Outline of the Webinar

1. Introduction
2. Life cycle assessment
3. Approach to linking environmental impacts to US diets
4. US diets: a distribution of impacts
5. **Gender differences in diets and impacts**
6. Differences in foods & nutrients by low vs high impacts
7. Conclusion

Data Sources

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    - ~7,000 food items from nutrient database (NNDDS)
- **database of Food Impacts on the Environment for Linking to Diets (*dataFIELD*)**
  - Based on "Life Cycle Assessment" of foods
    - Environmental systems, industrial ecology literatures
    - Extensive review, data extraction of 300+ Food-LCA studies
  - Focus on greenhouse gas emissions (GHGE) in primary production

Approach

NHANES
(National Health and Nutrition Examination Survey)

13,203 individuals
~7000 as-consumed food items

Food Environmental Impact Database
Populated with literature-based emission factors

Approach

NHANES
(National Health and Nutrition Examination Survey)

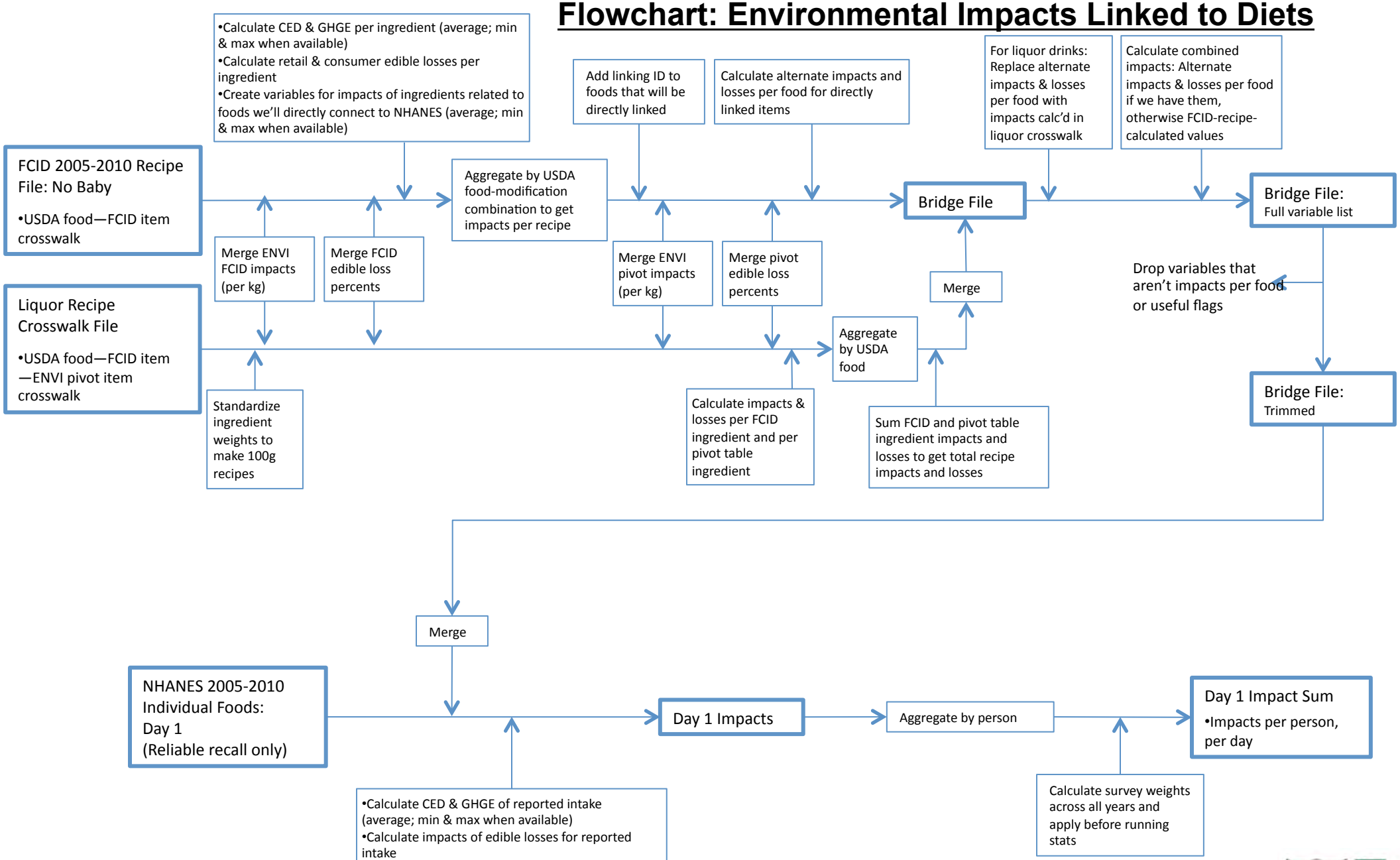
13,203 individuals
~7000 as-consumed food items

FCID
(Food Commodities Intake Database)

~332 food commodities

Food Environmental Impact Database
Populated with literature-based emission factors

Flowchart: Environmental Impacts Linked to Diets



Version: October 13, 2016

School of Public Health and Tropical Medicine

Tulane University

Recipe file for linking WWEIA foods

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Pizza with pepperoni, thin crust

WWEIA Food Code: 58106550

Ingredient	FCID Code	Crop Group	FCID Description	Cooking Status
1	1500402000	15	Wheat, flour	Cooked
2	801377000	8, 8A	Tomato, puree	Cooked
3	801375000	8, 8A	Tomato	Cooked
4	8602000000	86, 86B	Water, indirect, all sources	Cooked
5	3600223000	36	Milk, nonfat solids	Cooked
6	3600224000	36	Milk, water	Cooked
7	3600222000	36	Milk, fat	Cooked
8	3100044000	31	Beef, meat	Cooked
9	3400290000	34	Pork, meat	Cooked
10	600350000	6	Soybean, oil	Refined
11	3400293000	34	Pork, fat	Cooked
12	301237000	3, 3A	Onion, bulb	Cooked
13	3100047000	31	Beef, fat	Cooked
14	3100046000	31	Beef, meat byproducts	Cooked
15	1500125000	15	Corn, field, oil	Refined

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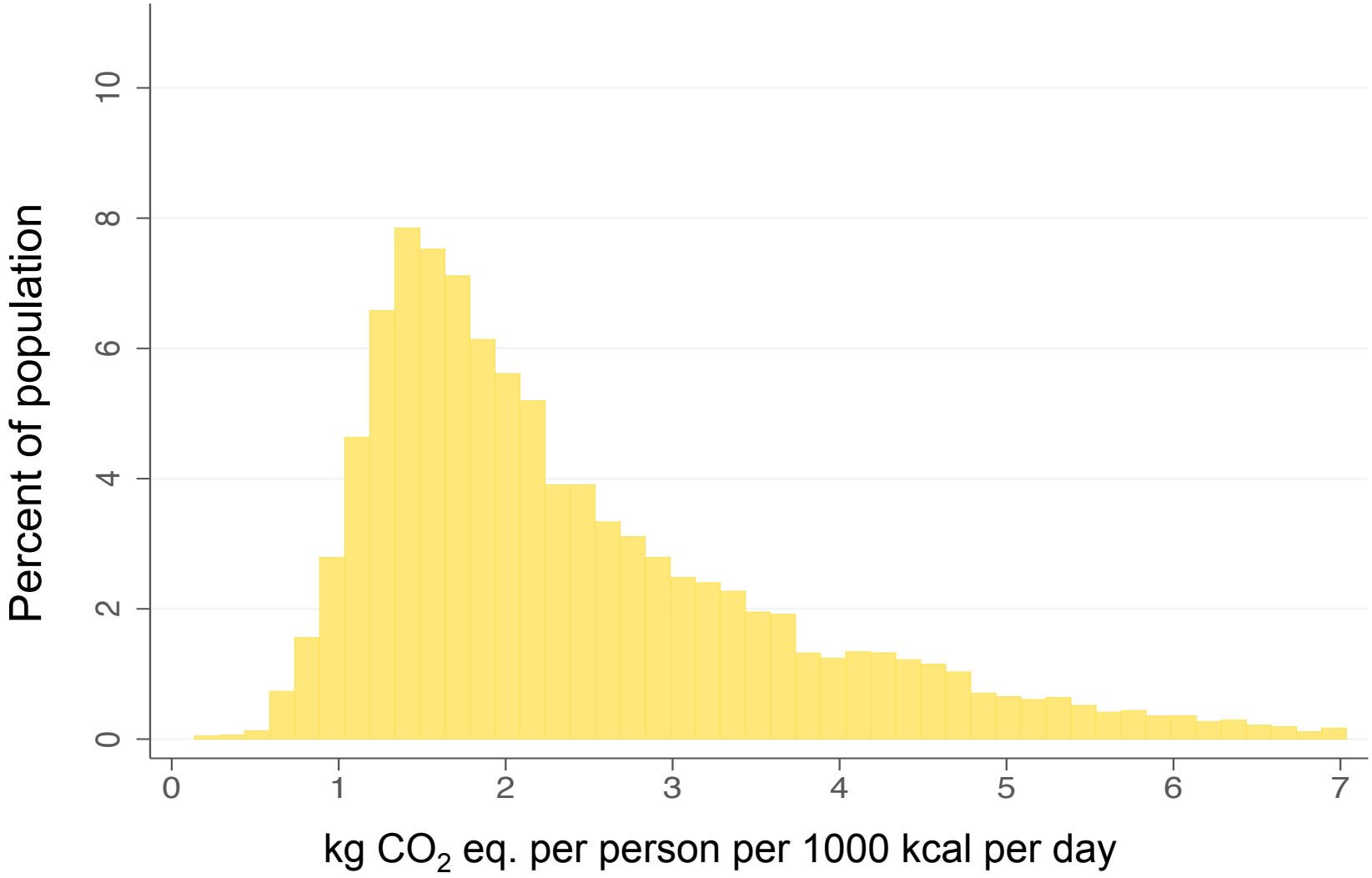
Distribution of diet-level GHGE

NHANES 2005-2010, 1-day diets, kg CO_2e per person per 1000 kcal



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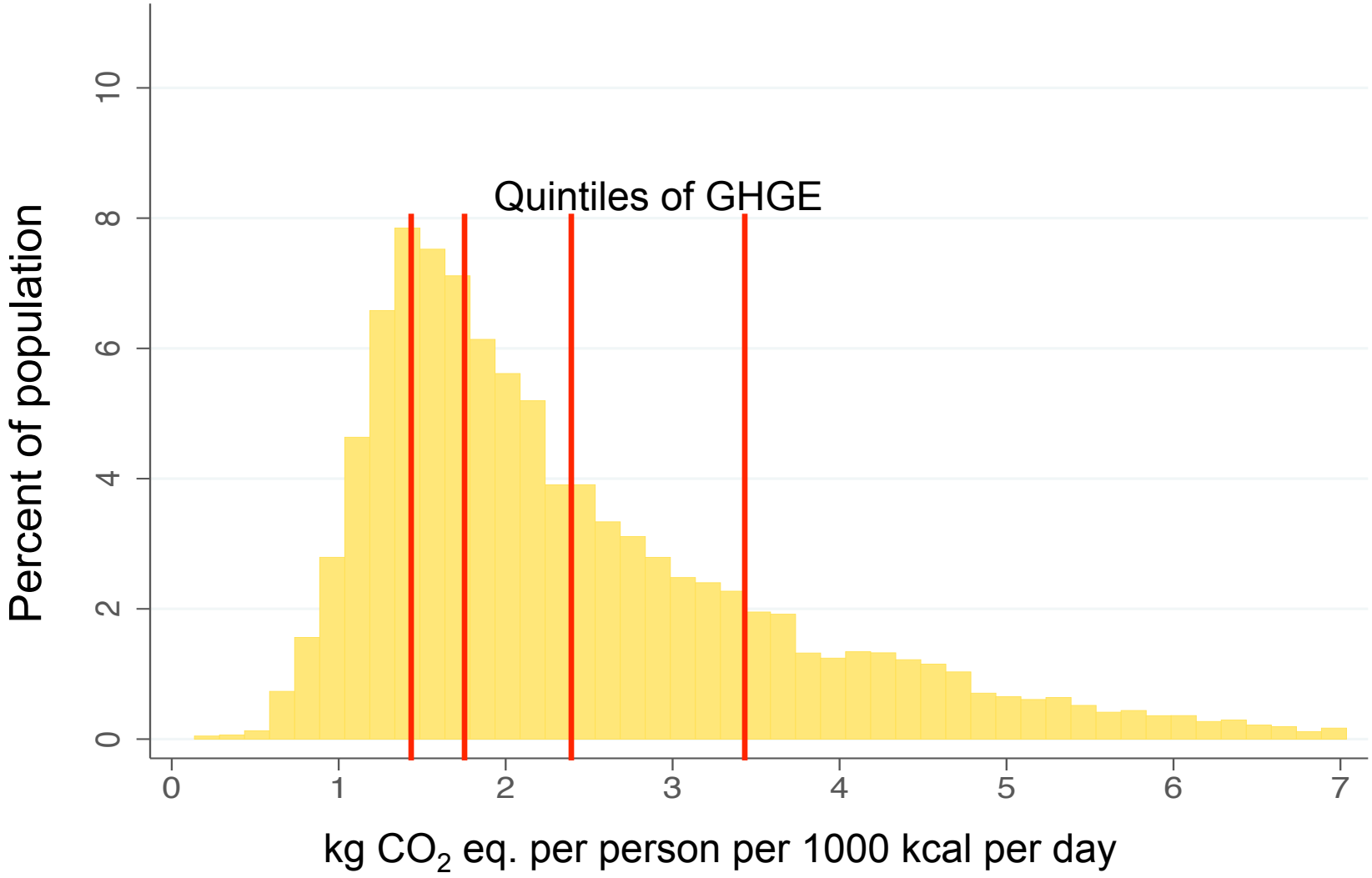

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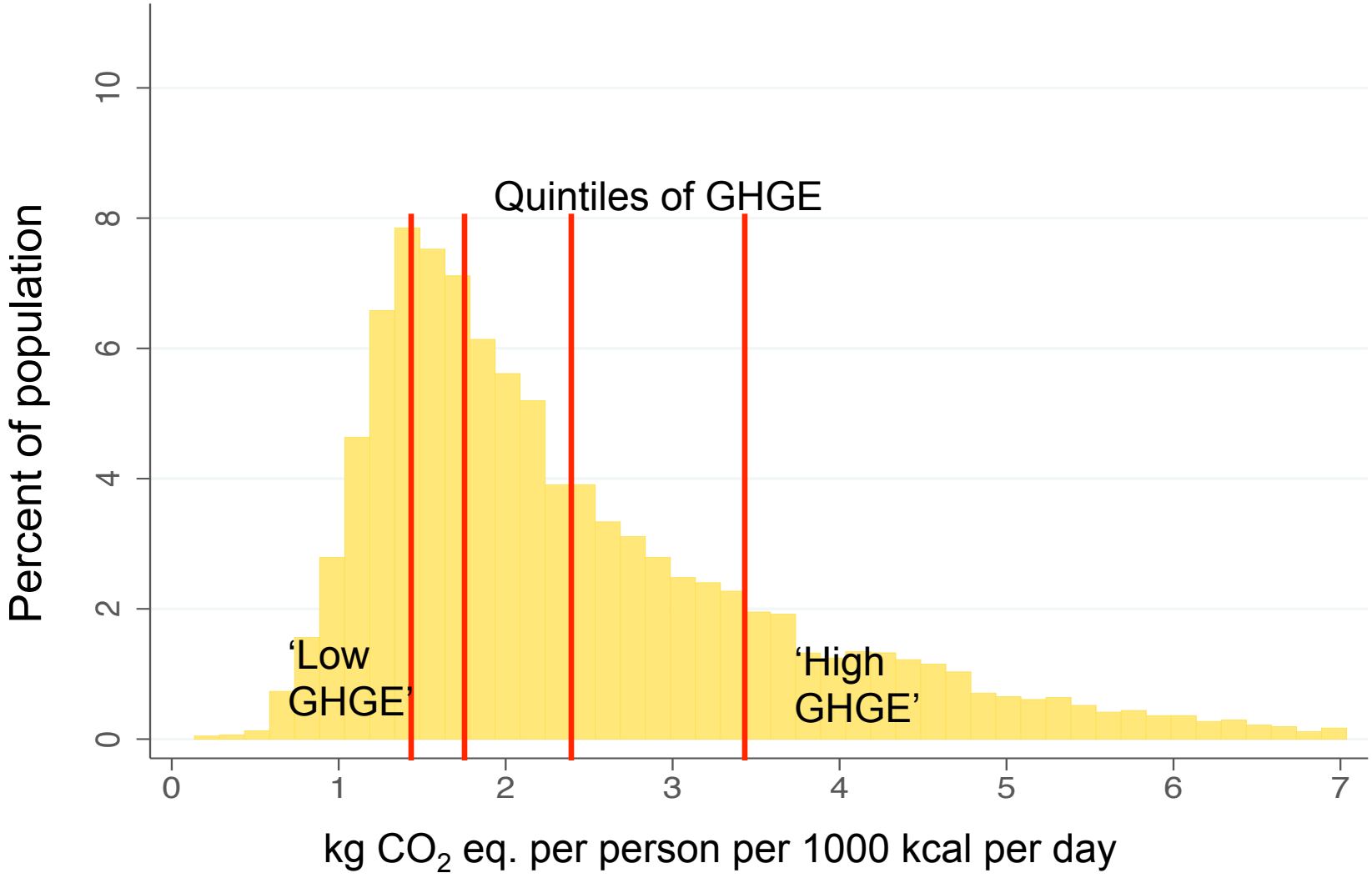

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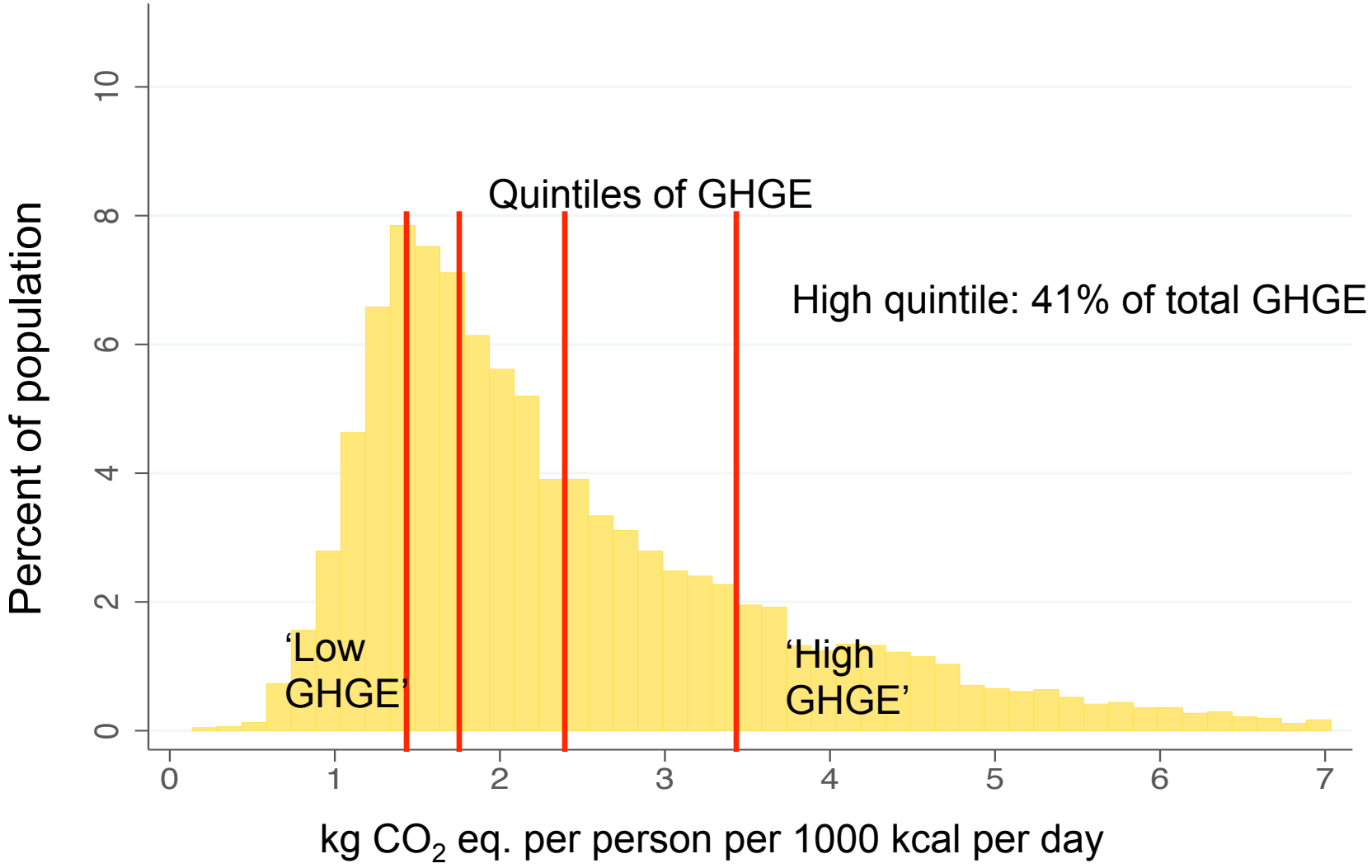

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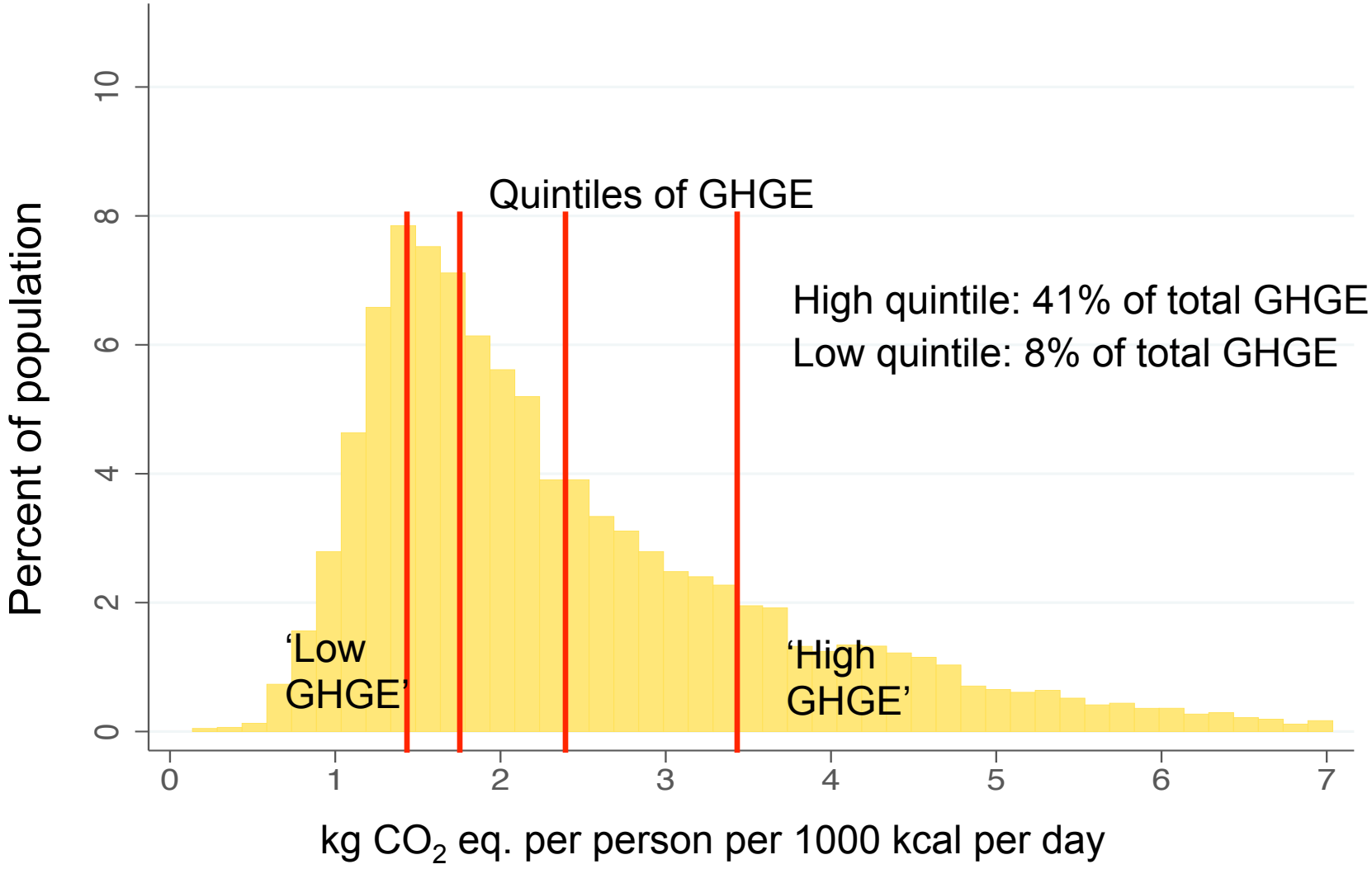

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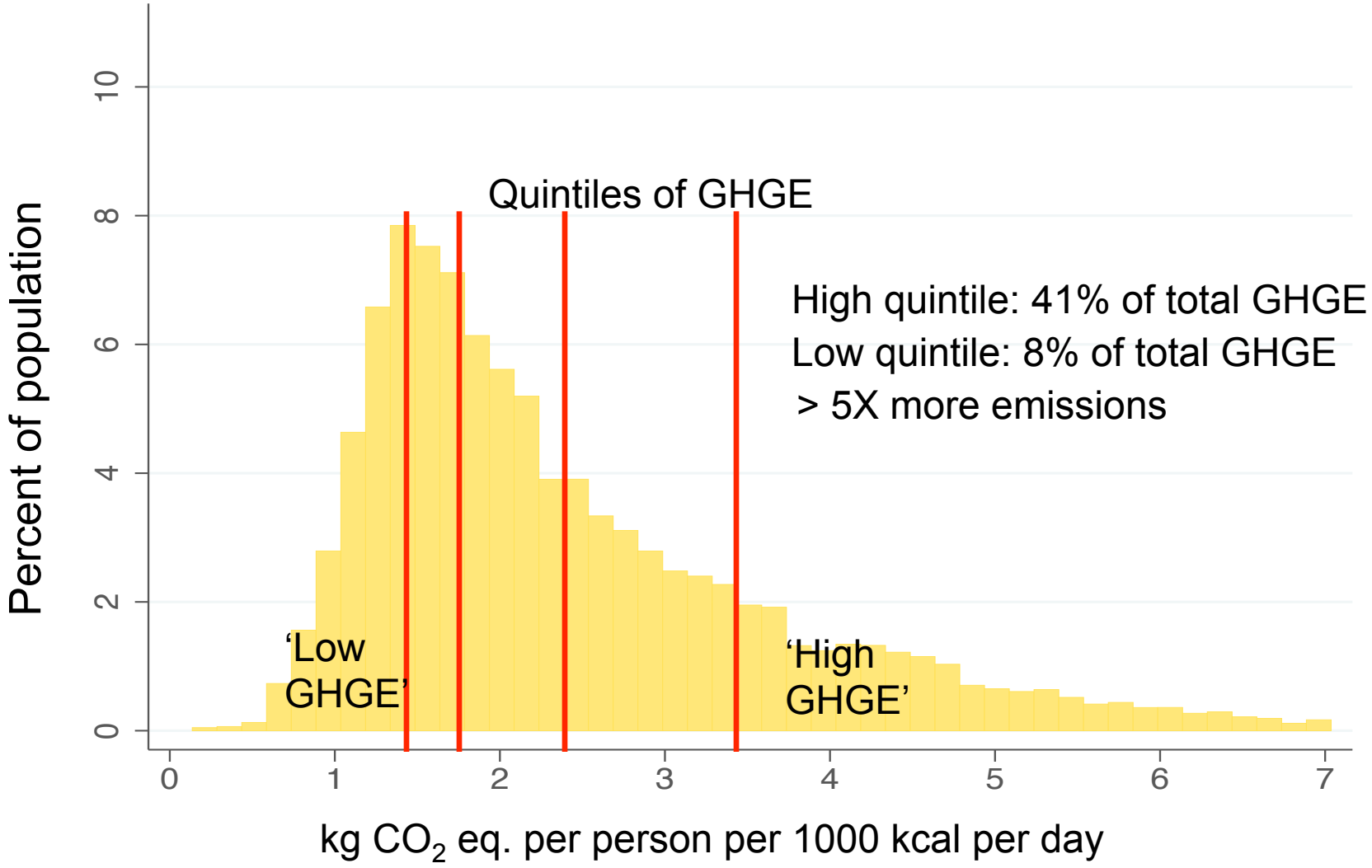

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- Q1: Do men's diets have a higher carbon footprint?
- Q2: If so, what are the differences in consumption of specific food groups that contribute to this?
- Q3: What are the differences in overall diet quality, as measured by the Healthy Eating Index?

Mean GHGE by gender

NHANES 2005-2010, 1-day diets

Variable	Unit	Women	Men	p-value
GHGE per day	kg CO_2-eq	3.8 (0.0)	6.0 (0.1)	0.000

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Variable	Unit	Women	Men	p-value
GHGE per day	kg CO_2-eq	3.8 (0.0)	6.0 (0.1)	0.000
Energy	kcal	1833 (15)	2650 (23)	0.000

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GHGE per day	kg CO_2-eq	3.8 (0.0)	6.0 (0.1)	0.000
Energy	kcal	1833 (15)	2650 (23)	0.000
GHGE per 1000 kcal per d	kg CO_2-eq	2.1 (0.0)	2.3 (0.0)	0.000

Food group intakes (per 1000 kcal) by gender

NHANES 2005-2010, 1-day diets

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Fruit		0.54	0.42	0.000
Vegetables		0.88	0.72	0.000
Total grain	oz eq PTK	3.12	3.05	0.014
Whole grain		0.40	0.33	0.000
Refined grain		2.73	2.73	0.918
Total protein foods	oz eq PTK	2.86	3.15	0.000
Total dairy	cup eq PTK	0.82	0.71	0.000
Oils	g PTK	10.73	9.92	0.000
Solid fats	g PTK	17.51	17.91	0.037
Added sugars	tsp eq PTK	8.83	8.60	0.130

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Protein foods: total	*oz eq PTK*	2.86	3.15	0.000
Protein foods: animal		2.45	2.80	0.000
Meat		0.71	0.92	0.000
Poultry		0.77	0.77	0.896
Seafood		0.31	0.31	0.964
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* Meat includes beef, veal, lamb, pork, and game meat

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Healthy Eating Index	Points	49.9	47.4	0.000

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- Women consume lower amounts of other food groups
  - Protein foods, Meats, Solid fats
- Overall, women's diets are healthier
  - Higher healthy eating index scores

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- High-impact diets are higher in:
  - vitamins A and D, choline, calcium, iron, and potassium

Overall differences in diet quality

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- Measured using the Healthy Eating Index
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- Low-impact diets score significantly higher than high-impact diets:
  - 50 vs 48 points

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  - Overall, low-impact diets are healthier than high-impact diets
  - Low-impact diets better on a number of nutrients
    - fiber, sodium, saturated fat
  - But, low-impact diets are worse on other nutrients
    - calcium, vitamin D, potassium

Limitations and Future Directions

- Consider other environmental impacts (e.g. water, land use)
- Further disaggregate diets by demographic characteristics
- Consider usual intakes

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  - Tulane University: Amelia Willits-Smith, Brittany Kovacs, Rodrigo Aranda, Paul Hutchinson, Ben Pollock, Lydia Bazzano, Adrienne Mundorf
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