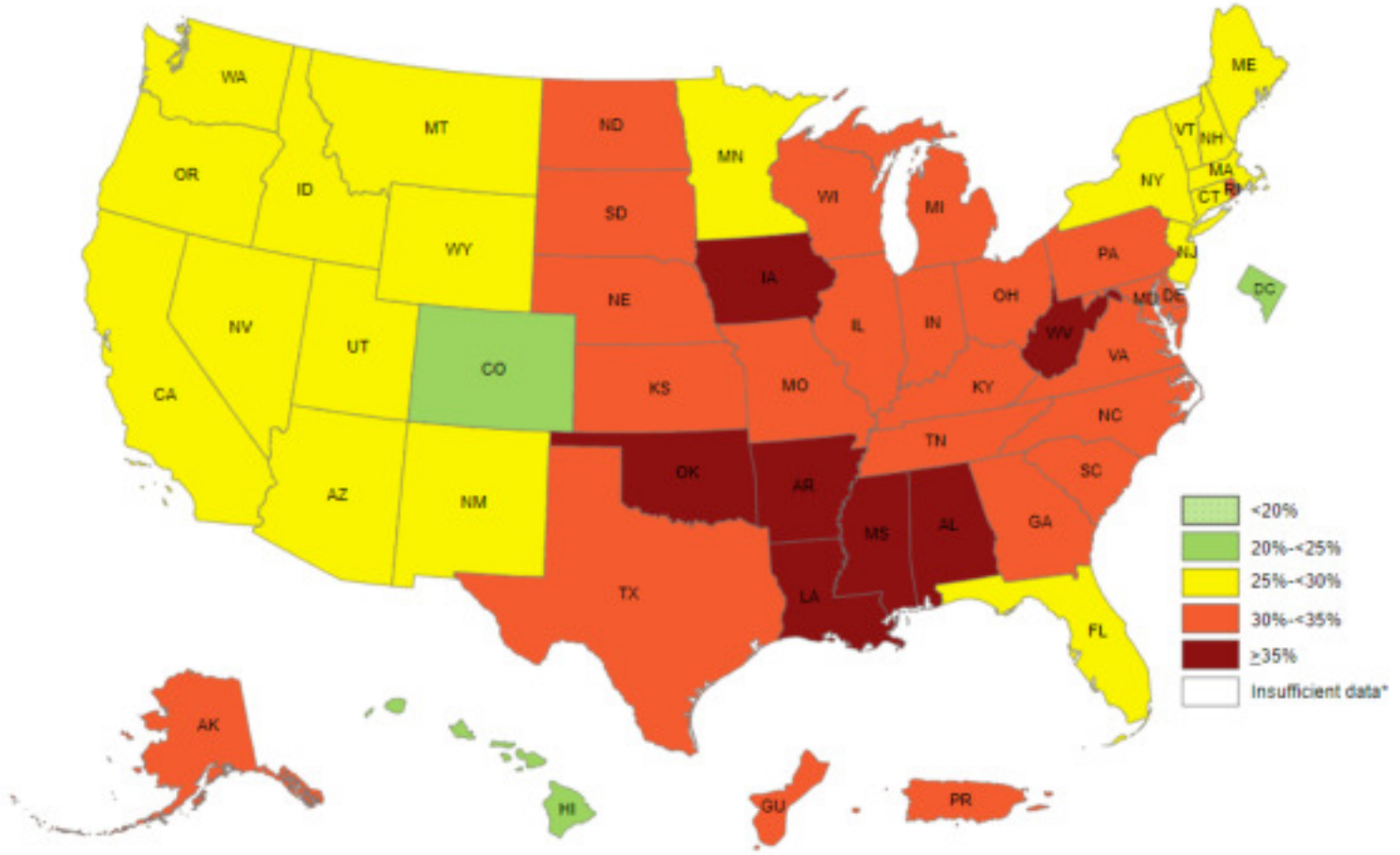
PRACTICALITY OF THE USAGE OF MEDICAL FOODS TO ASSURE COMPLIANCE & MEET NUTRITIONAL REQUIREMENTS: HEALTHCARE PROVIDERS PERSPECTIVES ON THREE DISEASE STATES…**ESRD**

Alison L. Steiber PhD, RDN
Chief Science Officer
Research, International and Scientific Affairs
Academy of Nutrition and Dietetics

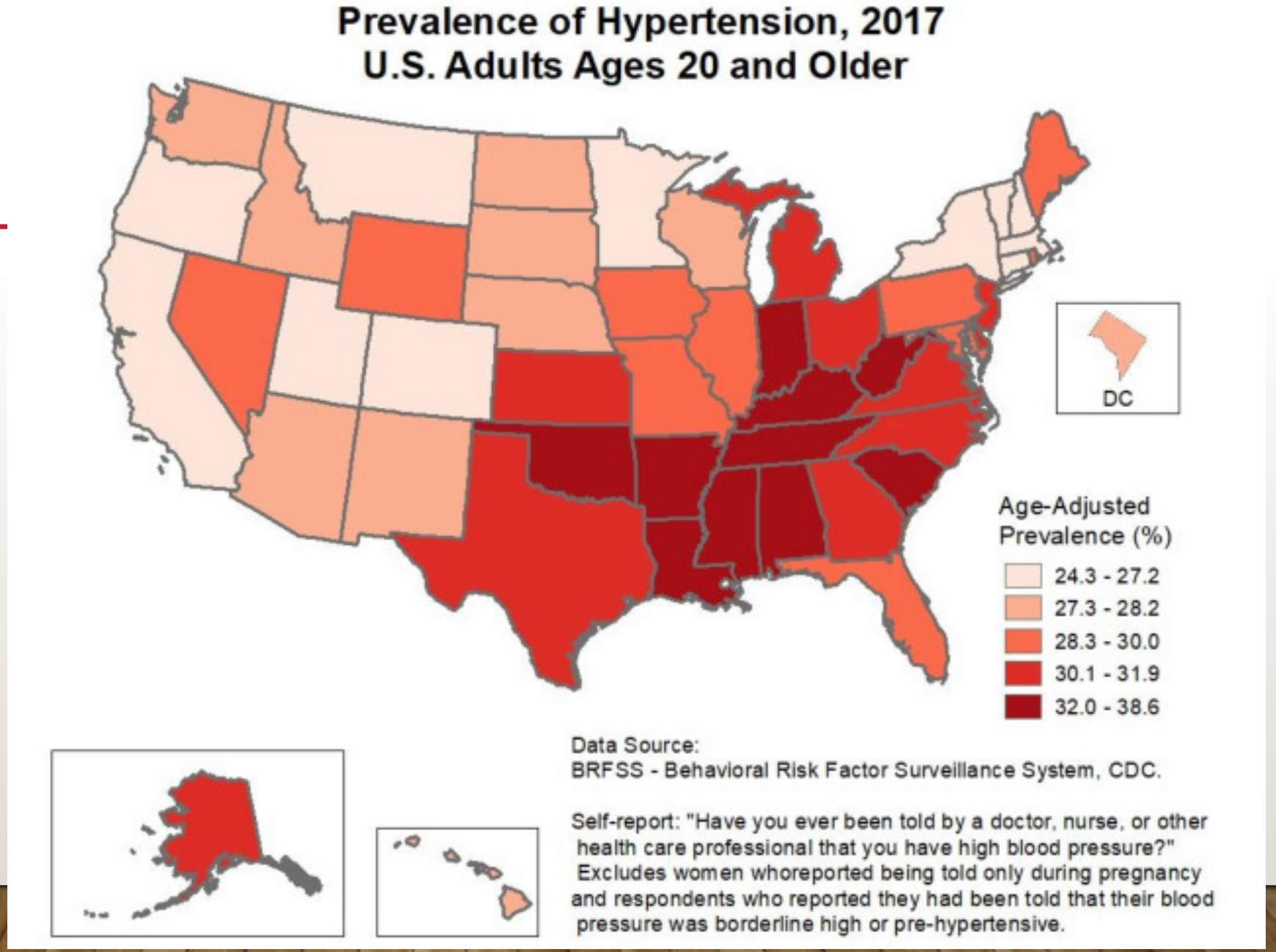
OBESITY RATES 2017



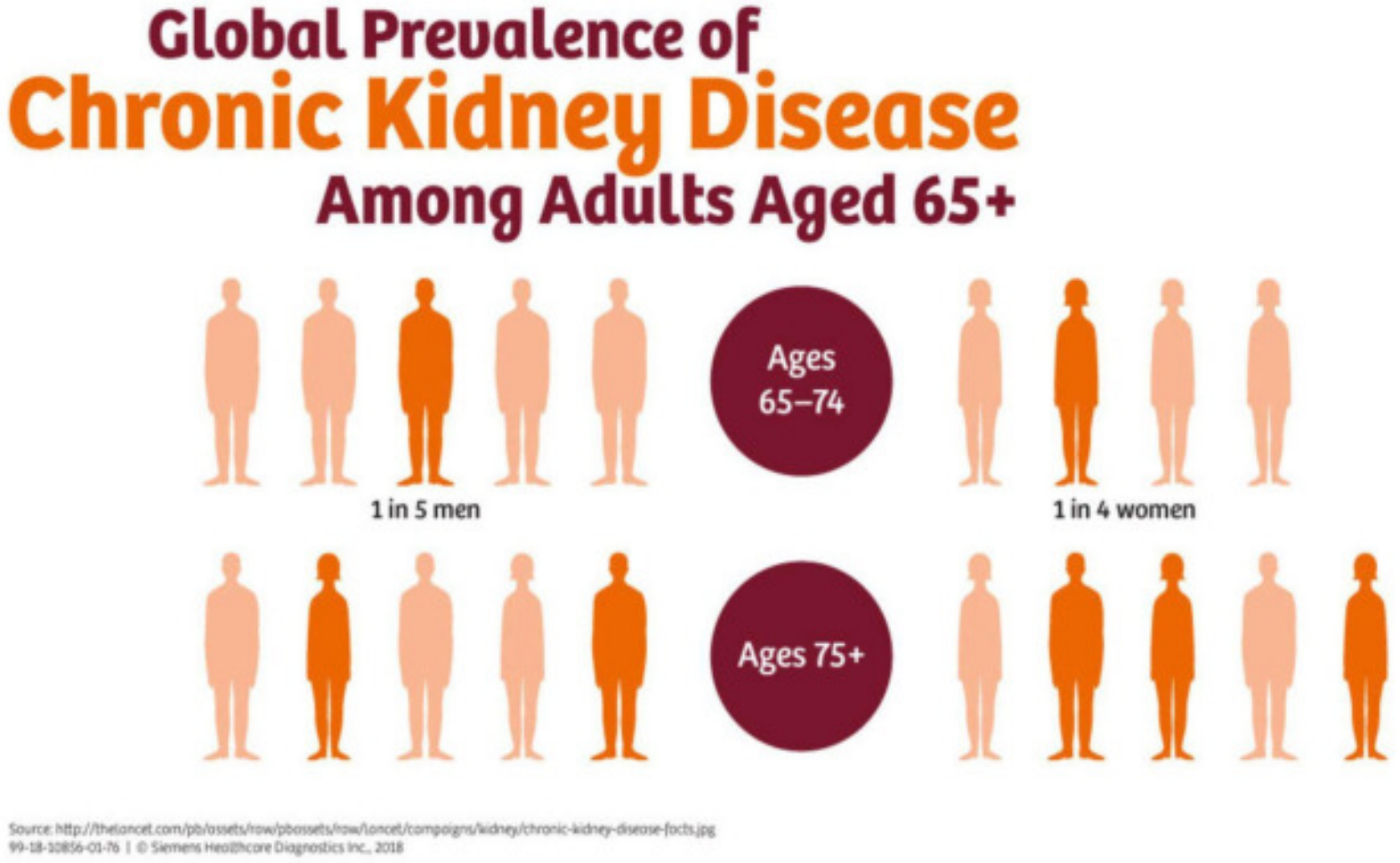
Source: Behavioral Risk Factor Surveillance System

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%

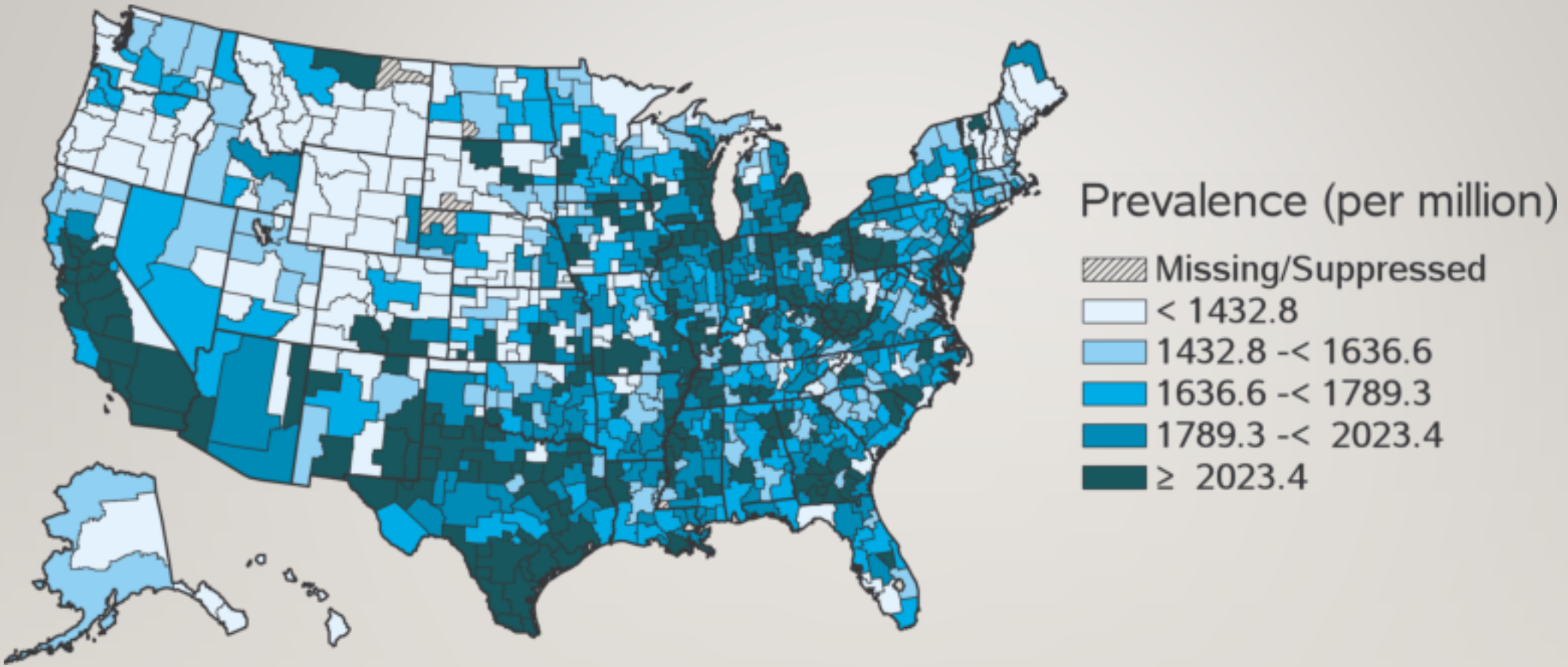
HYPERTENSION



GLOBAL PREVALENCE

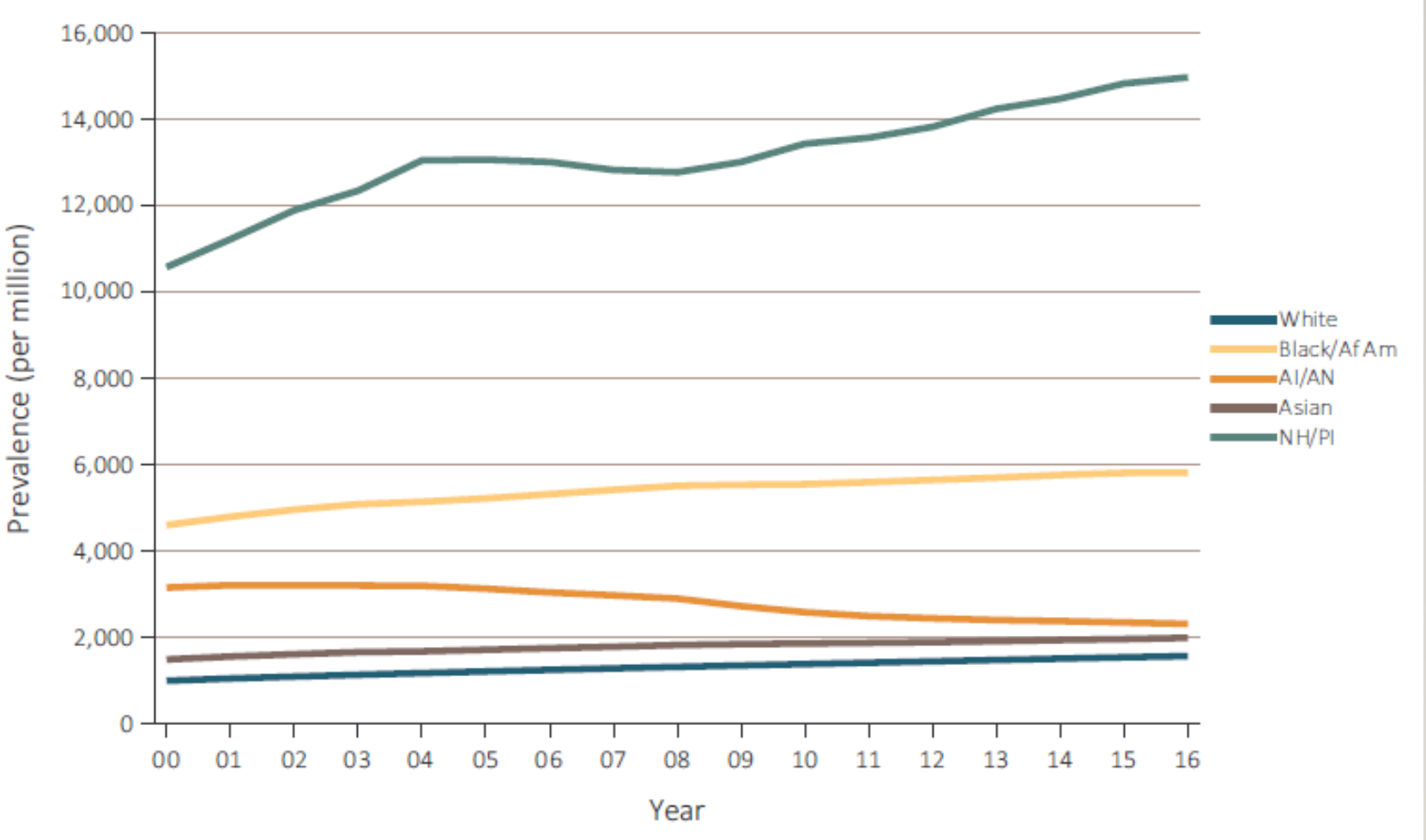


MAP OF THE STANDARDIZED PREVALENCE OF ESRD IN THE U.S. POPULATION, 2012-2016*



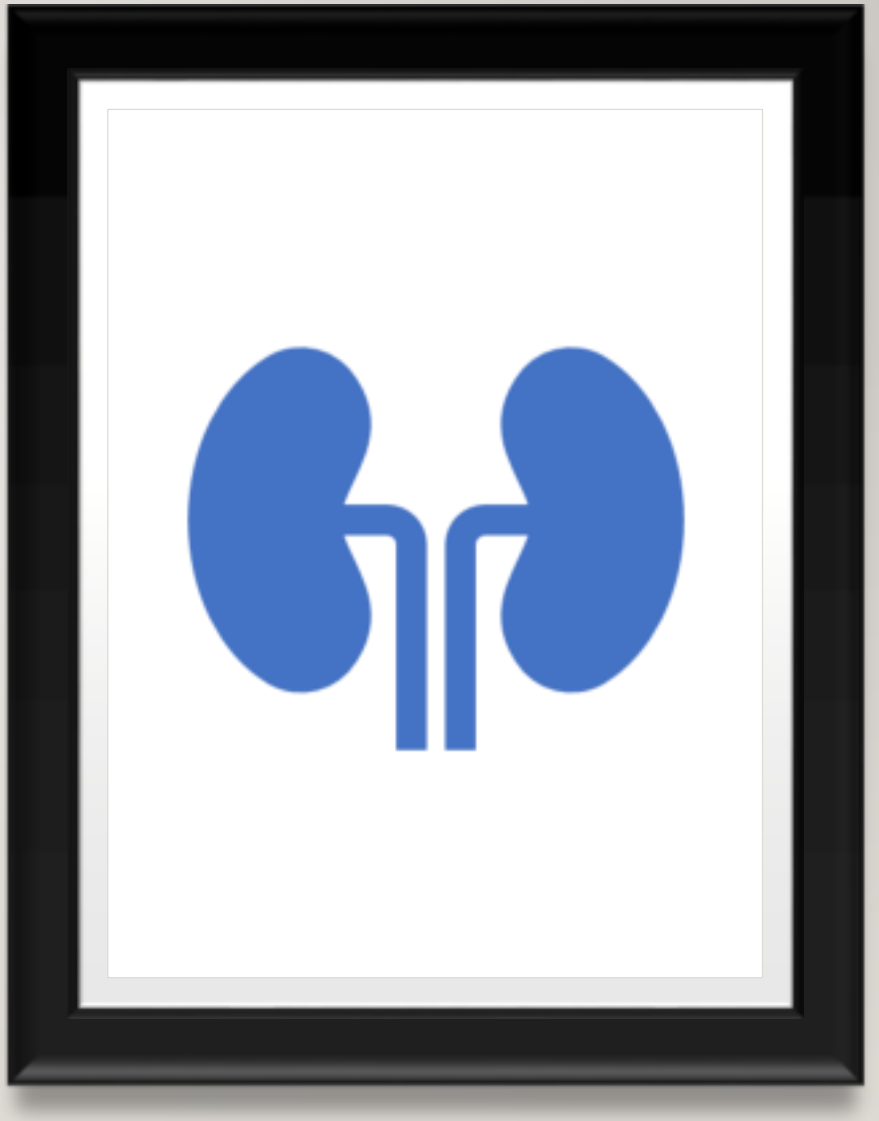
*Data Source: Special analyses, USRDS ESRD Database. Standardized to the age-sex-race distribution of the 2011 US population. Special analyses exclude unknown age, sex, HSA and unknown/other race. *Four Health Service Areas were suppressed because the ratio of crude rate to standardized rate or standardized rate to crude rate was greater than 3. Values for cells with 10 or fewer patients are suppressed. Abbreviation: ESRD, end-stage renal disease.*

TRENDS IN THE STANDARDIZED PREVALENCE OF ESRD, BY RACE, IN THE U.S. POPULATION, 2000-2016



Data Source: Special analyses, USRDS ESRD Database. Point prevalence on December 31 of each year. Standardized to the age-sex distribution of the 2011 US population. Special analyses exclude unknown age, sex, and unknown/other race. Abbreviations NH/PI: Native Hawaiian/Pacific Islander; AI/AN: Americans Indian/Alaska Natives; ESRD, end-stage renal disease.

IS THERE EVIDENCE THAT THE QUALITY OF DIETS OF PATIENTS WITH CKD IS POOR?



EVIDENCE FOR DEFICIENCY IN HD:VITAMIN K

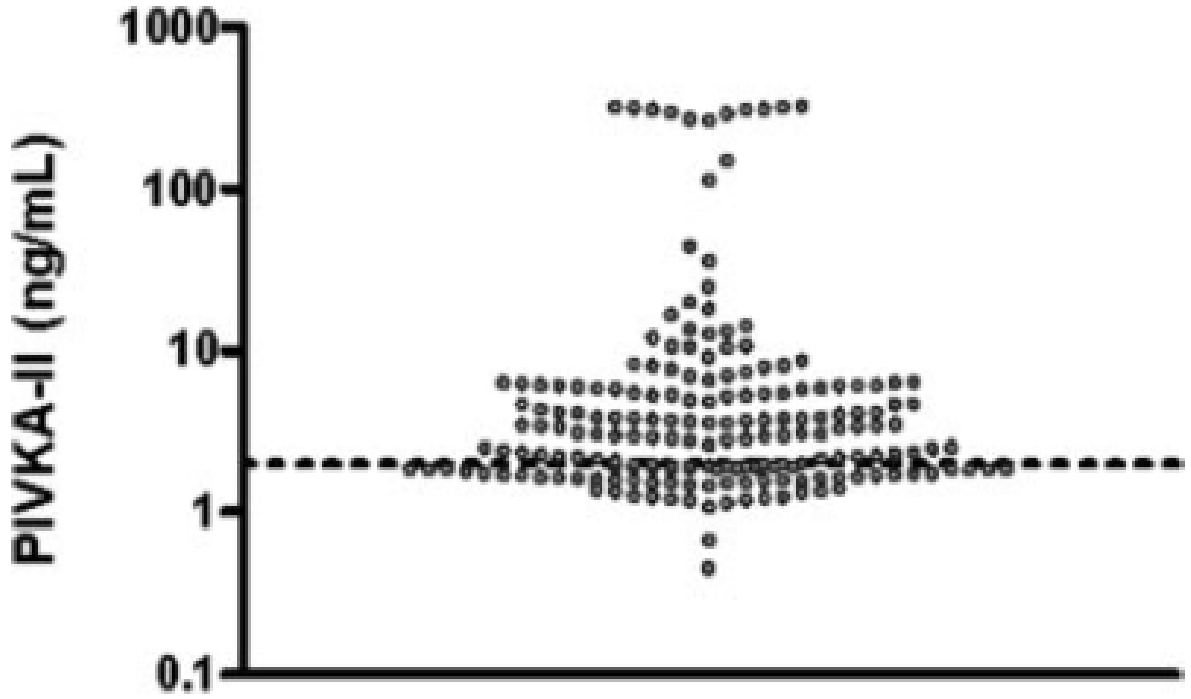


Figure 1. Dialysis patients are deficient in vitamin K. Distribution of PIVKA-II in hemodialysis patients. According to the upper limit of the normal range (dotted line, 2 ng/ml[30]), 64% of dialysis patients display vitamin K deficiency (as indicated by increased PIVKA-II levels).

Schlieper et al, JASN, 2011

EVIDENCE FOR DEFICIENCY IN HD: INTERVENTION STUDY WITH VITAMIN K(2)

Table 2. Circulating dephosphorylated-uncarboxylated-MGP (pmol/L)

	Treatment group (MK-7) ($N = 165$)		
	360 µg ($n = 59$)	720 µg ($n = 53$)	1080 µg ($n = 53$)
Baseline	2872 (123–7539)	2897 (500–7567)	3206 (857–7337)
After treatment	2306 (105–6618)	1935 (130–6132)	1719 (116–6047)
% Change	17[a]	33[a]	46[a]

Circulating dephosphorylated-uncarboxylated MGP values are presented as mean (range).
[a]$P < 0.001$.

Linear dose response of dp-uncarboxylated MGP to Vitamin K

Caluwe et al NDT 2014

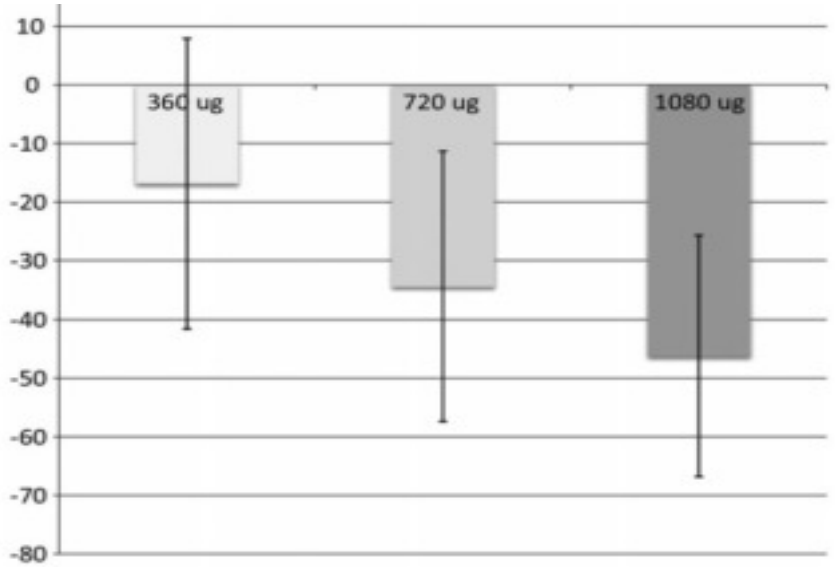


FIGURE 2: Relative decrease (%) in circulating dp-uc-MGP levels after 8 weeks of supplementation with different doses of MK-7. Data represent mean ± standard deviation. The decrease was statistically significant in every treatment group ($P < 0.001$).

Intake of Vitamins and Minerals in Stable Hemodialysis Patients as Determined by 9-Day Food Records

Michael V. Rocco, MD, MS, Diane Poole, RD,† Patsy Poindexter, LPN,‡ Jean Jordan, LPN,§ and John M. Burkart, MD,¶*

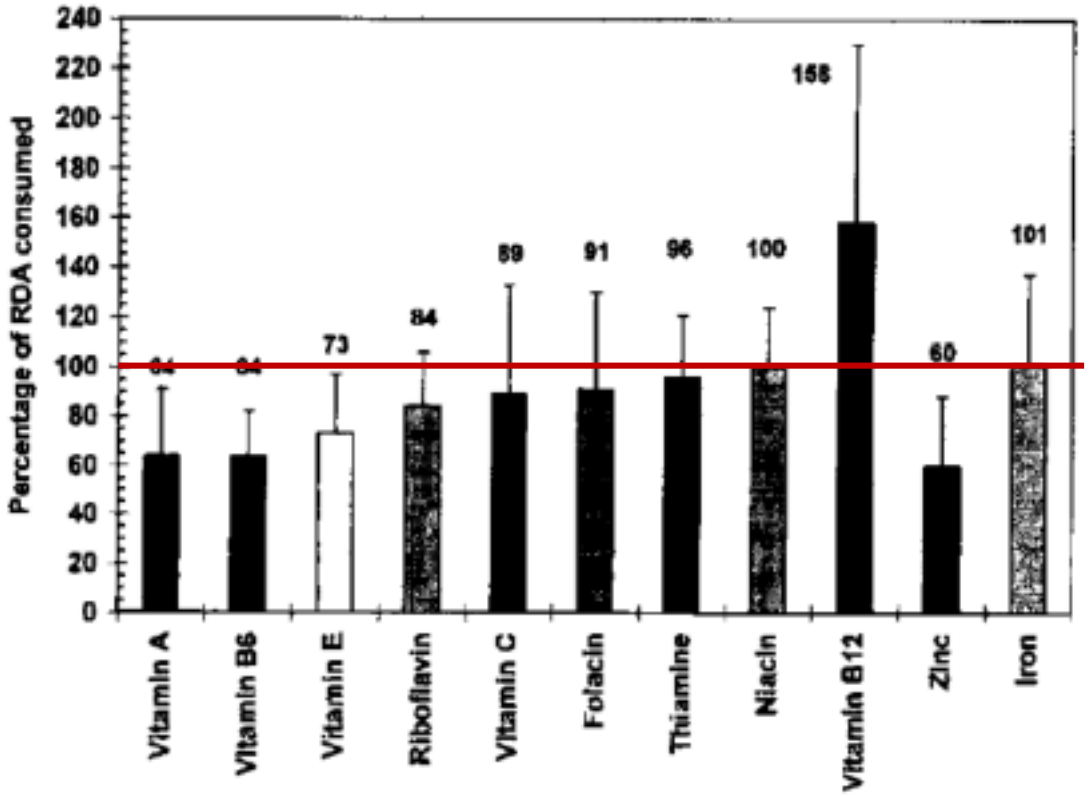


Figure 1. Percentage of RDA consumed by chronic hemodialysis patients for selected vitamins and minerals.

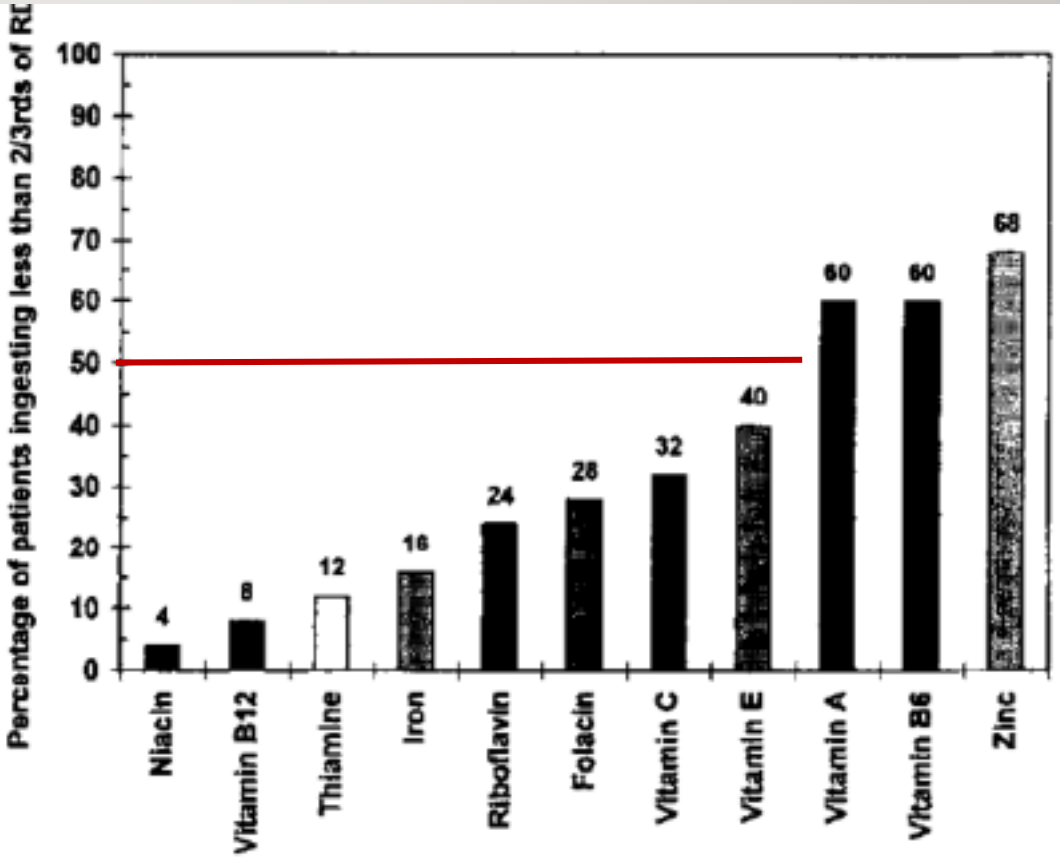


Figure 2. Percent of patients consuming less than two thirds of the RDA for selected vitamins and minerals.

Journal of Renal Nutrition, Vol 7, No 1 (January), 1997: pp 17-24

Table 2. Daily Intake of Macronutrients and Proportion of Individuals Within Recommended Targets

Macronutrients	Daily Intake	N (%) Within Target Values		Daily Recommendations	
Calorie density, kcal/kg*†	24.8 ± 7.5	10 (11)*	14 (15)†	30-35 kcal/kg*	30-40 kcal/kg†
Protein density, g/kg*†	1.1 ± 0.4	32 (41)*	49 (54)†	≥1.2 g/kg*	≥1.1 g/kg†
Total fat‡§, g	68.8 ± 29.3	43 (47)		25%-35% energy	
Saturated fat	22.6 ± 10.9	7 (8)		<7% energy	
MUFA	28.9 ± 12.3	14 (15)		>20% energy	
PUFA	12 ± 8.2	10 (11)		>10% energy	
Cholesterol‡§, mg	257 ± 127	39 (43)		<200 mg	
Carbohydrates§, g	189 ± 70	76 (84.5)		≥130 g	
Fiber§, g	16.6 ± 6.2	21 (22)		>20 g	

Only parameter with >50% meeting = carbohydrates

Nutrients that >50% are meeting = iron, zinc and B12

Table 3. Daily Intake of Micronutrients and Proportion of Individuals Within Recommended Targets

Macronutrients	Daily Intake, mg	N (%) Within Target Values	Daily Recommendations
Minerals*			
Phosphorus	1104 ± 316	18 (20)	800-1000 mg
Calcium	710 ± 268	31 (34)	500-800 mg
Sodium	2308 ± 910	15 (15)	2000-2300 mg
Potassium	2609 ± 716	43 (47)	1950-2730 mg
Iron	9.1 ± 3.1	90 (99)	8 mg ♂/15 mg ♀
Magnesium†	230 ± 66	2 (2)	19-30 y (400 mg ♂/310 mg ♀) >30 y (420 mg ♂/320 mg ♀)
Zinc	7 ± 2.5	89 (98)	10-15 mg ♂/8-12 mg ♀
Hydrosoluble vitamins†			
Thiamine (B_1)	1.1 ± 0.4	26 (29)	≥1.3 mg ♂/≥1.1 mg ♀
Riboflavin (B_2)	1.5 ± 0.5	11 (12)	19-50 y (≥1.3 mg) >50 y (≥1.7 mg ♂/≥1.5 mg ♀)
Niacin (B_3)	16.1 ± 6.5	41 (45)	≥16 mg ♂/≥14 mg ♀
Folate (B_9)	180 ± 74	1 (1.1)	≥400 μg
Cobalamin (B_{12})	4.7 ± 6.3	66 (75.5)	≥2.4 μg
Ascorbic acid (C)	59 ± 41	17 (19)	≥90 mg ♂/≥75 mg ♀
Liposoluble vitamins†			
Vitamin A	771 ± 909	21 (23)	≥900 μg RAE ♂/≥700 μg RAE ♀
Cholecalciferol (D)	1.5 ± 1.7	0 (0)	19-50 y 5 μg 51-70 y 10 μg >70 y 15 μg
α-Tocopherol (E)	7.4 ± 3.5	2 (2)	≥15 mg

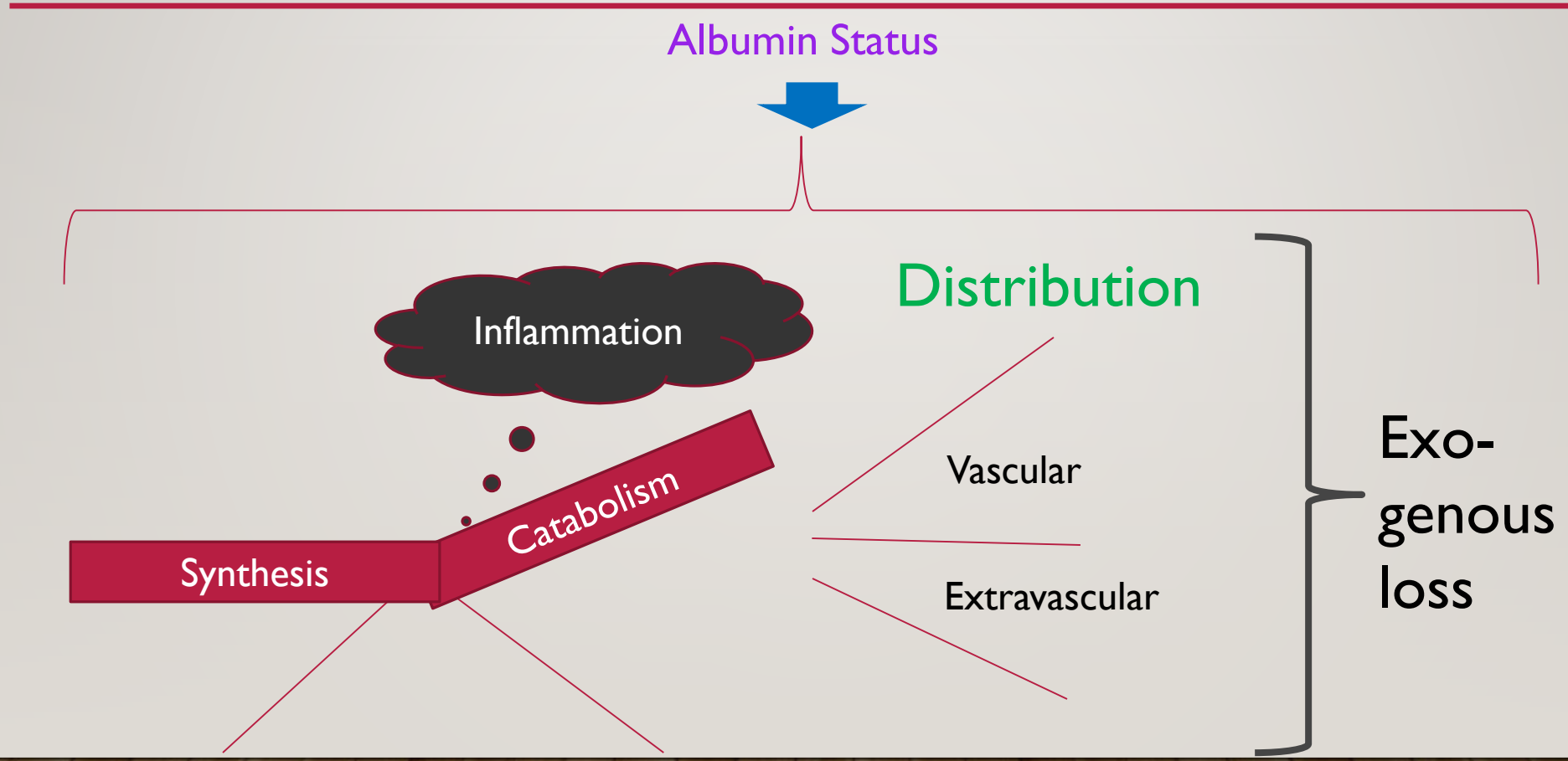
Luis D et al, JREN 2016

DIET/NUTRIENT ADEQUACY KEY POINTS

- Deficiency has been identified and replenishment is needed
  - ✓Evidence exists that certain nutrients have been documented to be either suboptimal or frankly deficient in patients with CKD
- Diet is sub-optimal to support adequacy of key nutrients
  - ✓Evidence exists that a substantial percentage of patients with CKD consume a diet that is low in multiple nutrients (macro and micro)
- Clinical condition causes an increased need in single or multiple nutrients
  - ✓Evidence exists that the medical condition of chronic kidney disease alters the metabolism of at least one nutrient leading to increased needs

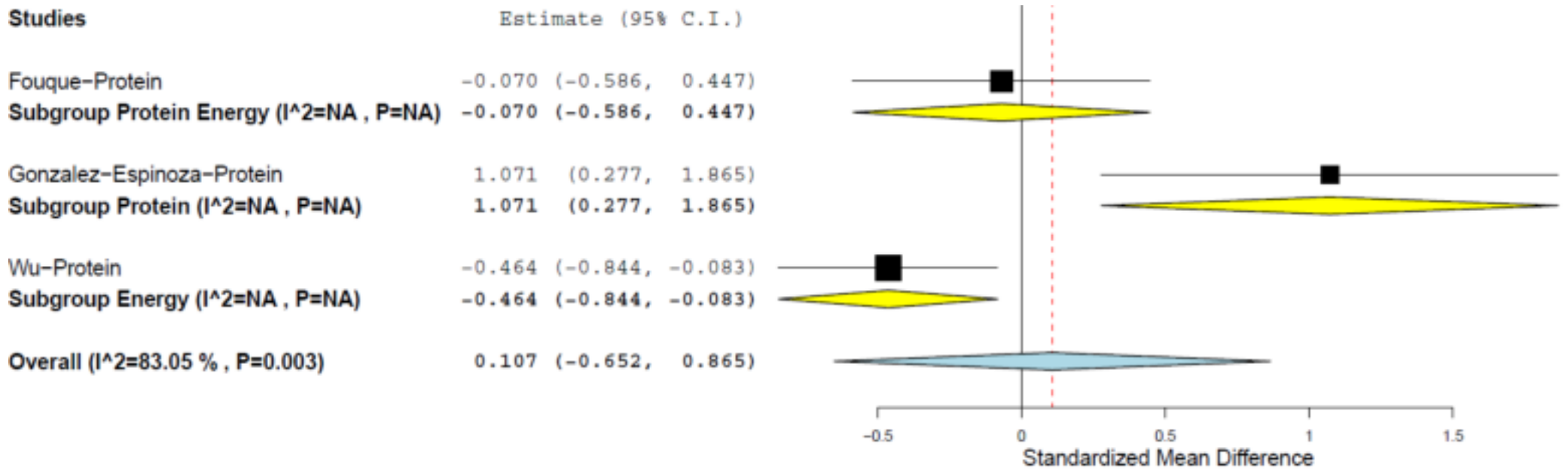
INTERVENTIONS WITH ONS…CONSIDERATION AND EFFECTIVENESS

MOST CURRENT STUDIES, USED ALBUMIN STATUS AS THE CRITERIA FOR MALNUTRITION



Protein Intake as an outcome with ONS Interventions

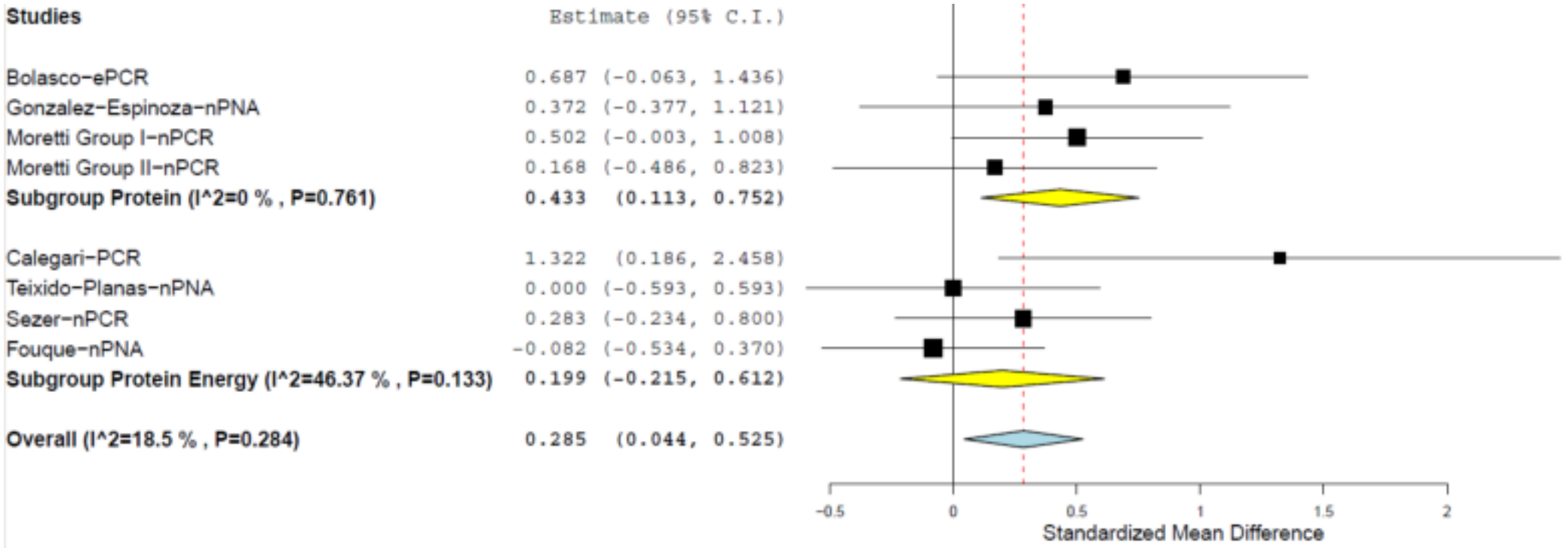
Academy of Nutrition and Dietetics
EVIDENCE ANALYSIS LIBRARY®



Statistically significant

PNA/PCR Outcome with Oral Nutrition Supplement (ONS) Interventions

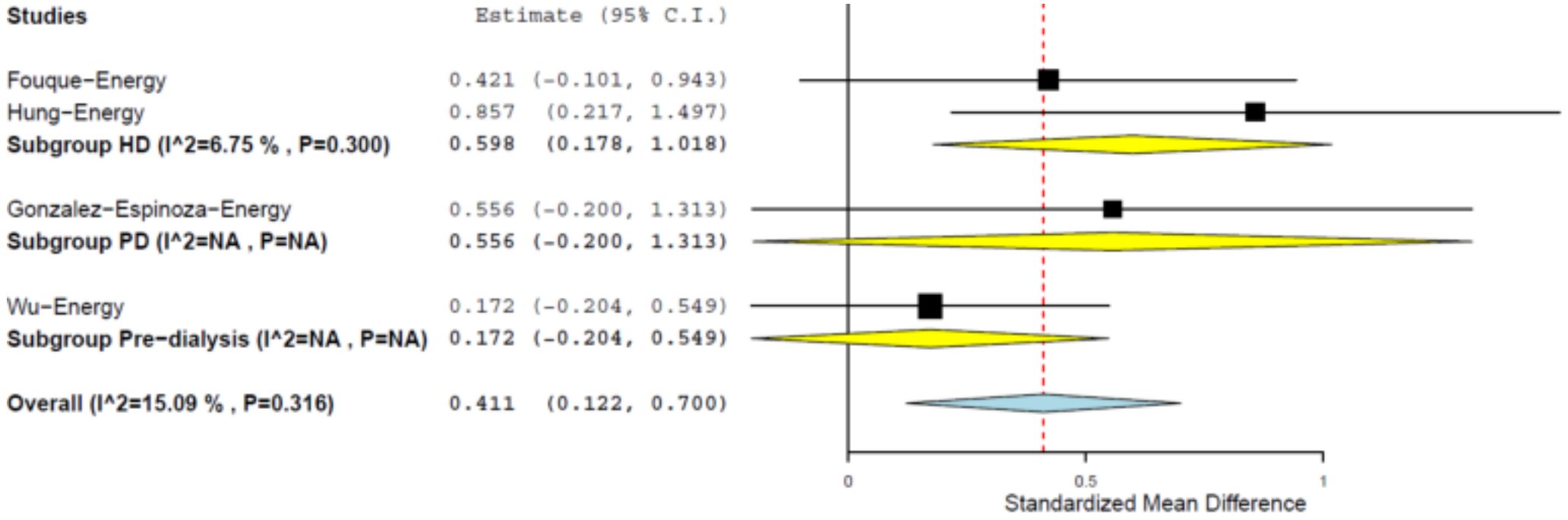
Academy of Nutrition and Dietetics
EVIDENCE ANALYSIS LIBRARY®



Not statistically significant

Academy of Nutrition and Dietetics
EVIDENCE ANALYSIS LIBRARY®

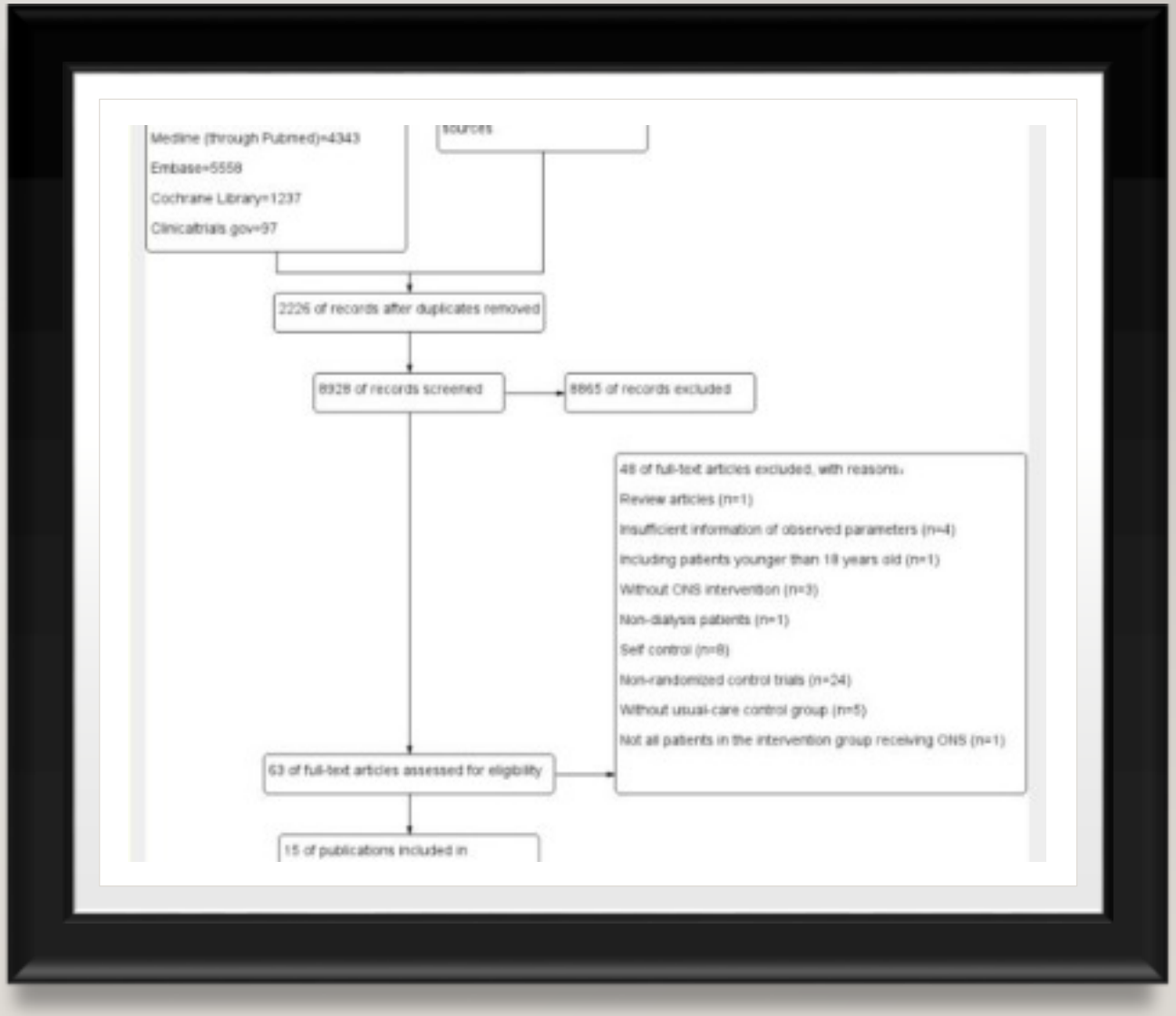
Energy Intake by Population and ONS



Not statistically significant

LIU P, MA F, WANG Q AND HE S, PLOS ONE, 2018

The Effects of oral nutrition supplements in patients with maintenance dialysis therapy: A Systematic Review and Meta-analysis of Randomized Clinical Trials



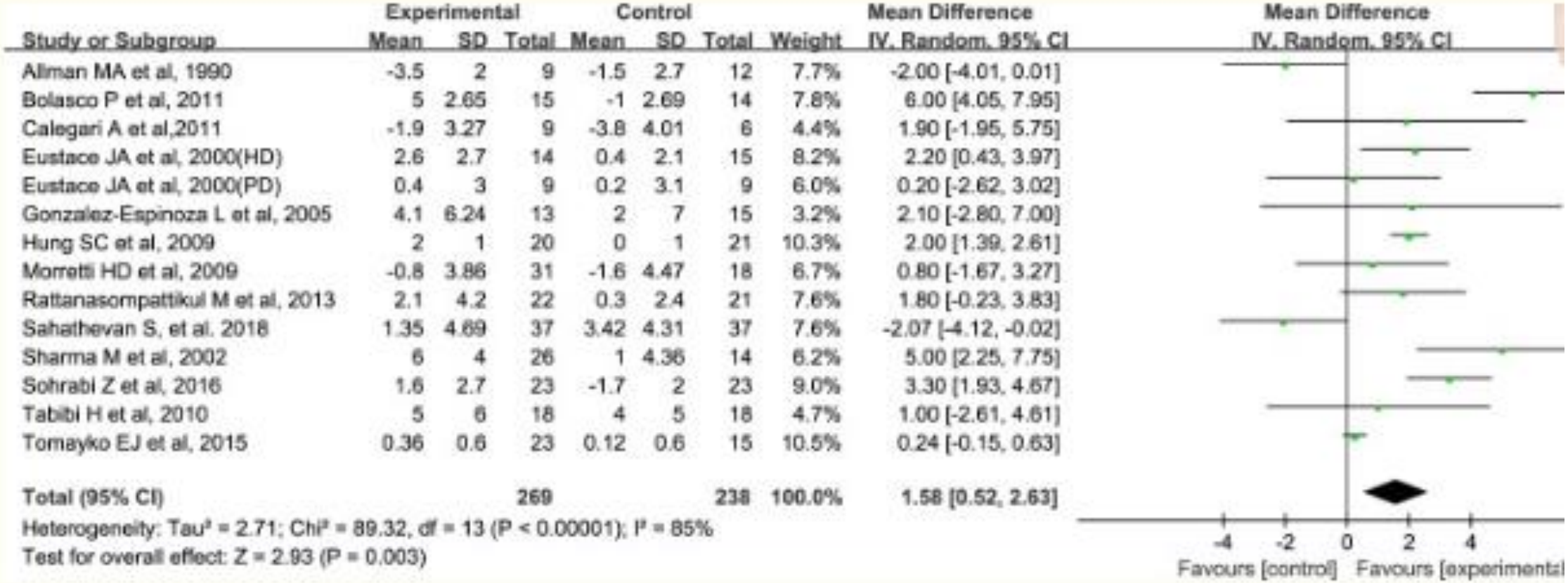


Fig 2

Forest plots depicting the effect of ONS on serum albumin level.

Conclusion: "Evidence of very-low quality suggests that short-term oral nutritional supplements with energy or protein/AA were found to be associated with increased ALBUMIN level, esp. in those who receive HD.

More high-quality & large RCTs, particularly those involving the observation of mortality and/or quality of life, are needed to validated our findings in a long-term way.

Liu P, Ma F, Wang Q and He S, PLoS One, 2018