DIETARY SUPPLEMENT USE AND ITS MICRONUTRIENT CONTRIBUTION DURING PREGNANCY AND LACTATION IN THE UNITED STATES

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Data from 2 Publications

NHANES 2001 - 2014

- Usual total nutrient intakes of pregnant women in the U.S.

Bailey RL, Pac SG, Fulgoni VL, Reidy KC, Catalano PM. 2019, JAMA Network Open 2(6): e195967.

NHANES 1999-2014

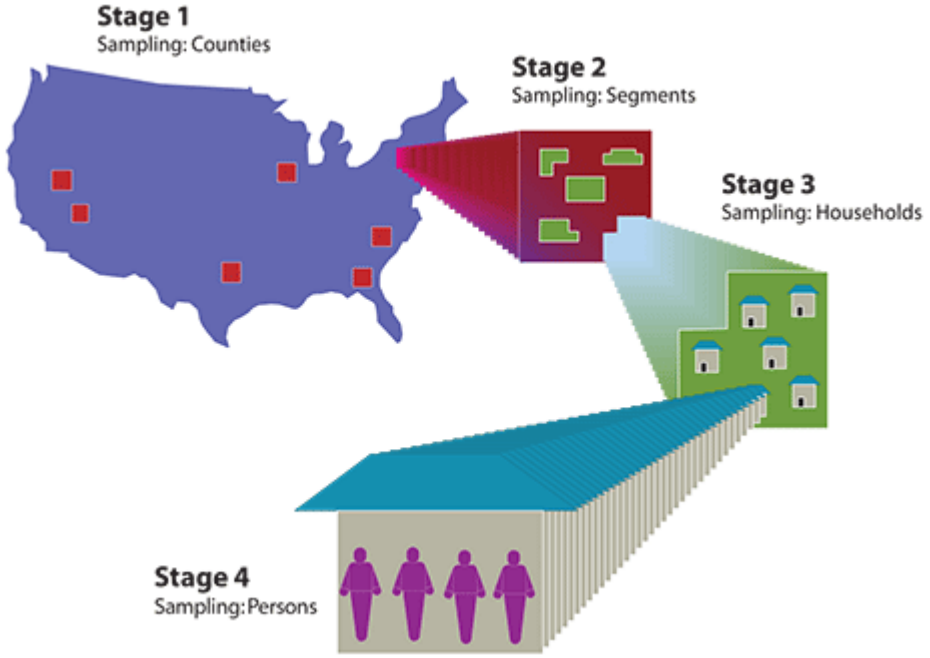
- Dietary supplement use, product type, doses, etc.
  - Pregnant
  - Lactating
  - Not pregnant, not lactating

Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

NHANES Methods

nhanes
The Nation's Mobile Health Survey

- Nationally-representative sample of U.S. residents
- In home interview
  - Demographic and questionnaire collected
  - Product inventory for dietary supplements
- Medical examination center
  - Clinical and24-hour dietary recall
- Follow up telephone call
  - 24-hour dietary recall

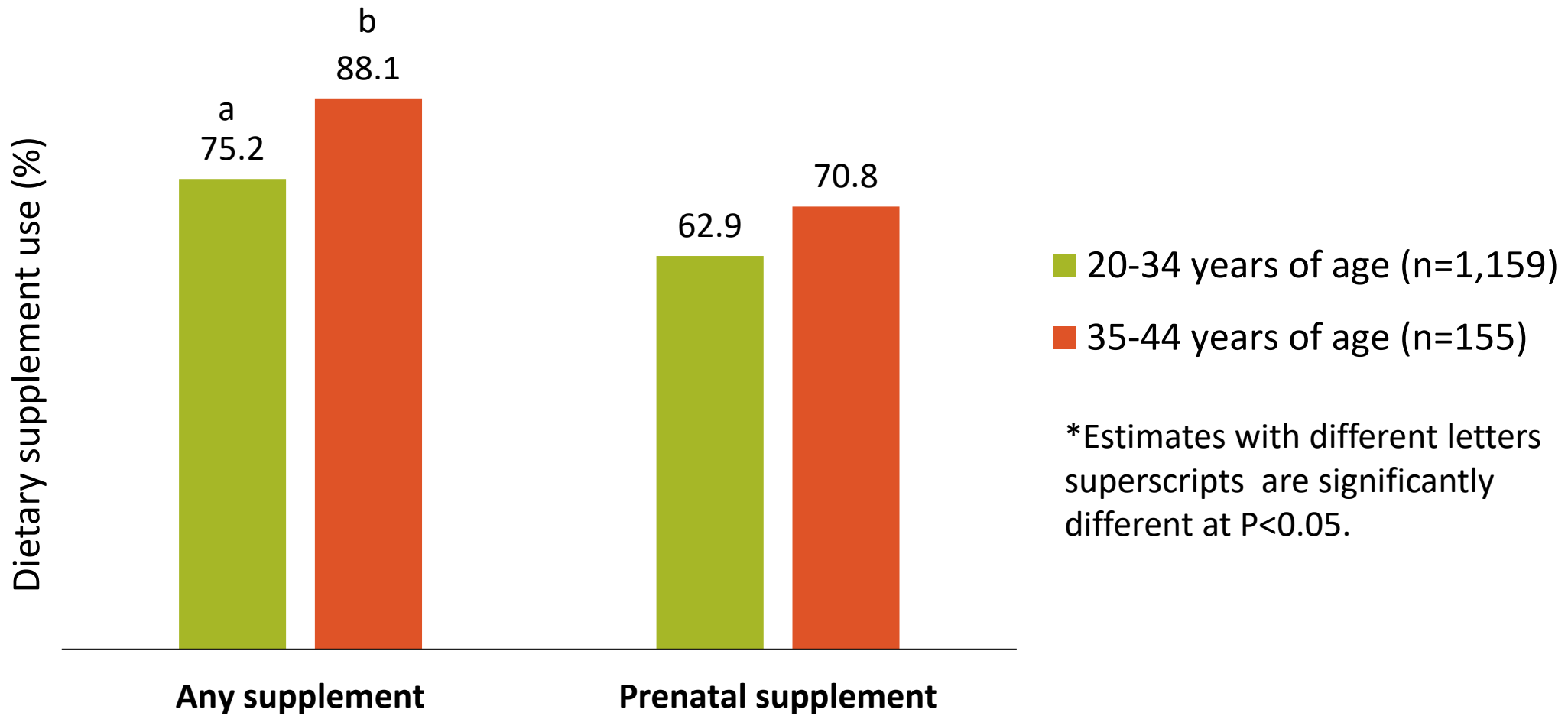


The majority of pregnant and lactating women use dietary supplements

- 77% of pregnant women
- 70% of lactating women
- 45% of non-pregnant, non-lactating women

Bailey et al. (2019), JAMA Network Open 2(6): e195967; Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

Prevalence (%) of dietary supplement use by younger (20-34y) and older (35-44y) pregnant women in the United States, NHANES 1999-2014



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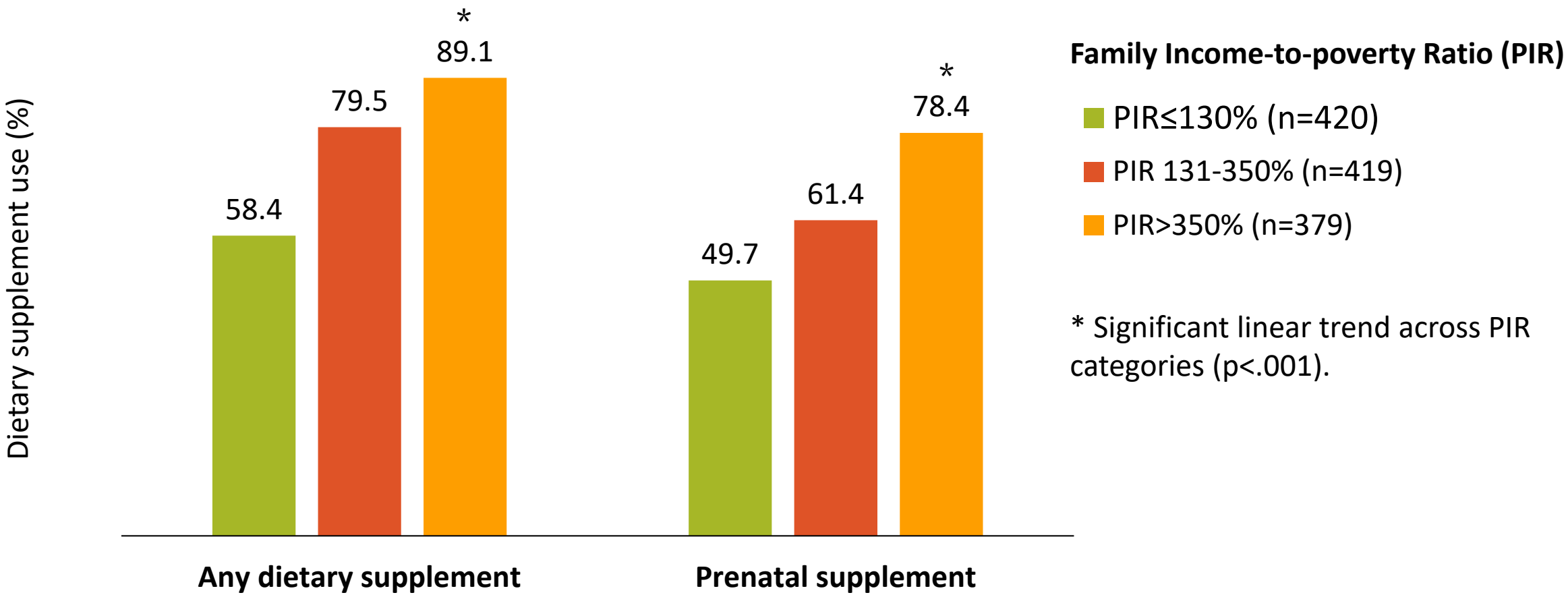
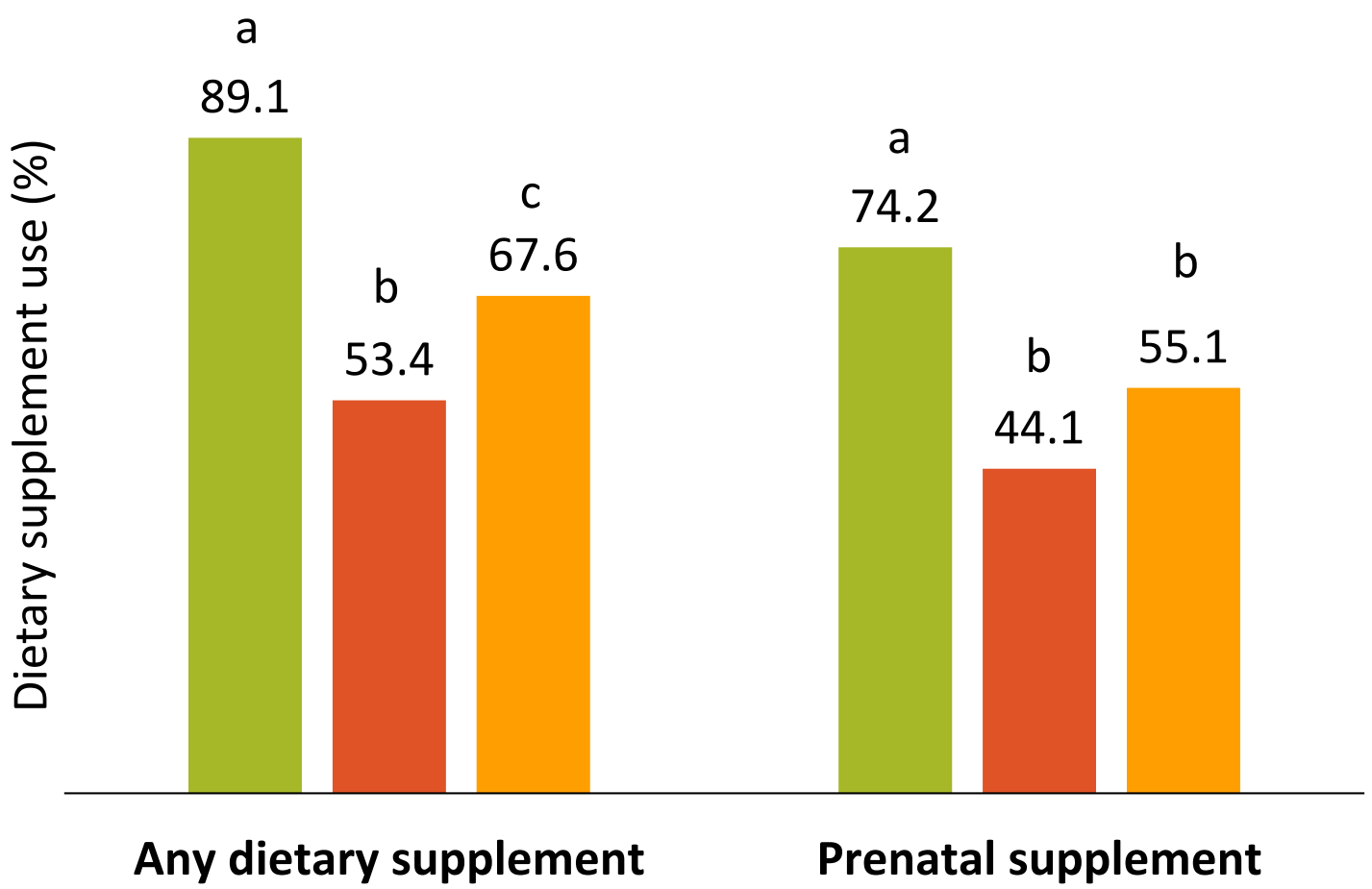
Prevalence (%) of dietary supplement use by family income-to-poverty level among pregnant women (20-44y) in the United States, NHANES 1999-2014



Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

Prevalence (%) of dietary supplement use by Race/ethnicity among pregnant women in the United States, NHANES 1999-2014



Race/ethnicity

- Non-Hispanic white (n=578)
- Non-Hispanic black (n=207)
- Hispanic/Mexican American (n=429)

*Estimates with different letter superscripts are significantly different at P<0.0167

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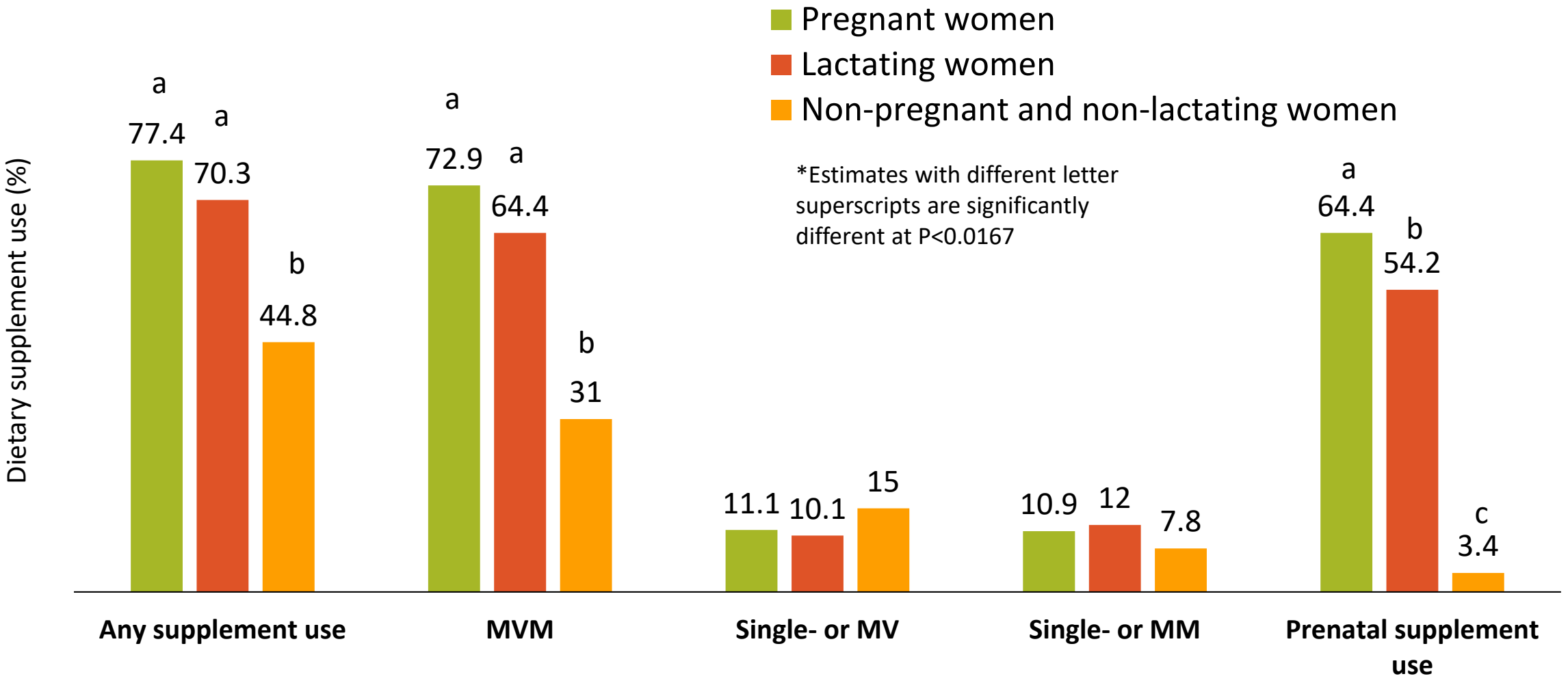
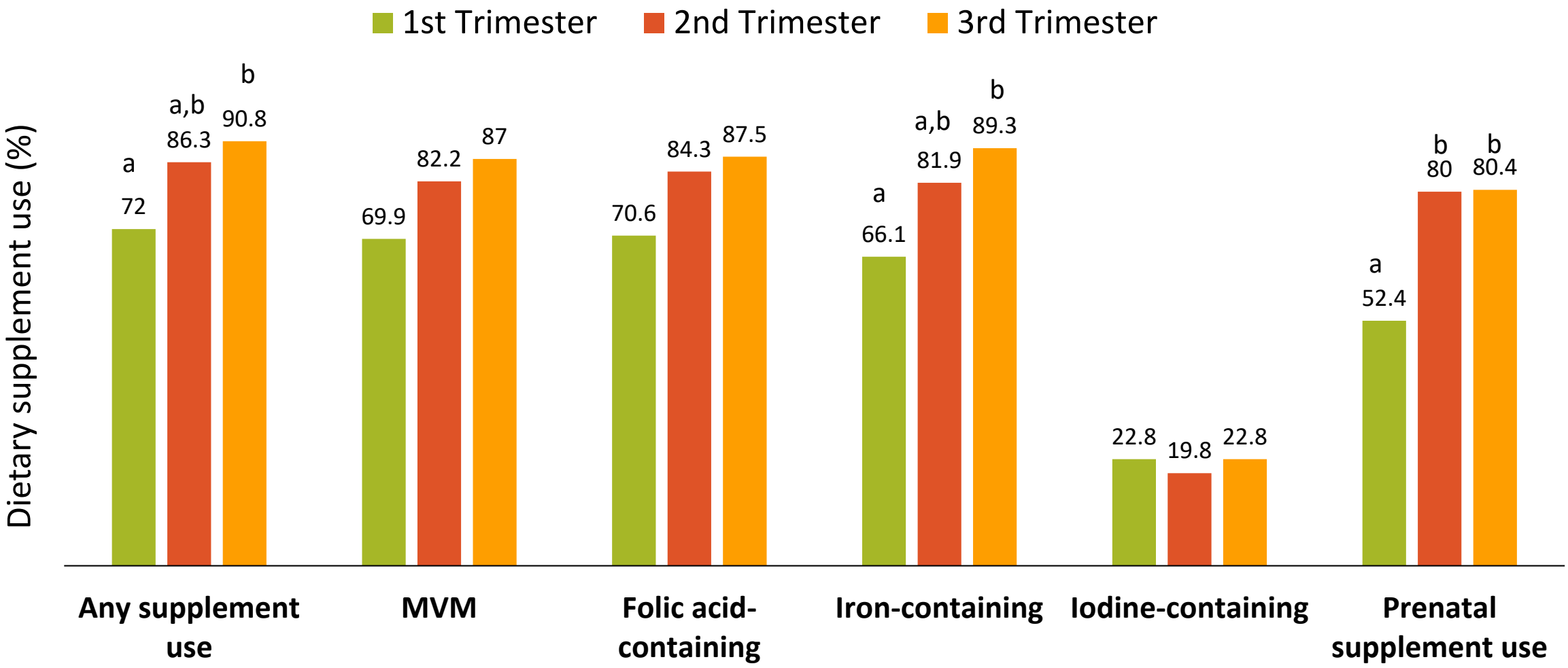
Dietary Supplement Use by women (20-44y) by pregnancy and lactation status in the United States, NHANES 1999-2014



Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

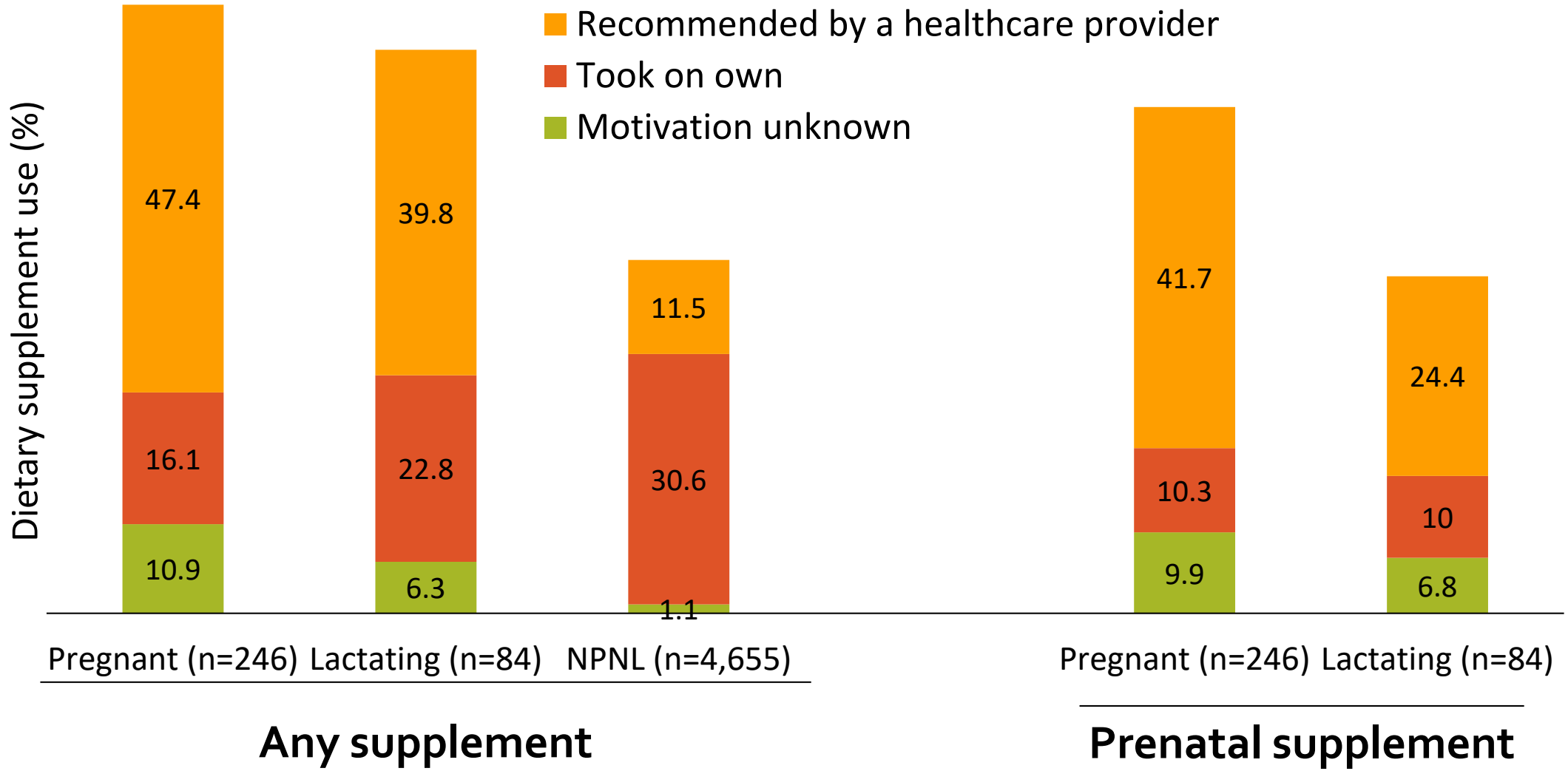
Prevalence of dietary supplement use by trimester of pregnancy among pregnant women (20-44y) in the United States, NHANES 1999-2012 (n=790)



*Estimates with different alphabets are significantly different at P<0.0167

Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

Prevalence of reasons for dietary supplement use among pregnant and lactating women (20-44y) in the US, NHANES 2007-2014 (n=330)



Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

Percentages of women (20-44y) using dietary supplements containing specified **vitamins** by pregnancy and lactation status in the United States, NHANES 1999-2014

	Pregnant women (n=1,314)	Lactating women (n=297)	Non-pregnant and non-lactating women (n=8,096)
Vitamin A	40.3 ± 2.2 [a]	41.6 ± 3.7 [a]	22.0 ± 0.6 [b]
Thiamin	69.4 ± 2.2 [a]	63.7 ± 3.4 [a]	30.4 ± 0.7 [b]
Riboflavin	69.4 ± 2.2 [a]	63.7 ± 3.4 [a]	30.4 ± 0.7 [b]
Niacin	69.6 ± 2.2 [a]	63.9 ± 3.4 [a]	31.2 ± 0.7 [b]
Vitamin B6	72.8 ± 2.1 [a]	65.1 ± 3.4 [a]	32.7 ± 0.7 [b]
Folic acid	73.3 ± 2.1 [a]	65.1 ± 3.4 [a]	32.9 ± 0.7 [b]
Vitamin B12	69.9 ± 2.1 [a]	63.9 ± 3.5 [a]	32.9 ± 0.7 [b]
Vitamin C	73.3 ± 2.0 [a]	64.6 ± 3.4 [a]	35.5 ± 0.8 [b]
Vitamin D	71.7 ± 2.0 [a]	66.8 ± 3.3 [a]	33.1 ± 0.7 [b]
Vitamin E	72.0 ± 2.0 [a]	64.0 ± 3.5 [a]	32.6 ± 0.7 [b]
Choline	4.9 ± 1.1 [a]	7.6 ± 2.1 [a]	5.2 ± 0.3 [a]

Jun S, Gahche JJ, Potischman N, Dwyer JT, Guenther PM, Sauder KA, et al. 2020, Obstetrics & Gynecology. doi: 10.1097/AOG.0000000000003657

Percentages of women (20-44y) using dietary supplements containing specified **minerals** by pregnancy and lactation status in the United States, NHANES 1999-2014

	Pregnant women (n=1,314)	Lactating women (n=297)	Non-pregnant and non-lactating women (n=8,096)
Calcium	68.1 ± 2.2 [a]	62.3 ± 3.2 [a]	32.2 ± 0.7 [b]
Iodine	20.4 ± 1.7 [a]	17.5 ± 2.5 [a]	18.2 ± 0.6 [a]
Iron	72.3 ± 2.0 [a]	65.0 ± 3.3 [a]	28.3 ± 0.7 [b]
Magnesium	28.1 ± 2.1 [a]	26.2 ± 3.8 [a]	26.0 ± 0.6 [a]
Phosphorous	5.2 ± 1.0 [a]	6.2 ± 2.0 [a]	13.3 ± 0.5 [b]
Selenium	9.9 ± 1.2 [a]	11.7 ± 2.7 [a]	21.0 ± 0.6 [b]
Zinc	68.0 ± 2.2 [a]	60.6 ± 3.5 [a]	29.8 ± 0.7 [b]

*Estimates with different alphabets are significantly different at P<0.0167

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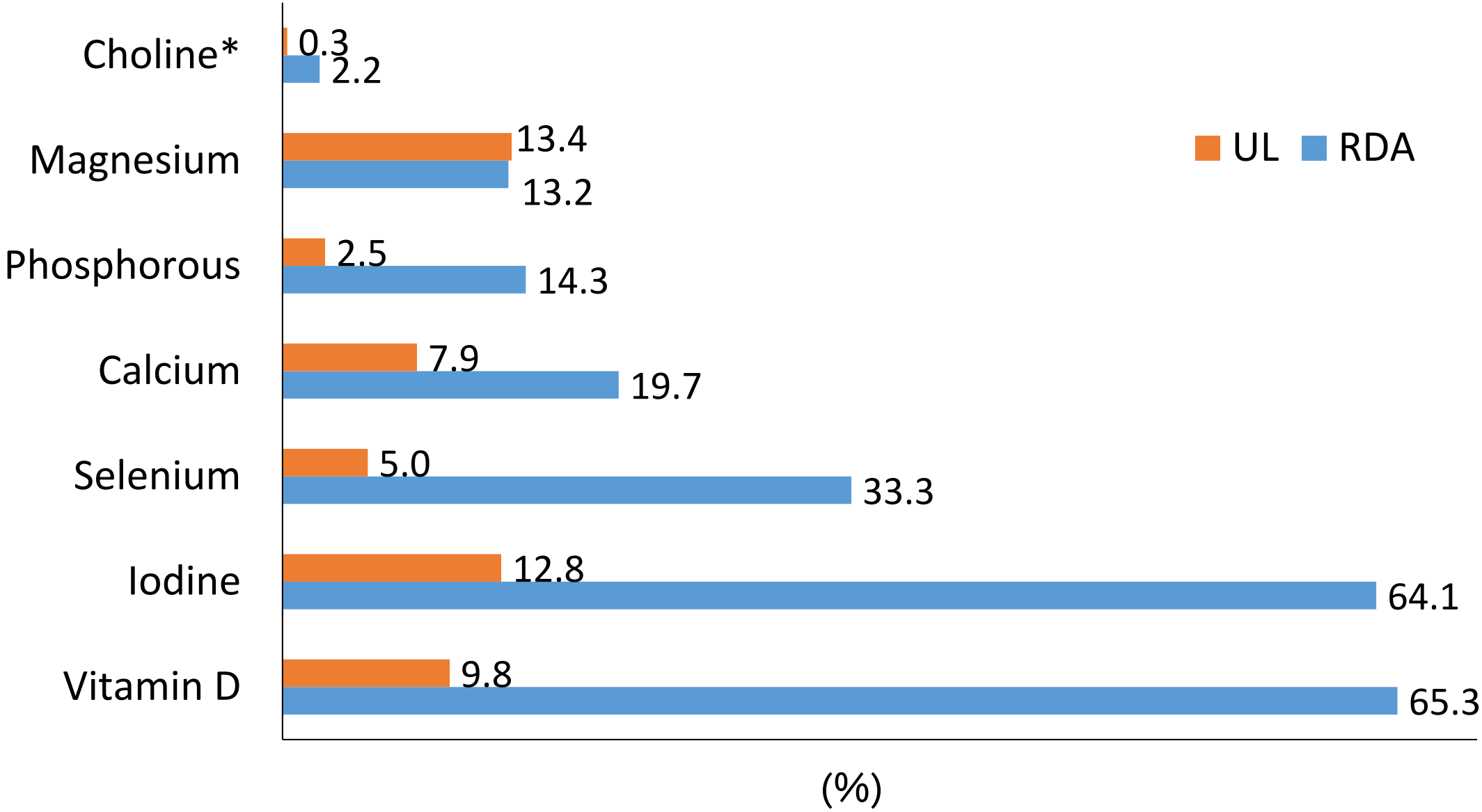
Pregnant women- median intake from supplements, % of RDA and UL



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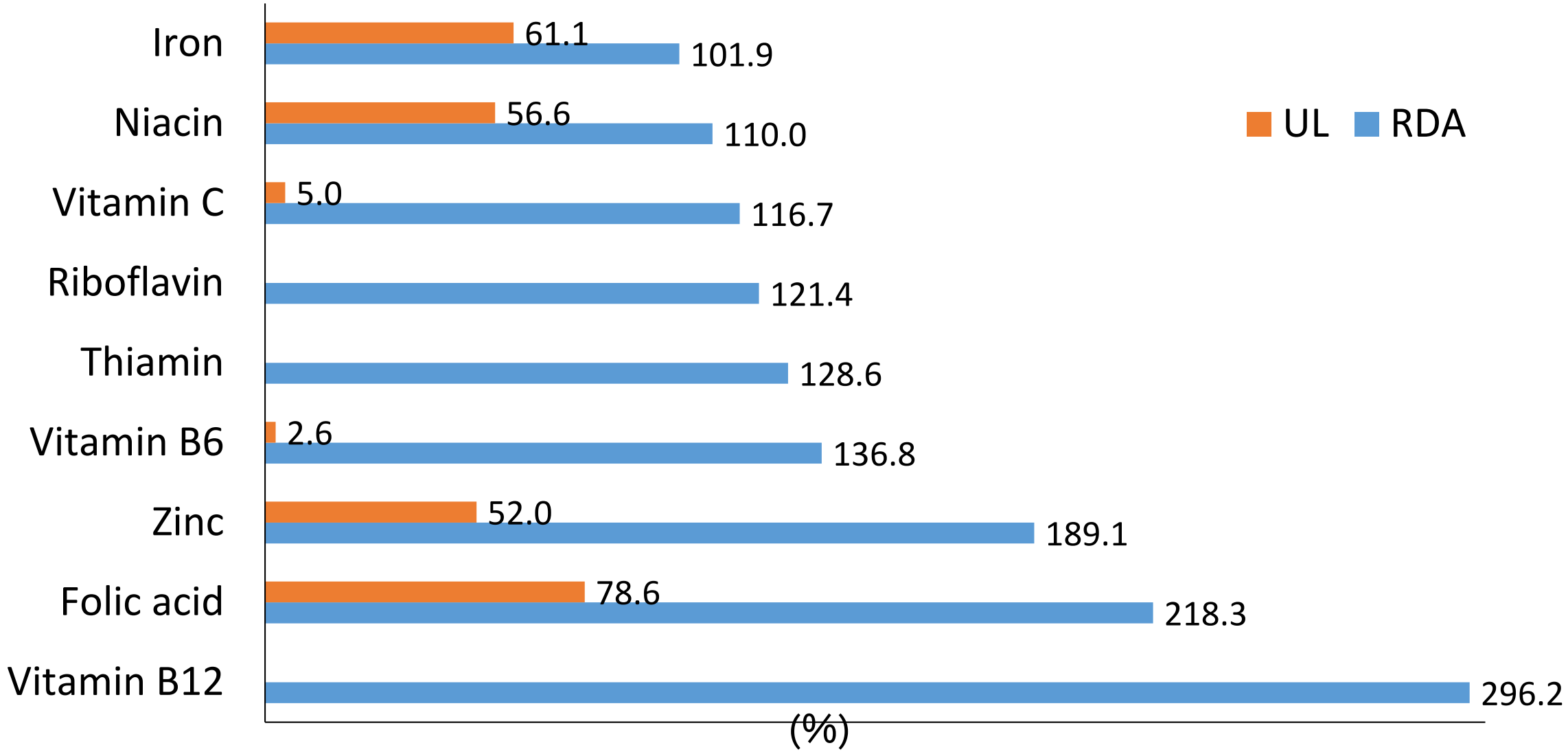
Pregnant women
- median intake from dietary supplements, % of RDA and UL



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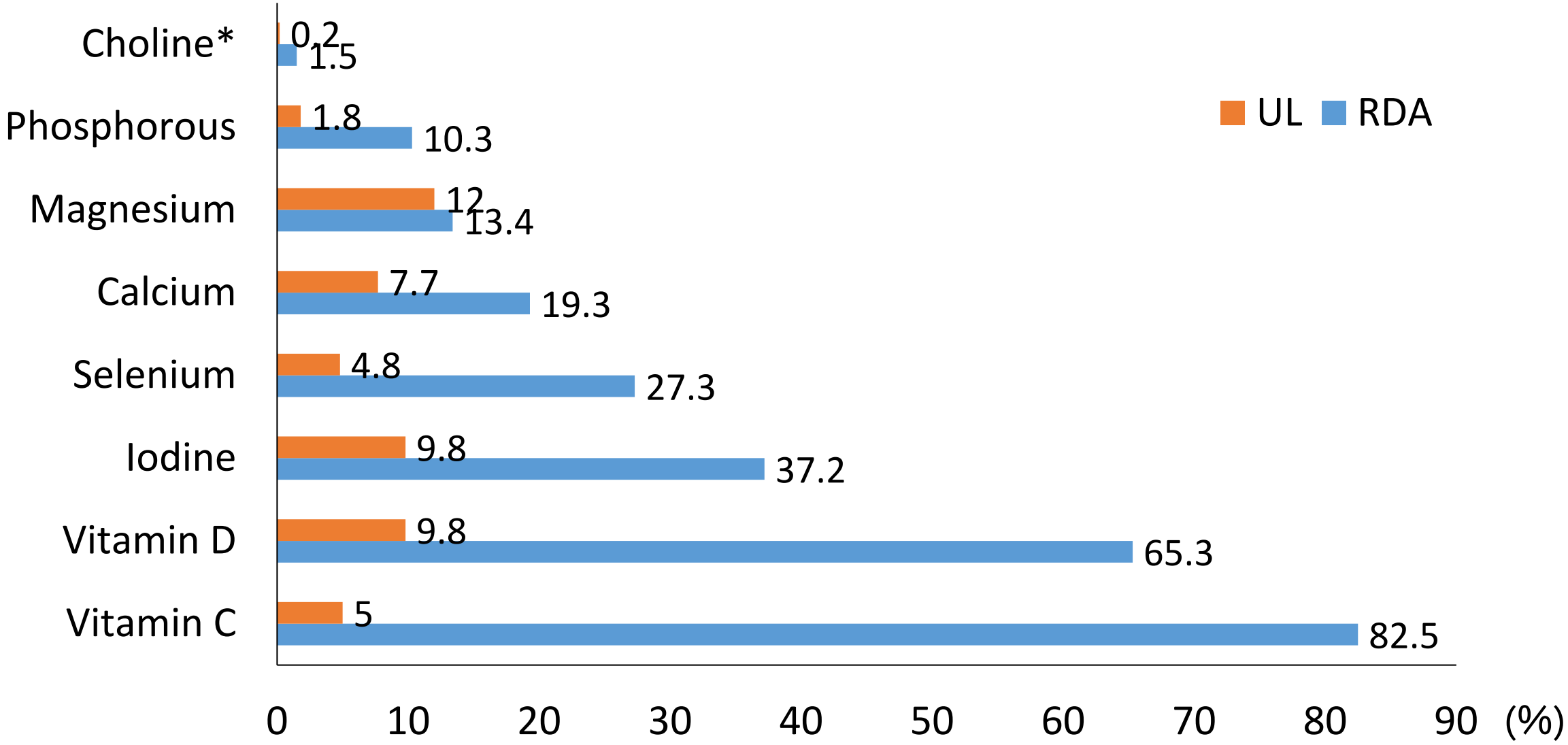
Lactating women
- median intake from dietary supplements, % of RDA and UL



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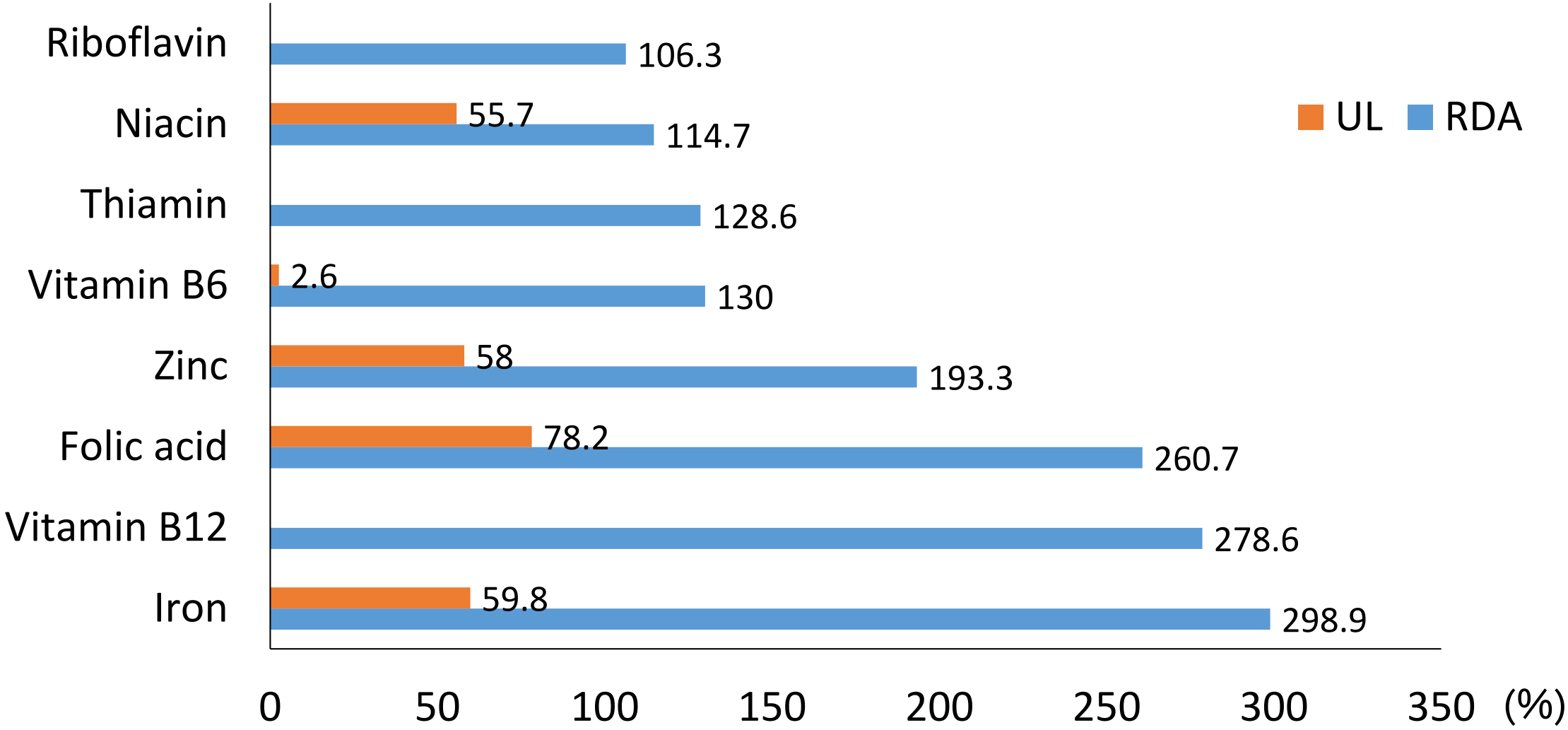
Lactating women
- median intake from dietary supplements, % of RDA and UL



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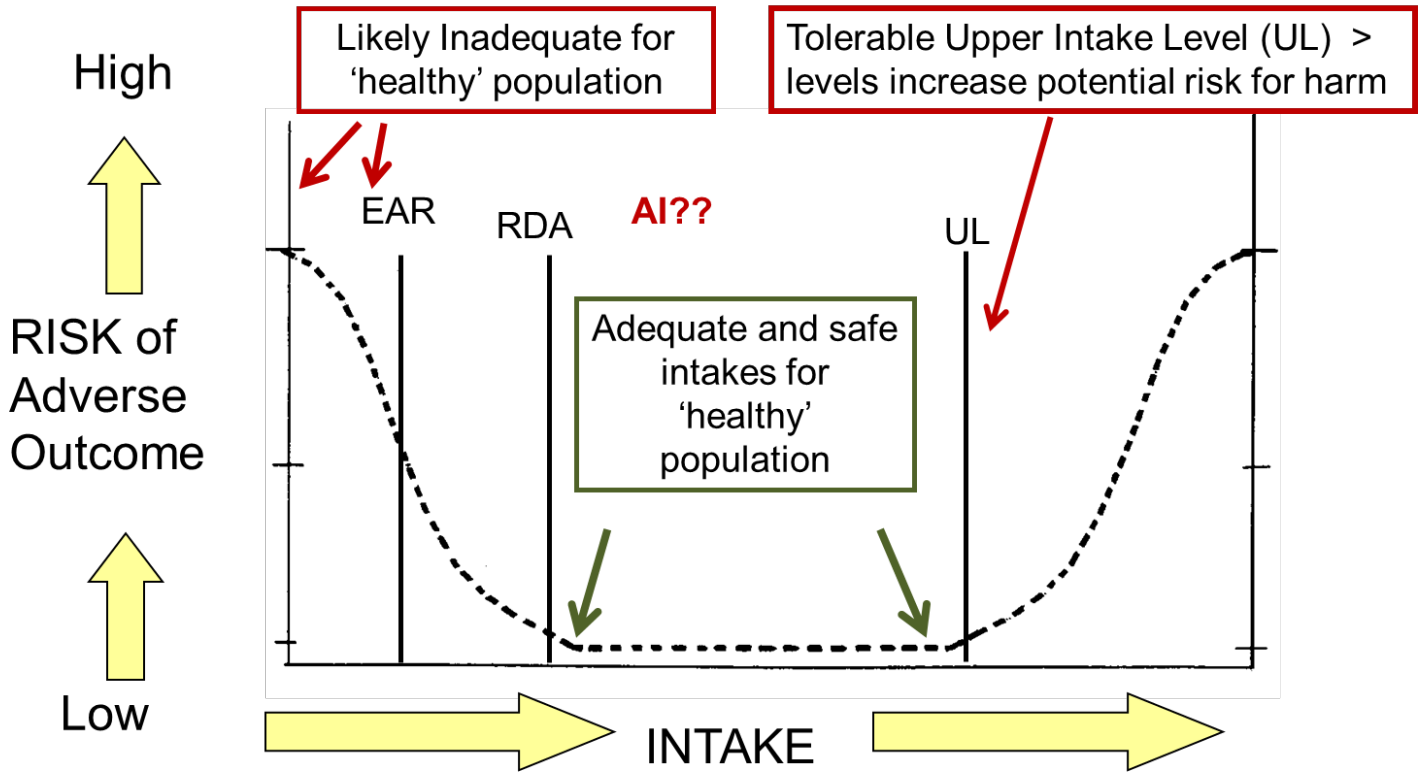
Pregnancy Data NHANES 2001-2014

- Two 24-hour dietary recalls
- National Cancer Institute (NCI) method was used to produce usual intakes and prevalence of meeting/exceeding the DRI
- Estimated Average Requirement (EAR, %<EAR)
  - ✓Adequate Intake (AI, %>AI)
  - ✓Tolerable Upper Intake Level (UL, %>UL)

Adapted from the IOM/FNB: Dietary reference intakes applications in dietary assessment, 2000.



Total usual intakes (foods, beverages, supplements)

% < EAR

- Magnesium (48%)
- Vitamin D (46%)
- Vitamin E (43%)
- Iron (36%)
- Vitamin A (16%)
- Folate (16%)
- Calcium (13%)
- Vitamin C (12%)
- Vitamin B6 (11%)
- Zinc (11%)

% > Adequate Intake

- Vitamin K (48%)
- Potassium (42%)
- Choline (8 %)

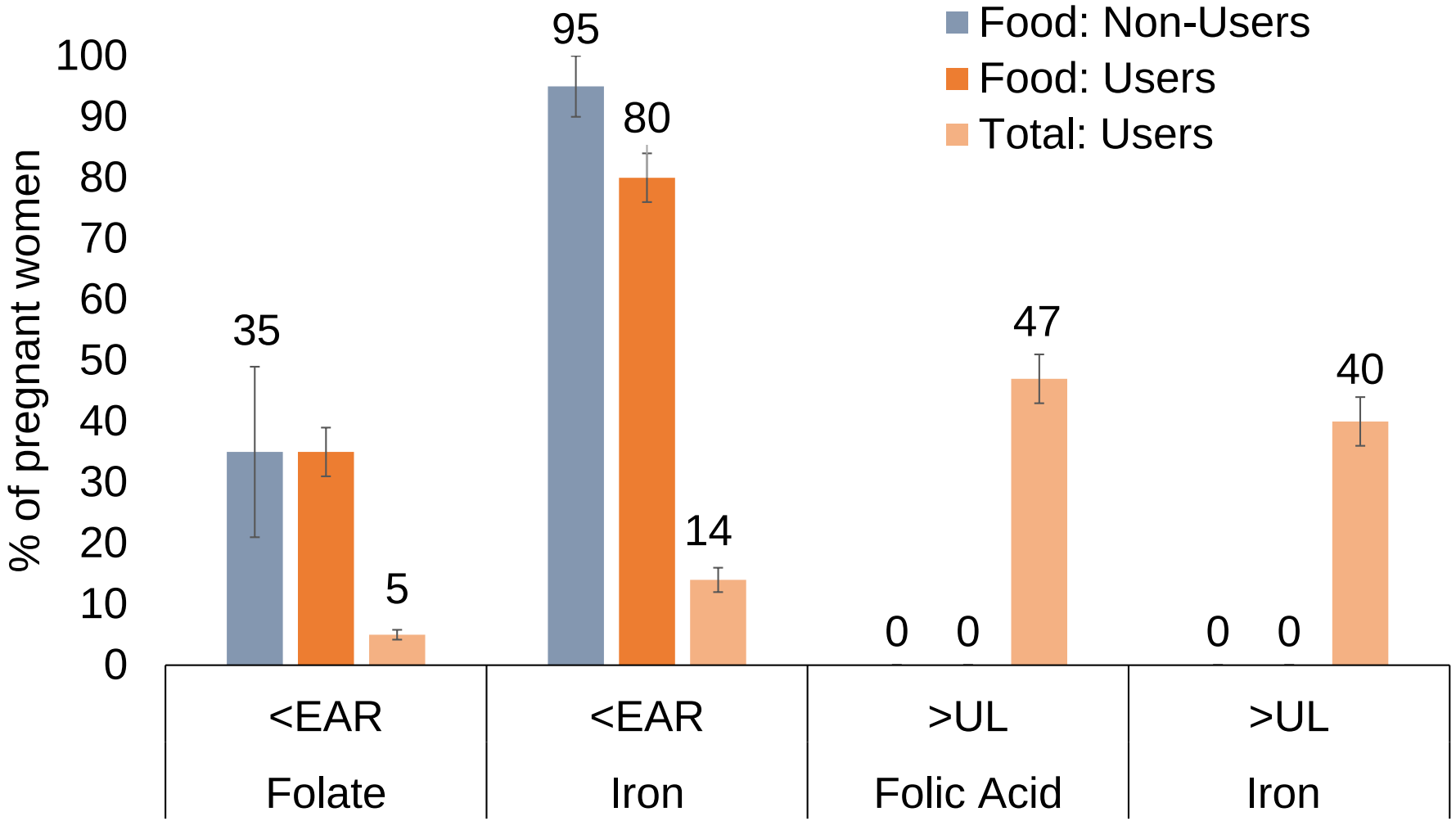
% > UL*

- Sodium (95%)
- Folic Acid (33%)
- Iron (28 %)
- Zinc (7%)
- Calcium (3*)

*** For all nutrients other than sodium UL estimates are for supplement users only**

Bailey et al. (2019), JAMA Network Open 2(6): e195967.

Prevalence (SE) of usual nutrient intake distributions <EAR and >UL for folate/folic acid and iron stratified by dietary supplement use



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Limitations

- Small sample sizes and self-reported data
  - Total intake data for lactating women is largely unknown
- Iodine contributions from foods are not available
  - NHANES 1999-2006: mean urinary iodine content was 148 µg/L, lower than WHO cut off for “insufficiency” (<150 µg/L)

Gahche JJ, Bailey RL, Mirel LB, Dwyer JT. Journal of Nutrition, 2013; 143:872-877.

- Our team did not publish data on omega-3 fatty acid use or other product types
  - 0.6% of childbearing-age women and 7.3% of pregnant women reported use of DHA/EPA dietary supplements NHANES 2003-2014, no differences in DHA/EPA from diet alone

Thompson M, Nicholas H, […], and Nordgren TM. Nutrients. 2019 Jan; 11(1): 177.

Summary and Conclusions

- Most pregnant and lactating women use dietary supplements
- Dietary supplement use varies by age, race/ethnicity, family income, and trimester of pregnancy
- The “doses” of micronutrients provided exhibit considerable variability
- Dietary supplements help consumers meet the recommended targets, but also contribute to potentially excessive intakes for certain nutrients

Summary and Conclusions

- Many pregnant women do not consume enough of key nutrients; specifically iron, potassium, calcium, magnesium, zinc, and vitamins A, C, D, E, K, B6, folate, and choline - even with the use of dietary supplement.
- Almost all pregnant women are at risk of excessive consumption of sodium, and many are at risk of excessive consumption of folic acid and iron, especially among dietary supplement users.
- Improved dietary guidance to help pregnant [and potentially lactating] women meet and not exceed dietary recommendations is warranted.

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Shinyoung Jun

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