Nutrition for Women

dotFIT Masterclass

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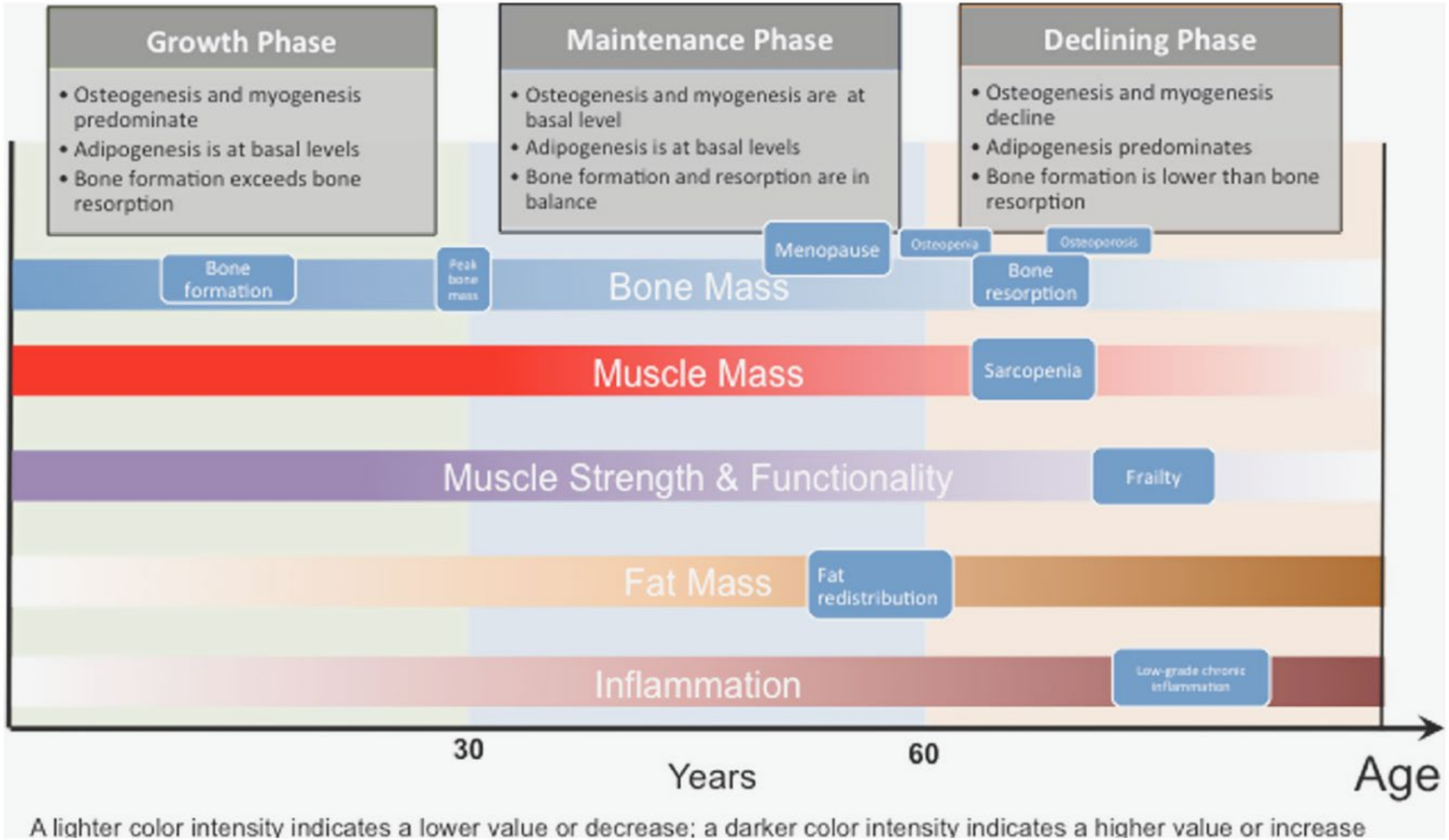
Content to be Presented

- Nutrient needs for females across the lifespan
- The impact of diet on health risk and symptons during menopause
- Changes in metabolism with aging and implications for weight loss
- Muscle health and aging

Life Stages of Females

- Youth
  - Infancy 0-12 months
  - Childhood 1-8 years
  - Adolescence 9-13 years
- Reproductive Stage – Pregnancy and Lactation
  - Teens 14-18 years
  - Early Adulthood 19-30 years
  - Adulthood 31-50 years
- Post-Reproductive Stage
  - Midlife 51-70 years
  - Late Adulthood > 70 years

Phases of Physical Development Across the Lifespan



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Life Stage & Nutrient Needs of Young Females

Adolescence/Early Teens:

- Onset of menstrual cycle and rapid growth increases risk of iron deficiency
- Rate of bone development is high; continues to form until mid-late 20's

Pre-conception:

- Folic acid supplementation 2-3 months prior and after conception lowers risk for neural tube defects by 70%
- Adequate iron intake lowers risk for miscarriage, low birthweight, and birth defects

- **Iron (RDA)**
  - 14-18 y – 15 mg
  - 19-50 y – 18 mg
    - Pregnancy 27 mg
    - Lactation 10 mg
- **Calcium (RDA)**
  - 14-18 y – 1,300 mg
  - 19-50 y – 1,000 mg
- **Folate (RDA)**
  - 14-70 y – 400 mcg
  - Pregnancy – 600 mcg
  - Lactation – 500 mcg

Key Nutrients for Females in the US

Bone Health:

- Calcium*
- Magnesium*
- Vitamin K
- Vitamin D

Growth, Development & Pregnancy:

- Iron – young children, young women and pregnant women fall short.
- Choline*
  - B vitamin needed to produce cells, early brain development; neurotransmitter for memory, mood, muscle, brain and nervous system function

Magnesium (RDA)

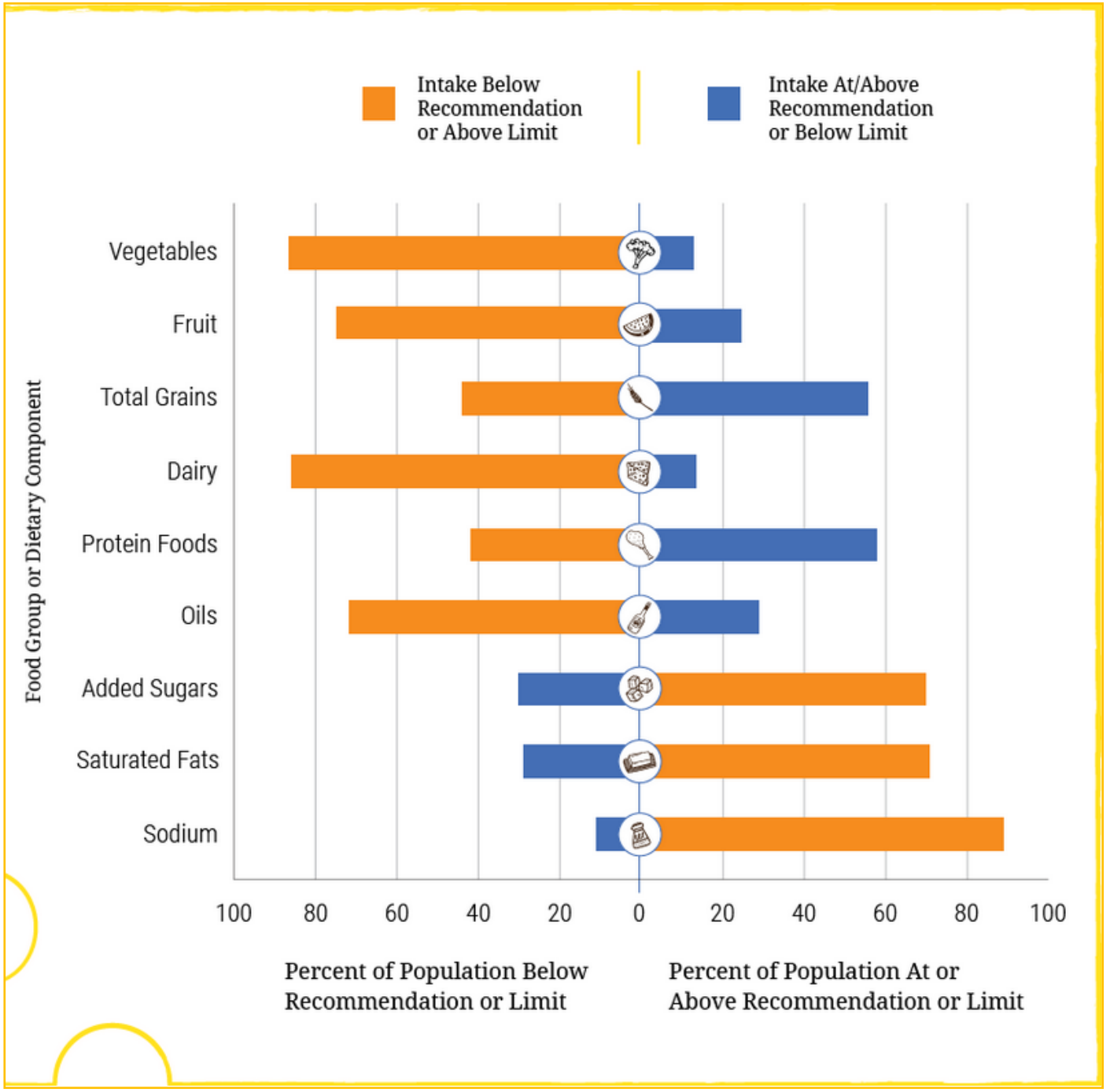
- 14-18 y – 360 mg
- 19-30 y – 310 mg
- 31 y+ 320 mg
  - Pregnancy + 40 mg/day
  - Lactation – same as RDA

Choline (AI)

- 14-18 y – 400 mg/d
- 19+ y – 425 mg/d
  - Pregnancy – 450 mg/d
  - Lactation – 550 mg/d

Key Nutrients for Women in the US

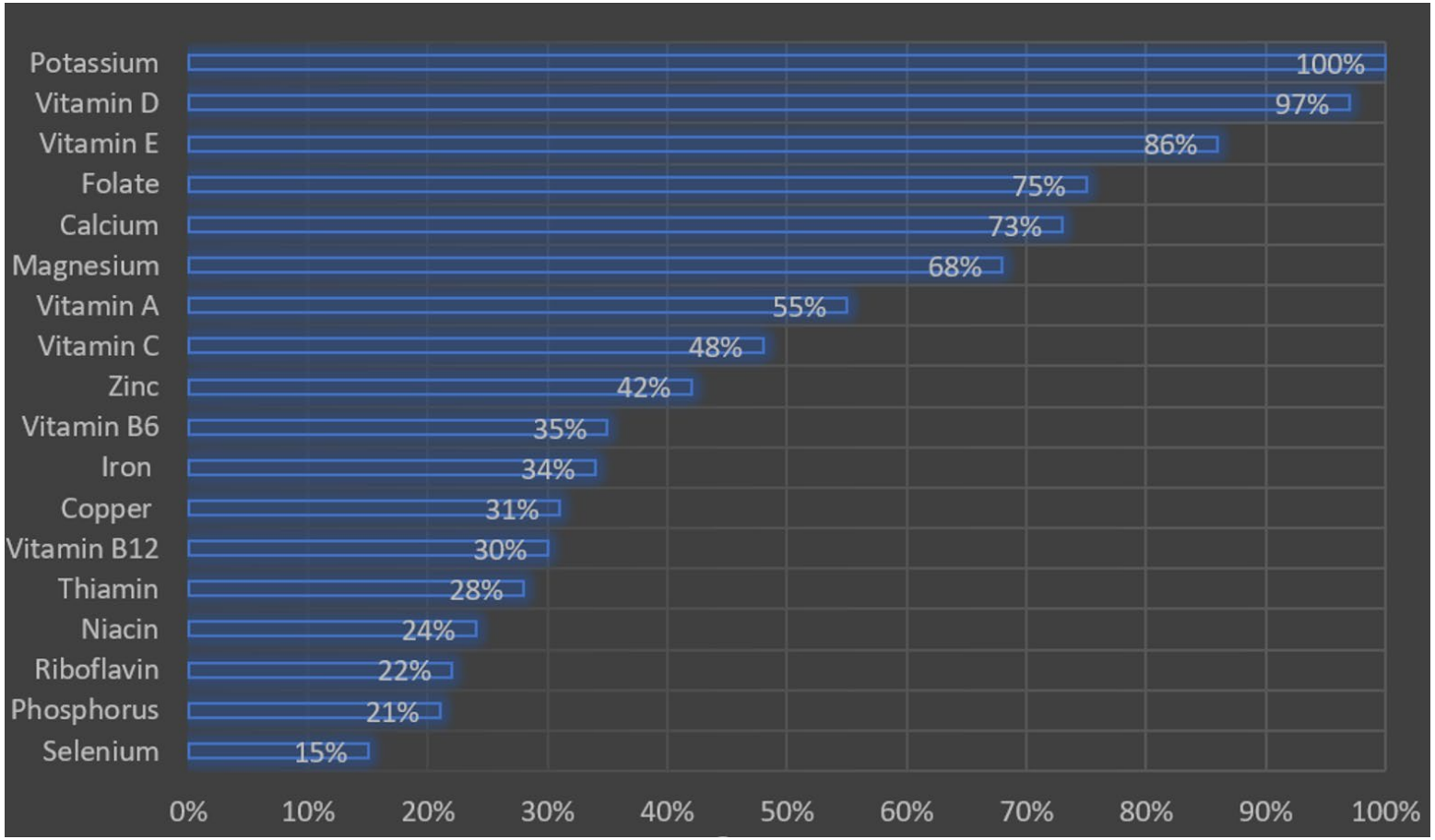
- Others:
  - Vitamin A*
  - Vitamin C*
  - Vitamin E*
  - Potassium
- Dietary Fiber*
  - 14 gram per 1,000 calories
  - Nutrient of concern in the US because most fall short at ~15 grams a day



What Americans are Eating

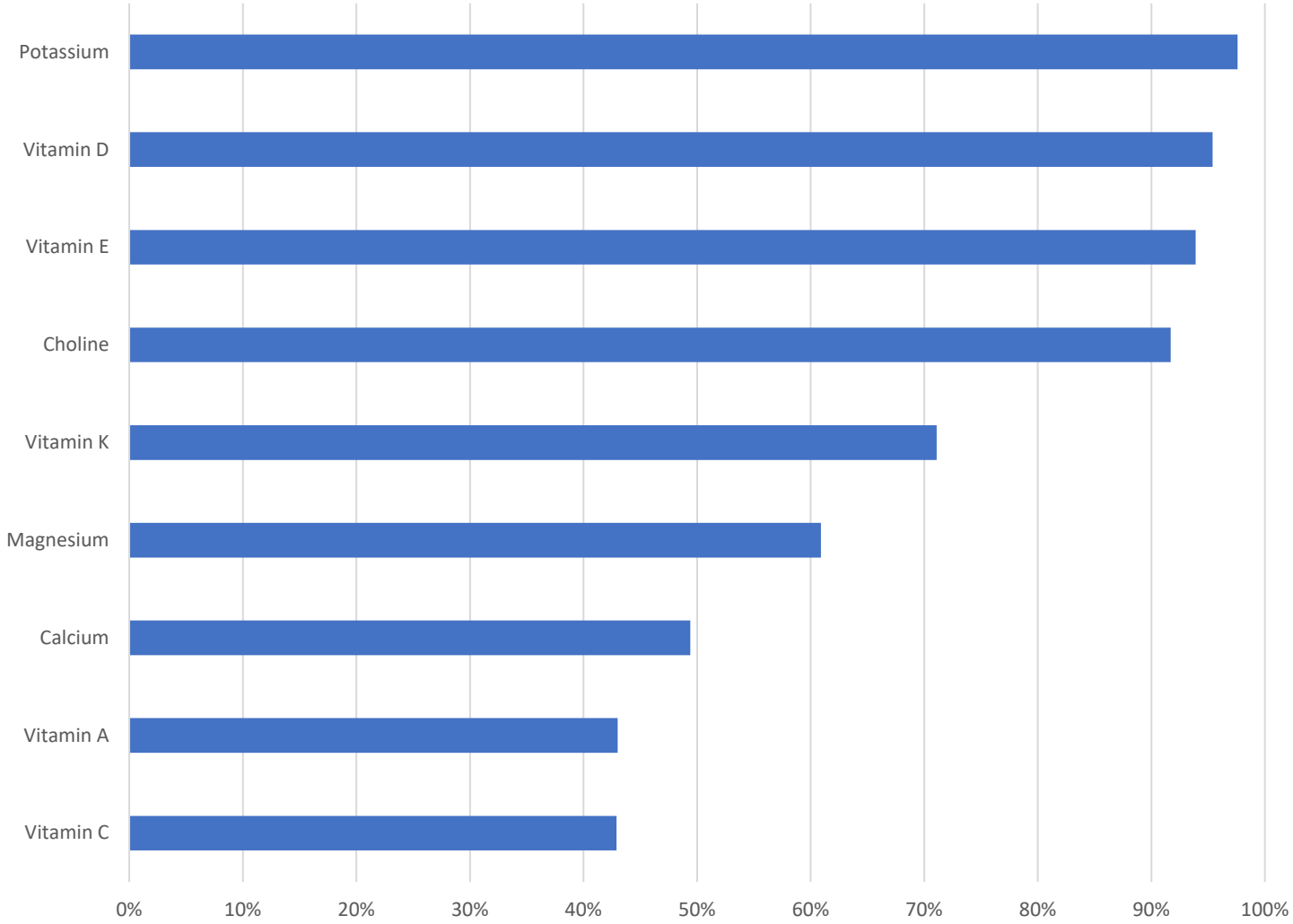
Dietary Guidelines for Americans Report 2015-20

% of US Population NOT Meeting RDAs for Select Vitamin & Minerals



RDA – Recommended Dietary Allowance: The dietary intake level that is sufficient to meet the nutrient requirement of ***nearly all (97 to 98 percent) healthy*** individuals in a particular life stage and gender group.

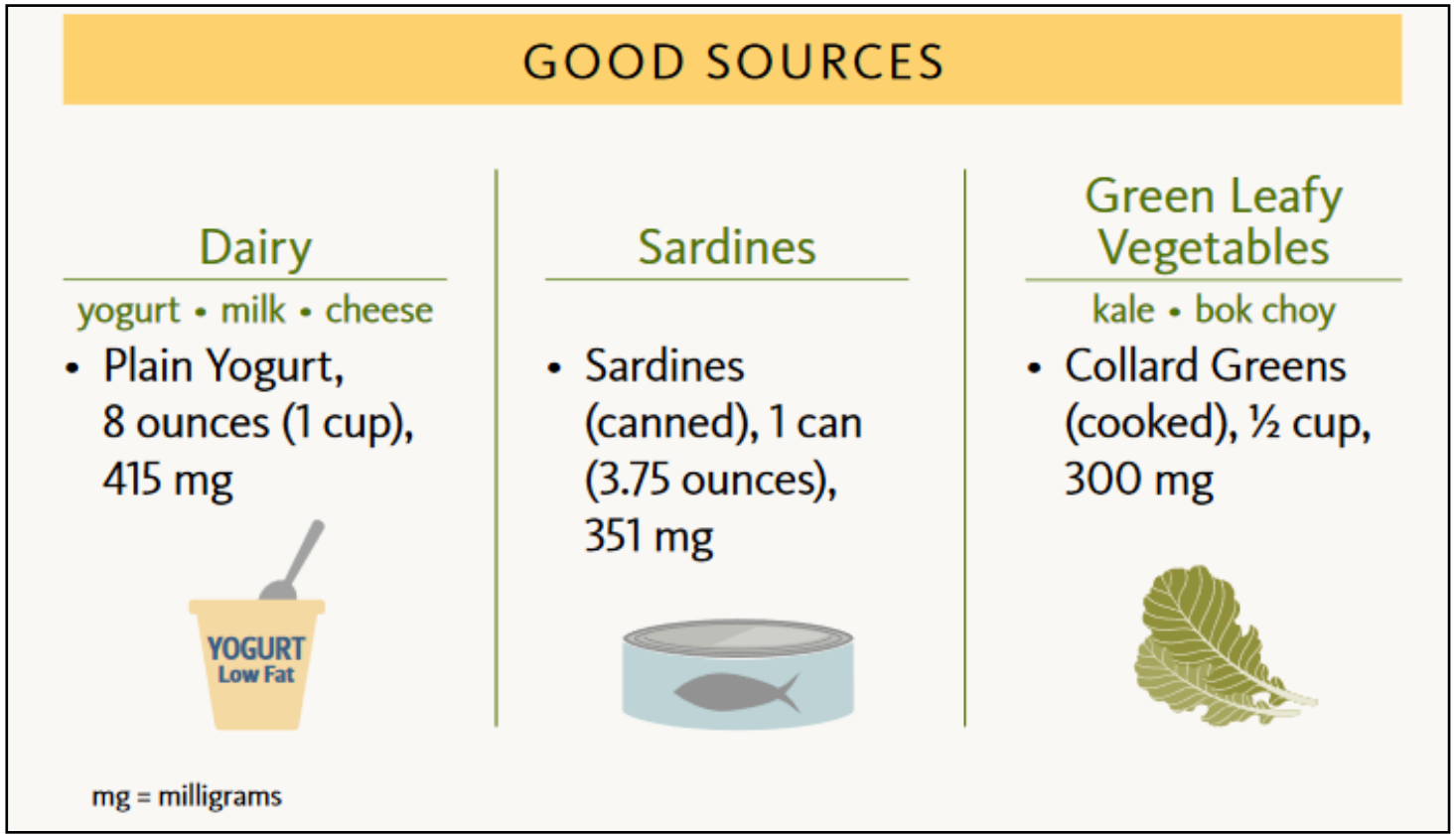
Grossly Under Consumed Vitamins & Minerals by U.S. Adults ≥ 19 yrs



EAR: Estimated Average Requirement: A nutrient intake value that is estimated to meet the requirement of ***half the healthy*** individuals in a particular life stage and gender group

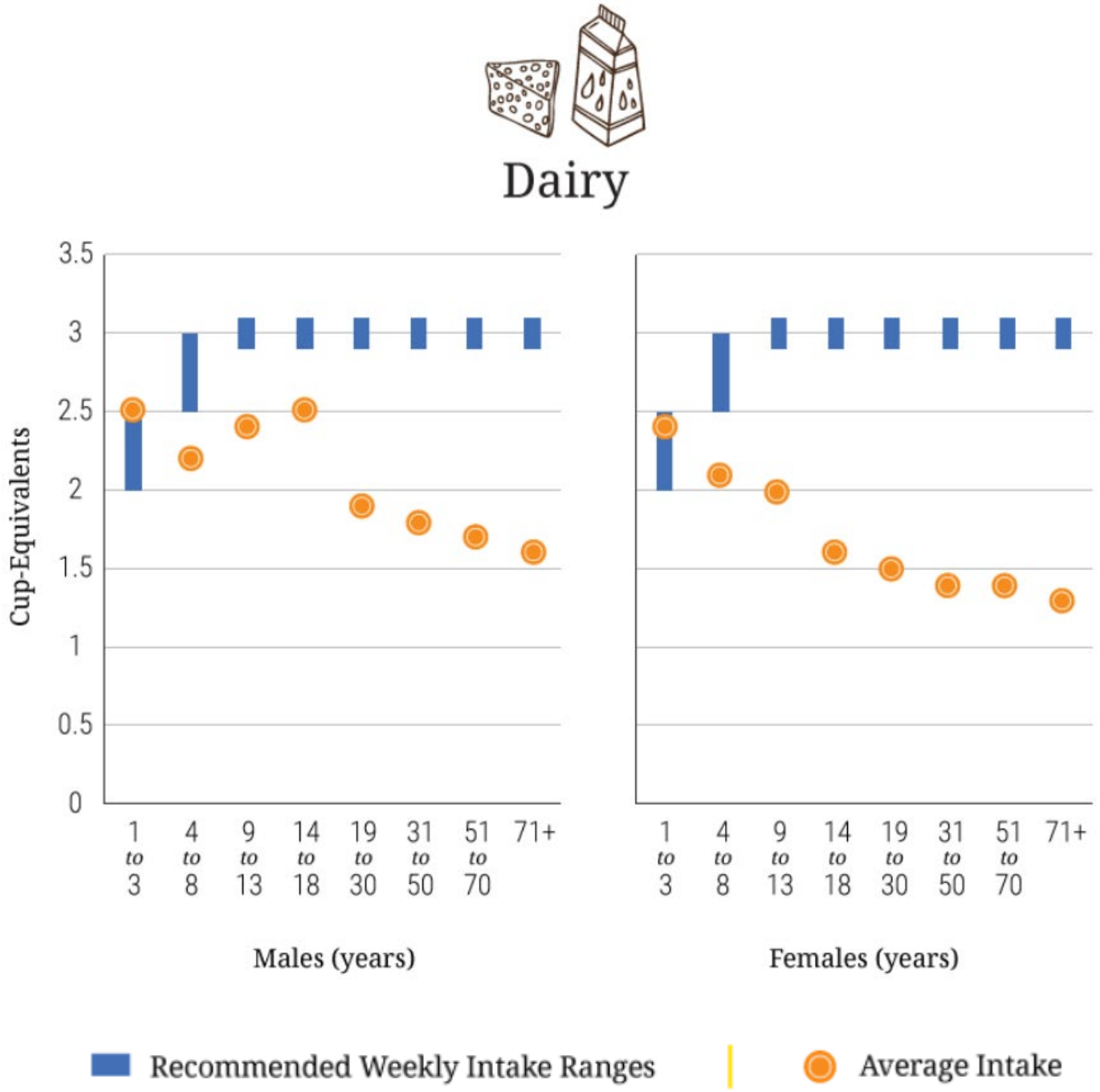
Calcium – How to Meet Daily Needs

- Females
  - 14-18 yrs – 1,300 mg/day
  - 19-50 yrs – 1,000 mg/day
  - 51+ yrs – 1,200 mg day
- ~3 servings daily of dairy, leafy greens, fortified foods OR supplement
- 500 mg at a time to maximize absorption with cofactors Vitamin D, magnesium, Vitamin K



Calcium Intakes

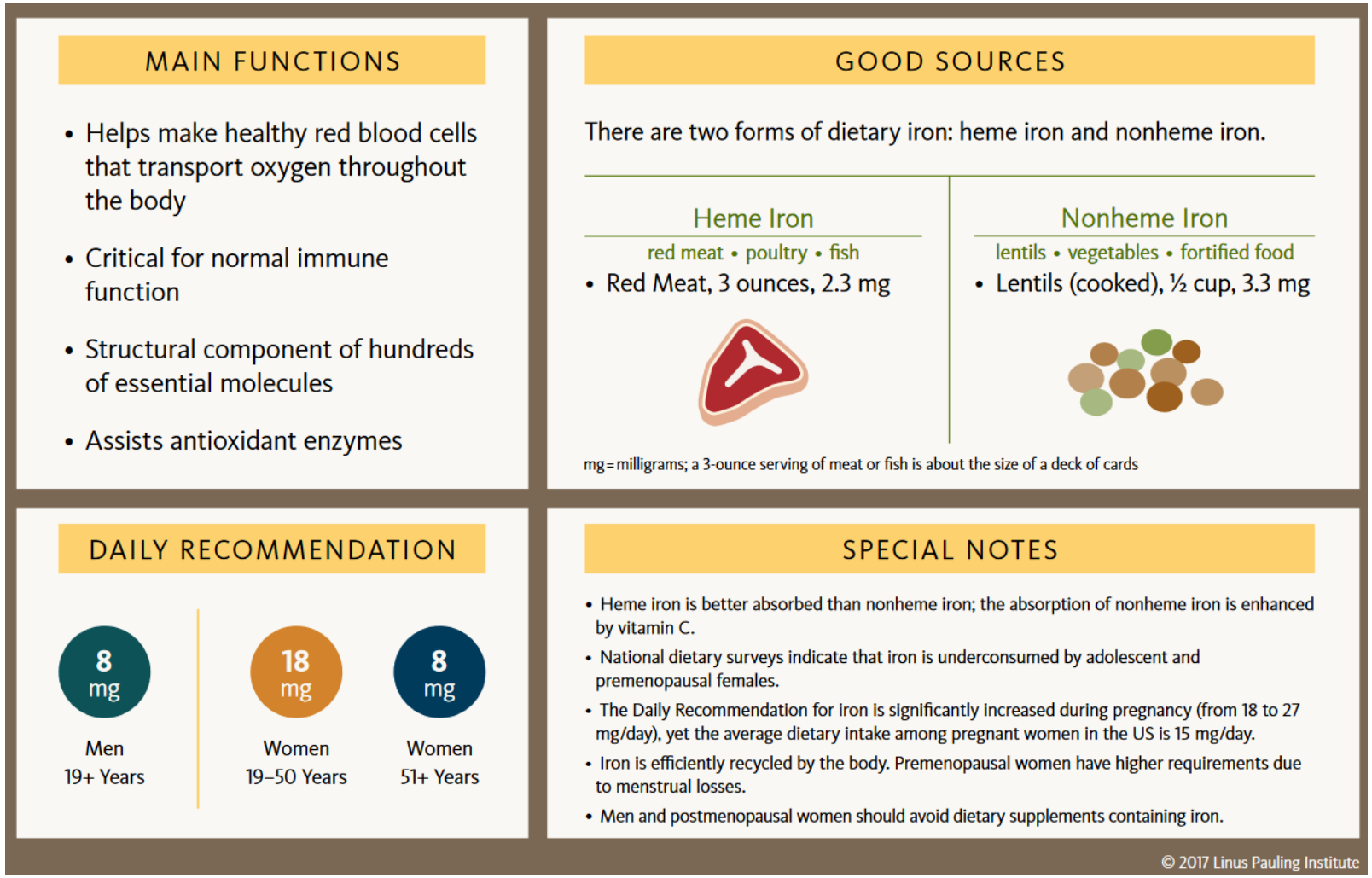
- ~49.4% do not consume enough from food
- Survey data reveals older children, adolescents, women, pregnant women and older women do NOT meet daily requirements



Dietary Guidelines for Americans Report 2015-2020

Iron Requirements & Sources

- 16% of adolescent girls fall below the EAR
- 25.4% of pregnant women are deficient
  - Require doctor Rx
- Premenopausal women fall short
- Regular intense exercise increases average requirement by 30%



Magnesium – How to Meet Daily Needs

- Eat a variety of whole grains, greens, nuts
- RDAs for Females
  - 14-18 yrs – 360 mg/d
  - 19-30 yrs – 310 mg/d
  - 31+ yrs – 320 mg/d
- Pregnancy increases daily needs by 40 mg. Lactation does not increase daily needs

GOOD SOURCES

Whole Grains

wheat • oats • barley

- Brown Rice (cooked), 1 cup, 86 mg

Green Leafy Vegetables

Swiss chard • spinach

- Spinach (boiled), 1 cup, 157 mg

Nuts

hazelnuts • cashews

- Almonds, 1 ounce (23 almonds), 77 mg

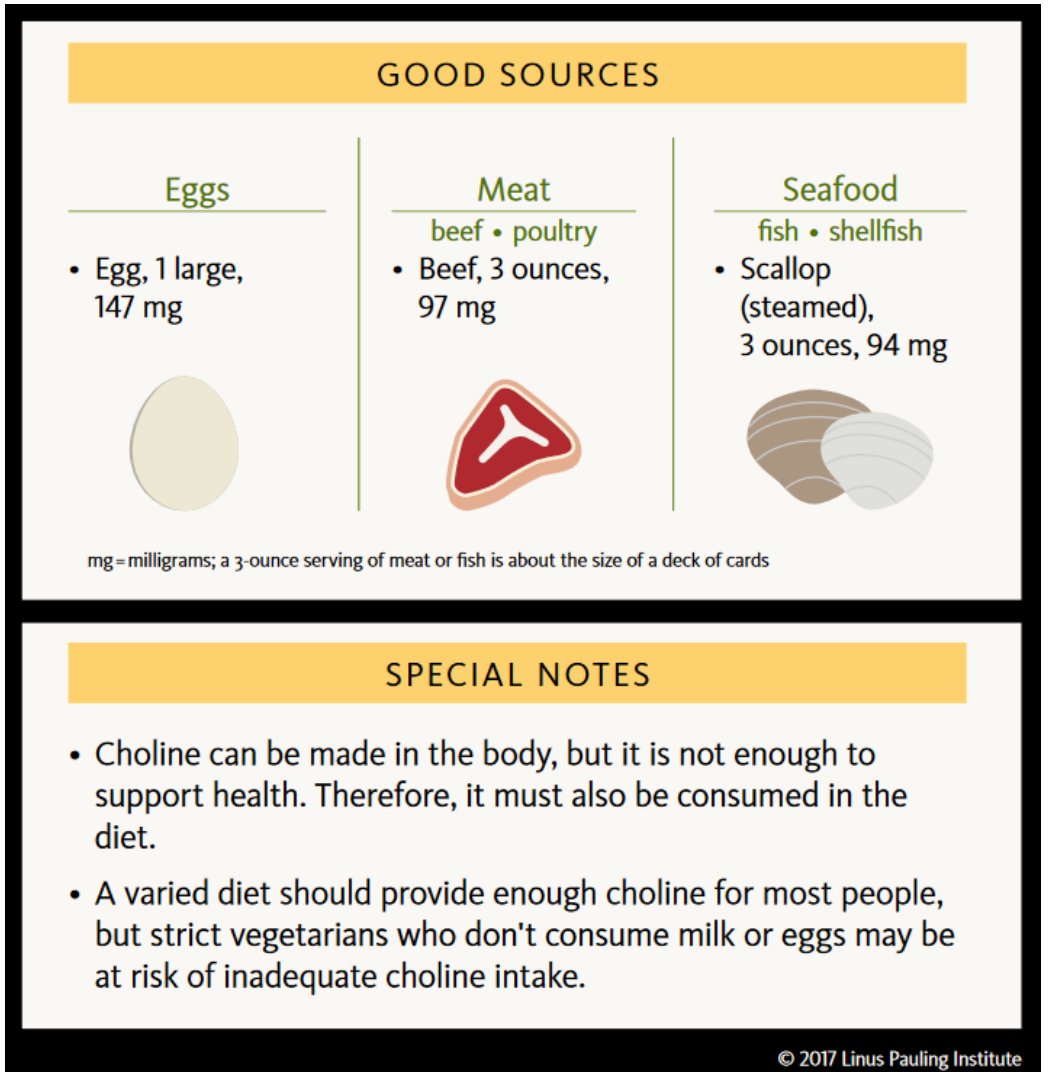
mg = milligrams

SPECIAL NOTES

- Most people consume too little magnesium.
- The Tolerable Upper Intake Level (UL) for magnesium is 350 mg/day from supplements. The UL does not apply to naturally occurring magnesium from food.

Choline – How to Meet Daily Needs

- Essential nutrient for cell structure, brain, muscle and nervous system function
- Consume eggs, meat, seafood, soybeans, potatoes, kidney beans, quinoa
- AIs for Females
  - 14-18 y – 400 mg/d
  - 19+ y – 425 mg/d
    - Pregnancy – 450 mg/d
    - Lactation – 550 mg/d

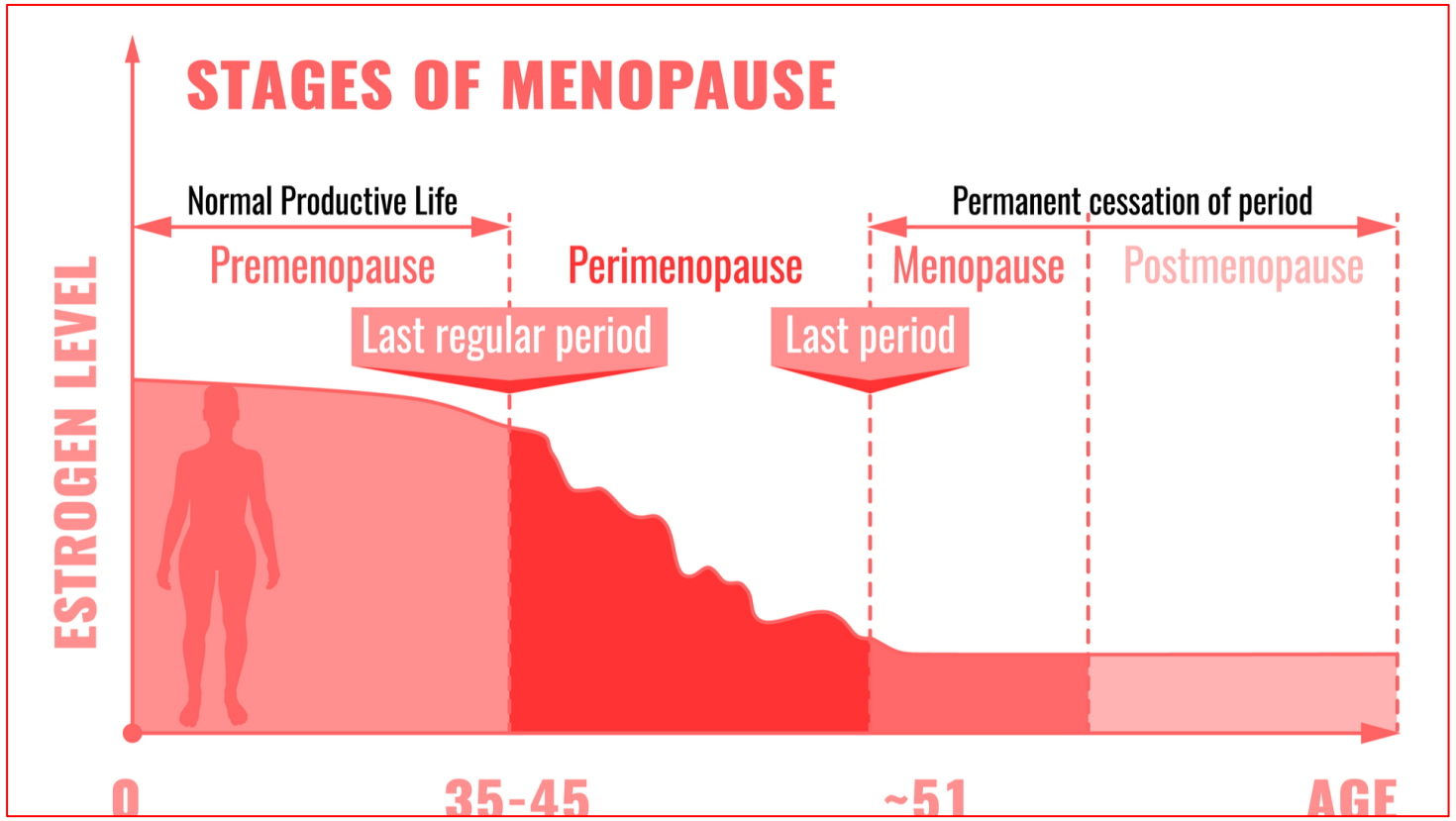


Vegetarian and Vegan Diets

- Twice as many women than men follow these eating patterns
- Avoiding animal products increases the likelihood of lower intakes of:
  - Calcium
  - Vitamin D
  - Iron
  - Iodine
  - B12
  - Choline
  - Omega-3 fish oils
- Plant “milks” – look for fortified with calcium, vitamin D
  - Tend to be lower in protein and do not contain iodine
- Include whole grains, iron-fortified cereals, legumes, nuts, seeds, dried fruit and leafy greens to prevent iron deficiency

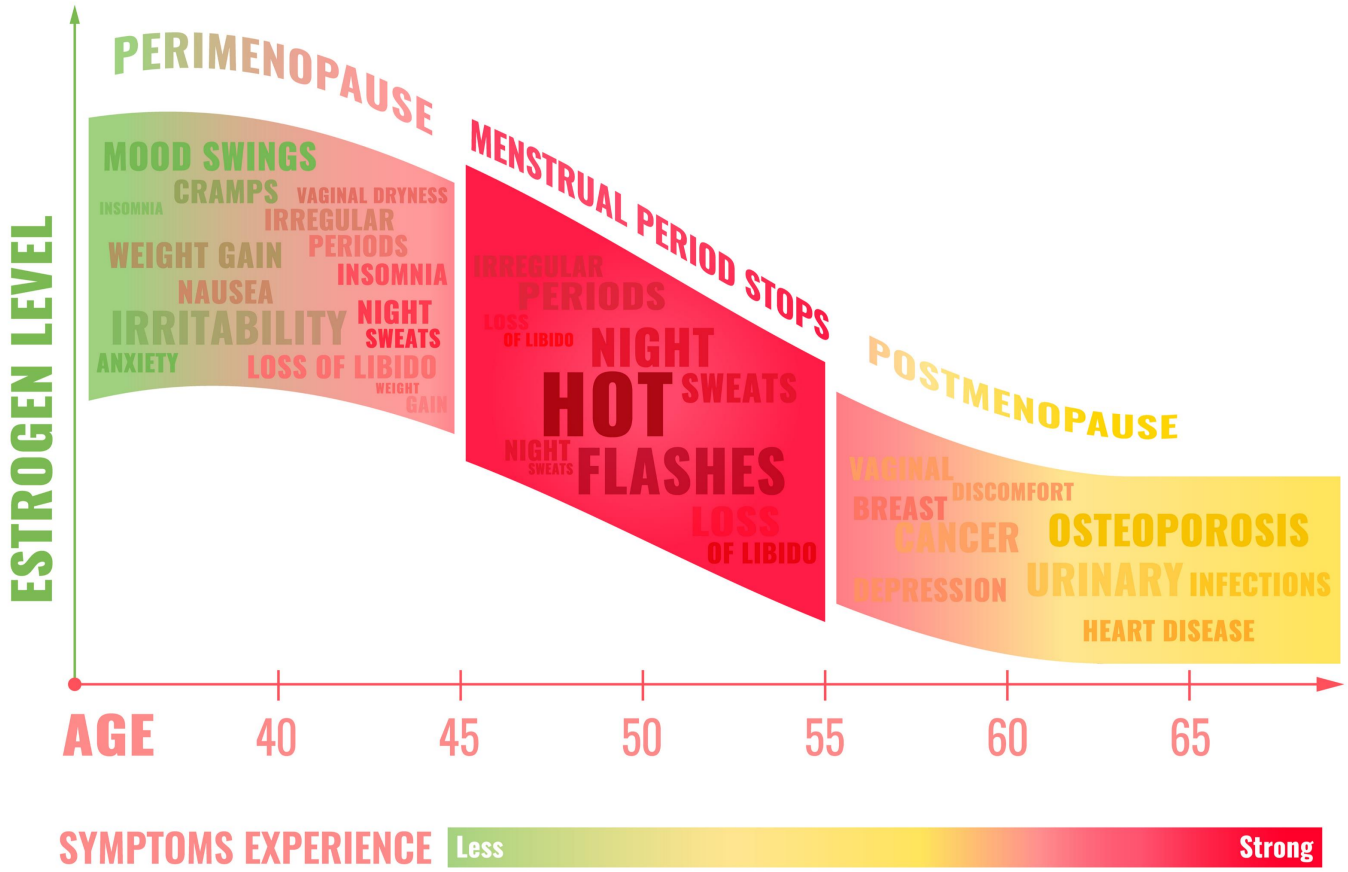
Menopause

- Fluctuating levels of estrogen, progesterone, testosterone, follicular stimulating hormone, luteinizing
- Menopause
  - 12 months without a menstrual cycle – end of fertility
  - Average age is 51 in US
  - 1/3 of average lifespan
- Peri-menopause
  - ~4 years prior to menopause
  - Hormones begin to fluctuate
- Early menopause – 40-45 years
- Premature menopause – occurs before 40 (1%)



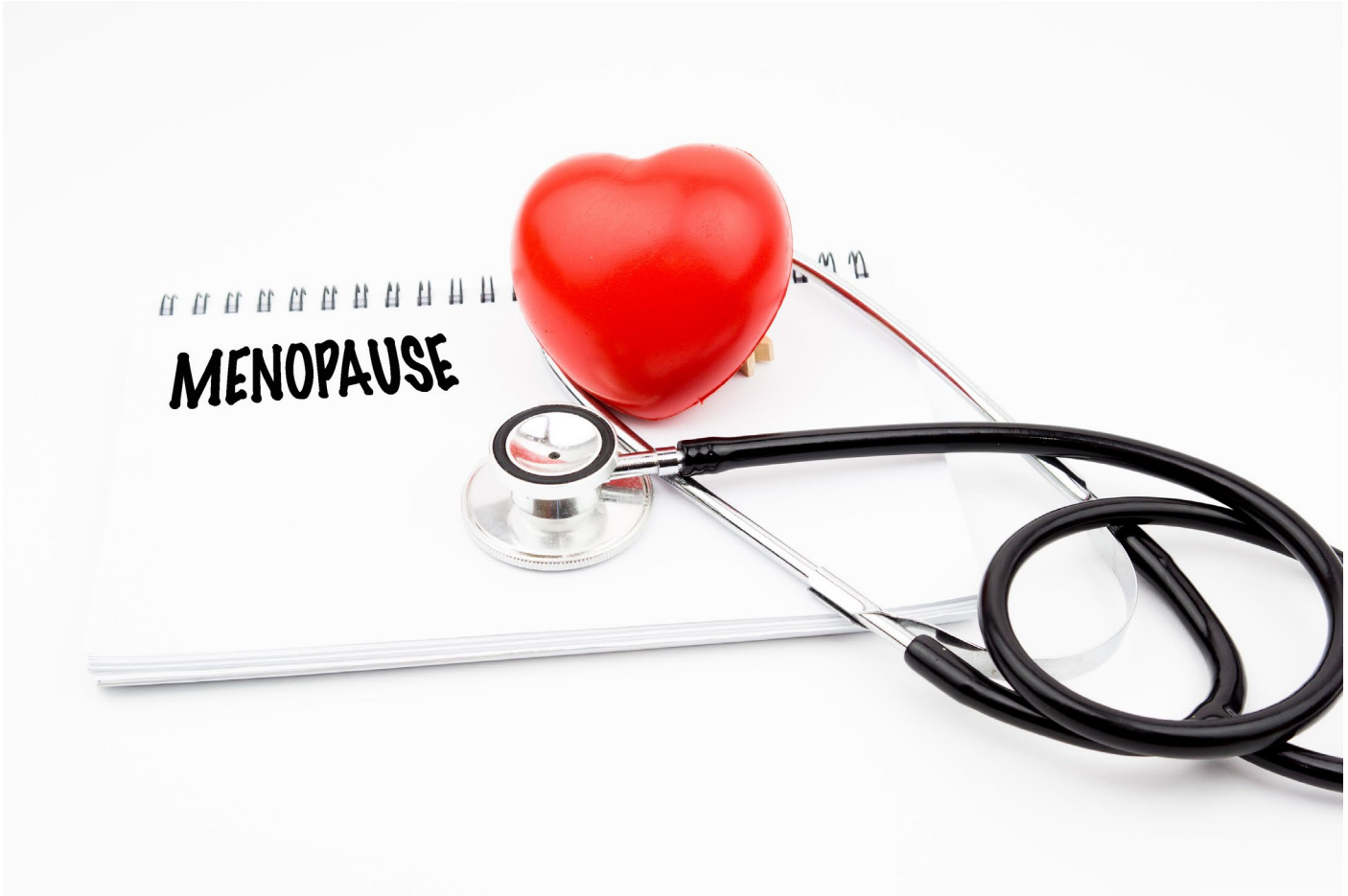
Menopause Symptoms

- Signs and Symptoms
  - Hot flashes, night sweats, flushing
  - Irregular periods – shorter, longer, heavy flow, spotting, skipping
  - Sleep disturbances, mood shifts, brain fog, fatigue, headaches, low libido
  - Thinning hair, decreased bone mass, abdominal weight gain
- Prevalence of symptoms:
  - Up to 75% experience hot flashes
  - Over 40% have sleep problems
  - 10-20% have serious mood disturbances such as anxiety, depression



Menopause – Physiological Changes

- Estrogen is cardioprotective.
  - The ovaries use LDL (bad) cholesterol to make estrogen
- Decrease in estrogen leads to:
  - Less LDL cholesterol being used
  - Higher levels in circulation
  - Greater risk of heart disease



Menopause – Physiological Changes

- Estrogen helps regulate fat metabolism via beta oxidation in the mitochondria
  - Lower estrogen levels downregulate genes in fat metabolism
- Lower estrogen results in a relative increase in testosterone; resulting in fat redistribution to the abdominal region (nature's life preserver)
  - Estrogen directs fat storage to the glutes and thighs vs. testosterone which augments fat storage to the abdomen

PMID: 18971793

Menopause – Physiological Changes

- Estrogen helps remodel bone
  - Lower levels increase activity of osteoclasts, which breakdown bone; leading to porous bones
- Higher bone density at onset of menopause decreases likelihood of osteoporosis
- Higher prevalence of osteoporosis in women vs. men over 65y (25% vs. 5%, CDC)
  - Leading cause of fractures in older adults

PMID: 18971793

Menopause – Nutrition Guidelines

- Lower requirement for iron
  - Switch to Over50MV with menopause
- Increased requirement for calcium and vitamin D to maintain bone density
  - Under-consumed nutrients
  - 1,200 mg/day of calcium (3+ servings and/or supplement)
  - ~1,000 IU of vitamin D – get blood tested for ideal dose
- Vitamin D RDA
  - 14 y + 600 IU
  - >70 y + Pregnancy/Lactation: 600 IU

International Osteoporosis Foundation Position Statement

- Without sufficient vitamin D only 10-15% of calcium is absorbed.[1]
- Skin production of vitamin D declines with age, and as vitamin D is difficult to obtain from food sources alone, IOF advises vitamin D supplementation to reach these recommended levels.[2]
- IOF recommends a daily dosage of 800 to 1000 IU/day of vitamin D for fall- and fracture-prevention in adults ages 60 and older.[2]
- To raise levels above 30 ng/mL, adults may need 1500-2000 IU/day.

PMID: **20422154**

Guide to dotFIT Multivitamins for Women

2-11 y – take one

12-17 y take one
18-65 y – take two if competitive athlete or intense exerciser

18-50 y– take one for low to moderate exercisers OR while breastfeeding

51 y + – take one
65 y athletes and intense exercisers – take one

Vegans/vegetarians – take one

Menopause – Nutrition Guidelines

Dairy Products are rich in bone building nutrients:

- Protein
- Calcium
- Vitamin D
- Vitamin K
- Magnesium
- Phosphorus
- Potassium

- Study of 746 postmenopausal women – significantly higher bone density in women ate more dairy + animal protein

PMID 28077378

Menopause – Nutrition Guidelines

- Fiber-rich foods to counteract elevated cholesterol, manage appetite and support gut health
  - At least 14 grams per 1,000 calories (21-25 g/day for women)
  - Average intake is ~14 g/day
- Whole grains (oats + barley)
  - 3 servings/day = 20% lower risk of heart disease and stroke
  - Rich in beta glucan: soluble fiber that binds bad cholesterol

PMID: **27301975**

Menopause – Nutrition Guidelines

- Legumes to help lower cholesterol, increase fiber and protein
  - replace refined grains to decrease risk of heart disease and support weight loss
  - ½ cup/day lowers LDL cholesterol

PMID: **24710915**

Menopause – Nutrition Guidelines

- Dark greens, berries and other fruits and veggies for fiber and antioxidants
  - Fruits contain pectin, a soluble fiber which lowers bad cholesterol
  - Berry phytochemicals like anthocyanins and carotenoids protect cell damage and have anti-inflammatory activity. Potential to reduce risk of chronic disease and support healthy aging

Menopause – Nutrition Guidelines

Lean protein to preserve muscle, support bone health and metabolism

- Higher protein diets linked to better bone health
- Protein has highest thermic effect of food
- Higher protein reduces appetite and hunger levels
    - Increasing from 15-30% reducing intake by 441 calories in overweight women

PMID: **21102327, 15466943, 16002798**

Menopause – Nutrition Guidelines

- Healthy fats from oily fish to lower inflammation, risk of CVD and raise good cholesterol levels
  - At least 8 ounces weekly or supplement with 600-1,000 mg/day of EPA+DHA
  - Steamed/baked (not fried)
- Vegan friendly sources: Flaxseeds, chia seeds, walnuts and algae oil

Menopause – Nutrition Guidelines

- Soy isoflavones to help alleviate hot flashes and lower cholesterol
  - Also called phytoestrogens: similar in structure to estrogen (estradiol)
  - Meta-analysis of 10 studies: phytoestrogens significantly reduce frequency of hot flushes
  - Average intake in the US is 1 mg/day vs. 25-50 mg in Asian countries where fewer symptoms are experienced

PMID: **26268987, 25263312, 17487647**

Menopause – Nutrition Guidelines

- Tea to support heart health
  - Green, white, black
- Contains plant compounds (flavonoids):
  - Catechins: inhibits cholesterol absorption and synthesis; support healthy blood pressure via nitric oxide activation
  - Quercetin: may lower inflammation and support healthy blood vessels (Placebo RCT on supplements)

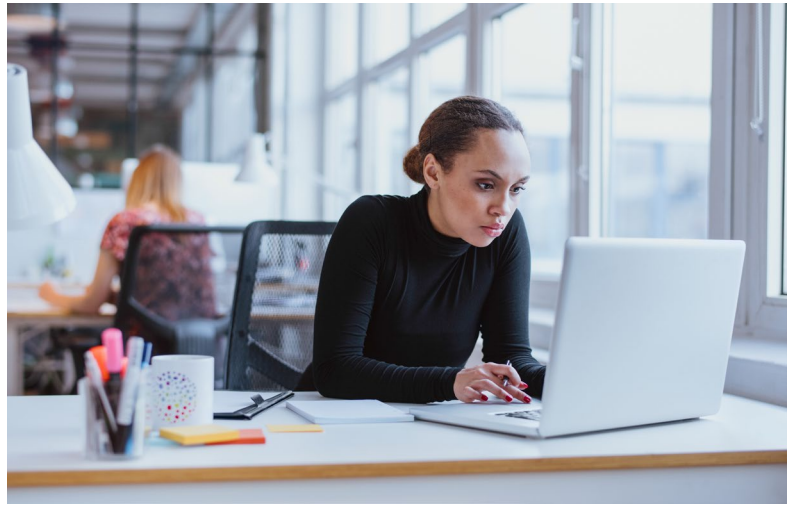
PMID: **25972527**

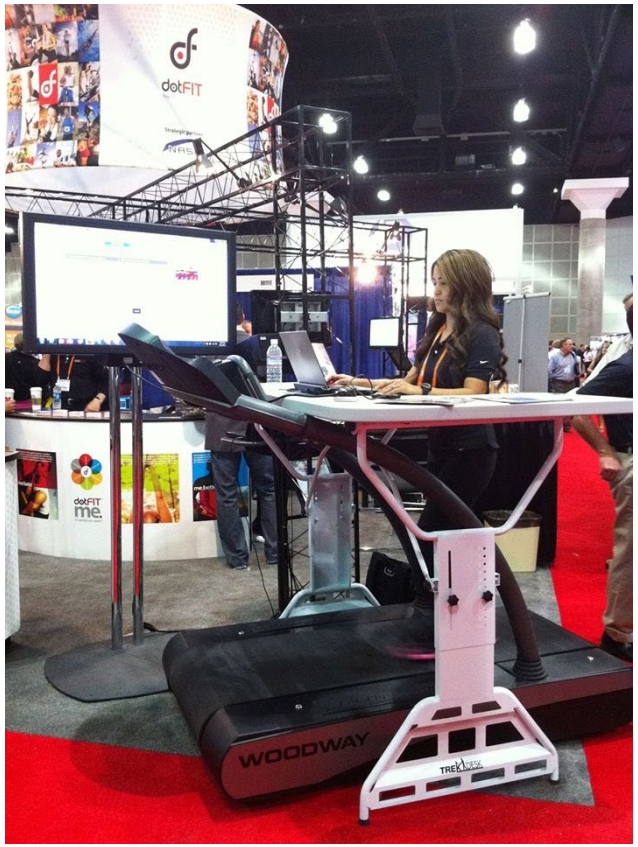
Metabolism Changes with Aging – Implications for Weight Loss

- Basal Metabolic Rate (BMR) makes up 60-75% of calorie needs
  - Fat free mass/skeletal muscle is the major determinant of BMR (60-85% of body mass)
- Women have a lower BMR than men when adjusted for body composition
- BMR decreases significantly with age and sedentary lifestyles
  - After age 20 years: 1-2% drop per decade

Metabolism Changes with Aging – Implications for Weight Loss

- NEAT (non exercise activity thermogenesis) – calories burned through lifestyle activities and spontaneous movement
  - Varies up to 2,000 calories a day among adults of similar size
- Decreases with age – older adults burn almost 30% fewer calories with NEAT compared to younger subjects matched for lean body mass
  - Less walking/fewer daily steps

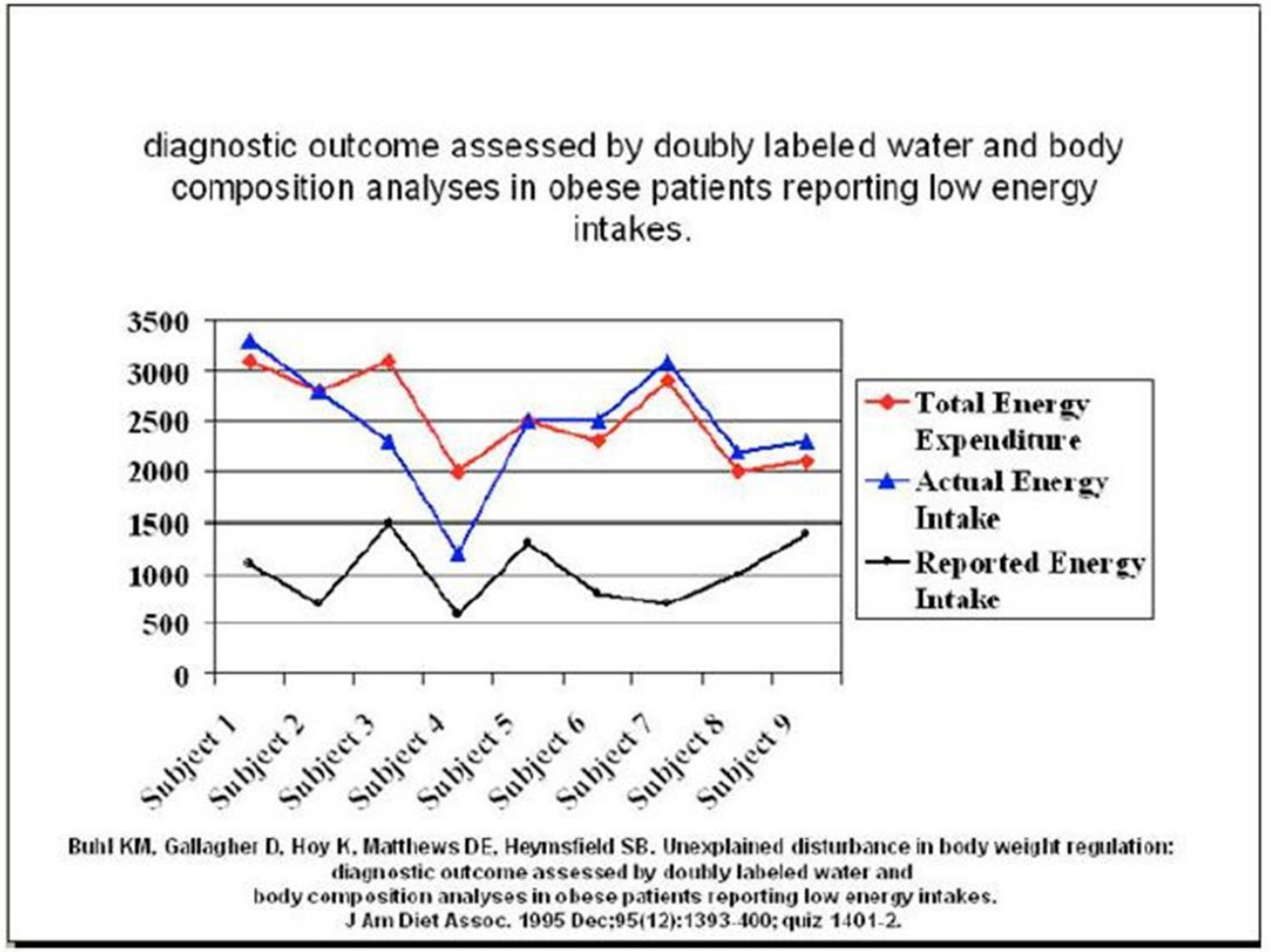




Physical Activity Level of Job	NEAT Calories Expended Per Day
Chair Bound	300
Seated with Some Movement	700-1,000
Upright	1,300
Strenuous	2,300

PMID: **17401138; 15102614**

Metabolism of “Diet Resistance” Individuals



Actual energy intake is based on body mass changes mapped to **actual energy expenditure**. All subjects dramatically underreported. Highlighting subjects 2 & 7: they burned an average of 3000 calories per day but had no change in body mass/weight. Therefore they must have consumed 3000 calories per day, while claiming to only have consumed 600 per day.

PMID: **7594141**

Muscle Health & Healthy Aging

- Muscle mass begins to decline at age 30 y: 3% to 8% every decade, accelerating with menopause, age, and sedentary lifestyle
  - Increases risk of falls, fractures and functional disability
- Current RDA at 0.36 g/lb. appears insufficient to maintain muscle mass in older adults
  - Higher protein intakes have been found to help maintain muscle in older individuals - 0.5 to 0.8 g/lb. of body weight or 1 g/lb. of LBM per day

The maintenance of muscle mass throughout the lifespan is a cornerstone of healthy aging

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GROW STRONG.

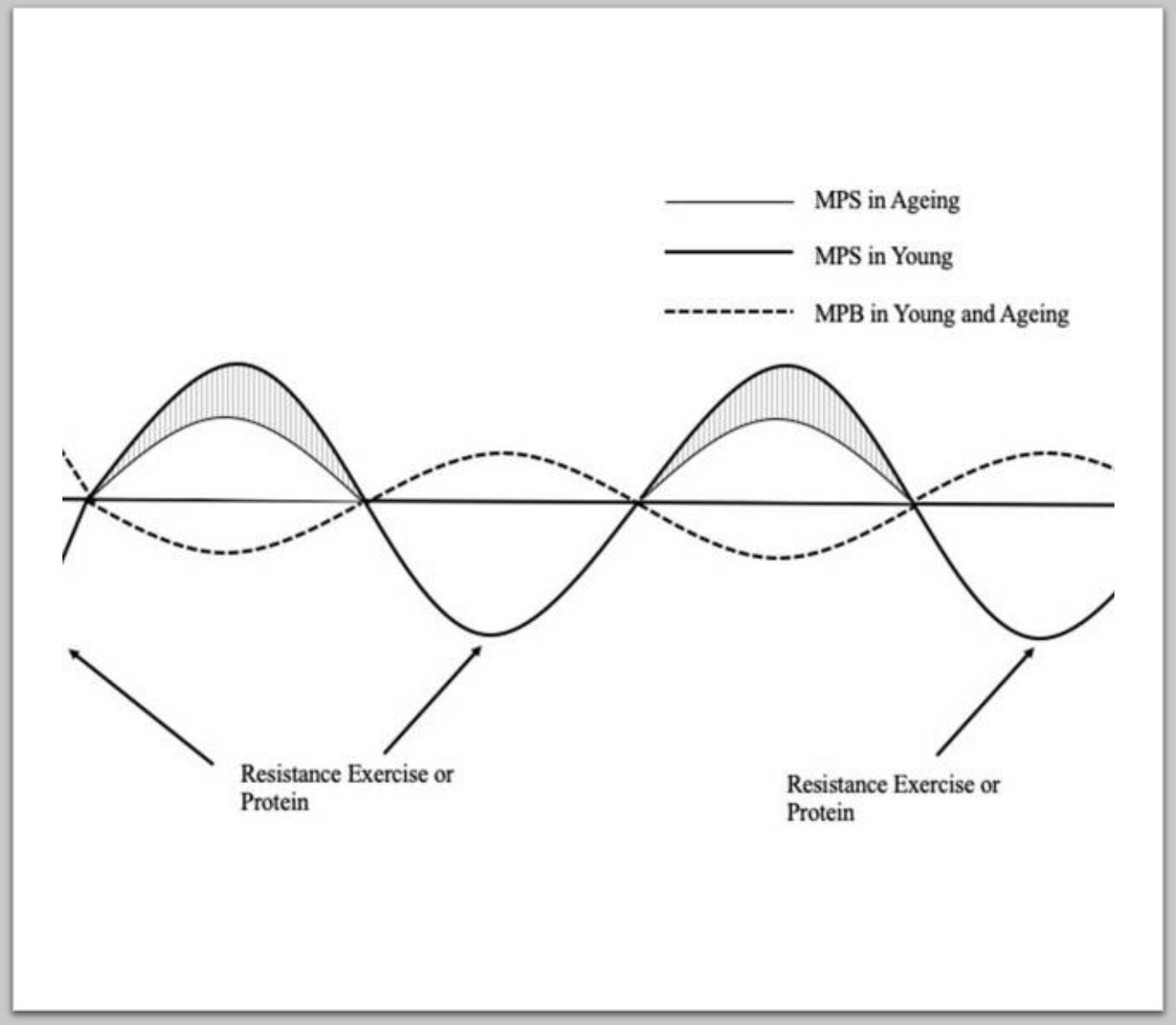
PMID: 26775160

Muscle Health & Aging

- Aging increases the body's resistance to anabolic impact of resistance training and protein
  - Older adults require up to 40 g of whey protein to have a similar muscle protein synthetic response as younger individuals who consume 20 g
  - High quality protein dose per meal to maximize MPS: .18 to .20 g/lb. of body weight

Muscle Health & Aging

- Following resistance exercise or the ingestion of protein, younger humans have a greater myofibrillar protein synthesis (MPS) response compared to older people.
- Thus, exercise and adjusted protein intake play a major factor in attenuating age-related decreasing net protein balance leading to skeletal muscle protein loss over time.
- Resistance exercise is the most potent protector and stimulator of muscle mass



PMID: **31552262**

Muscle Health & Aging

- Whey Protein Characteristics:
  - High biological value
  - Rapid digestibility
  - Richest source of essential amino acids
  - Greatest amount of leucine per dose
    - 3.0 g vs. 2.3 g in casein and 1.5 in soy
  - Low in lactose
  - Convenient method of meeting higher daily targets

Table 1. Protein quality assessment based on protein sources.

Protein Type	Protein Digestibility (%)	Biological Value (%)	Net Protein Utilization (%)	PDCAAS	DIAAS
		Animal source			
Red meat [1]		80	73	92	
Casein [1,3,6]	99	77	76–82	100	
Whey [1]		104	92	100	
Milk [1,4,6]	96	91	82	100	114
Egg [1,4,6]	98	100	94	100	113
		Plant source			
Black bean [1,6,8]	70			75	
Cooked black bean [7,8]	83			65	59
Soy flour [5,8]	80			93	89(SAA)
Soy protein isolate [1,6]	98	74	61	100	
Green lentil [3,4]	84			63	65
Yellow split pea [4,6]	88			64	73
Cooked pea [7]	89			60	58
Pea protein concentrate [7]	99			89	82
Chickpea [3,4]	89			74	83
Peanuts [1]				52	
Roasted peanuts [7]	98			51	43
Peanut butter [3,4]	98			45	46
Whole grains [2]				45	
Wheat [3,5,6]	91	56–68	53–65	51	45(Lys)
Wheat gluten [1]		64	67	25	
White bread [4,6]	93			28	29
White rice [4,6]	93			56	57
Cooked rice [7]	87			62	60

[1] Hoffman and Falvo [52]; [2] van Vliet et al. [53]; [3] Sarwar et al. [54]; [4] Marinangeli and House [55]; [5] Mathai et al. [56]; [6] ANSES [57]; [7] Rutherfurd et al. [58]; [8] Sarwar [59]. Abbreviations: PDCAAS: protein digestibility-corrected amino acid score; DIAAS: digestible indispensable amino acid score; Lys: lysine; SAA: sulfur amino acids.

Creatine for Women

2021 Review of Creatine Studies:

- Among women and elite athletes:
  - Greater strength, power, speed, and muscle mass
- Among postmenopausal and older women:
  - No increase in fat mass from one to two years of supplementation
  - Improvements in functional tasks, strength, muscle mass, attenuating bone loss
  - Benefits on muscle and bone occur when combined with resistance exercise
- Safety in healthy individuals is well established

There is accumulating evidence that creatine supplementation has the potential to be a multifactorial intervention across the lifespan in females, with little to no side effects."

J. International Society of Sports Nutrition https://rdcu.be/cfRqH

PlaySpan in Action – My Typical Weekday

Daily Supplements to Fill Gaps & Reach RDAs

- Over50MV – once a day
- SuperCalcium+ - once a day
- SuperOmega3+ - twice a day
- Vitamin D3 – three times a day

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Breakfast	Calories	Protein	Calcium	Fiber
Coffee	5			
Creamer	60			
Berries	39			
Whole wheat tortilla	35	4		
Sliced turkey breast	25	5		
Avocado	29	1		
Hummus	18			
Whey Smooth Choc + PB Flavor Packet	170	26		
	381	**36**	**262**	**12**
Lunch				
Salad Mix	160	3		
Broccoli medley	17	1		
Grilled chicken	111	22		
Mandarin oranges	36			
Mini milky way	38			
	362	**26**	**75**	**4**

Snack				
Triscuits	120	3		
Swiss cheese	70	5		
Apple	79			
Amino Boost Watermelon - 1 scoop	5	12		
	274	**20**	**159**	**6**
Dinner				
Sweet potato	77	2		
Chicken	111	21		
Green beans	44	2		
EVOO	120			
Mini twix	50			
Tea	0			
	402	25	94	7
	Calories	**Protein**	**Calcium**	**Fiber**
Daily Totals	**1419**	**107**	**590**	**29**

dotFIT PlaySpan: Targeted Multivitamin & Mineral w/ Vitamin D + Calcium and Omega-3s when needed + 1 gram of protein per pound of lean body mass daily

Summary

- Nutrient needs vary based on a woman's life stage, age and activity level
- Consuming recommended amounts (RDAs) of key nutrients at each stage supports optimal health and development
- Changes in metabolism do not prevent weight loss. Menopause shift fat distribution towards midsection
- Adequate protein, resistance training, and eating a wide variety of foods helps prevent age-related muscle loss and supports healthy aging

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