE. THEN FILL IN THE CIRCLE OF THE USUAL NUMBER YOU TOOK PER WEEK OR DAY. (you may wish to check the label on the bottle)

Brand (Example: Centrum)	Name (Example: Silver)	AVERAGE USE DURING LAST YEAR				
		1 to 3 a week	4 to 6 a week	1 a day	2 a day	3 or more a day
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supplement Composition Table

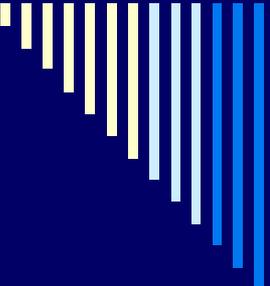
- Based on the label, the nutrient profile of each multivitamin was entered into the Cancer Research Center of Hawaii's Supplement Composition Table (SCT).
- >2700 multivitamin products





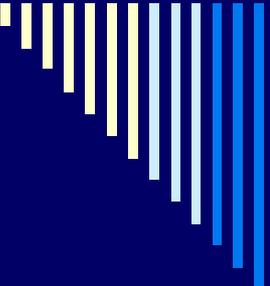
Multivitamin Supplement

- Defined as a product containing 2 or more vitamins out of 13 (vitamin A, B-6, B-12, C, D, E, K, thiamin, riboflavin, niacin, folic acid, pantothenic acid, biotin), with or without minerals.
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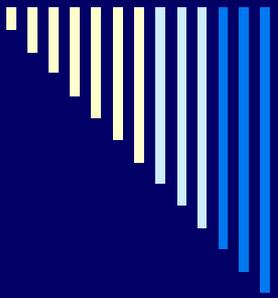
Nutrient intake from supplements

- Frequency of use per day \times the nutrient composition per dose from the SCT for each supplement product
 - Total nutrient intake per day from multivitamins = \sum each nutrient up to 3 supplements reported
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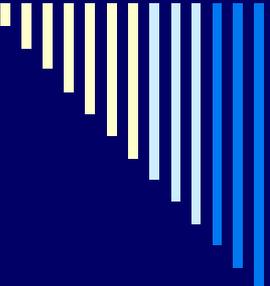


Multivitamin users and products

- 29,044 participants provided complete information on brand name, product name, and frequency of use.
 - A total of 1,465 multivitamin products with minerals (n=1,225, 84%) without minerals (n=240, 16%)
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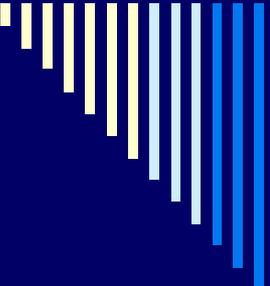
Variability of nutrient composition across products



Vitamin composition of multivitamin products (n=1,465)

Vitamin	10th Pctl	Median	90th Pctl
Thiamin, mg	0	7.5	75
Riboflavin, mg	0	8.3	50
Vitamin B-6, mg	0	6	75
Folate, μg DFE	0	680	850
Vitamin B-12, μg	0	15	125
Vitamin C, mg	0	150	1000

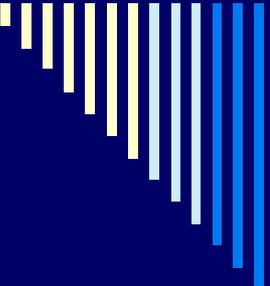
Pctl, percentile; DFE, dietary folate equivalents



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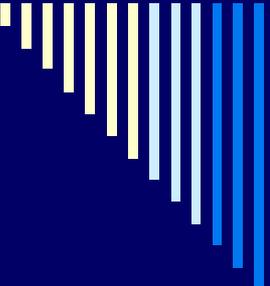
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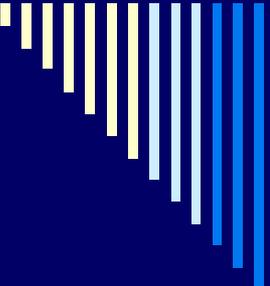
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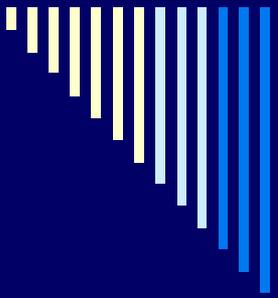
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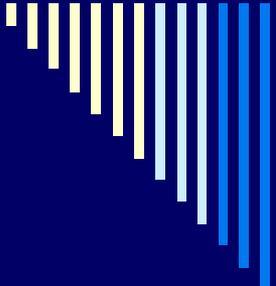


Mineral composition of multivitamin with minerals products (n=1,225)

Mineral	10th Pctl	Median	90th Pctl
Calcium, mg	0	140	600
Iron, mg	0	5	20
Zinc, mg	0	15	25
Selenium, μg	0	25	200



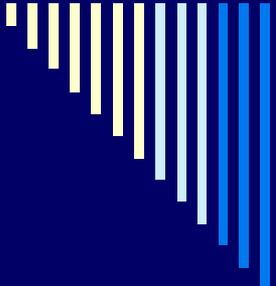
Variability of nutrient intake among users



Daily vitamin intake from multivitamin supplements among users (n=29,044)

Nutrient	10th Pctl	Median	90th Pctl	RDA*
Thiamin, mg	1.1	1.5	30	1.2/1.1
Riboflavin, mg	1.2	1.7	30	1.3/1.1
Vitamin B-6, mg	1.5	3	36	1.7/1.5
Folate, µg DFE	194	680	1020	400
Vitamin B-12, µg	6	25	60	2.4
Vitamin C, mg	43	60	500	90/75

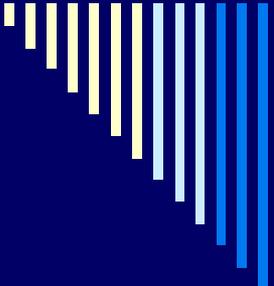
*RDA for men/women aged >51 years



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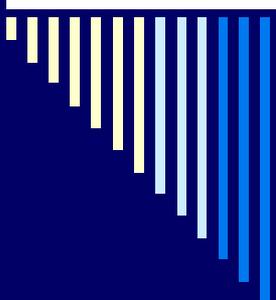
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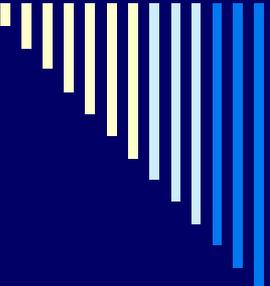
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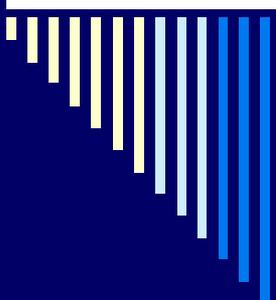
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Daily mineral intake from multivitamin supplements among users (n=29,044)

Nutrient	10th Pctl	Median	90th Pctl	RDA/AI*
Calcium, mg	0	200	450	1200
Iron, mg	0	4	18	8
Zinc, mg	3.6	15	30	11/8
Selenium, µg	0	20	110	55

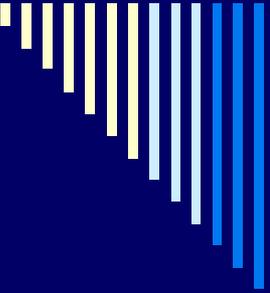
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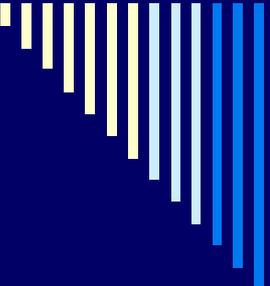
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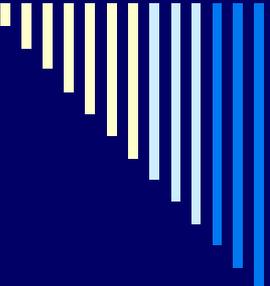
Conclusions

- The composition of multivitamin supplements was highly variable.
 - This variation in composition contributed substantially to the variation in nutrient intakes from multivitamins among users.
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Implication

- To accurately estimate nutrient intakes from multivitamins, brand and product information should be collected so as to identify the exact supplement composition, instead of assuming a uniform nutrient profile.
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More information

Park et al, J Nutr 136:1359-64, 2006

*“Allowing for variations in multivitamin
supplement composition improves nutrient
intake estimates for epidemiologic studies”*
