

Subcommittee 1:

Food and Nutrient Intakes, and Health:
Current Status and Trends



Marian Neuhouser
SC 1 Chair



Alice H. Lichtenstein
DGAC Vice Chair



Steve
Abrams



Cheryl
Anderson



Mary
Story

Scope

Current status and trends in:

- Food group, food, and nutrient intake
- Eating behaviors
- Diet-related chronic diseases and weight status
- Dietary pattern composition

Invited Experts and Consultants

Invited Experts

Individuals invited by the SC, usually on a one time basis, to provide their expertise to inform the SC's work. Invited experts do not participate in decisions at the SC level.

Consultant SC Members

Individuals sought by the SC to participate in SC discussions and decisions on an ongoing basis but are not members of the full DGAC. Like DGAC members, consultants complete training and have been reviewed and cleared through a formal process within the Federal government.

Experts and Consultants

Invited Experts (Sept to Nov 2014)

None

Consultant SC Members

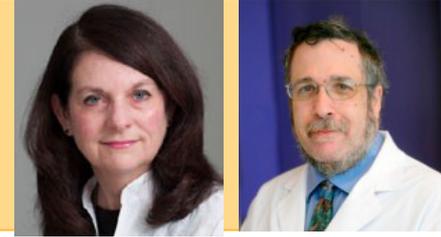
None

Topics Addressed Today

1. Nutrients of Public Health Concern: *Marian Neuhouser and Steve Abrams*
2. Dietary Pattern Composition: *Marian Neuhouser and Cheryl Anderson*
3. Health Conditions—Prevalence and Trends: *Cheryl Anderson and Barbara Millen*

Nutrients of Public Health Concern

Topic Leads:
Marian Neuhouser
and Steve Abrams



- Background
 - Most questions and draft conclusion statements have been presented in past meetings.
 - One question remains for presentation today

Nutrients of Public Health Concern

Question NOC5a:

How well do the USDA Food Patterns meet the nutritional needs of children 2 to 5 years of age and how do the recommended amounts compare to their current intakes? Given the relatively small empty calorie limit for this age group, how much flexibility is possible in food choices?

Food Pattern Modeling

Nutrients of Public Health Concern Q5a

Review of the Evidence

- Nutritional needs and diets of young children differ from those of adults and older children, so patterns were modified for children 2-5 years.
- Nutrient profiles for dairy and fruit groups were modified to represent intakes of young children:
 - Fruit juice changed from 33% to 42% of total fruit intake
 - Milk intake changed from 54% to 71% of total dairy intake
 - Fluid milk represented by lowfat (1%) rather than fat-free milk
- Resulting patterns were compared to nutritional goals, and to current intakes
- Potential for flexibility in the patterns was identified.

Nutrients of Public Health Concern Q5a

Key Findings

- Modified USDA Food Patterns meet the nutrient needs of young children.
 - Nutrients for which the RDAs are not met are the same as for older children and adults.
- Recommended food group amounts fall within the range of usual intakes (5th to 95th percentiles) of this age group for most food groups and subgroups.
- Patterns have limited flexibility to allow for calories from solid fats or added sugars (empty calories).
 - Options to increase flexibility in food choices include a small reduction in the amount of Protein Foods, or a change from 1% milk to fat-free milk at 4 years of age.

Nutrients of Public Health Concern Q5a

Draft Summary Statement

- The USDA Food Patterns provide suitable guidance for feeding young children 2 to 5 years of age.
- The pattern assumes use of 1% rather than fat-free milk.
- The allowance for empty calories is limited since total kcals consumed are lower.

Nutrients of Public Health Concern

Question NOC5a:

How well do the USDA Food Patterns meet the nutritional needs of children 2 to 5 years of age and how do the recommended amounts compare to their current intakes? Given the relatively small empty calorie limit for this age group, how much flexibility is possible in food choices?

Discussion

Reminder: DGAC members, please state your name before speaking.

Dietary Patterns Composition

Topic Leads:
Marian Neuhouser
and Cheryl Anderson



- Background
 - A primary focus of SC2 is to examine the associations of dietary patterns (rather than single nutrients) with risk of obesity, cardiovascular disease, type 2 diabetes and cancer.
 - Several types of patterns emerged as having healthful benefits
 - Here, we complement that work by seeking to determine the specific types and quantities of food groups that appeared most consistently in the studies examined in SC2.

Dietary Patterns Composition

Questions Addressed Today

1. What is the composition of dietary patterns with evidence of positive health outcomes (eg, Med, DASH, HEI), and of patterns commonly consumed in the US? What are the similarities (and differences) within and amongst the dietary patterns with evidence of positive health outcomes and the commonly consumed dietary patterns?
2. To what extent does the U.S. population consume a dietary pattern that is similar to those observed to have positive health benefits [e.g., Mediterranean-type diets, Dietary Approaches to Stop Hypertension (DASH)- type diets, diets that closely align with the Healthy Eating Index and vegetarian diets] overall and by age/gender and race/ethnic groups?
3. Using the Food Pattern Modeling process, can healthy eating patterns for vegetarians and for those who want to follow a Mediterranean-style diet be developed? How do these patterns differ from the USDA Food Patterns previously updated for the 2015 DGAs?

Dietary Patterns Composition

Question DPC 1.

What is the composition of dietary patterns with evidence of positive health outcomes (eg, Med, DASH, HEI, Vegetarian), and of patterns commonly consumed in the US? What are the similarities (and differences) within and amongst the dietary patterns with evidence of positive health outcomes and the commonly consumed dietary patterns?

Data analysis

Dietary Patterns Composition DPC Q1

Methods

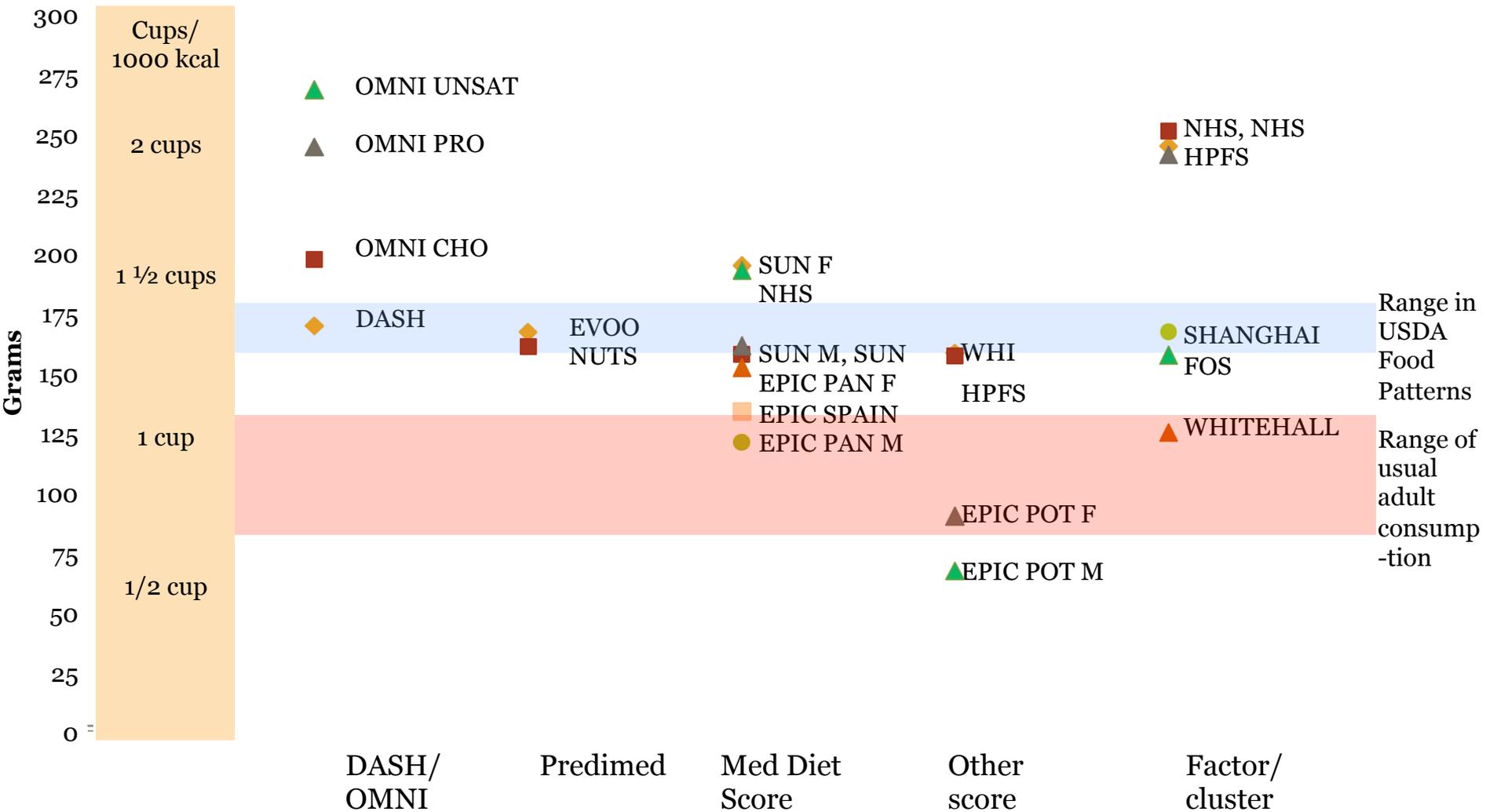
- Reviewed articles examined by SC 2 to identify those that reported quantified data on food group intakes in the population or intervention group with positive health outcomes. Many articles were excluded because of insufficient quantitative information.
- Quantified food group intakes for these groups were converted to grams, if presented in servings. Used serving to gram conversions from the study or related documents (e.g., Harvard FFQ conversions).
- Converted grams per day to grams per 1000 calories, to enable comparison across studies.

Dietary Patterns Composition DPC Q1

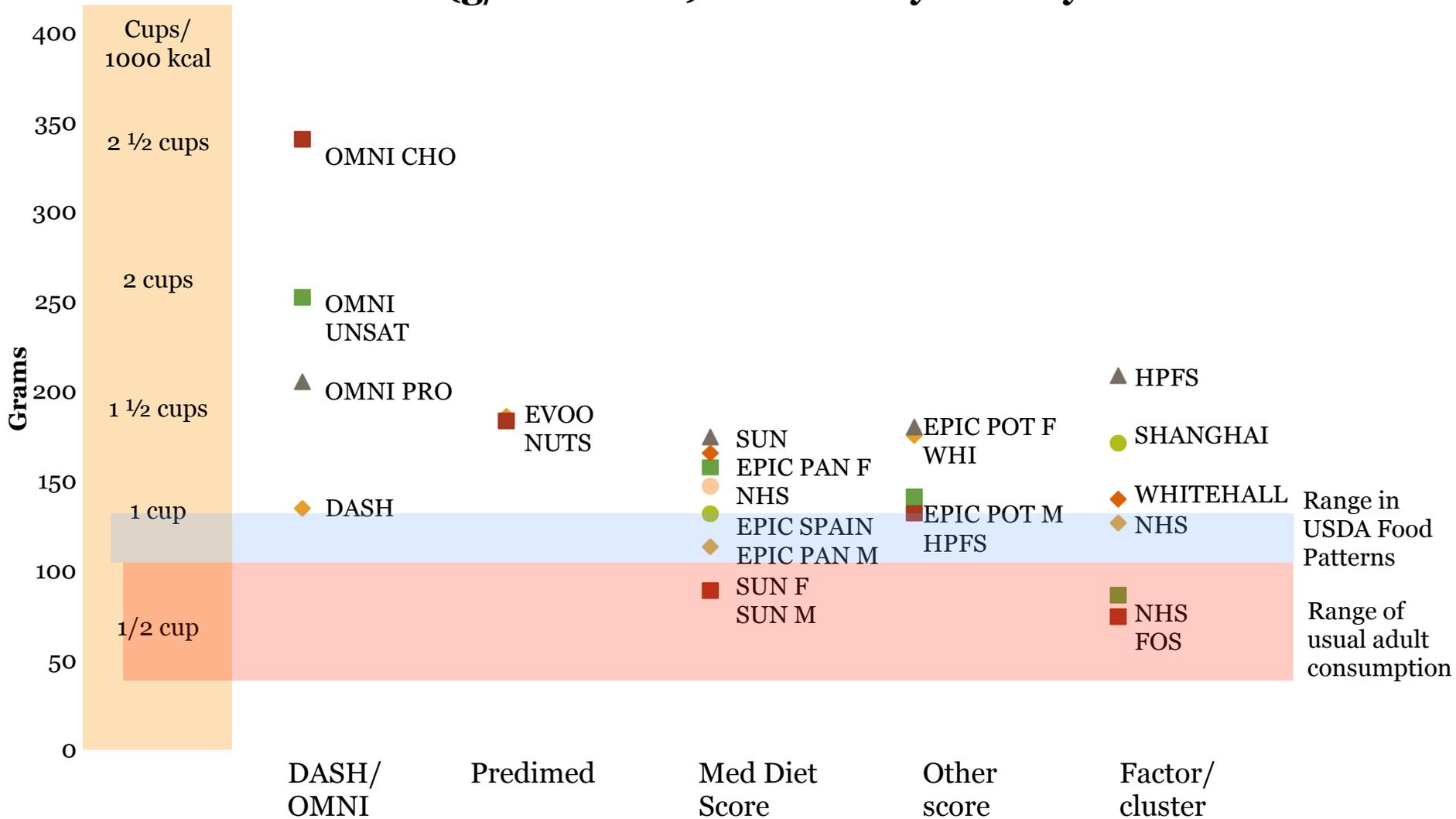
Methods

- **For comparison to usual intakes:**
Usual intakes from NHANES 2007-10 for adults were converted into grams per 1000 calories for each adult age/sex group. The range of these intakes was used as the comparator.
- **For comparison to USDA Food Patterns (Healthy US-Style Patterns):**
Recommended amounts of each food group in the patterns from 1800 to 2400 calories were converted to grams per 1000 calories. The range of these recommended intakes was used as the comparator.

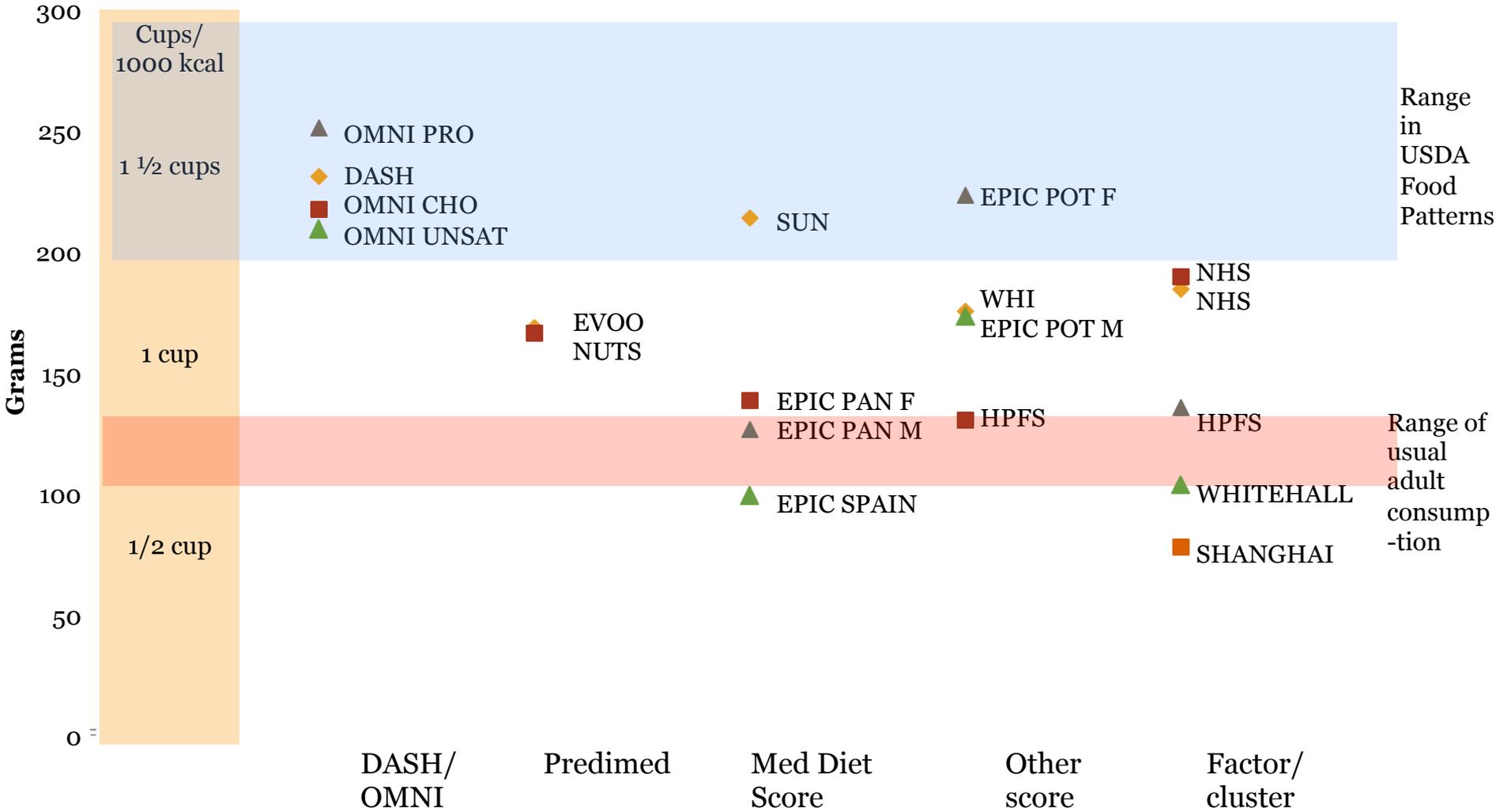
Vegetable intake (g/1000 kcal) for Healthy Dietary Patterns



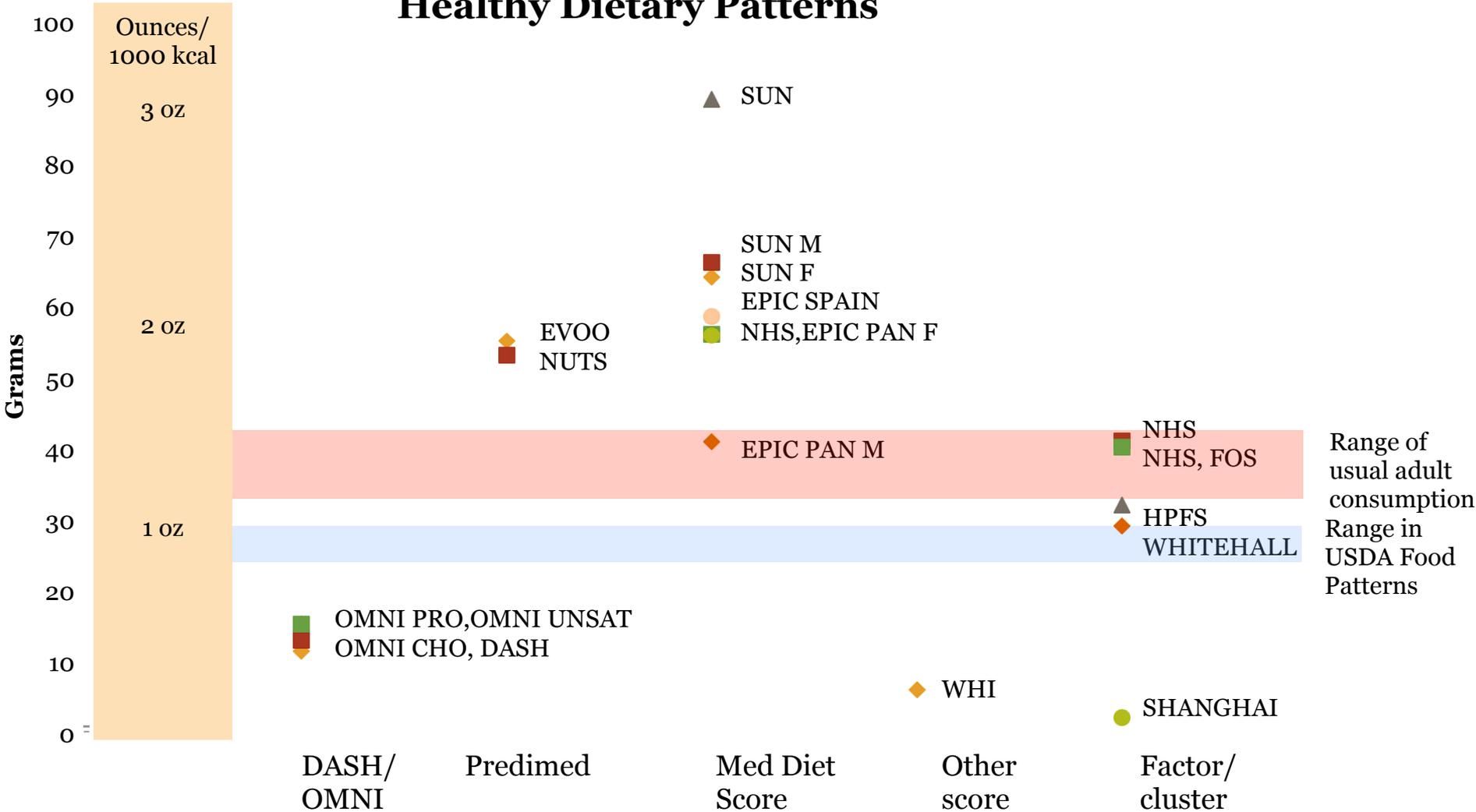
Fruit intake (g/1000 kcal) for Healthy Dietary Patterns



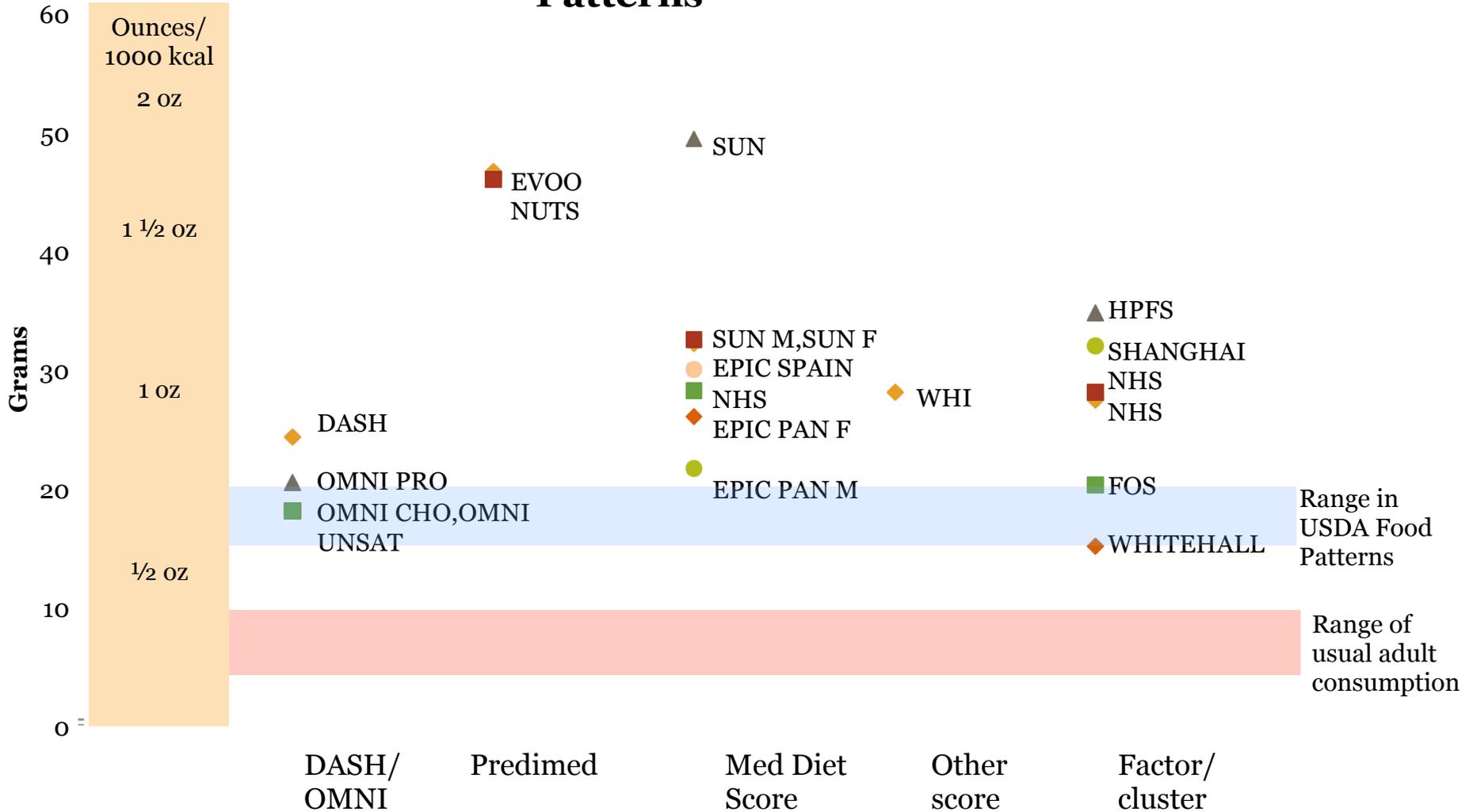
Dairy intake (g/1000 kcal) for Healthy Dietary Patterns



Red and Processed meat intake (g/1000 kcal) for Healthy Dietary Patterns



Seafood intake (g/ 1000 kcal) for Healthy Dietary Patterns



Dietary Patterns Composition DPC Q1

Draft Conclusion Statement

- Dietary patterns with varying food group composition, but certain common elements, were observed across intervention and cohort studies to have health benefits and they offer options for achieving a healthy diet.
- In general, the ranges of intake in dietary patterns with positive health benefits are very close to that recommended by the USDA food patterns, but amounts of some specific food groups vary across the various diet patterns types.
 - DASH-style diets, Mediterranean-style diets, and the USDA food patterns are similar with respect to amounts of fruits and vegetables, and the OMNI diets are slightly higher.
 - Dairy intake is comparable between DASH-style diets and the USDA Food Patterns, but dairy is lower for Mediterranean-style diets.
 - Red and processed meats are higher in the Mediterranean-style diets but lower in the DASH-style diet than is recommended by the USDA food patterns.
 - Seafood intake is similar in DASH-style and higher in Mediterranean-style diets than the USDA food patterns.
- The data from the intervention trials and the cohort studies provide empirical data that the USDA food patterns provide an evidence-based guide to food consumption.

Dietary Patterns Composition DPC Q1

Draft Implications

- The quality of the current diets of the US population is suboptimal overall (presented in previous DGAC meetings) and has major adverse health consequences.
- To improve the population's diet, there are several eating patterns that can be adopted.
- The approaches that can be taken are varied and can be adapted to personal and cultural preferences.
- The opportunity to consume a variety of dietary patterns may help to promote and support more sustained dietary changes leading to improved health in the U.S. population.

Dietary Patterns Composition

Question DPC 2.

To what extent does the U.S. population consume a dietary pattern that is similar to those observed to have positive health benefits [e.g., Mediterranean-type diets, Dietary Approaches to Stop Hypertension (DASH)-type diets, diets that closely align with the Healthy Eating Index and vegetarian diets] overall and by age/gender and race/ethnic groups?

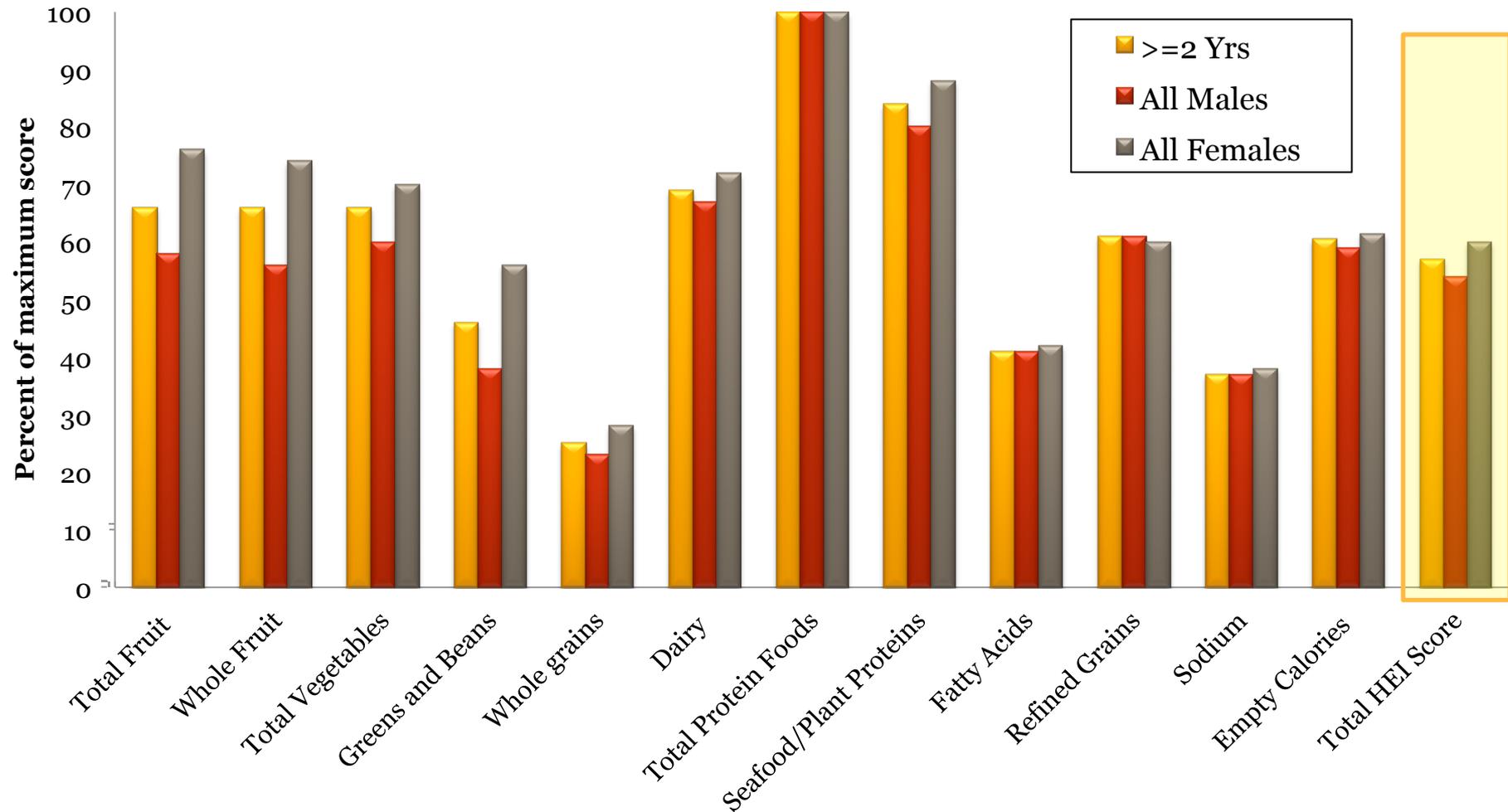
Data analysis

Dietary Patterns Composition DPC Q2

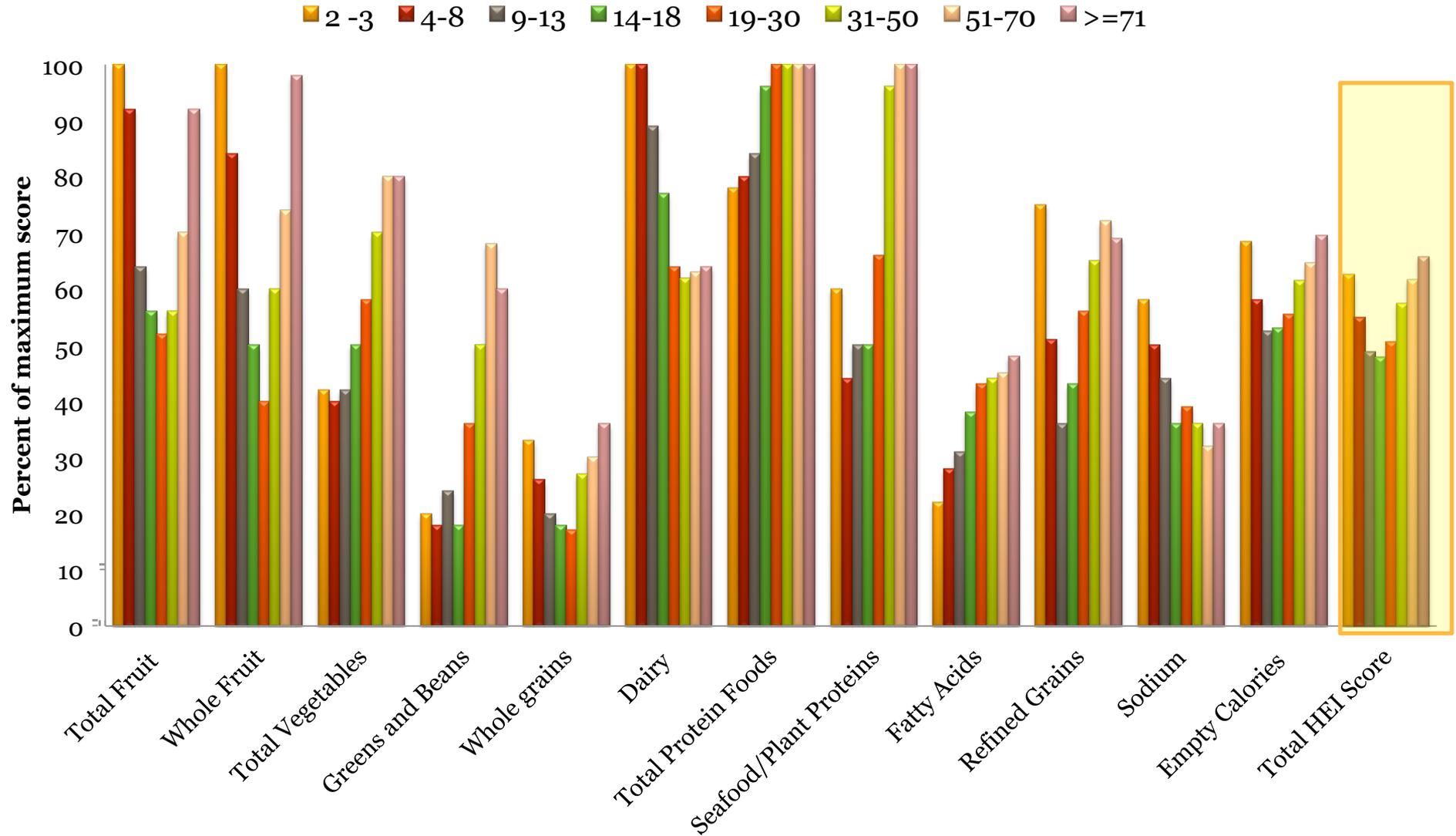
Methods

- Compare HEI-2010 scores and subscores for age/sex groups, using NHANES 2009-10 intake data, to ideal scores.

Average HEI-2010 scores for Americans Ages 2 and older- 2009-2010



Average HEI-2010 scores for Americans by age group, 2009-10



Dietary Patterns Composition DPC Q2

Key Findings

- HEI component scores varied in the WWEIA/ NHANES data
 - Females, young children and middle-aged and older adults had better component scores while preadolescent and adolescent children had the poorest score
- Data are not available to examine DASH-style or Mediterranean-style diets in WWEIA.

Dietary Patterns Composition DPC Q2

Draft Conclusion Statement

- Data from WWEIA show that the average HEI score in the U.S. population is 57 points out of a total of 100 points.
- The best scores were observed for the following components: total protein foods (average score of 100%), seafood and plant protein (84%), and dairy (69%) while the poorest scores were observed for whole grains (25%) , sodium (37%), fatty acids (41%), greens and beans (46%), and empty calories (average score of 60%).
- In addition, young children ages 2-3 years and middle aged and older adults (51 years and older) have the best HEI scores (total scores of 63% and 66%, respectively) while preadolescents and adolescents have the poorest HEI scores (total scores of 49% and 48 %, respectively).

Dietary Patterns Composition

Question DPC 3.

Using the Food Pattern Modeling process, can healthy eating patterns for vegetarians and for those who want to follow a Mediterranean-style diet be developed? How do these patterns differ from the USDA Food Patterns previously updated for the 2015 DGAs?

Food Pattern Modeling

Dietary Patterns Composition DPC Q3

Methods

Vegetarian Patterns

- Review data on food group intakes from analysis of self-identified vegetarian's diets, from NHANES 2007-10, to select foods to include/exclude in Vegetarian Patterns. Based on this data, chose to model a lacto-ovo vegetarian pattern.
- Select the types and amounts based on the average amounts consumed of each food group or subgroup by vegetarians vs. non-vegetarians in the NHANES sample.
- Determine amounts from each food category that could be included to meet nutrient goals in the Patterns at 12 calorie levels based on vegetarians' choices, using an iterative process.
- Balance calories by adjusting amounts of oils, solid fats, and added sugars as appropriate.
- Assess nutrient adequacy of the Vegetarian Patterns in comparison to Dietary Reference Intakes and Dietary Guidelines recommendations.

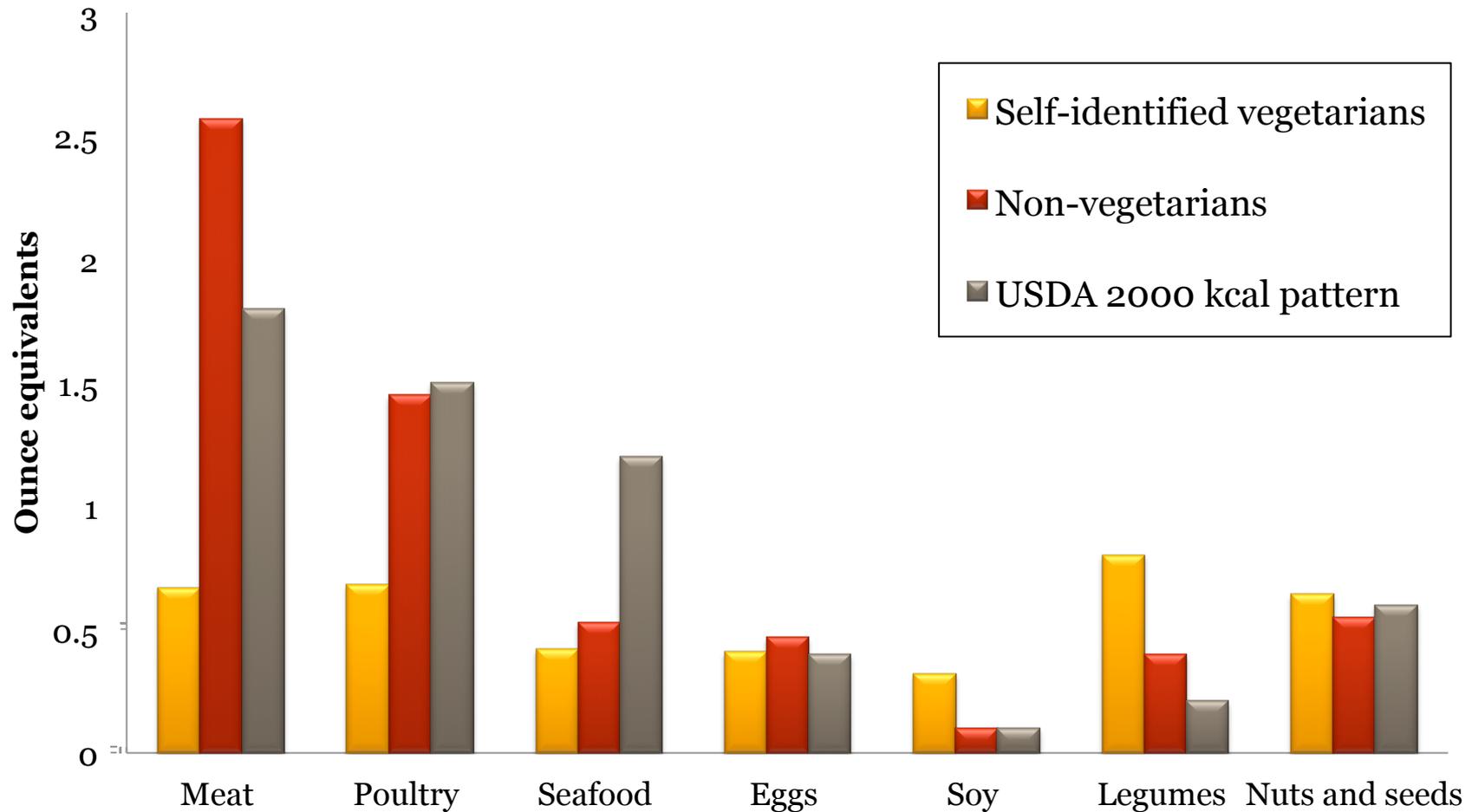
Dietary Patterns Composition DPC Q3

Methods

Mediterranean-style Patterns

- Review data from Dietary Patterns Composition project on food group intakes for studies assessing diets with a Med-diet index. Compare range of food group intakes to the food group amounts in the Healthy US-Style Food Patterns.
- Select food groups for modification and the range of amounts of each food group to include in initial analysis. Using an iterative process, adjust the amounts to provide smooth transitions across calorie levels.
- Balance calories by adjusting amounts of oils, solid fats, and added sugars as appropriate.
- Compare nutrients in the Med-Style Patterns to Dietary Reference Intakes and 2010 Dietary Guidelines. With the DGAC, determine to what extent nutrient standards for Patterns may be modified for Med-Style patterns.

Intake from Protein Foods subgroups by self-identified vegetarians in comparison to non-vegetarians and amounts in USDA food pattern



Intake by populations with positive health outcomes (in studies using a Med-Diet index) compared to amounts in USDA Food Patterns at 1800-2400 kcal

Food group	Range of intakes	Median intake	Amts in USDA Food Patterns
	Grams per 1000 kcal		
Vegetables	121-195	161	156-174
Fruit	88-185	156	96-125
Grains/cereals	20-135	80	89-101
Red/processed meat	41-89	56	25-28
Seafood	22-49	32	16-20
Dairy	99-214	152	194-258
Oils	10-24	12	13-14

Composition of 3 USDA Patterns at the 2000 calorie level

Food group	Healthy US-style	Healthy Vegetarian	Healthy Med-style
	Daily/weekly amounts		
Fruit	2 c	2 c	2 ½ c
Vegetables	2 ½ c	2 ½ c	2 ½ c
-Legumes	1 ½ c per wk	3 c per wk	1 ½ c per wk
Whole Grains	3 oz eq	3 oz eq	3 oz eq
Dairy	3 c	3 c	2 c
Protein Foods	5 ½ oz eq	3 ½ oz eq	6 ½ oz eq
Meat	12 ½ oz eq/wk	--	12 ½ oz eq/wk
Poultry	10 ½ oz eq/wk	--	10 ½ oz eq/wk
Seafood	8 oz eq/wk	--	15 oz eq/wk
Eggs	3 oz eq/wk	3 oz eq/wk	3 oz eq/wk
Nuts/seeds	4 oz eq/wk	7 oz eq/wk	4 oz eq/wk
Processed soy	½ oz eq/wk	8 oz eq/wk	½ oz eq/wk
Oils	27 g	27 g	27 g

Nutrients in Patterns at the 2000 calorie level

Nutrient	Healthy US-style	Healthy Vegetarian	Healthy Med-style
	Percent of goal or limit 19-30 yo women		
Protein -%RDA	198%	155%	194%
Protein -%kcal	18%	14%	18%
Fat-%kcal	33%	34%	32%
Saturated fat - %kcal	8%	8%	8%
CHO-%RDA	197%	211%	199%
CHO-%kcal	51%	55%	52%
Fiber -% goal	109%	126%	112%
Calcium-%RDA	127%	133%	100%
Iron-%RDA	93%	96%	95%
Vitamin D-%RDA	46%	37%	42%
Potassium-%AI	71%	70%	71%
Sodium-%UL	76%	61%	72%

Range of Calcium amounts in Patterns

Age/sex Group	Healthy US-style	Healthy Vegetarian	Healthy Med-style
	Percent of RDA		
M/F 2-3	110%	112%	110%*
M/F 4-8	98-103%	100-106%	97-103%*
M/F 9-13	93-97%	96-100%	71-76%
F14-18	97%	100%	76%
F19-30	127%	133%	100%
F31-50	126%	131%	99%
F51-70	101%	104%	77%

*Amount of dairy for children 2 to 8 not changed in Med-style patterns

Dietary Patterns Composition DPC Q3

Draft Conclusion Statement

- Food Pattern Modeling demonstrates that healthy eating patterns can be achieved for a variety of eating styles including “healthy US-style”, “healthy Mediterranean-style” and “healthy vegetarian style” eating patterns.
- While there are some differences across the three eating patterns, comparable amounts of nutrients can be obtained using nutrient dense foods while maintaining energy balance.

Dietary Patterns Composition DPC Q3

Draft Implications

- There are a variety of options available to help Americans accomplish healthful eating patterns that maintain energy balance and meet Dietary Guidelines. These include a healthy US-style, Mediterranean-style, or vegetarian eating patterns. (Detailed information on these patterns can be found in the complete food pattern modeling report.)
- These diets meet nutritional goals and use a variety of foods. Importantly, these diets reflect the range of foods that can be used to accomplish a healthful eating pattern, and they support the inclusion of diverse foods that are consistent with one's individual, cultural, or religious practices.
- These diets can be translated to a variety of settings including homes, schools, worksites, health care facilities, and places of worship.

Dietary Patterns Composition

1. What is the composition of dietary patterns with evidence of positive health outcomes (eg, Med, DASH, HEI), and of patterns commonly consumed in the US? What are the similarities (and differences) within and amongst the dietary patterns with evidence of positive health outcomes and the commonly consumed dietary patterns?
2. To what extent does the U.S. population consume a dietary pattern that is similar to those observed to have positive health benefits [e.g., Mediterranean-type diets, Dietary Approaches to Stop Hypertension (DASH)- type diets, diets that closely align with the Healthy Eating Index and vegetarian diets] overall and by age/gender and race/ethnic groups?
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Discussion

Reminder: DGAC members, please state your name before speaking.

Health Conditions- Prevalence and Trends

Topic Leads:
Cheryl Anderson and
Barbara Millen



- Background
 - Data, conclusion statements, and implications have all been presented at the earlier public meetings.
 - Today we are presenting edits and additions to the conclusions and implications based on DGAC discussion and further SC deliberations.

Health Conditions—Prevalence and Trends

Question HC 1.

What is the current prevalence of overweight/obesity and distribution of body weight, BMI, and waist circumference in the U.S. population and age, gender, racial/ethnic, and income groups? What are the trends in prevalence?

Health Conditions— HC Q1

Draft Conclusion Statement

- The current rates of overweight and obesity are extremely high among children, adolescents, and adults. These high rates have persisted for more than 25 years.
- Overall, 65% of adult females and 70% of adult males are overweight or obese, and rates are highest in middle-aged and older adults. Rates of overweight and obesity in adults vary by age and ethnicity.
- Overweight is most prevalent in those 40+ years of age and in Hispanic American adults.
- Obesity is most prevalent in African American adults. Obesity is least prevalent in all adults with highest incomes (400+% the poverty threshold).
- Abdominal obesity is present in US adults of all ages, increases with age, and varies by gender and race/ethnicity.
 - Abdominal obesity rates are highest in individuals aged 60 years or older, and are higher in women than men at all ages.
 - In men, abdominal obesity rates are slightly higher among Whites than Mexican American or African American. In women, abdominal obesity rates are lower in Whites than in Mexican American or African American.

Health Conditions— HC Q1

Draft Conclusion Statement, cont'd.

- Nearly one in three youth, 2 to 19 years, is now overweight (85th - 94th percentile) or obese (\geq 95th percentile) and rates vary by age and ethnicity.
- In youth, 2-19 years of age, obesity prevalence increases with age, and the age category with the highest prevalence is 12-19 year olds.
- In youth, 2-19 years of age, the race categories with the highest prevalence of obesity are African Americans and Hispanics.

Health Conditions— HC Q1

Draft Implications

- Long-standing high levels require urgent strategies that work in multiple settings
- Develop and implement comprehensive interventions that are evidence-based –
 - trained interventionists and professional nutrition service providers
 - healthcare settings and community locations
- Include preventative nutrition services in quality of care standards in healthcare settings
 - multidisciplinary teams and nutrition professionals
 - Incentives for providers and systems
- The public should monitor body weight and engage with providers in evidence based approaches aimed at achieving and maintaining healthy body weight.

Health Conditions—Prevalence and Trends

Question HC 2.

What is the relative prevalence of metabolic and cardiovascular risk factors (i.e., blood pressure, blood lipids, and diabetes) by BMI/body weight/waist circumference in the U.S. population and subgroups?

Health Conditions—HC Q2

Draft Conclusion Statement

- Approximately 50% of individuals who are normal weight have at least one cardio-metabolic risk factor
- Approximately 70% percent of individuals who are overweight and 75% of those who are obese have one or more cardio-metabolic risk factors
- Rates of elevated blood pressure, adverse blood lipid profiles (i.e., low HDL-C, high LDL-C, and high triglycerides), and diabetes are highest in individuals with abdominal obesity (waist circumference >102 cm in men, 88 cm in women).
- In children, aged 3 to 19 years, with type 2 diabetes, the prevalence of obesity was higher in African Americans, followed by American Indians, and Hispanics compared to Whites or Asian Pacific Islanders youths.
- Lipid abnormalities and rates of borderline high blood pressure vary by weight status in boys and girls; and rates are particularly high in obese boys.
- Nearly three-fourths of the overweight or obese population also have at least one cardio-metabolic risk factor indicating that they qualify for preventive lifestyle and nutrition interventions for weight management by trained professionals and nutrition professionals as recommended by AHA /ACC.

Health Conditions— HC Q2

Draft Implications

- Rates of cardio-metabolic risk factors are extremely high and reflect the high rates of population overweight and obesity.
 - Multiple metabolic risk factors co-exist
 - Substantially increase risks for coronary heart disease, hypertension and stroke, diabetes and other obesity-related co-morbidities
 - Costly, preventable, and can be managed with intensive, comprehensive and evidence-based lifestyle interventions implemented by multidisciplinary teams or medical nutrition therapy
- Bold action is needed to confront the Nation's obesity epidemic and its devastating metabolic consequences.
- Revamp healthcare and public health systems to integrate preventive nutrition and lifestyle services
- Shift healthcare paradigm towards prevention
- Revise quality of care guidelines to incentivize personalized lifestyle and nutrition interventions.

Health Conditions— HC Q2

Draft Implications, cont'd.

- In adults, prevention and treatment of overweight and obesity across the lifespan requires both individual and population-based, environmental strategies.
 - Complement healthcare and public health initiatives with collaborative programming in agriculture, retail, educational, and social service settings lifestyle for long-term adoption of healthy nutrition and lifestyle behavior
 - Change should be not only feasible but normative.
- In youth 8-17 years of age, the high rates of overweight and obesity and their concomitant cardio-metabolic risk factors require early preventative interventions at individual and population levels.
 - Evidence-based strategies needed
 - Complemented by environmental approaches across wide-ranging sectors

Health Conditions—Prevalence and Trends

Question HC 3.

What are the current rates of nutrition-related health outcomes (i.e. incidence of and mortality from cancer [breast, lung, colorectal, prostate] and prevalence of high blood pressure, CVD, and type 2 diabetes), birth defects/congenital abnormalities, neurological and psychological illness, and bone health -in the overall U.S. population?

Health Conditions—HC Q3

Draft Conclusion Statement

- Adults have high rates of nutrition-related chronic diseases, including high blood pressure, CVD, type 2 diabetes, and various forms of cancer.
- Children and adolescents also have nutrition-related chronic diseases, including borderline high blood pressure and type 2 diabetes.
- At all ages, rates of chronic disease risk are linked to overweight and obesity. The rates of these chronic diseases vary by race/ethnicity.
- Prevalence of osteoporosis and of low bone mass increases with age, particularly in post-menopausal women.
- Among the less common health outcomes:
 - Congenital abnormalities are a relatively rare pregnancy outcome.
 - Nutrition-related neurological and psychological conditions are a growing concern.

Health Conditions—HC Q3

Draft Implications

- Given the high rates of nutrition-related chronic diseases in the adult population and rising rates in youth, imperative to:
 - Develop prevention policies for all age groups
 - Address nutrition and lifestyle issues with evidence-based interventions that are appropriate for delivery in multiple settings
- Deliver effective multidisciplinary interventions by qualified professionals
- More data are needed to understand the complex etiology of congenital abnormalities and neurological and psychological conditions, and factors that influence bone health so as to inform potential dietary choices by the U.S. population.

Health Conditions—Prevalence and Trends

HC 1. What is the current prevalence of overweight/obesity and distribution of body weight, BMI, and waist circumference in the U.S. population and age, gender, racial/ethnic, and income groups? What are the trends in prevalence?

HC 2. What is the relative prevalence of metabolic and cardiovascular risk factors (i.e., blood pressure, blood lipids, and diabetes) by BMI/body weight/waist circumference in the U.S. population and subgroups?

HC 3. What are the current rates of nutrition-related health outcomes (i.e. incidence of and mortality from cancer [breast, lung, colorectal, prostate] and prevalence of high blood pressure, CVD, and type 2 diabetes), birth defects/congenital anomalies, neurological and psychological illness, and bone health in the overall U.S. population?

Discussion

Reminder: DGAC members, please state your name before speaking.

Next Steps

- Complete the chapter writing
- Draft research recommendations

Subcommittee 1:

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Current Status and Trends