



2020 Dietary Guidelines Advisory Committee: Data Analysis and Food Pattern Modeling

Regan Bailey

Jamy Ard

Teresa Davis

Timothy Naimi

Jamie Stang

Barbara Schneeman

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Topics and Questions Under Review

Data Analysis Questions

- Previously presented questions – B24 and PL data discussed today:
 - Current intakes of food groups and nutrients*
 - Current dietary patterns and beverages*
 - Dietary patterns across life stages*
 - Nutrients of public health concern*
- To be discussed today:
 - *Relationship between added sugars intakes and meeting food group and nutrient recs*
 - *Frequency of eating and meeting food group and nutrient recs*
 - *Beverages and meeting food group and nutrient recs*
 - *Alcohol and meeting food group and nutrient recs*

**Data for ages 2+ presented at meeting 4*

Analytic Framework: Population

Nationally representative sample of the U.S. population

Life stages:

- Infants and toddlers (B<24 months)
- Pregnancy (ages 20-44 years)
- Lactation (ages 20-44 years)

Note: *Exceptions will be noted*

Analysis of Intakes Stratified by Infant Milk Source

Ages 6<12 months

- All infants
 - Human milk – no infant formula (HM)
 - Those receiving any infant formula, includes “mixed-fed” (FMF)

Ages 12<24 months

- All infants

Analytic Framework: Data Sources

Dietary intakes of foods, beverages and dietary supplements

What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES 2007-2016)

- Cross-sectional, nationally representative dietary intake data
 - ✓ *USDA Food and Nutrient Database for Dietary Studies*
 - ✓ *USDA Food Patterns Equivalents Database*
 - ✓ *WWEIA Food Categories*
 - ✓ *NHANES Dietary Supplement Database*

Breastfeeding initiation and duration

U.S. National Immunization Survey 2017-2018

Timing and introduction of foods and beverages

National Survey of Children's Health 2016-2018

Key Definitions – B24

- **Human milk** – Mother's own milk provided at the breast (i.e., nursing) or expressed and fed fresh or after refrigeration/ freezing; not inclusive of donor milk
- **Complementary foods and beverages (CFB)** – Foods and beverages other than human milk or infant formula (liquids, semisolids, and solids) provided to an infant or young child to provide nutrients and energy
- **Infant formula** – Commercially prepared infant formula meeting FDA and/or Codex Alimentarius international food standards
- **Mixed feeding** – Feeding human milk and infant formula but not CFB such as cow's milk

Questions birth to less than 24 months

Describe and evaluate current intakes of food groups

Describe and evaluate current dietary patterns and beverages

Describe and evaluate current intakes of nutrients

Describe and evaluate nutrients of public health concern

Approach to Answer Question: Data Analysis

Limitations in Interpretation to Consider

- NHANES 2007-2014 cycles combined
 - Small sample sizes
 - Strengths and weaknesses associated with this strategy
- Measurement error and proxy interviews
- Usual intake among dynamic age groups
- Categorizing based on infant milk source
- Lack of significance testing

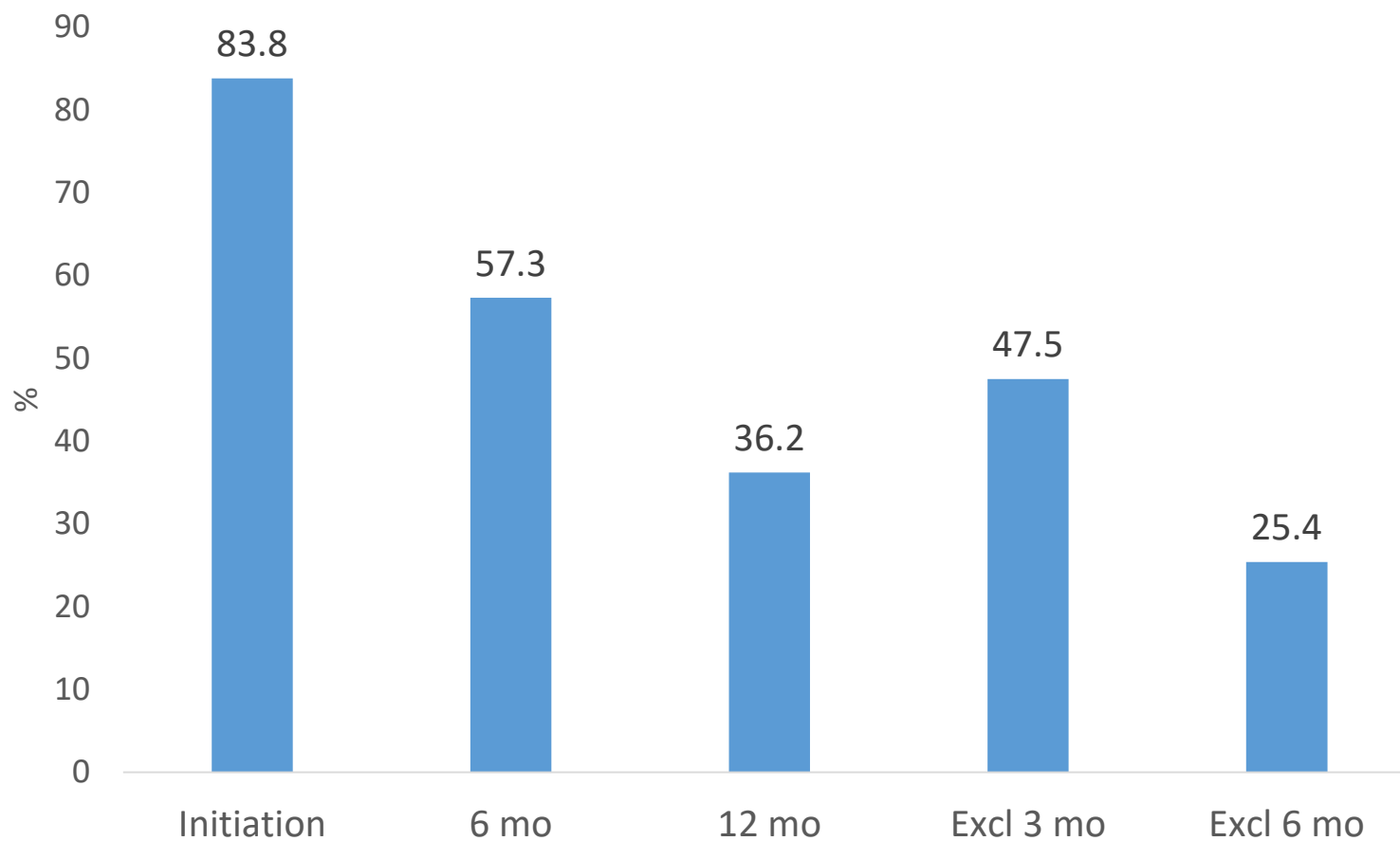
Type of Milk	Sample Size	Mean age (months)
Human milk group (no formula or milk)	141	8.1
Formula group	847	8.6
(Formula/milk, and human milk)	(92)	(8.4)
(Formula/milk, no human milk)	(755)	(8.6)

Analytic Framework

- Breastfeeding rates and duration
- Timing of introduction to complementary foods and beverages
- Proportion of infants and toddlers reporting intake of a food group or subgroup
- Mean intakes of food groups and subgroups
- Food category sources of food groups

Analytic Results

Breastfeeding initiation, duration, and exclusivity

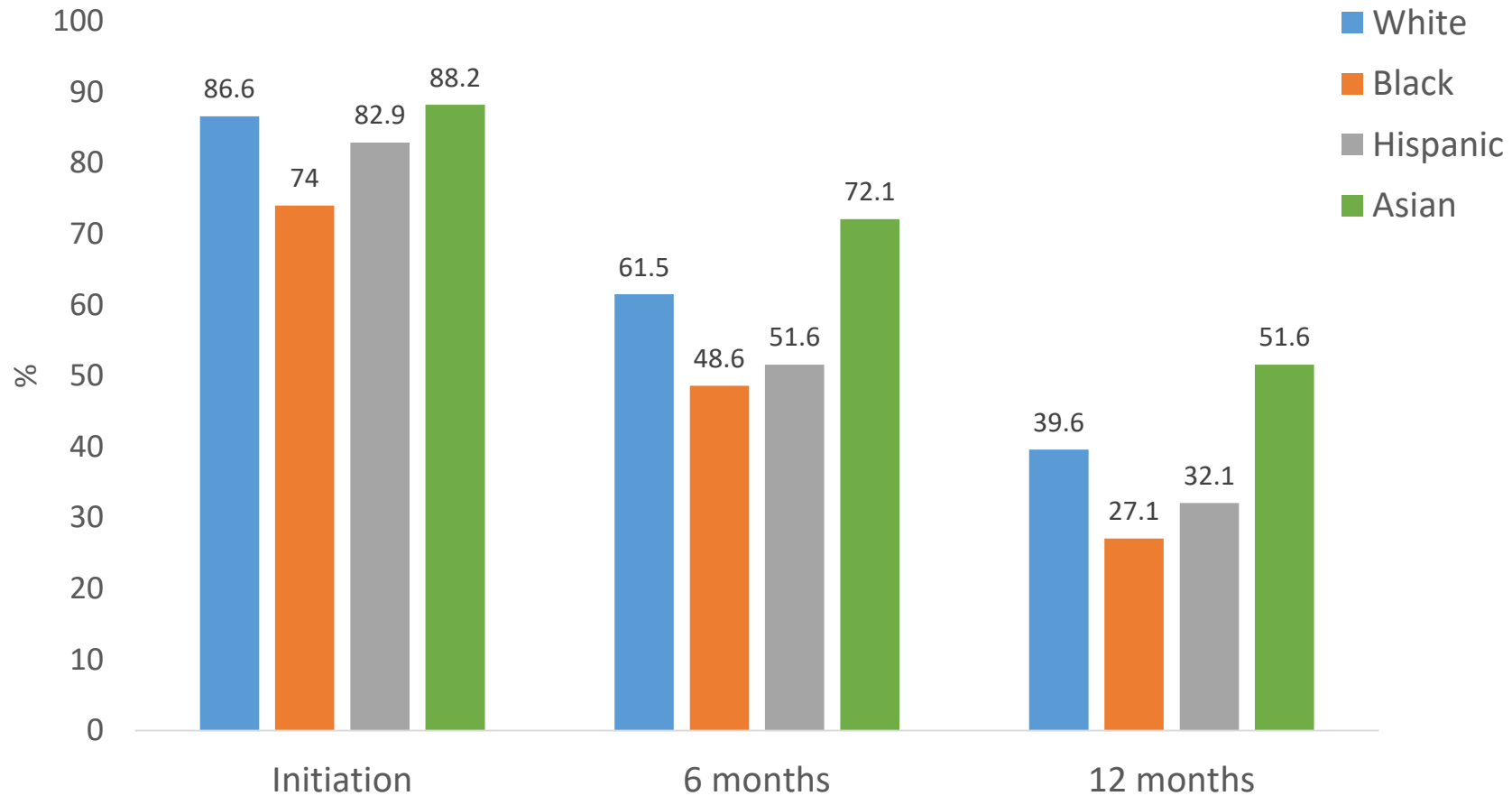


National Immunization Survey 2017-2018, among infants born in 2015

Food group intakes, B24
2020 Dietary Guidelines Advisory Committee: Meeting 5

Analytic Results

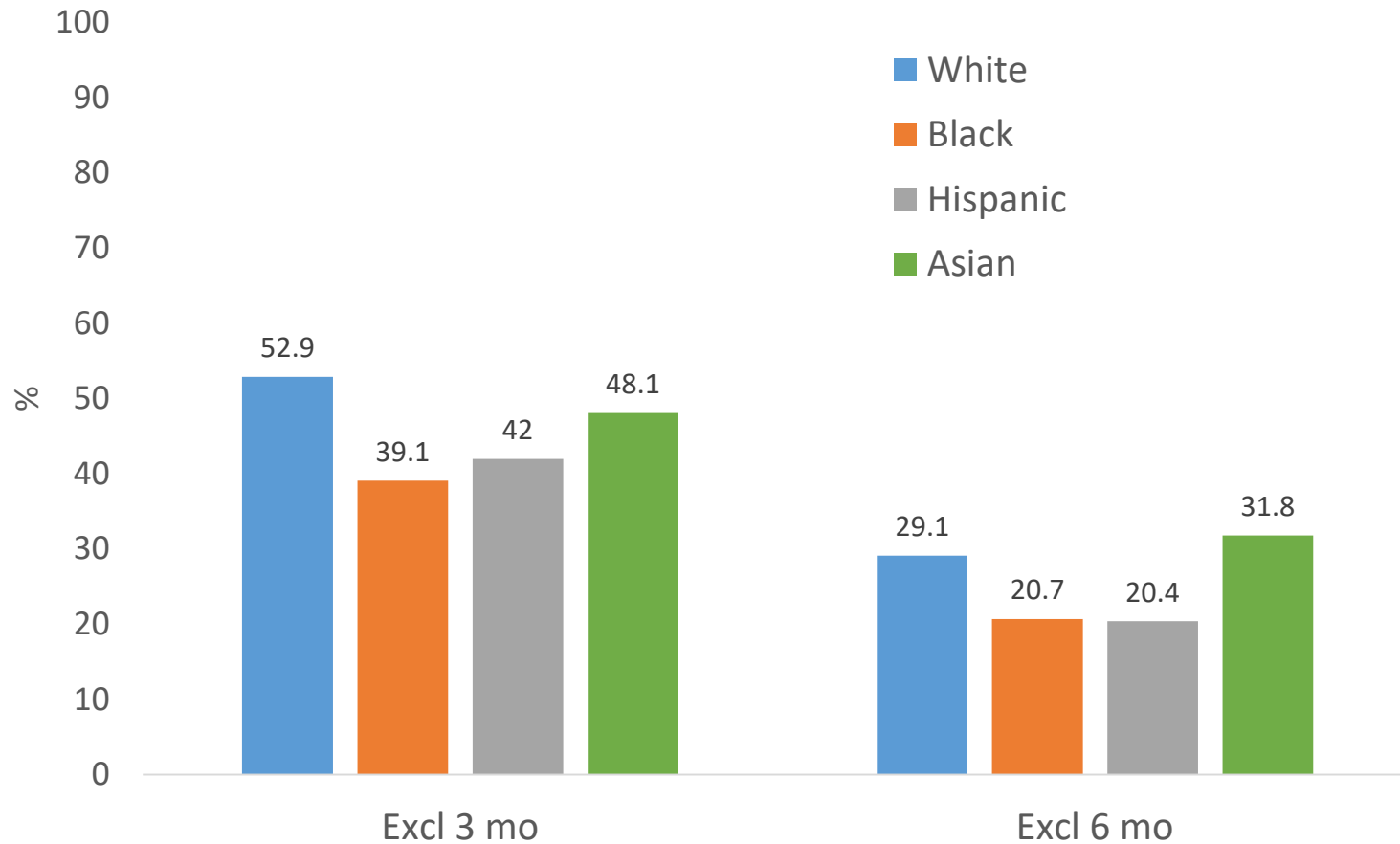
Breastfeeding initiation and duration by race/ethnicity



National Immunization Survey 2017-2018, among infants born in 2015

Analytic Results

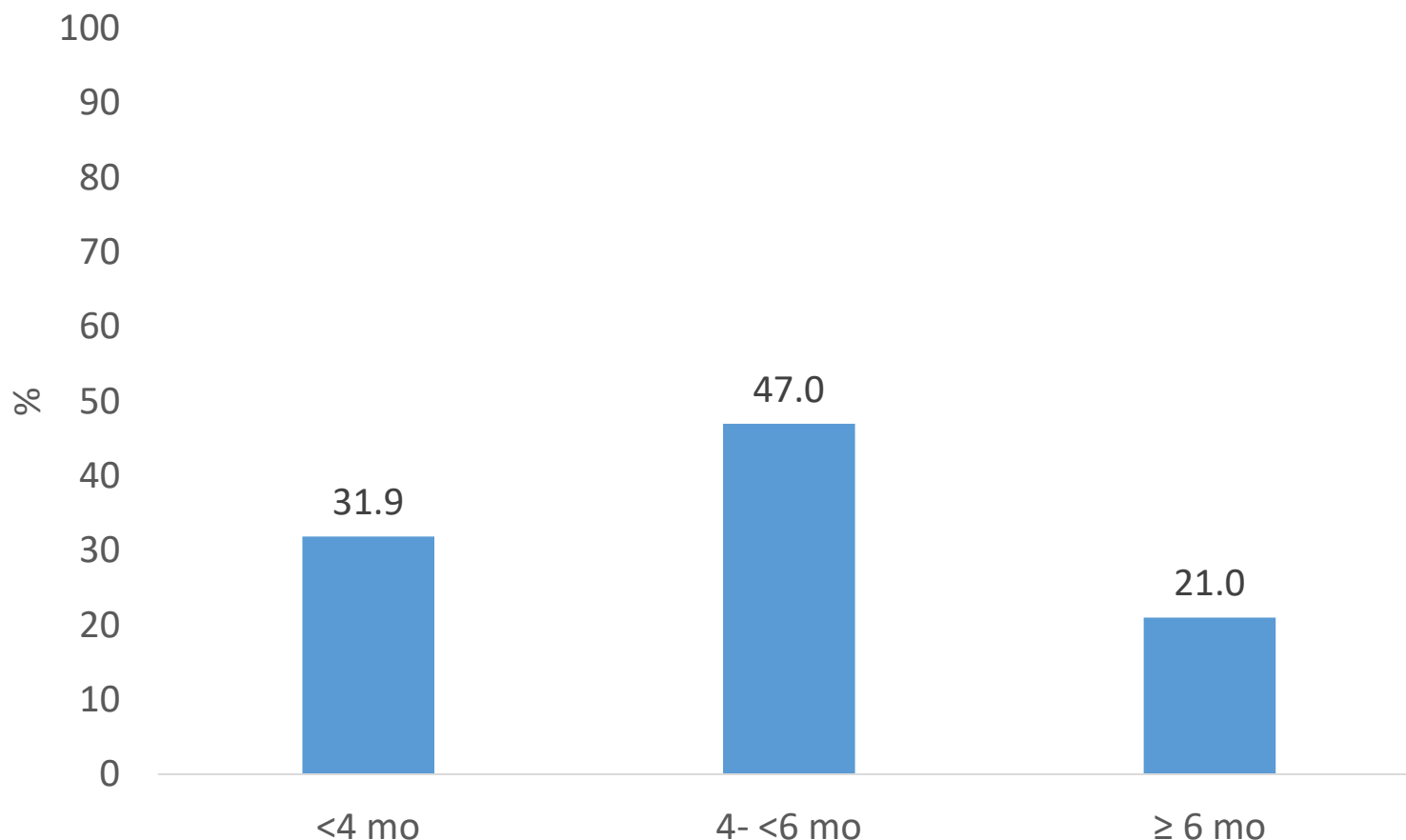
Breastfeeding exclusivity by race/ethnicity



National Immunization Survey 2017-2018, among infants born in 2015

Analytic Results

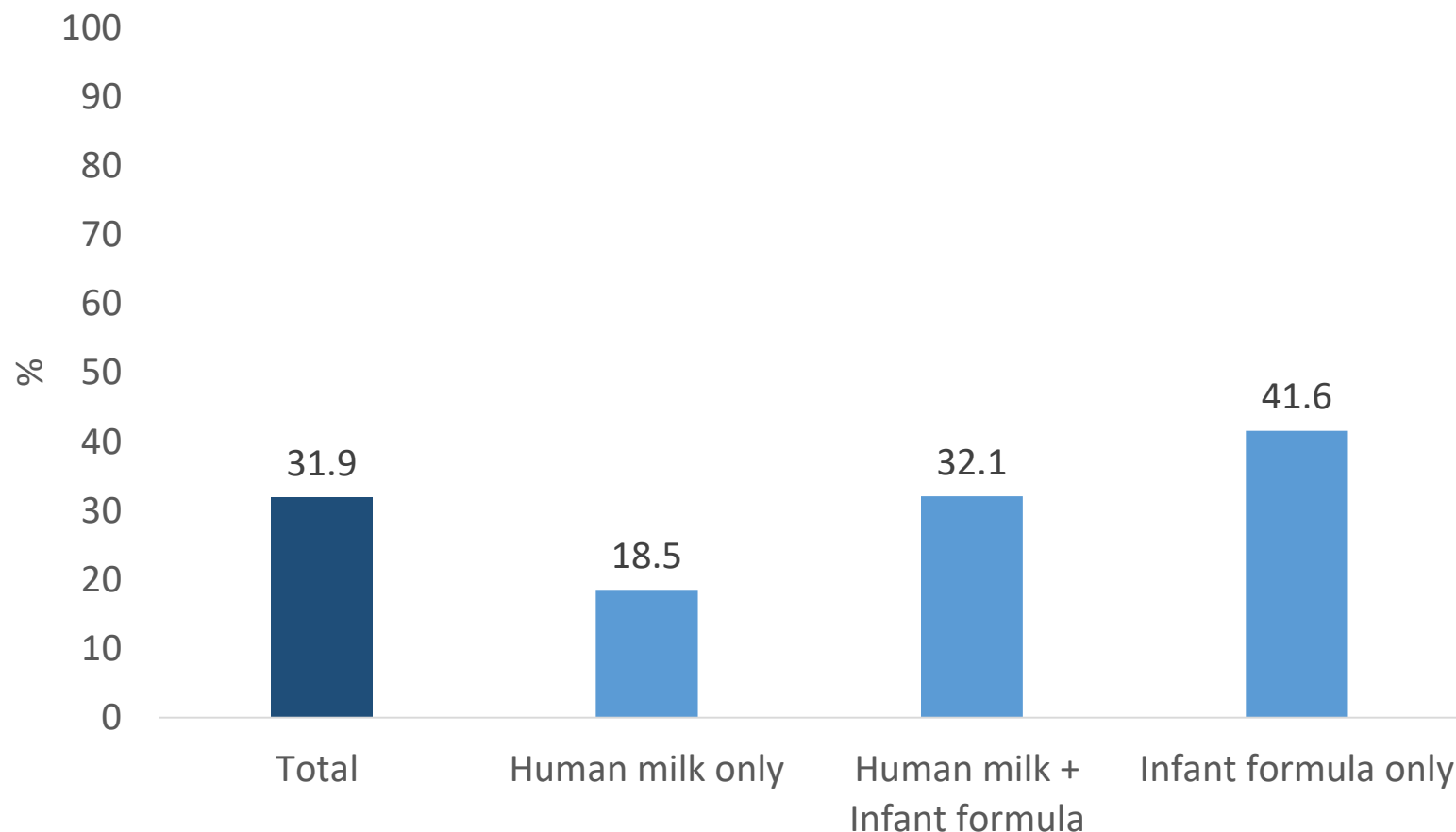
Timing of introduction of complementary foods and beverages



National Survey of Children's Health, 2016-2018

Analytic Results

Introduction to complementary foods and beverages <4mo, by milk source at 4 mo



National Survey of Children's Health, 2016-2018

Data Analysis and Food Pattern Modeling
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Analytic Framework – Food Groups, B24

- Breastfeeding rates and duration
- Timing of introduction to complementary foods and beverages
- Proportion of infants and toddlers reporting intake of a food group or subgroup
- Mean intakes of food groups and subgroups
- Food category sources of food groups

Analytic Results

Proportion of reported intakes of food groups and subgroups, 6<12 mo

		All infants	HM	FMF
Fruit	Total	84	75	86
	Juice	40	20	45
Vegetables	Total including legumes	80	76	81
	Total starchy	42	37	43
	Total red / orange	64	59	66
	Dark green	6	6†	6
	Other	29	36	28
	Legumes	6	6†	6
Protein foods	Total excluding legumes	47	33	50
	Meat (beef, veal, pork, etc.)	14	7†	16
	Poultry	28	18	30
	Cured meat	7	3†	8
	Total fish and seafood	1†	#	1†
	Eggs	19	17	19
	Peanuts, nuts, seeds	2	3†	2
	Soy products, except soy milk	3	2†	3
Grain	Total	89	81	91
	Whole	59	51	61
Dairy	Total	45	40	46
Oil		57	46	59
Solid fat		60	49	62
Added sugars		63	55	64

Notes

† indicates an estimate that may be less precise than others due to small sample size and/or large relative standard error.

indicates a non-zero value too small to present. Sample based on age at Mobile Examination Center.

Complementary foods include all foods and beverages except human milk and infant formula.

Milk reporting status determined by the report of human milk on either day 1 or day 2.

Analytic Results

Mean reported intakes of food groups, by age

	6 to 11 months ¹	12-23 months ¹	2 – 5 years males ²	2-5 years females ²
Fruit, cup-eq	0.62	1.25	1.23	1.19
Vegetables, cup-eq	0.40	0.56	0.70	0.66
Protein foods, oz-eq	0.48	1.94	3.13	2.91
Grains, oz-eq	1.07	3.07	5.34	4.53
Dairy, cup-eq	0.26	2.56	1.98	1.90
Oil, grams	1.7	8.4	17.63	15.86
Solid fat, grams	3.3	24.7	27.47	25.06
Added sugars, tsp-eq	1.0	6.2	11.34	9.81

¹WWEIA, NHANES 2007-2016, individuals ages 6<12 months and 12<24 months, day 1 dietary intake data, weighted.

²WWEIA, NHANES 2015-2016, individuals ages 2-5 years, day 1 dietary intake data, weighted

Complementary foods include all foods and beverages except human milk and infant formula.

Milk reporting status determined by the report of human milk on either day 1 or day 2.

Analytic Results

Food category sources of food groups

- Infants 6<12 months
 - FMF infants may obtain a larger proportion of food groups from baby food sources than HM infants
 - HM: 61% of added sugars come from categories of milk & dairy, grains, and fruit
 - FMF: 64% of added sugars through snacks & sweets, baby foods, and milk & dairy
- Infants 12<24 months
 - Observed food category sources of food groups similar to population ages 2+
 - Top sources of added sugars are same as that of older children
 - 27%: sweetened beverages
 - 20%: sweet bakery products and other desserts
 - 10%: candy and sugars
 - 8%: ready to eat cereals and snack/meal bars

Analytic Results Summary: 6<12 mo

- Breastfeeding initiation rates are high, but exclusive breastfeeding past 3 months and any duration past 6 months is below 50%. Differences are observed by race-ethnicity.
- CFB are introduced < 6 months for a majority of infants. Introduction of CFB <4 months is more prevalent for FMF infants.
- Noted differences in the patterns for CFB between HM and FMF groups.
- Mean intake of CFB is generally higher among FMF infants and a greater proportion of CFB comes from sources categorized as baby foods for FMF when compared HM group.
 - Reported energy intakes from CFB for FMF infants are about 100 kcal higher when compared to HM infants.

Draft Summary: 12<24 mo

Patterns of food group intakes and sources of food groups among 1 yr olds are similar to the U.S. population, ages 2 yrs and older. There is a notable increase in the intakes of added sugars when 1 yr olds are compared with those <12 months.

Question

Describe/evaluate nutrients of public health concern

Describe and evaluate current intakes of nutrients

Approach to Answer Question: Data Analysis

Analytic Framework: Nutrients of Public Health Concern

Nationally representative sample of the U.S. population

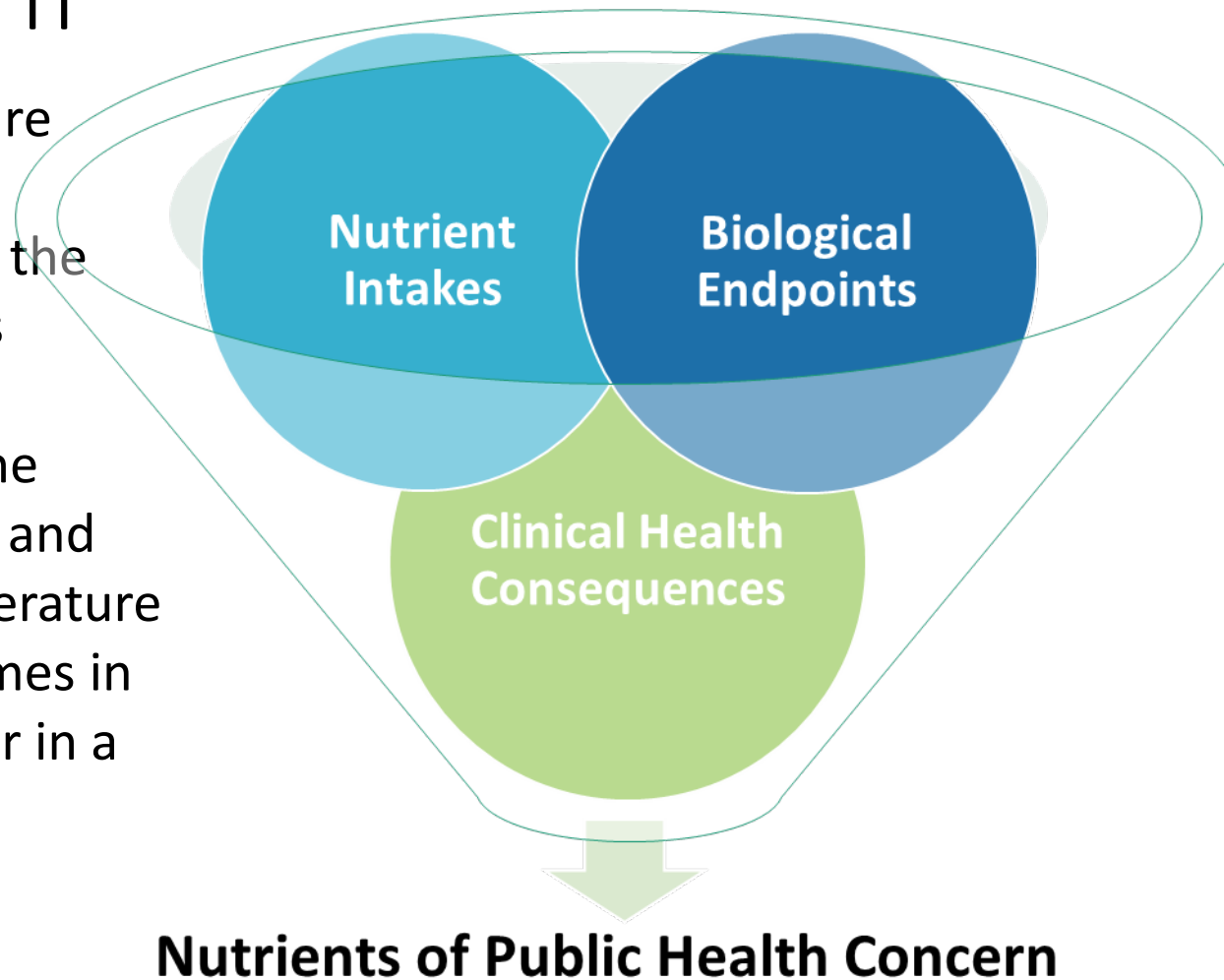
Life stages:

- Infants and toddlers (8 to less than 12 months)
- Children and adolescents (ages 1-18 years)
- Adults (ages 19-70 years)
- Pregnant Women
- Lactating Women
- Older Adults (ages 71 years and older)

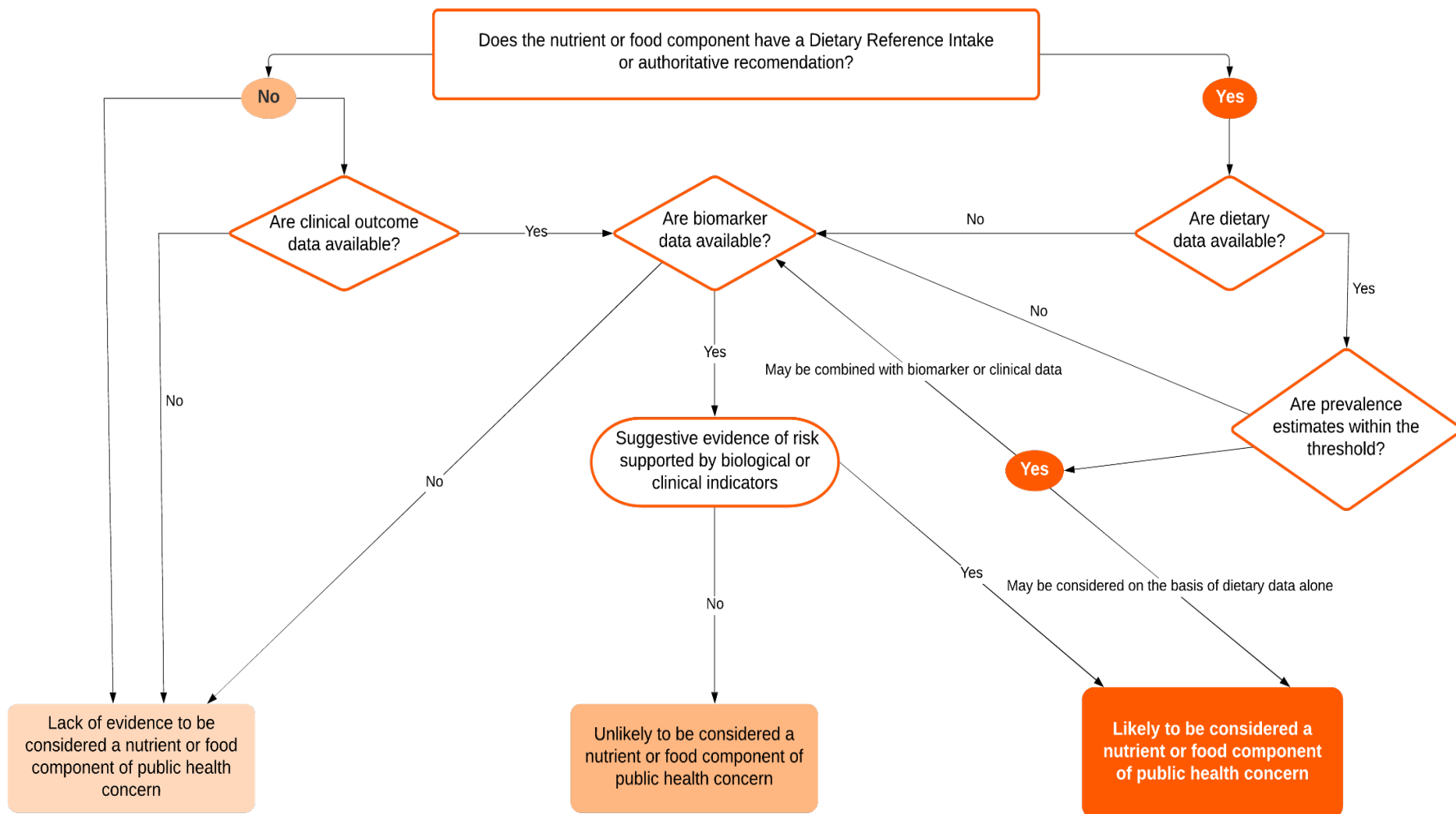
Note: *these age groupings reflect DRI age-sex groupings*

Three-pronged analytical framework for establishing nutrients of public health concern

Food components that are overconsumed or under consumed (compared to the dietary reference intakes recommendation and to biological measures of the nutrient when available) and linked in the scientific literature to adverse health outcomes in the general population or in a subpopulation.



Nutrients of Public Health Concern



Underconsumed and Overconsumed Nutrient or Food Component

Proposed Term

- Underconsumed nutrient or food component
- Overconsumed nutrient or food component

Proposed Definition

A food component that is underconsumed by 5% or more of the population or in specific groups relative to the EAR, AI, or other quantitative authoritative recommendations from the diet alone

A food component that is consumed in potential excess of the UL, CDRR, or other quantitative authoritative recommendations by 5% or more of the population or in specific groups from the diet alone

Nutrient of Public Health Concern

- Nutrient or food component of public health concern
- Underconsumed and overconsumed nutrients or food components with supporting evidence through biochemical indices or functional status indicators, if available, plus evidence that the inadequacy or excess is directly related to a specific health condition, indicating public health significance

Nutrient or Food Component that Pose Special Challenges

- Nutrient or food component that pose special challenges
- Nutrients or food components that pose special challenges in identifying at risk groups or for which dietary guidance to meet recommended intake levels was challenging to develop

Question

Birth to less than 24 months

Describe/evaluate nutrients of public health concern

Describe and evaluate current intakes of nutrients

Approach to Answer Question: Data Analysis

Analytic Framework: Nutrient Intakes 6<12 mo

- **Mean nutrient intakes from CFB**
- **Usual intake distribution of nutrients**
 - Human milk and/or infant formulas, foods and beverage
- **Nutrient intakes compared to Dietary Reference Intakes**
 - Percent of infants below EAR for protein, iron and zinc
 - Compared mean nutrient intakes from CFB to the portion of the determined to come from CFB

NOTES:

Analysis stratified by human milk only (HM) and any formula (FMF)

1 yr olds are a part of 2013-2016 analysis of the 1-3 yr old DRI age grouping

Analytic Results Summary: 6<12 mo

Percent of infants with nutrient intakes <EAR or > UL

Dietary intakes include human milk and/or infant formula and CFB; excludes dietary supplements

Nutrient	HM	FMF	All Infants
% below EAR			
Protein	27%	<3%	7%
Iron	77%	7%	19%
Zinc	54%	<3%	10%
% above UL			
Iron	<3%	<3%	<3%
Zinc	3%	77%	64%

Nutrients of Public Health Concern, B24
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Analytic Results Summary: 6<12 mo

Mean intakes from CFB compared to portion of AI presumed to come from CFB

Nutrient	AI, 7-12 mo [‡]	AI Contribution from CFB, units per day	All Infants n=988	HM n=141	FMF n=847
Carbohydrate , g/d	95	51	54	36	58
Fat, g/d	30	5.7	7.7	4.8	8.3
n-6 fatty acids (primarily linoleic acid, 18:2), g/d	4.6	1.2	1.4	1	1.5
n-3 fatty acids (primarily alpha-linolenic acid, 18:3), g/d	0.5	0.11	0.2	0.1	0.2
Calcium, mg [‡]	260	140	236	133	258
Choline, mg/d	150	54	48	29	52
Vitamin C, mg	50	22	43.2	21.9	47.7
Vitamin A, µg (RAE)	500	244	237	215	242
Vitamin D, IU [‡]	400	400	41.6	16.4	47.2
Vitamin E, mg	5	2.06	1.96	1.5	2.06
Phosphorus, mg	275	200	229	138	248
Magnesium, mg	75	55	59	41	63
Selenium, µg	20	9.2	13.4	7.7	14.6
Sodium, mg (AI, not CDRR)	370	300	319	201	344
Potassium, mg	860	600	573	388	613

Mean >AI

Mean <AI

Mean close to AI

Draft Conclusions: 6-<12m

Proposed Nutrients of Public Health Concern

- Based on proportion of HM infants with intakes (human milk and CFB) below EAR
 - Iron
 - Zinc
 - Protein

Proposed Nutrient or food component that pose special challenges

- Based on estimated mean nutrient intakes for all infants from CFB compared to the proportion of AI expected to come from CFB
 - Potassium
 - Vitamin D
 - Choline
- Based on percent of FMF infants with intakes above the UL
 - Zinc
 - Retinol

Draft Conclusions: 6-<12m (continued)

Complementary foods should be nutrient-dense, especially for sources of dietary components for which potential risk of inadequacy is noted.

Draft Conclusion: NOPHC 12<24 mo

Proposed nutrient or food component of public health concern (from meeting 4)

- potassium
- fiber
- vitamin D
- sodium
- added sugars

Proposed nutrient or food component that pose special challenges

- choline
- linoleic acid

Many 1 y olds exceed recommendations for zinc and retinol from foods alone.

Caveats with Data in B-24

- Lack of biomarker data available
 - Low serum ferritin concentration (<12 ng/ml) among children aged 1-5 years
 - ✓ ~4% overall, boys 4.5% and girls 3.1%
- The basis of the DRIs for this age group
- Existing food composition data on HM are outdated and do not account for known variations that exist among a number of components.
- It is difficult to estimate the volume of HM consumed, assumptions are made in estimating volumes of HM.

Questions

Pregnancy and Lactation

Describe and evaluate current intakes of food groups and nutrients

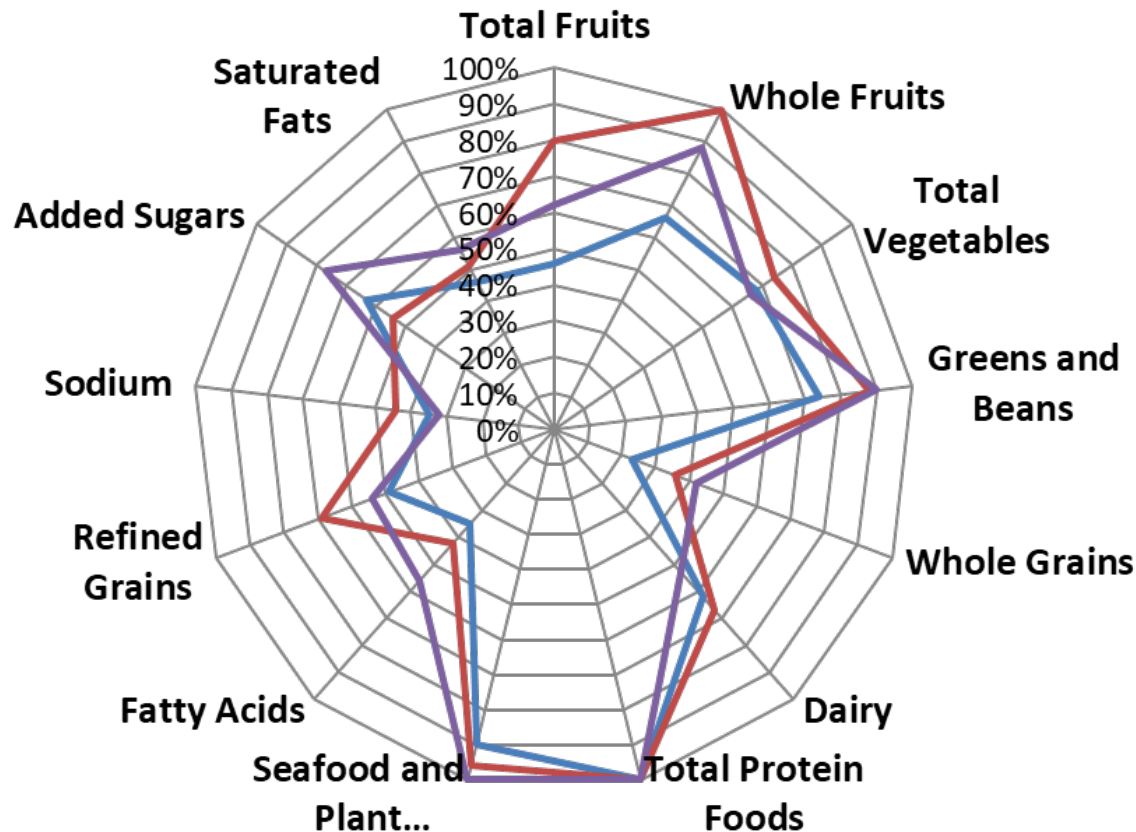
Describe and evaluate current dietary patterns and beverages

Describe and evaluate nutrients of public health concern

Approach to Answer Question: Data Analysis

HEI-2015 Scores pregnant and lactating women

Total HEI-2015 Scores by Pregnancy or Lactation Status		
Women ages 20-44 years		
Not Pregnant or Lactating (54)	Pregnant (63)	Lactating (62)



Higher dietary quality is being driven by higher intakes of fruits, greens and beans, whole grains, dairy, fatty acids and seafood and plant proteins (lactating only), combined with lower intakes of refined grains, sodium, and saturated fats.

Draft Summary Statement

Dietary Intakes and Diet Quality

During pregnancy and lactation, the dietary quality of women, as reflected by mean Healthy Eating Index scores, is higher than women of the same age range who are non-pregnant or non-lactating

Question

Pregnancy and Lactation

Describe/evaluate nutrients of public health concern

Describe and evaluate current intakes of nutrients

Approach to Answer Question: Data Analysis

Analytic Results

Dietary Supplement Use

The majority of pregnant and lactating women use dietary supplements, primarily micronutrients



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



Analytic Results

Energy and Macronutrient Intakes

- Reported energy intakes are higher during P/L, than non-pregnant or lactating peers
- Intakes > AI for dietary fiber
 - Pregnancy: 11%
 - Lactation: 20%
- Most pregnant and lactating women are within AMDR for protein, carbohydrate, linolenic acid and linoleic acid

Analytic Results

Under and over consumed dietary components

Usual nutrient intakes: 2013-2016 † (foods alone; foods and supplements)

Pregnancy	Lactation	% > Tolerable Upper Intake Level
<EAR <ul style="list-style-type: none"> Calcium (25%; 17%) Copper (9%; 11%)* Folate (31%; 22%) Magnesium (47%; 51%) Iron (84%; 36%)† Riboflavin (6%; 6%)* Thiamin (11%; 11%)* Vitamin A (32%^; 16%†) Vitamin B6 (19%; 15%) Vitamin C (34%; 19%) Vitamin D (96%; 38%) Vitamin E (82%^; 43%†) Zinc (21%; 17%) 	<EAR <ul style="list-style-type: none"> Calcium (13%, 8%)* Copper (7%; 11%)* Folate (9%; 7%)* Magnesium (14%; 13%)* Vitamin B6 (10%; 9%)* Vitamin C (53%; 34%) Vitamin D (89%; 38%) Zinc (13%; 12%)* Vitamin A (40%^) 	Pregnant <ul style="list-style-type: none"> Folic Acid (<3%; 27%) Iron (<3%; 14%)* <ul style="list-style-type: none"> DS Users 28%†
		Lactating <ul style="list-style-type: none"> Folic Acid (<3%; 24%) Iron (<3%; 29%) Vitamin D (<3%; 7%)* Zinc (<3%; 11%)*
		% > Chronic Disease Risk Reduction
>AI <ul style="list-style-type: none"> Choline (~5%) Potassium (<3%; 23%) Vitamin K (63%; 64%) 	>AI <ul style="list-style-type: none"> Choline (~8%)*† Potassium (<3%; 46%) Vitamin K (83%; 84%)* Vitamin E (71%^) 	Pregnant <ul style="list-style-type: none"> Sodium (88%; 87%)*
		Lactating <ul style="list-style-type: none"> Sodium (97%; 97%)*

* Indicates an unstable estimate due to small sample size † From Bailey et al. JAMA Open Network (2019; NHANES 2001-2014) ^ Food only, NHANES 2013-2016

Analytic Results

Biomarkers of nutrient status

Biomarker data for pregnant and lactating women are not available.

Based on biomarker data in non-pregnant and non-lactating similar women of similar age, NHANES 2015-2016

- High serum soluble transferrin receptor concentration (> 4.4 mg/L)
 - 21% among females, 12-19 years
 - 16% among women, 20-49 year
- Low serum ferritin concentration (<15 ng/ml)
 - 20% among females, 12-19 years
 - 19% among women, 20-49 year

Analytic Results

Biomarker Data for Pregnancy: Iodine

Median urinary iodine concentration (UIC) of pregnant women remains below the WHO cut off for “insufficiency” (<150 µg/L)

- 144 µg/L (NHANES 2007-2010) ¹
- 148 µg/L (NHANES 1999-2006) ²
 - Dairy consumption, iodized salt and use of dietary supplements containing iodine are among factors related to status.
 - Reproductive-aged females appear to be adequate.

¹ Perrine CG, Herrick KA, Gupta PM, Caldwell KL. Thyroid, 2019; 29: 153-154.

² Gahche JJ, Bailey RL, Mirel LB, Dwyer JT. Journal of Nutrition, 2013; 143:872-877.

Draft Summary Statement

Dietary Supplement Use

Most pregnant and lactating women use nutrient-containing dietary supplements. While supplements decrease the risk of low intakes, they increase the risk of high intakes among users, especially for folic acid and iron.

- Without supplement use, almost all pregnant women have iron intakes <EAR (95%)
- Iron requirements are much lower in lactation, but many lactating women continue to use prenatal levels of iron supplementation
- Pregnant and lactating women do not exceed the UL from foods alone.

Draft Conclusions

Nutrients or Dietary Components of Public Health Concern - 1

Proposed Nutrients of Public Health Concern

- Proposed for general U.S. population and carried over for pregnancy and lactation
- Based on nutrient intake distributions, taken into consideration with biological endpoints and prevalence of clinical outcomes (in non-pregnant and non-lactating women)
 - iron (pregnant women)
 - vitamin D
 - calcium
 - dietary fiber
 - potassium
 - sodium
 - saturated fat
 - added sugars

Draft Conclusions

Proposed Nutrient or food component that pose special challenges

Proposed Nutrient or food component that pose special challenges

- Based on UIC, **iodine** may be of concern, especially among those without dietary supplement use, with low dairy intake, and among those with high intakes of goitrogens.
- Based on high risk of NTDs, **folate** should remain of concern given the high prevalence of dietary inadequacy among pregnant women (first trimester only).
- **Choline** and **magnesium** should be considered for further evaluation based on high risk from dietary data alone.

Nutrients of Public Health Concern, pregnancy and lactation

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What is the relationship between frequency of eating and achieving food group and nutrient recommendations?

Approach to Answer Question: Data Analysis

Analytic Framework

Frequency of eating, with and without naming conventions:

- Number of eating events in a 24 hour period (midnight to midnight)
- Hourly distribution of eating events in a 24 hour period
- Percent engaging in self-described eating meals and snacks
- Time (hour of the day) in which events are

Percent of Americans engaging in self-described

- meals (e.g. breakfast, lunch, dinner) and
- snacks including beverage events

Proportion of total energy intake and select dietary component intakes from foods and beverages reported between 8:00pm and 11:59pm.

Analytic Results

Average of 5.7 eating occasions per day; Most occurs ~ noon or “evening”; Most report 3 (64%) or 2 (28%) “meals”

85% report breakfast (7-9am) and it provides 18% of energy. Less frequently consumed by 12-19y olds, non-Hispanic Blacks, lower income, but more energy is obtained in lower income groups. Hispanic Americans get more nutrients at “breakfast” than other r/e groups.

81% report lunch (12-1pm) and it provides 25-27% of energy. Less frequently consumed by Hispanic and non-Hispanic Black and lower PIR (especially among children 2-11y). Lower PIR groups consume less energy and nutrients at lunch than other r/e groups.

93% report dinner (6-8 pm) and it provides 32-36% of energy. Most protein and energy consumed. Less frequently consumed by 12-19y olds, Hispanic and non-Hispanic Blacks. Low income children have higher % energy (but not nutrients).

Extended consumption tends to be 6-11am; Snacking occurs btw lunch and dinner (2-5pm) or after dinner (8-10pm); Drinks occur btw 8-10pm

DRAFT Conclusion Statements

- Various eating patterns exist in America, including the frequency and timing, and are shaped by age, race/ethnicity, and income.
- Snacking is ubiquitous in the U.S. population (93%); snacks provides 22-23% of total energy consumed and usually 2 to 3 snacks are reported per day.
- Late-night eating events are associated with alcohol intake (in adults), and intakes of added sugars, sodium, and saturated fats in adolescents and adults (~25-30%).
- When compared with 2 meals (HEI= 61), Americans who consume 3 meals (HEI=55) tend to have around 5 point higher HEI scores.
- Every eating occasion is an chance to make nutrient-dense food choices. Shifts in childhood and adulthood snacks, and adolescence eating frequency and timing could help align patterns with recommendations.

Question – Beverage intakes

What is the relationship between beverage intakes and achieving food group and nutrient recommendations?

Approach to Answer Question: Data Analysis

Key Definitions

Beverage pattern – The quantities, proportions, variety or combinations of different beverages in diets.

Discrete beverage groups (1/2) –

- **Milk:** Plain and flavored milk, other dairy drinks and milk substitutes (Excludes milk or milk substitutes added to alcoholic beverages, coffee, tea, and/or foods such as cereal)
- **100% Juice:** 100% fruit and/or vegetable juice
- **Coffee/tea:** Regular and decaffeinated coffee or tea with additions such as milk, cream and/or sweeteners, and coffee and tea drinks, including ready-to-drink
- **Diet beverages:** Diet soft drinks, diet sport/energy drinks and other diet drinks that are low- and no-calorie-sweetened, containing 40 kcal or less per reference amount customarily consumed

Key Definitions – cont.

Discrete beverage groups continued (2/2)–

- Sweetened beverages: Energy containing soft drinks, fruit drinks, and sports/energy drinks with added sugars that contain more than 40 kcal per reference amount customarily consumed
 - Soft drinks: Energy-containing drinks made with carbonated water
 - Fruit drinks: Energy-containing fruit and/or vegetable drinks that are not 100% juice.
 - Sports/energy drinks: Energy-containing sport/energy drinks, nutritional beverages and protein/nutritional powders consumed with a beverage, smoothies and grain drinks.
- Water: Tap, bottled, flavored, carbonated and enhanced/fortified water containing < 5kcal.
- Alcoholic beverages: Beer, wine, liquor and cocktails.

Analytic Framework – Beverage intakes

Food group and dietary components per 8 oz of discrete beverage type

Beverage contribution as a percent of

- total daily energy
- selected nutrients, food components
- food groups
- daily beverage calories by discrete beverage type

Consumption prevalence of

- nutritionally fortified beverages
- cows milk and milk substitute beverages

Analytic Results Summary

Food group and dietary components per 8 oz of discrete beverage type

Beverage contribution as a percent of

- total daily energy
- selected nutrients, food components
- food groups
- daily beverage calories by discrete beverage type

Consumption prevalence of

- nutritionally fortified beverages
- cows milk and milk substitute beverages

Analytic Results Summary

Beverage contribution to intakes of dietary components (6<24 mo)

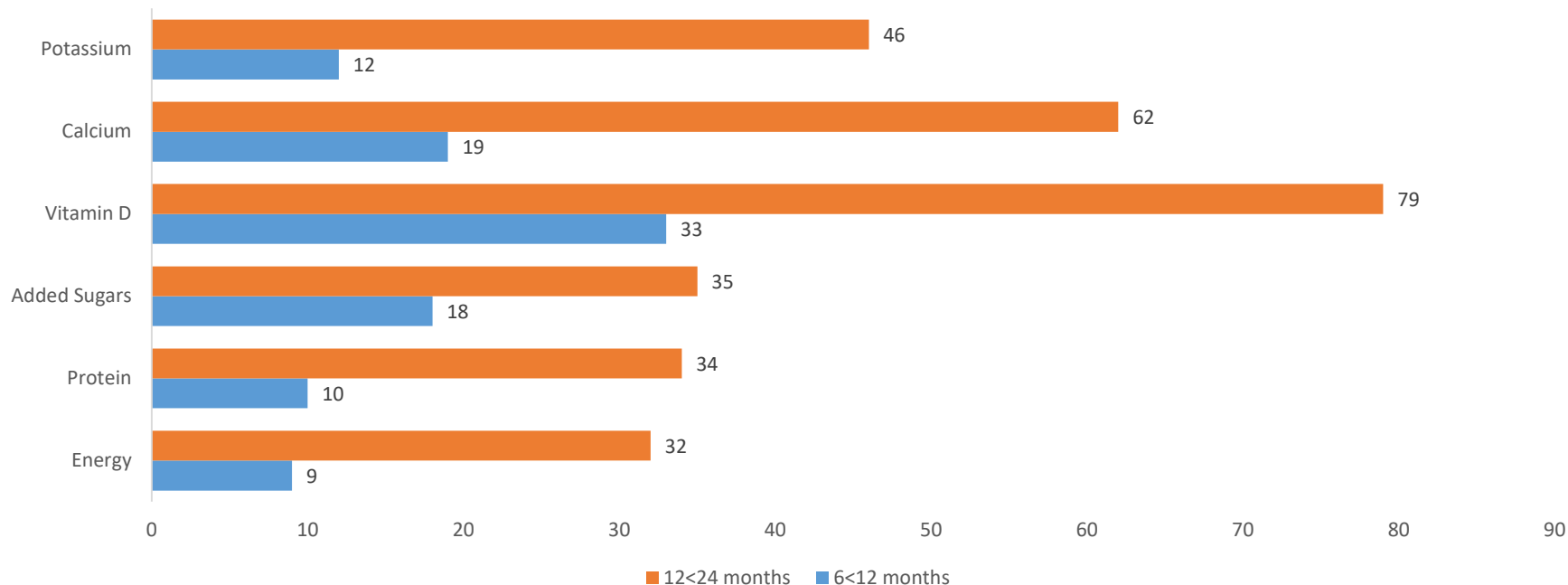
Percentage of infants and toddlers consuming beverage types at least once on the day, day 1, WWEIA, NHANES 2007-2016

	6-11 months old			12-23 months old	
	(N = 988)			(N = 1242)	
	%	se		%	se
Human milk.....	27	(1.6)		8	(1.0)
Infant formula.....	78	(1.5)		8	(1.0)
Whole milk.....	5	(0.7)		64	(1.9)
Reduced/low/nonfat milk.....	4	(0.9)		23	(1.1)
Flavored milk.....	1†	(0.2)		6	(1.0)
Milk substitutes.....	1†	(0.4)		5	(0.5)
100% juice.....	34	(2.0)		54	(1.9)
Sweetened beverages.....	5	(0.6)		29	(1.4)
Other beverages.....	2	(0.6)		10	(1.0)
Plain water.....	59	(2.0)		75	(1.6)

Analytic Results Summary – cont.

Beverage contribution to intakes of dietary components (6<24 mo)

Percentage of mean daily energy and selected nutrient intakes contributed by beverages among infants and toddlers, WWEIA, NHANES 2007-2016

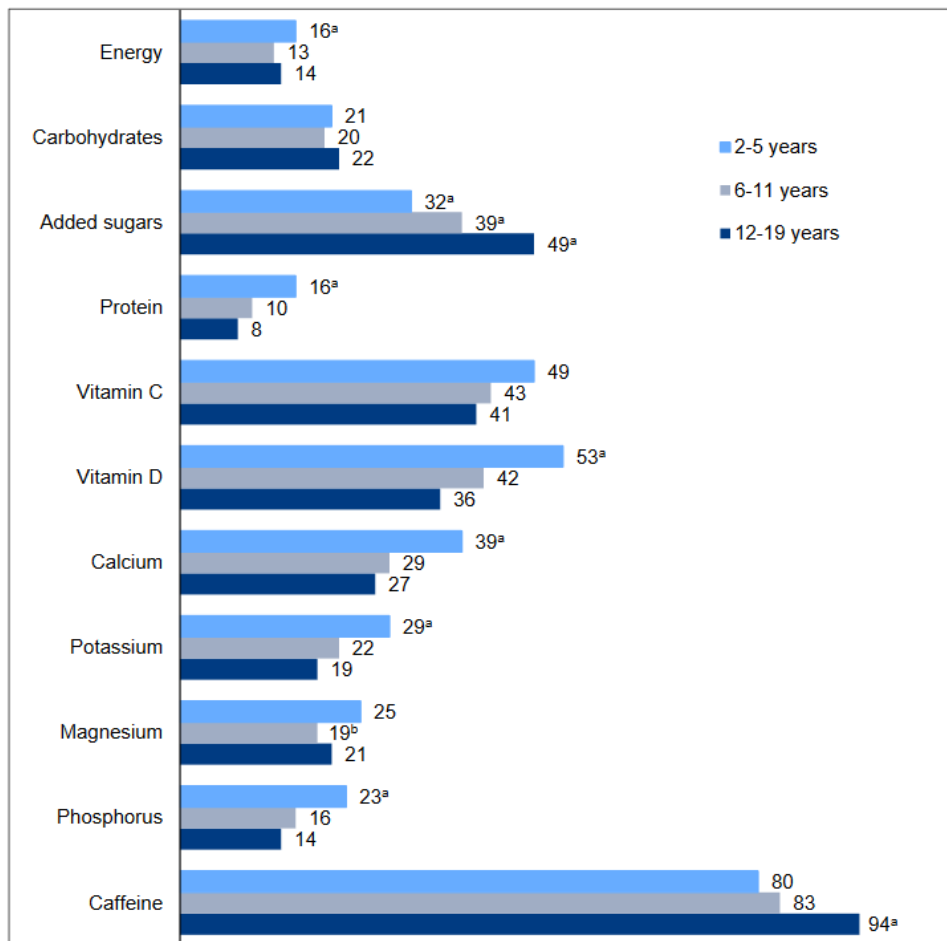


Dietary Component	Top Beverage Source
Potassium	Plain Milk
Calcium	Plain Milk
Vitamin D	Plain Milk
Added sugars	Sweetened Beverages

Analytic Results Summary

Beverage contribution to intakes of dietary components (children)

Percentage of mean daily energy and selected nutrient intakes contributed by beverages among children, WWEIA, NHANES 2015-2016



Dietary Component	Top Beverage Source	Percent of total intake
Added sugars	Soft drinks and fruit drinks	15-28%
Calcium	Plain Milk	14-25%
Potassium	Plain Milk	8-15%
Vitamin D	Plain Milk	23-40%

^a Significantly different than the other two age groups (P<0.01)

^b Significantly different than age 2 to 5 years (P<0.01)

SOURCE: What We Eat in America, NHANES 2015-2016, day 1, individuals 2-19 years

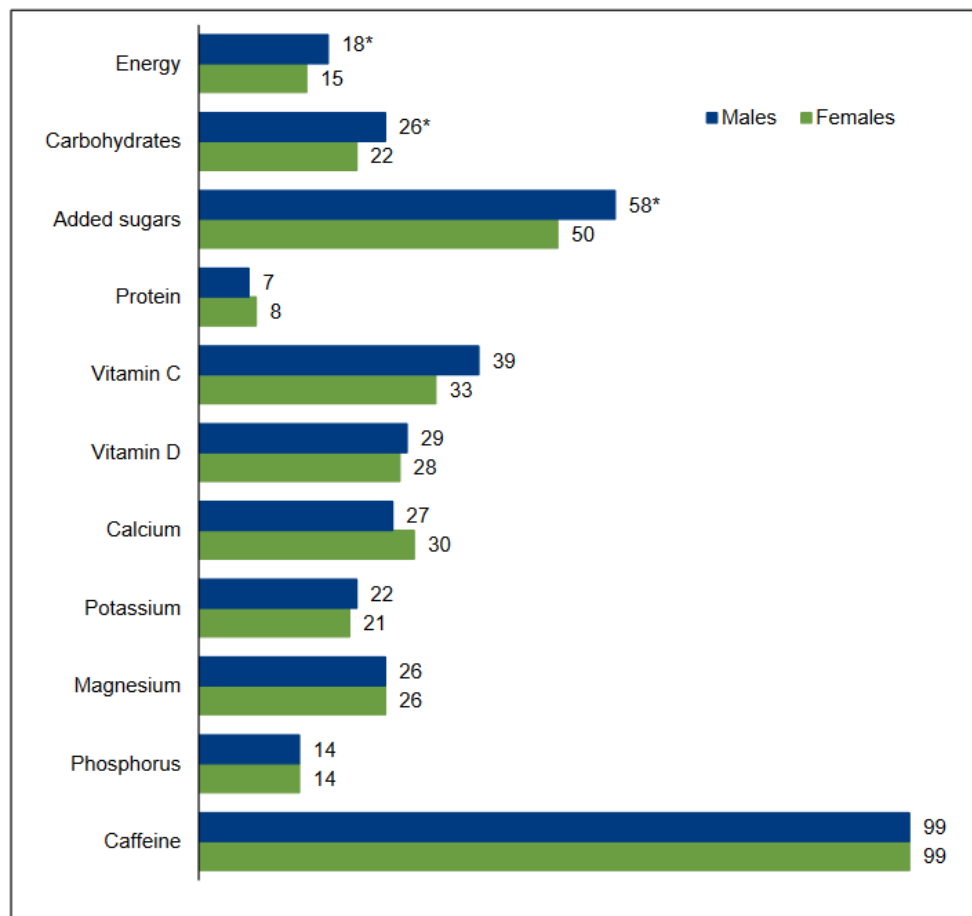
Consumption of Beverages and Meeting Recs

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Analytic Results Summary

Beverage contribution to intakes of dietary components (adults)

Percentage of mean daily energy and selected nutrient intakes contributed by beverages among adults, WWEIA, NHANES 2015-2016



*Significantly different from females, (p<0.01)

SOURCE: What We Eat in America, NHANES 2015-2016, day 1, individuals 20+ years

Dietary Component	Top Beverage Source	Percent of total intake
Added sugars	Soft drinks and fruit drinks	10-30%
Calcium	Plain Milk	7-14%
Potassium	Coffee	5-9%
Vitamin D	Plain Milk	11-21%

Draft Conclusion Statement

- Beverages are diverse in their contribution to food groups and dietary components. Selection of beverage choice can contribute positively to food groups that are currently below recommendations (i.e. dairy, fruit), nutrients that are under consumed (e.g. potassium, calcium, vitamin D), and dietary components that exceed recommended limits (i.e. added sugars).
- Plain fluid milk, plain calcium fortified soy beverage, and 100% juice contribute to meeting food group and nutrient needs without contributing calories from added sugars. Coffee, without additions of added sugars is a notable source of potassium for adults.

Draft Conclusion Statement continued

- Beverage contribution to added sugars increased from 30% for young children to 50% for adolescents. Among adults, beverages contribute nearly 60% of added sugars intakes.
 - The top beverage sources of added sugars are sweetened beverages other than milks and milk substitutes including regular soft drinks, fruit drinks, sports/energy drinks, smoothies, and coffee and tea inclusive of added sugars.

Question – Alcohol

What is the relationship between alcohol intakes and achieving food group and nutrient recommendations?

Approach to Answer Question: Data Analysis

Analytic Framework - Alcohol

Prevalence of alcohol use, binge drinking and frequent binge drinking

Average contribution of energy, caffeine, and added sugars per alcoholic drink equivalent of beer, wine, and liquor and cocktails

Alcoholic beverage contribution as a percent of

- Total Energy
- Added sugars, caffeine
- Daily beverage calories

Analytic Results:

prevalence of alcohol use

- The 2017 estimated per capita consumption of alcohol based on sales and shipments data was 2.34 gallons of ethanol on average per person (based on populations ages 14 and older). Healthy People 2020 (HP2020) set the national objective at not more than 2.1 gallons; 41 states exceeded the HP2020 objective in 2017.
- Nearly 70% of adults ages 21-26 and 55% of adults 26 years and older report alcohol use in the last month. About half of alcohol drinkers report binge drinking (5+ men, 4+ women drinks in one occasion) in the last month.
 - Alcohol use is lower (42%) among older adults.
 - Binge drinking is highest among those ages 21-25 yrs

Analytic Results: reported alcoholic beverage intakes

- 32% of men and 21% of women ages 20-64 report alcoholic beverage intakes on a given day.
- A significantly larger proportion of **total daily beverage calories** come from alcohol for men (31%) vs women (21%).
- Alcoholic beverages contribute 4-5% of **total energy intake in the total population** ages 20-70 years.

Percentage reporting and mean intakes of alcoholic beverage types among adults
ages 20-64 years, WWEIA NHANES, day 1, 2013-2016

	Percent of reported alcoholic beverage intake - men	Percent of reported alcoholic beverage intake - women	Mean intakes (oz.) among men of each beverages type when reported	Mean intakes (oz.) among women of each beverages type when reported
Beer	23%	8%	43oz	26oz
Wine	5%	9%	9 oz	10 oz
Spirits, mixed drinks	8%	5%	13 oz	14 oz

DRAFT Conclusion Statement - Alcohol

Per capita alcohol consumption has increased in the U.S. since 2000. Nearly 70% of adults 21-25 and 55% ages 26 and over report consuming alcohol in the last month, and almost half of drinkers report past-month binge drinking. Alcohol use decreases with age. Reported intakes of alcoholic beverages differs by age and sex. Beyond contributing to energy intakes, alcoholic beverages contribute little towards average intakes of food groups or nutrients.

Question – Added Sugars

What is the relationship between added sugars intakes and achieving food group and nutrient recommendations?

Approach to Answer Question: Data Analysis

Analytic Framework – Added Sugars

Usual intake distribution of added sugars

Percent of population achieving the recommendation

- less than 10% of total energy intake from added sugars

Food category sources of added sugars intakes, and
their contributions to nutrient and food group
intake

Analytic Results:

mean intakes of added sugars

- Mean intakes of added sugars have decreased significantly over time across all age groups.
 - WWEIA, NHANES 2003-2004: ages 2+, 21 tsp-eq (~84 g)
 - WWEIA, NHANES 2015-2016: ages 2+, 16.2 tsp-eq (~65 g)
- Mean intakes of added sugars are lowest for non-Hispanic Asians, and similar across other race-ethnic groups.

Mean intakes of added sugars (tsp-eq) by race-ethnicity, WWEIA NHANES 2015-2015

	Non-Hispanic White	Non-Hispanic Black	Non-Hispanic Asian	Hispanic
Ages 2+	16.63	17.68	9.58	15.61

- Mean intakes of added sugars are similar across income groups.

Mean intakes of added sugars (tsp-eq) by percent of poverty level, WWEIA NHANES 2015-2015

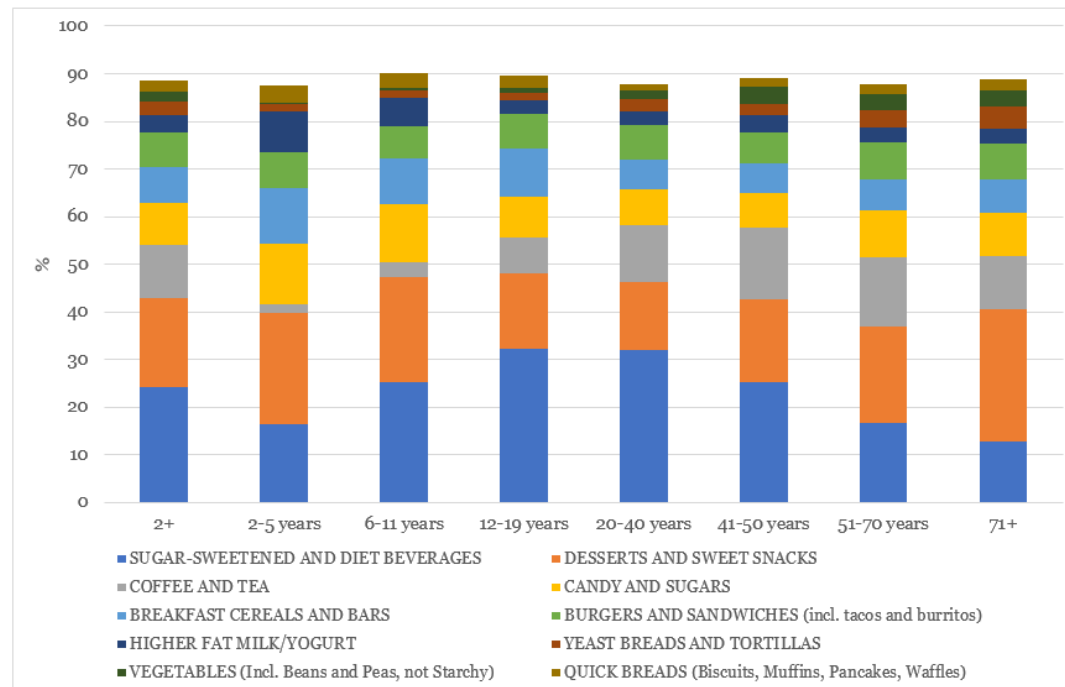
	<131% Poverty	131-350% Poverty	>350% Poverty	All Incomes
Ages 2+	16.7	17.12	15.33	16.19

Analytic Results: intakes and category sources

Top 5 Sources of Added Sugars by Age Groups (Years) by percentage of total added sugars intakes

	2+	2-5	6-11	12-19	20-40	41-50	51-70	71+
SUGAR-SWEETENED BEVERAGES	24.1	16.41	25.17	32.14	32.09	25.31	16.54	12.84
DESSERTS AND SWEET SNACKS	18.8	23.33	22.21	16.05	14.25	17.43	20.5	27.72
COFFEE AND TEA	11.1	1.97	3.02	7.3	11.94	14.9	14.33	11.13
CANDY AND SUGARS	8.97	12.63	12.14	8.78	7.33	7.34	9.86	9.02
BREAKFAST CEREALS AND BARS	7.4	11.67	9.61	10.09	6.39	6.23	6.48	7
% of total added sugars	70.4	66.01	72.15	74.36	72	71.21	67.71	67.71

Males and Females - Distribution of added sugars intake (percentages) across top 10 sub-categories



DRAFT Conclusion Statement – Added Sugars

- Mean intakes of added sugars have significantly decreased over time, but remain high across age, sex, race-ethnic and income.
- Nearly 70% of added sugars comes from 5 Food Categories: sweetened beverages, desserts & sweet snacks, coffee & tea (with their additions), candy & sugars, and breakfast cereals & bars.

DRAFT Conclusion Statement (cont.)

- Breakfast cereals and bars are the top source of whole grains, though mean intakes of whole grains are well below recommended amounts. Coffee and tea (without any additions) both contribute to intakes of potassium.
 - Choices with no or low amounts of added sugars can be made within these categories
- Added sugars intakes could be greatly reduced by decreasing intakes of sweetened beverages, desserts and sweet snacks, and candies; and by consuming coffee and tea and breakfast cereals/bars with low or no added sugars.

2020 Dietary Guidelines Advisory Committee: Dietary Patterns Subcommittee



Members:

Regan Bailey

Jamy Ard

Teresa Davis

Timothy Naimi

Jamie Stang

Barbara Schneeman

Support Staff:

TusaRebecca Pannucci

Kellie O. Casavale

Emily Callahan

Cheyenne Swanson

Kevin Kuczynski

Kristin Koegel

Eve Stooddy (DFO rep)