Individual Energy and Nutrient Intake from a 24-hour and 7-day Recall:

Comparing Estimates Using the 2011/2012 Bangladesh Integrated Household Survey

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Comparing 24HR and HCES

- In the past, obstacles to making direct comparisons between 24-hour Recalls and HCES have included:
  - Differing populations (targeted vs. nationally representative)
  - Differing compositions (women and/or children vs. household)
  - Differing years of implementation
  - Differing period of implementation (seasonality)
  - Availability of a 24-hour recall
- …until the 2011/2012 Bangladesh Integrated Household Survey

2011/2012 Bangladesh Integrated Household Survey

- Includes a 24-hour Recall (24HR)
  - Combination of 24HR and food weighing methods
  - Recipes and ingredients of prepared dishes and snacks and the amounts eaten by each household member
- Includes a 7-day Recall (7DR)
  - Household-level consumption recalled over the previous 7 days
- Both dietary assessment methods are applied to a nationally representative sample of 5,503 households

Research Questions

- The BIHS gives us a unique opportunity to analyze:

    1) How do individual-level energy and nutrient intakes compare between 24HR and HCES (here using the BIHS 7DR) data using the Adult Consumption Equivalents approach?
    2) How well do Adult Consumption Equivalents serve as a proxy for measuring the intrahousehold distribution of food?

Methods

- 23,135 individuals (5,503 households)
- Adult Consumption Equivalent (ACE) applied to the 7DR to estimate the intrahousehold distribution of food for comparison with the 24HR
- ACEs applied to the 24HR—after summing individual intake to the household level—to assess how well ACEs serve as a proxy for measuring the intrahousehold distribution of food
- Energy, iron, zinc, vitamin A, and calcium values of 288 food items in the BIHS were assigned using
    - Bangladesh-specific Food Composition Table provided by Helen Keller International
    - Local Bangladeshi recipes

Adult Consumption Equivalents (ACEs)

SEX	AGE (y)	ACE	HOUSEHOLD ACEs	INDIVIDUAL ACE (ACE ÷ HH ACE)
Female	60	0.68852	3.61475	0.19048
Female	30	0.77049	3.61475	0.21315
Female	11	0.70492	3.61475	0.19501
Male	25	1	3.61475	0.26757
Male	5	0.48361	3.61475	0.13379

ACEs are able to take into account differences in the size and composition of households…

Total household consumption of rice: **1,571.43 g**

Individual consumption (not using ACEs):

1,571.43 g ÷ HH size = 314.26 g per person

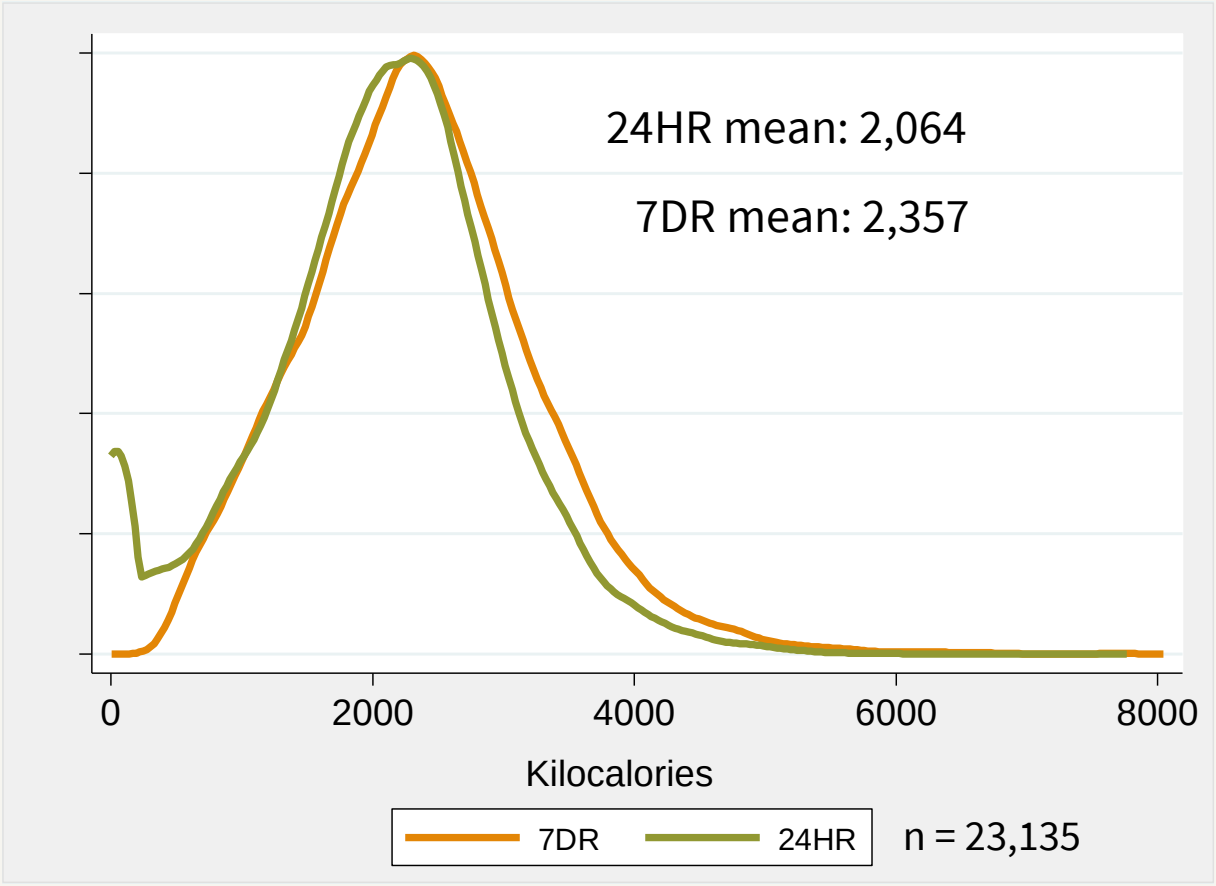
Individual consumption (using ACEs):

1,571.43 g x Individual AME =

Female, 60: 299.32 g
Female, 30: 334.95 g
Female, 11: 306.45 g
Male, 25: 420.47 g
Male, 5: 210.24 g

…to provide a standardized measure for estimating the intrahousehold distribution of food

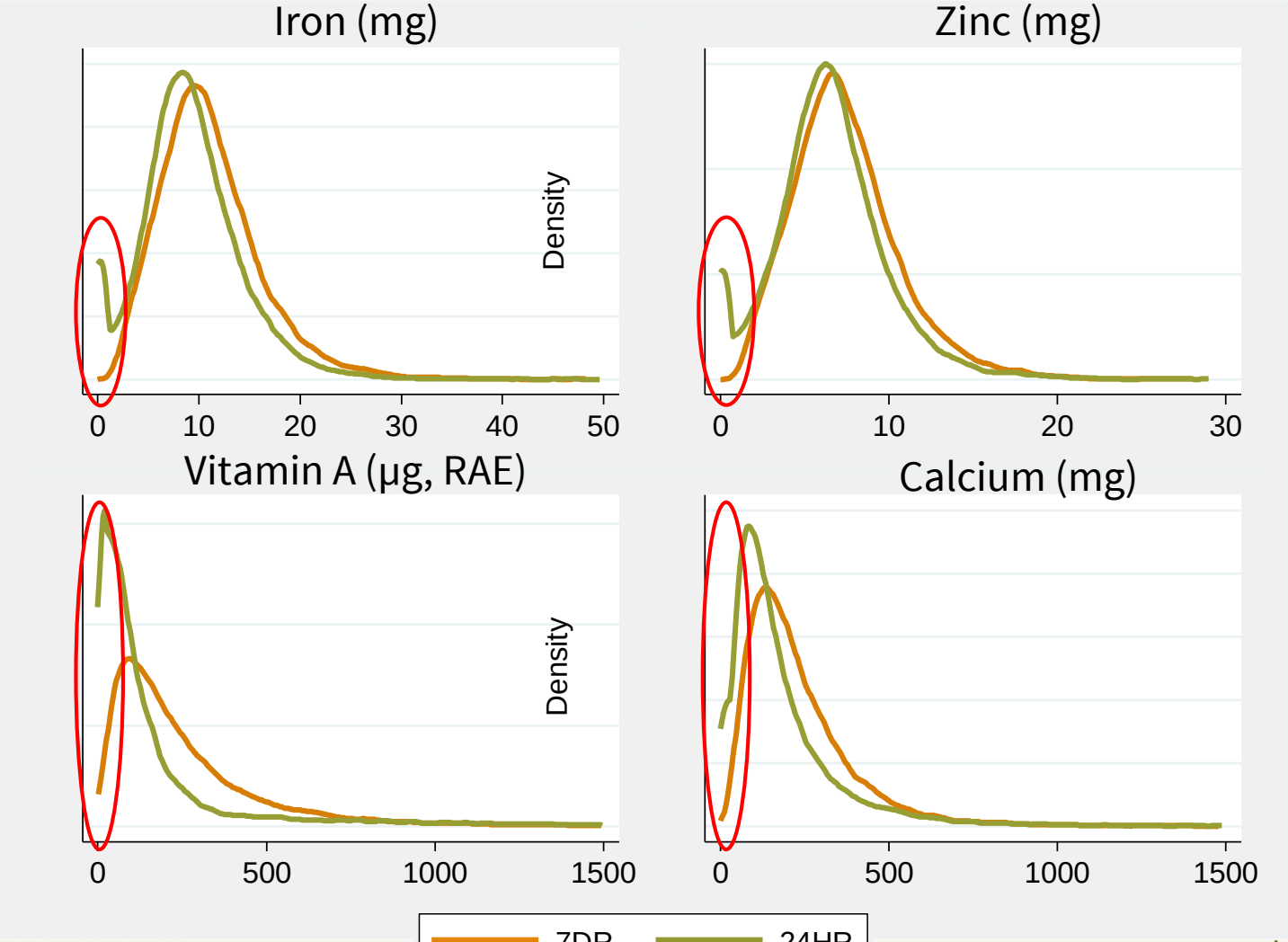
Results: 24HR vs 7DR Distribution of Energy (kilocalories)



Compared to apparent daily energy intake provided by the 24HR, 7DR energy estimates are on average 293 kilocalories (14%) higher

Results: 24HR vs 7DR

Iron, Zinc, Vitamin A, and Calcium Intake



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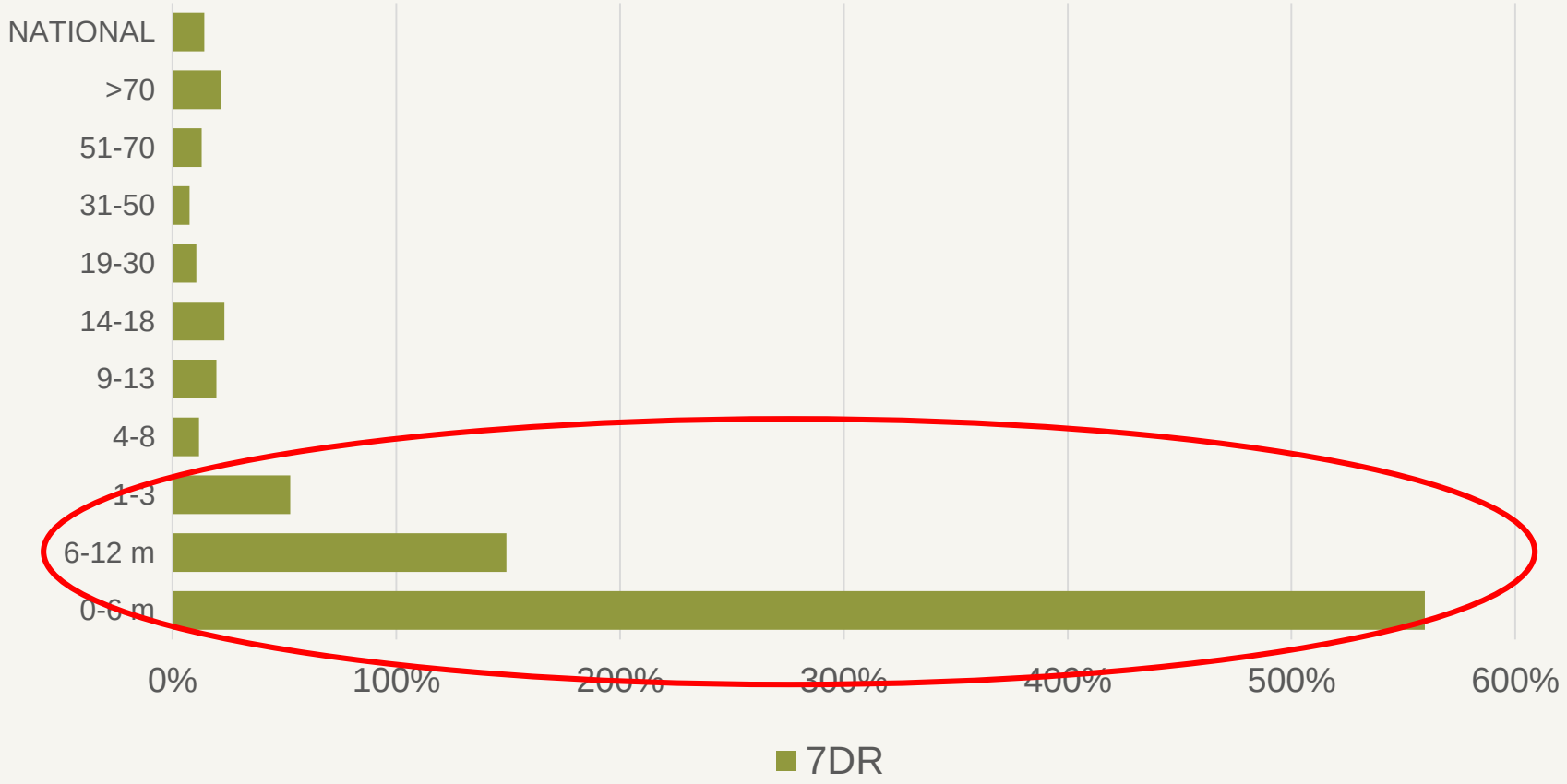
Some members in the 24HR consumed no food or "missed meals"

- 4% of individuals did not consume any food
- 11% of individuals "missed" a meal
- Causes for not taking a meal:
  - 4.0% – Currently staying away
  - 3.3% – Unwilling to take food
  - 2.3% – Breastfed child
  - 0.6% – Food was not available
  - 0.3% – Fasting
  - 0.2% – Sickness
  - 0.1% – Other
- "Missed meals" may be a misnomer
  - What is a "typical" day?

% Difference in 7DR Energy Intake from 24HR



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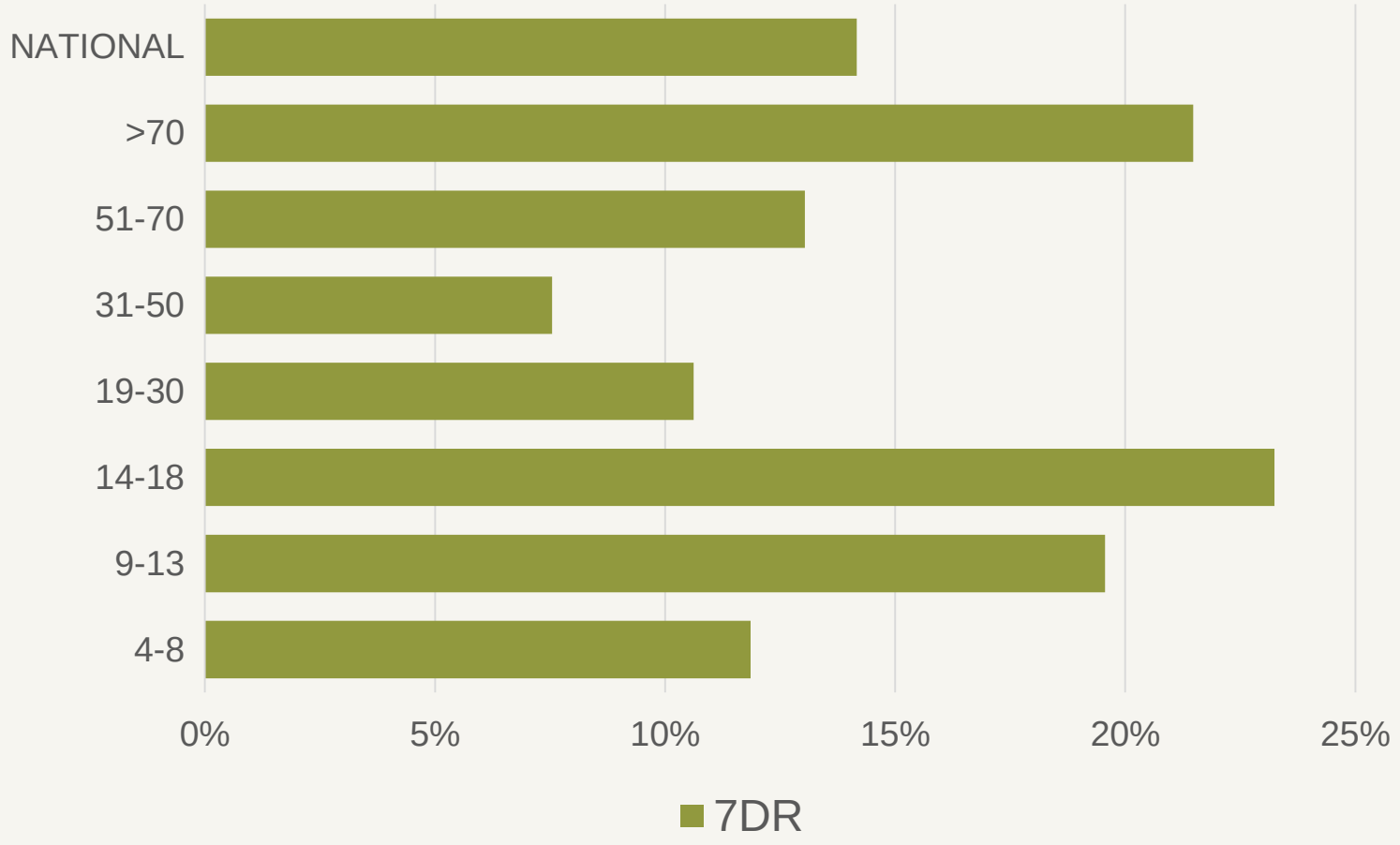

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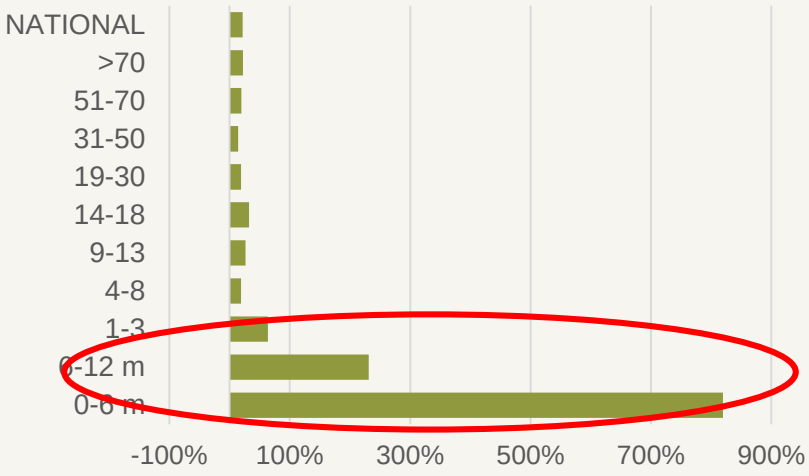
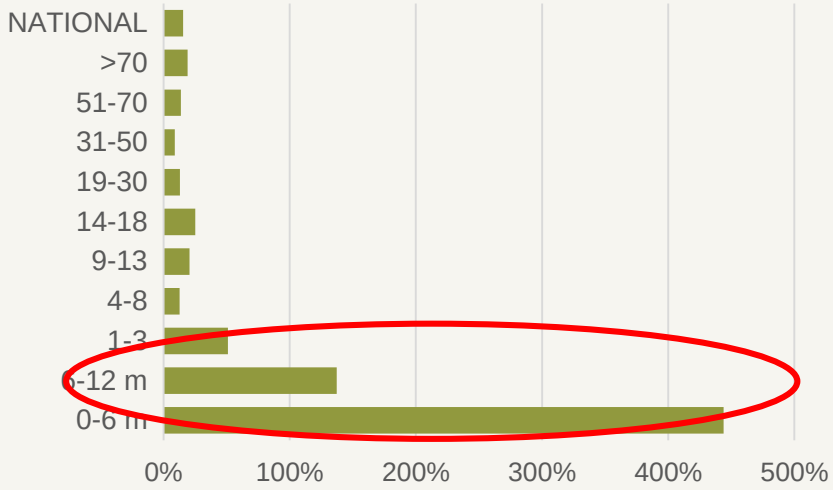
% Difference in 7DR Intake from 24HR:

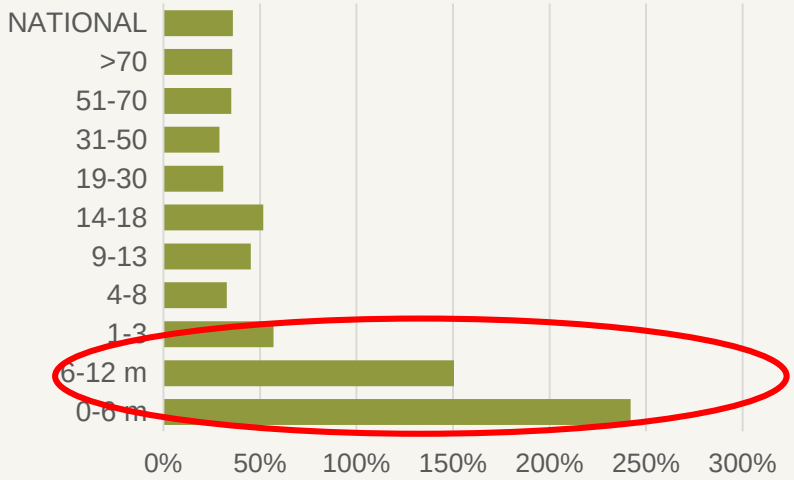
Iron Intake (mg)



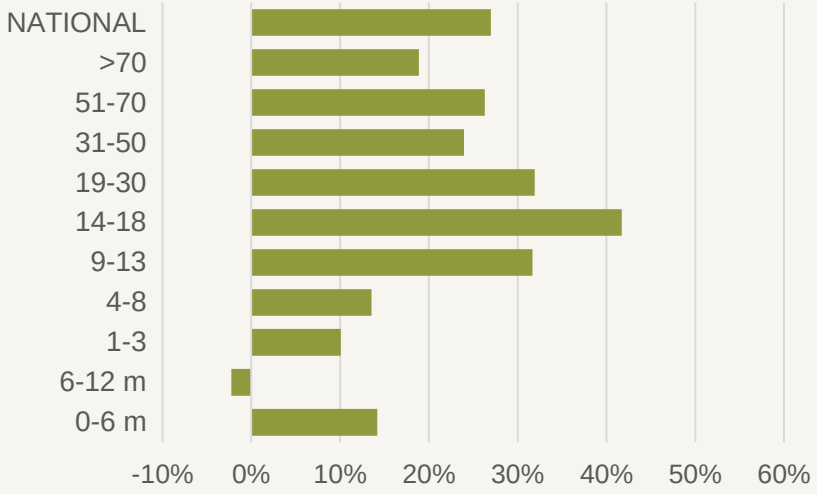
Zinc Intake (mg)



Vitamin A Intake (µg, RAE)



Calcium Intake (mg)



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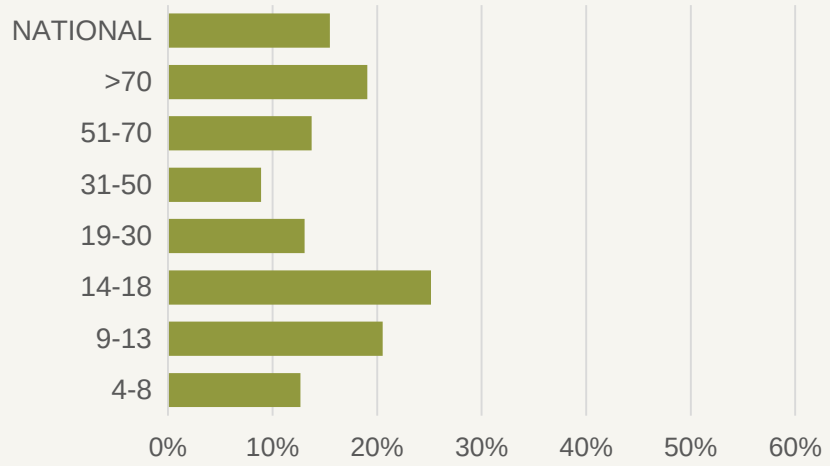
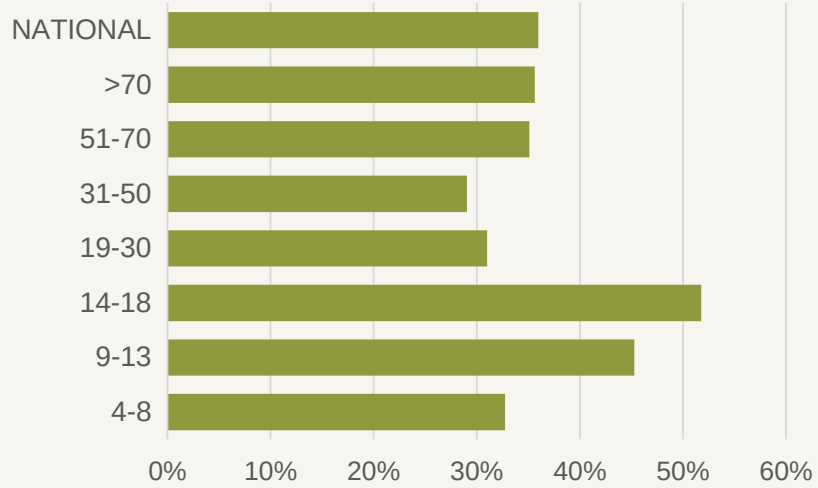
% Difference in 7DR Intake from 24HR:

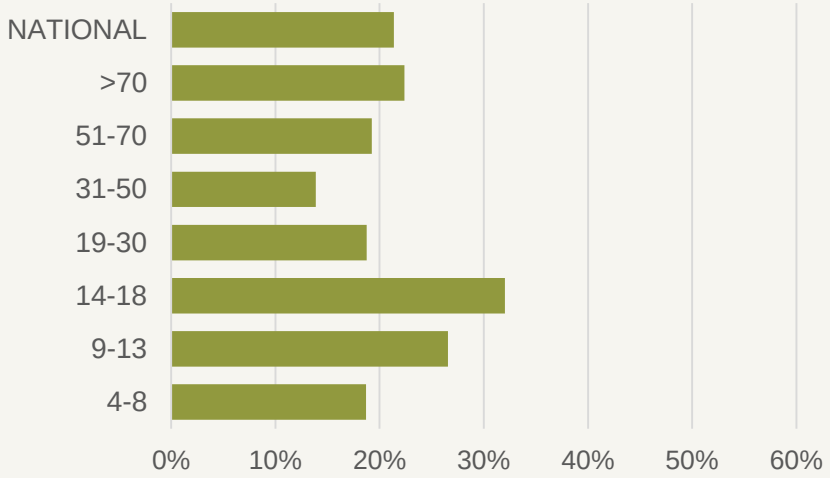
Iron Intake (mg)



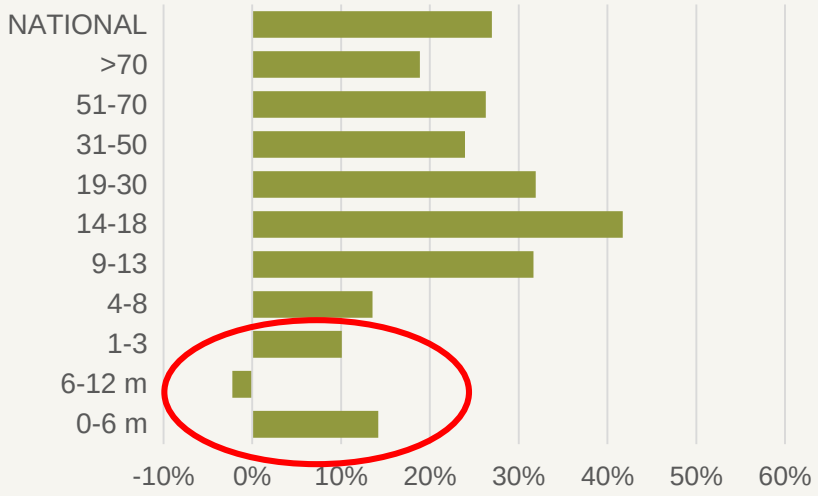
Zinc Intake (mg)



Vitamin A Intake (µg, RAE)



Calcium Intake (mg)



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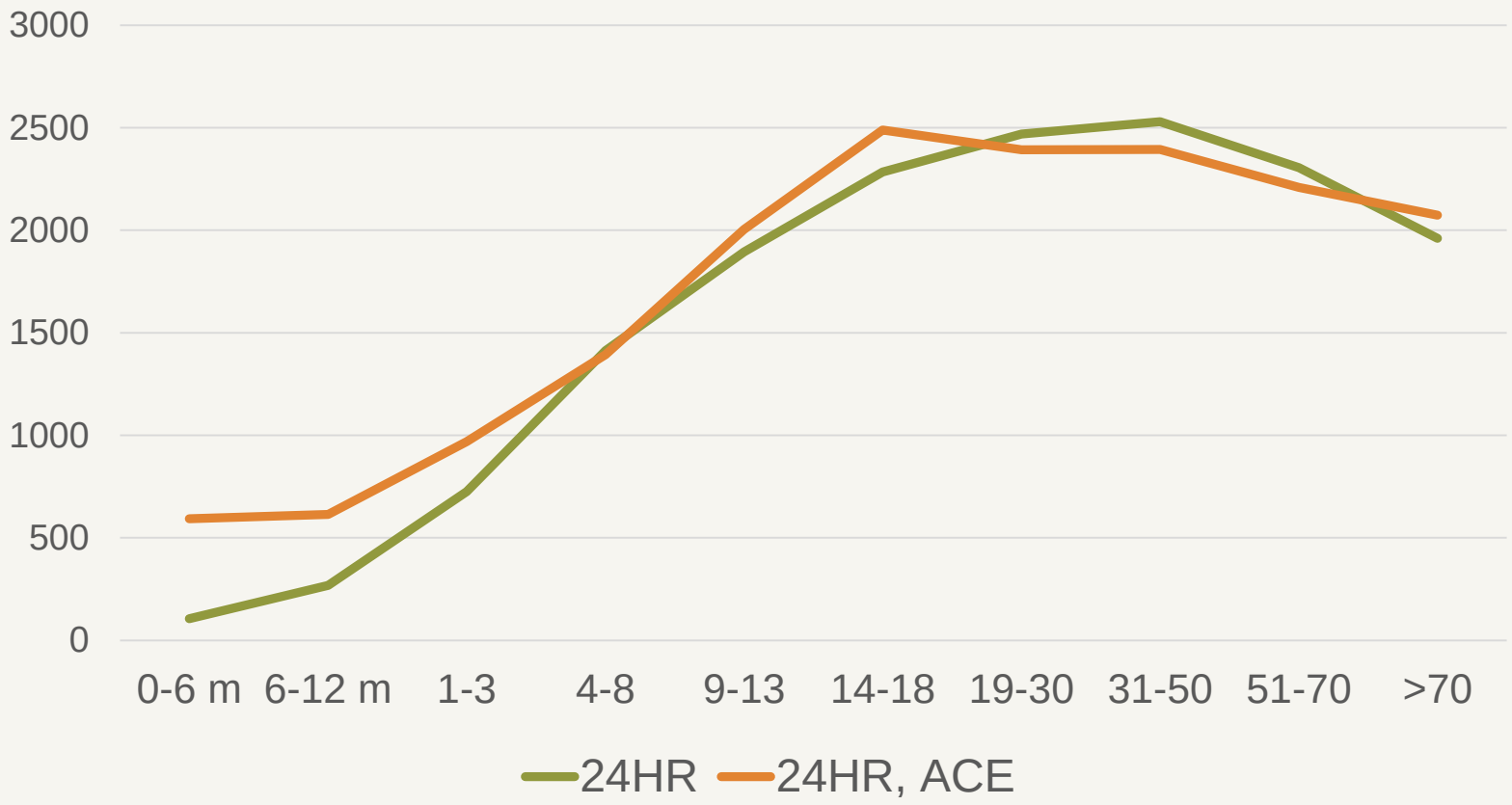
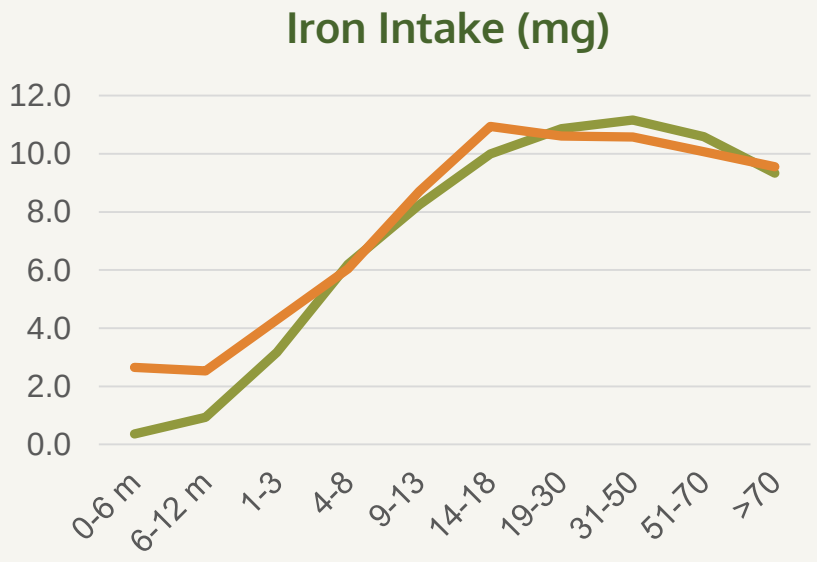
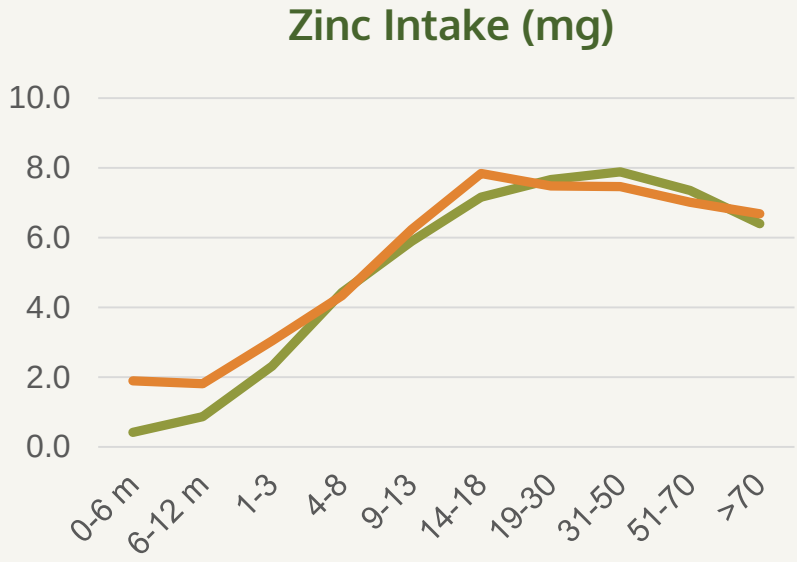
Results: ACEs

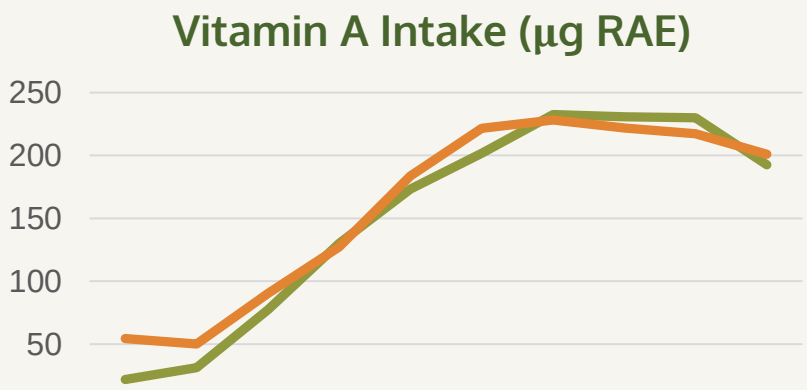
Difference in Intrahousehold Distribution of Energy Intake

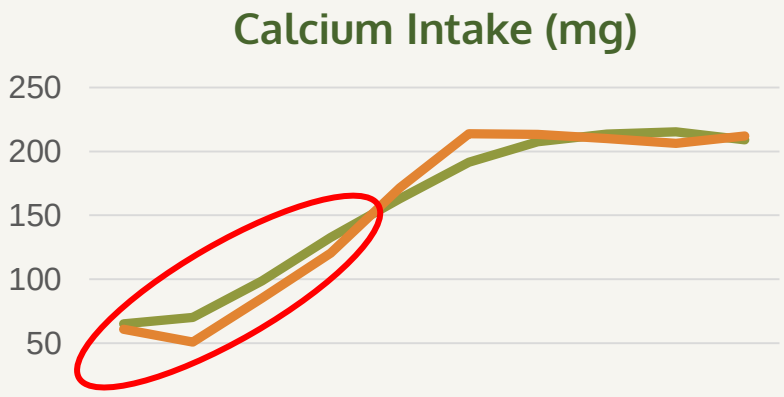


Results: ACEs
Difference in Intrahousehold Distribution of:









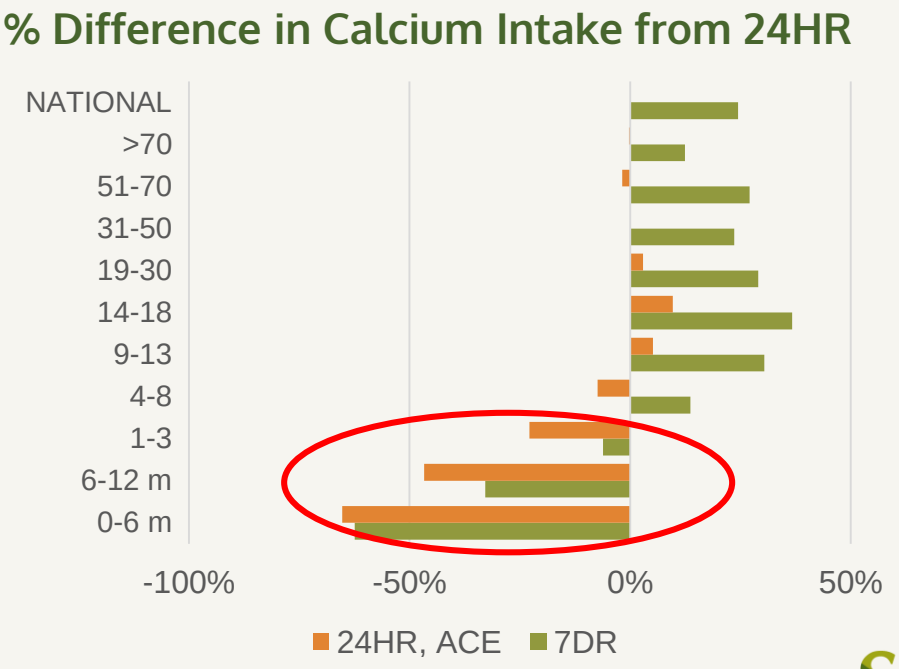
Why are 24HR ACE-based estimates suddenly *underestimating* intake in young children for calcium?

—24HR —24HR, ACE

Intrahousehold Distribution of Food using ACEs

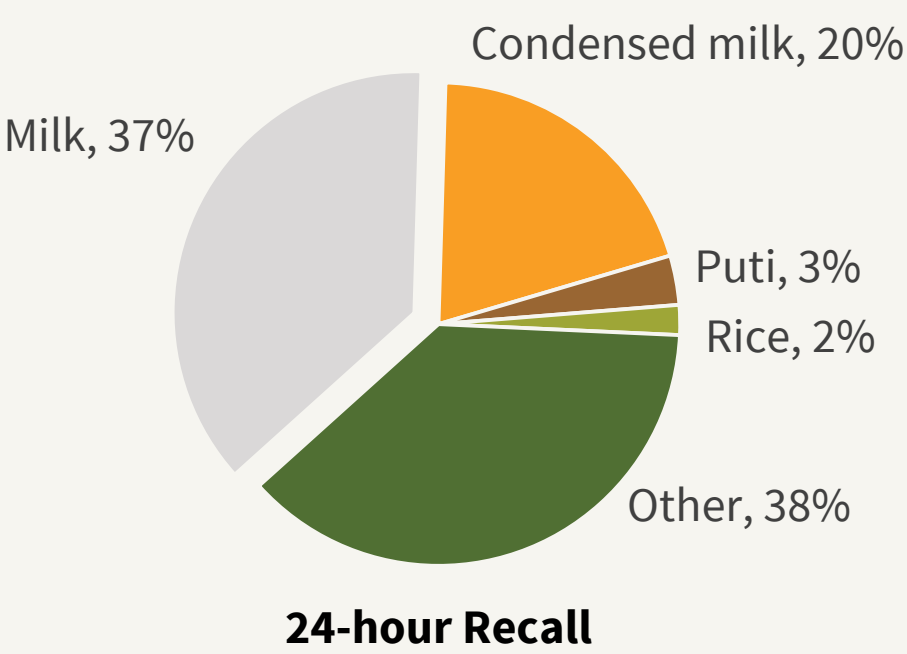
- What if *only* households in which every member took part in every meal were compared? Would distributions differ?
  - Drop **households** in which any member missed a meal or did not consume any food
    → 14,909 individuals from 3,806 households
  - No difference between distributions with the exception of calcium

Both the 7DR *and* 24HR ACE-based estimates are now underestimating calcium intake in children < 3 years of age.

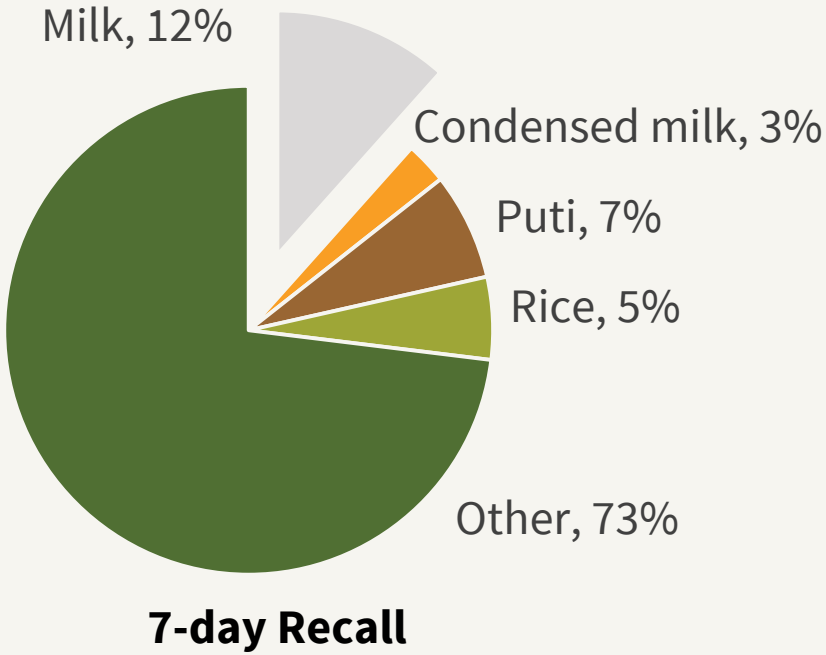


Intake in Children, 0-36 months

- ACE-based estimates assume that individuals consume portions of all available foods within the household
- The % contribution of foods to overall calcium intake among children, 0-36 months of age:



24-hour Recall



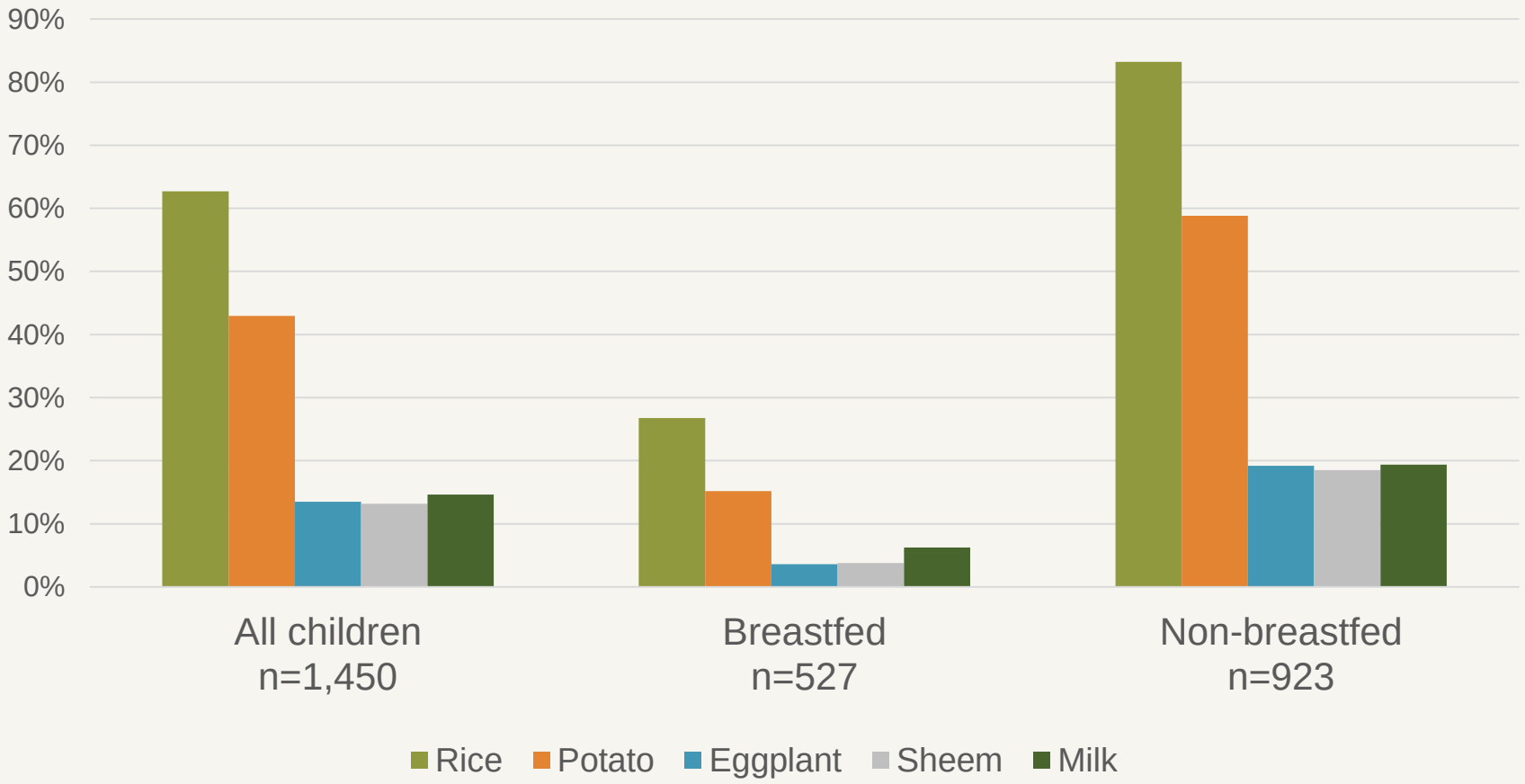
7-day Recall

Intake in Children, 0-24 months

- Among all children 0-24 months of age, the top 5 foods (according to grams consumed) in the 7DR include:
  - Rice
  - Potato
  - Eggplant
  - Sheem (flat bean)
  - Milk
- This mirrors the diet composition of the majority of the Bangladeshi population
- What is the percentage of children who consume these foods in the 24HR?
- How do the quantities consumed vary by breastfeeding status?

Consumption by Breastfeeding Status

% of Children 0-24 months Consuming Top 5 Foods in 7DR, by Breastfeeding Status



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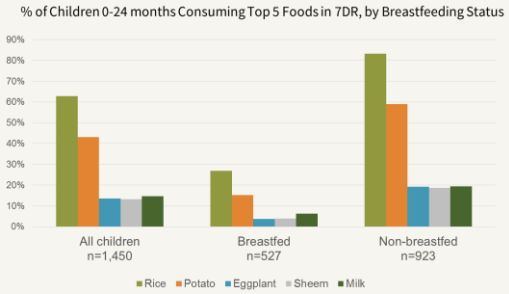
Consumption by Breastfeeding Status



Mean Consumption (g), by Breastfeeding Status

Food Item	7DR	24HR, All children	24HR, Breastfed	24HR, Non-breastfed
Rice	175	95	32	106
Potato	39	36	18	39
Eggplant	16	27	14	28
Sheem	14	27	15	28
Milk	9	192	152	200

Conclusions

- 7DR reports total quantities (g) of all foods consumed at the household level that are on average 811 g (21%) higher than 24HR estimates
  - Is more wastage—food leftover that is thrown away—likely over a 7DR than 24HR?
  - Are interviewees recalling food purchases, not just consumption?
- Comparing 24HR and ACE-based 24HR recall estimates, ACEs adequately allocate energy and nutrients to individuals > 3 years of age—roughly 94% of the population

Conclusions

- Next generation of research questions:
  - What is the best approach to modify HCES?
  - Should HCES include additional questions?
  - What is the optimal recall period for HCES?
  - What is the best approach to modify ACEs?
  - Should new algorithms be developed for adjusting the ACE for some age categories?
  - What is the external validity (conditions/characteristics of generalizability) of these findings?
- Need more 24HRs—like the BIHS—so that these questions can be addressed

Thank You

Questions or Comments?

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