

Alignment Of US School Lunches With The EAT-Lancet Healthy Reference Diet's Standards For Planetary Health

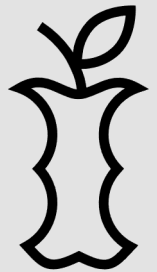
Presentation to NOPREN School Working Group

August 10, 2021

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Co-authors and funding sources

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Funding:

- MK Poole was supported by a T32 training grant in nutrition (Grant No. DK 007703-22) from the NIH. AA Musicus is supported by a T32 training grant (Grant No. 2T32CA057711-27) from the NIH.
- This content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Background

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of greenhouse gas emissions can be attributed to **food systems**¹

Preproduction

- Manufacturing of fertilizer and pesticides
- Production of animal feed

Production

- Land and water use
- Animal management

Postproduction

- Processing
- Packaging
- Storage
- Transportation
- Food waste







“Can we feed a future population of 10 billion people a healthy diet within planetary boundaries?”²



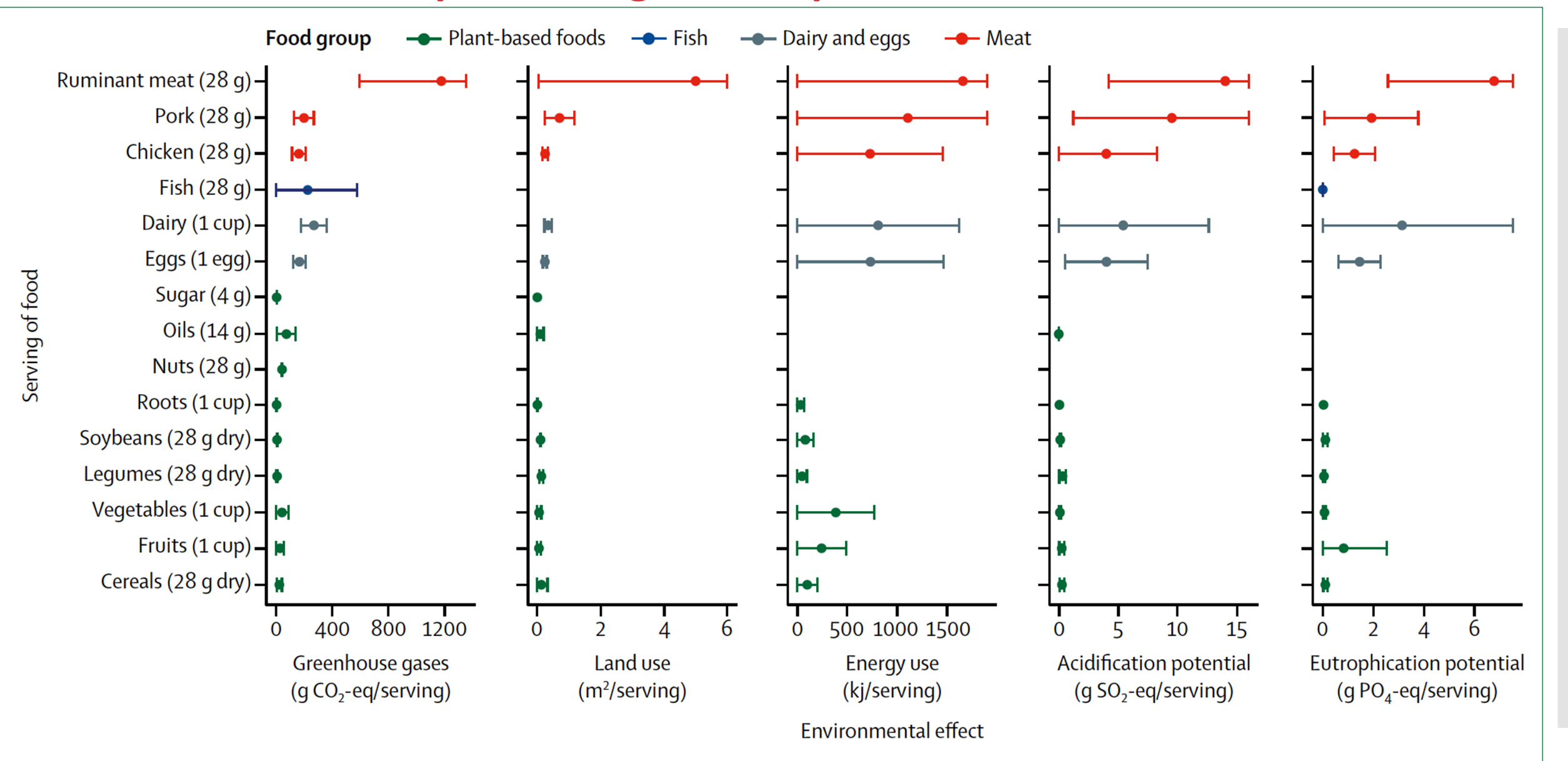
<https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/>

EAT-Lancet Commission on Food, Planet and Health

Planetary boundaries

Earth system process	Control variable	Boundary (Uncertainty range)
Climate change	 GHG emissions	5 Gt CO₂-eq yr⁻¹ (4.7 – 5.4 Gt CO ₂ -eq yr ⁻¹)
Land-system change	 Cropland use	13 M km² (11–15 M km ²)
Freshwater use	 Water use	2,500 km³ yr⁻¹ (1000–4000 km ³ yr ⁻¹)
Nitrogen cycling	 N application	90 Tg N yr⁻¹ (65–90 Tg N yr ⁻¹) * (90–130 Tg N yr ⁻¹)**
Phosphorus cycling	 P application	8 Tg P yr⁻¹ (6–12 Tg P yr ⁻¹) * (8–16 Tg P yr ⁻¹)**
Biodiversity loss	 Extinction rate	10 E/MSY (1–80 E/MSY)

Environmental effects per serving of food produced

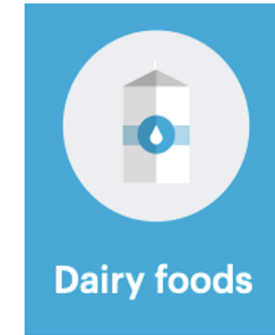
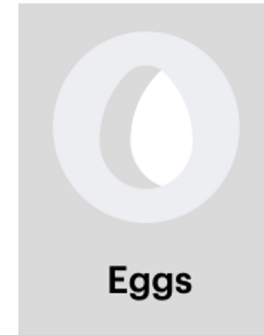


Healthy Reference Diet

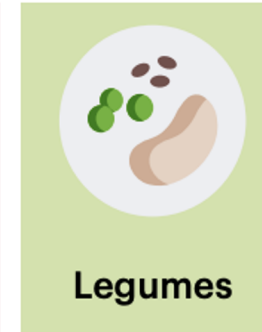
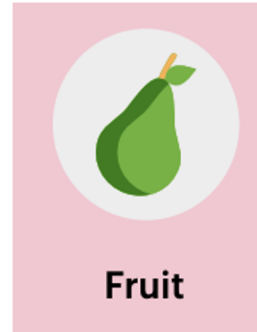
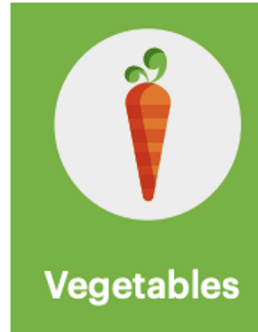
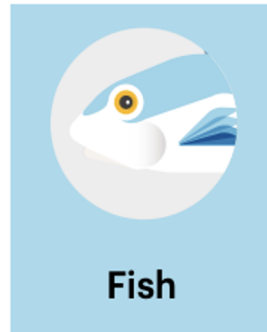
Limited intake



Optional foods

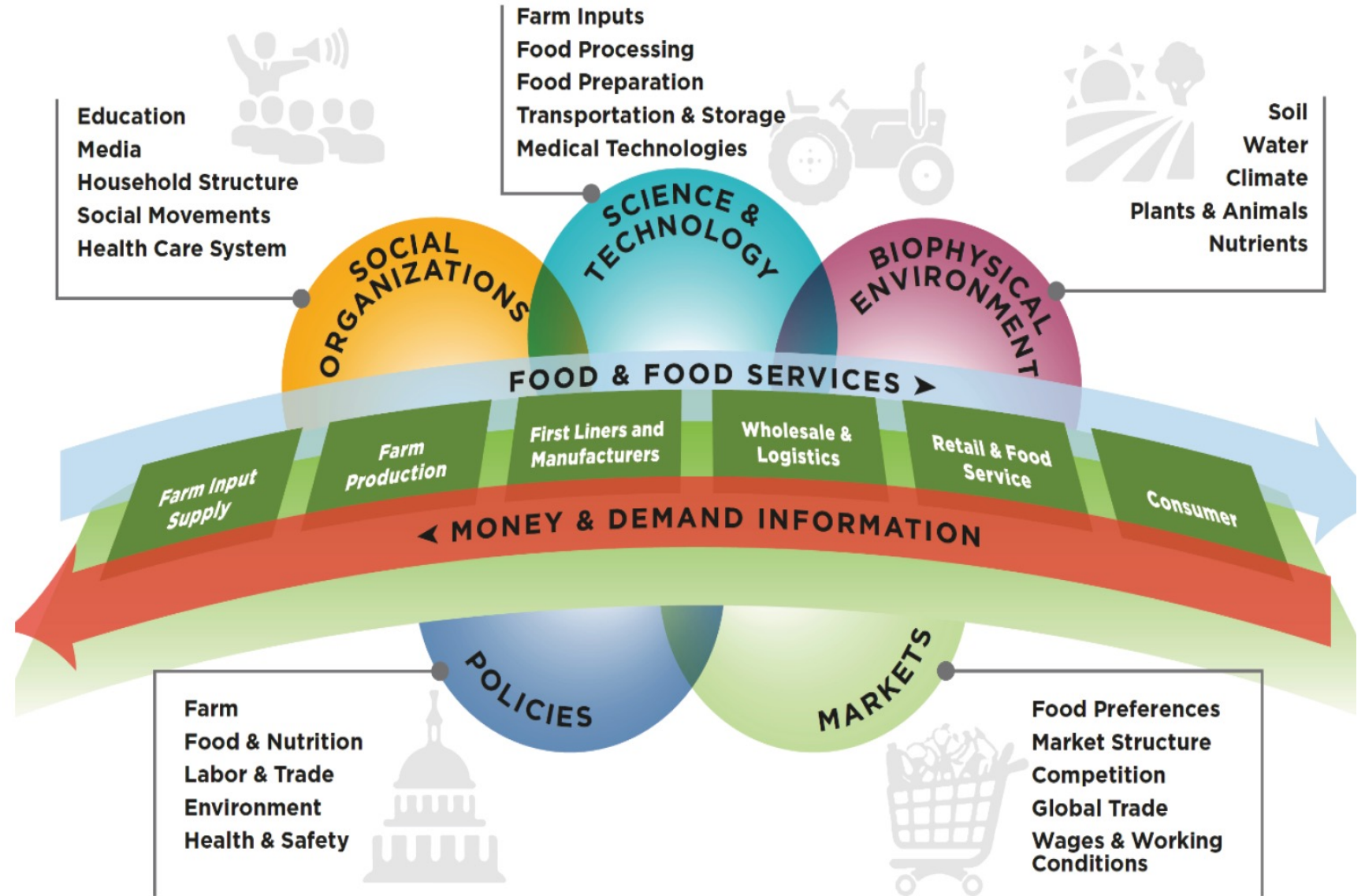


Emphasized foods



<https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/>

Study rationale



Study rationale



serves 30 million+
schoolchildren³



provide ~half of a child's
daily calorie intake³

- **National School Lunch Program (NSLP)**
 - Healthy, Hunger-Free Kids Act of 2010 revised nutrition standards to incorporate more fruit, vegetables, whole grains and less saturated fat, sodium, and added sugar⁴
 - Studies have found significant improvements in lunch quality and student dietary intake^{5,6,7}

Study aims

1.

Consider how the NSLP might build on its successes in improving nutrition by also protecting the environment

2.

Identify where the average school lunch exceeds or falls short of benchmarks for environmental health using the Healthy Reference Diet

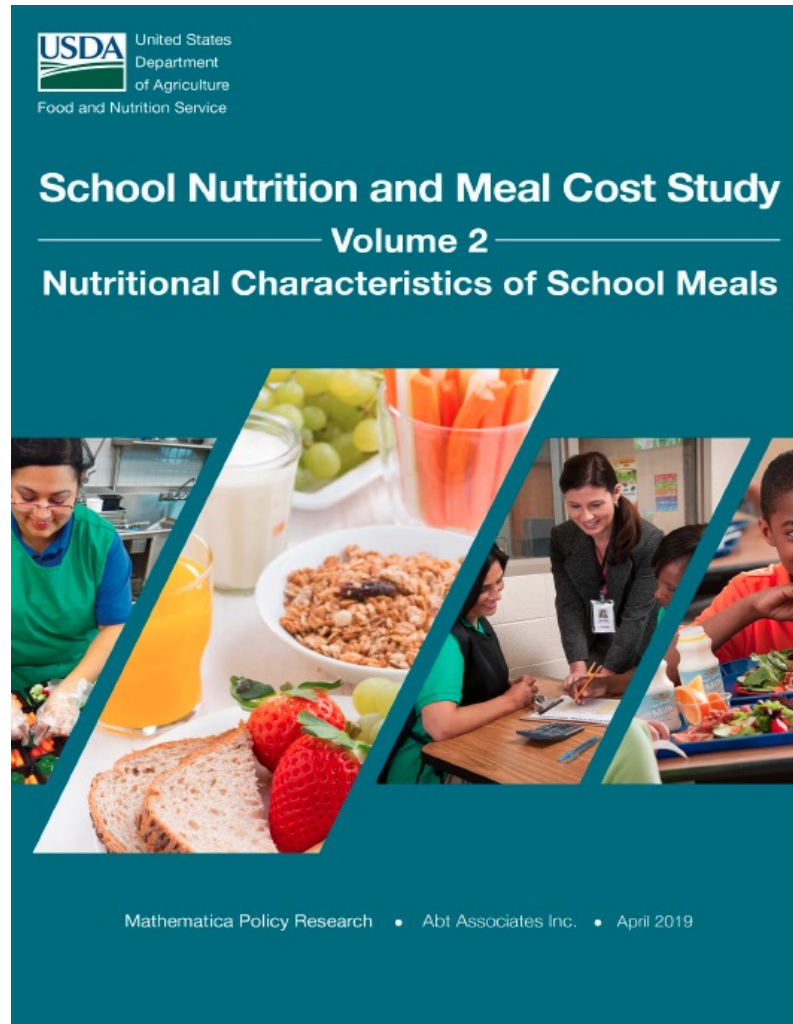
3.

Conduct exploratory analysis to estimate relative difference in food costs between the NSLP vs Healthy Reference Diet lunch

EAT-Lancet Healthy Reference Diet
for Planetary Health



Methods



<https://fnsprod.azureedge.net/sites/default/files/resource-files/SNMCSVolume2.pdf>

EAT-Lancet Healthy Reference Diet

**Macronutrient intake
grams per day
(possible range)**



Whole grains
Rice, wheat, corn and other

232



Tubers or starchy vegetables
Potatoes and cassava

50 (0–100)



Vegetables
All vegetables

300 (200–600)



Fruits
All fruits

200 (100–300)



Dairy foods
Whole milk or equivalents

250 (0–500)



Protein sources
Beef, lamb and pork
Chicken and other poultry
Eggs
Fish
Legumes
Nuts

14 (0–28)

29 (0–58)

13 (0–25)

28 (0–100)

75 (0–100)

50 (0–75)



Added fats
Unsaturated oils
Saturated oils

40 (20–80)

11.8 (0–11.8)



Added sugars
All sugars

31 (0–31)

<https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/>

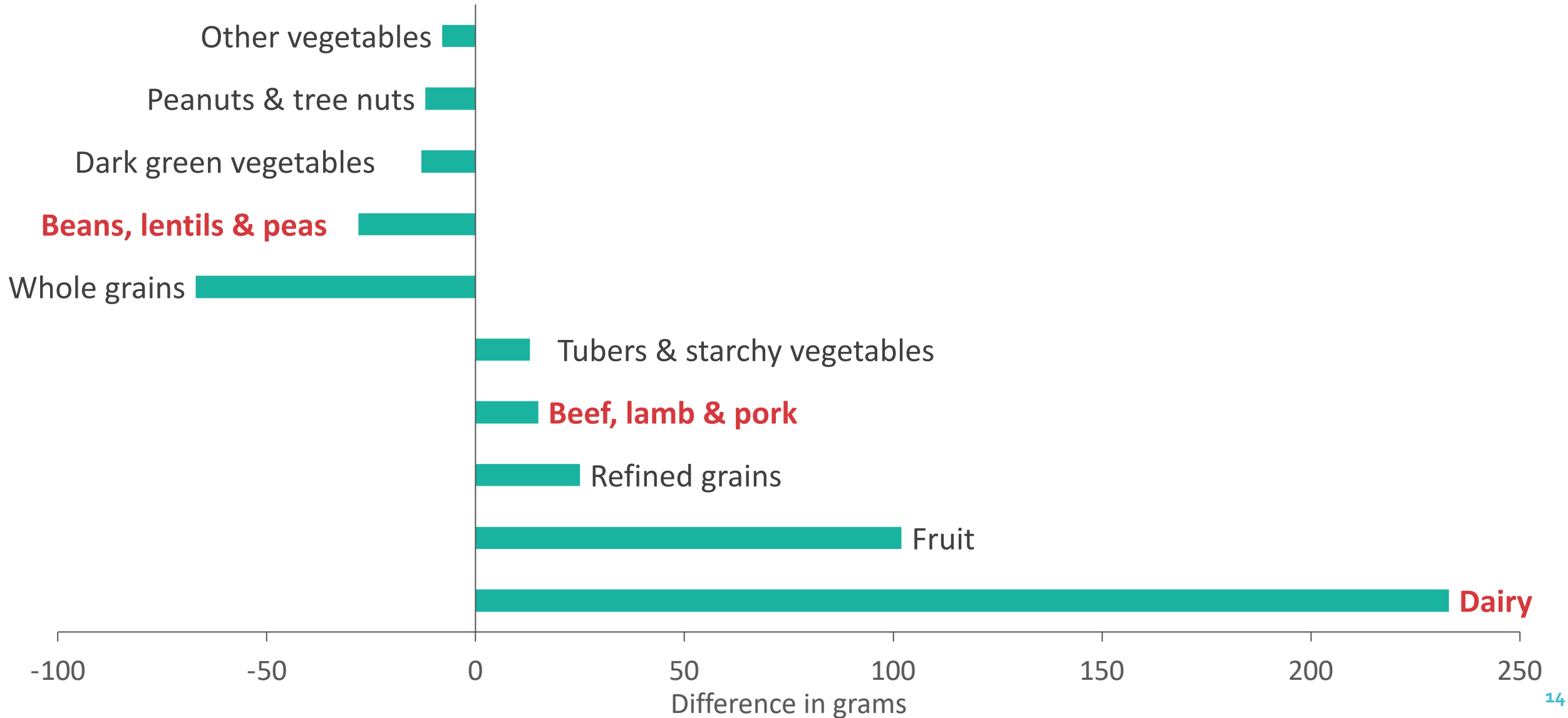
Primary outcome

- **Sample:** 1,207 schools from the USDA School Nutrition and Meal Cost Study (SNMCS)⁸
- **Measures:**
 - SNMCS: Average of five days of lunch menus per school
 - Healthy Reference Diet: Point estimates for recommended macronutrient intake⁹
- **Outcome:** **Average amounts of food prepared** (in grams) for 18 food categories per average NSLP lunch and Healthy Reference Diet lunch
- **Analysis:** One-sample t-tests to test whether the amounts prepared of each food category per NSLP lunch were different from the amounts calculated for the Healthy Reference Diet lunch

Secondary outcome

- **Sample:** 1,207 schools from the SNMCS
- **Measure:** Food items most commonly served at lunch from SNMCS data
- **Outcome:** Inflation-adjusted average costs per food item from USDA Center for Nutrition Policy and Promotion price database¹⁰
 - Average food cost per NSLP and Healthy Reference Diet lunch using same food items
- **Analysis:** Relative difference in average food costs per lunch between NSLP and Healthy Reference Diet lunch

Amount in grams per average school lunch above or below Healthy Reference Diet lunch benchmarks



Results

- Compared to the Healthy Reference Diet lunch, across grade levels, the NSLP lunch included:



Whole grains, legumes, dark green vegetables, peanuts/tree nuts, other vegetables, seafood, soy foods, unsaturated oils, and eggs



Dairy, fruit, refined grains, red meat, tubers/starchy vegetables, added sugars, red/orange vegetables, chicken/poultry, and solid fats

- Relative difference in food costs between NSLP lunch and Healthy Reference Diet lunch
 - Potential cost savings with Healthy Reference Diet

Implications



Consider substituting some red meat with plant-based foods like beans, lentils and peas



Consider substituting some dairy with other sources of calcium and reduce milk waste¹¹

Limitations

- **Not a real-world intervention**
 - Unable to quantify short-term impacts on dietary intake, food waste, and acceptability to stakeholders
- **Healthy Reference Diet**
 - Developed for average caloric needs of adults
 - May not include specific considerations for US food system
- **Complexity of school lunch costs**
 - Food and labor
 - Consumer vs. bulk purchasing

Future research



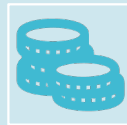
Calculate the environmental impacts of school meals



Develop sustainable diet benchmarks for youth



Explore facilitators and barriers to implementation of sustainable nutrition standards



Identify cost-neutral substitutions



Engage youth perspectives in sustainable lunches

Future directions

- **Strategic policymaking (local, state and federal levels)**
 - Adopt sustainable standards
 - Leverage food policy councils for multi-sector initiatives
- **Potential action steps for schools**
 - Incorporate sustainability into school wellness policies
 - Serve more plant-based proteins
 - Promote safe drinking water
 - Reduce food waste
 - Share environmentally conscious practices with stakeholders to demonstrate feasibility and reception from students, families, and school nutrition professionals

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