

What happened to lunch? Dietary intakes of 4-13 year old lunch consumers and non-consumers in the US



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Abstract

Dietary behavior studies relating meal patterns to dietary intake have primarily focused on skipping breakfast and consumption of snacks. Many papers have also been written about the dietary quality of the National School Lunch Program, but no previous study has investigated the percentage of children skipping lunch on weekends versus weekdays or if dietary intakes differ by lunch consumption status. **For this analysis, the NHANES 2009-2012 surveys were combined into a sample of 3,647 4-13 year olds. The first day 24hr recall was used to assess dietary intakes. Lunch consumption status was self-reported by the children or their proxy.** The results showed that on weekends, higher percentages of children skipped lunch than on weekdays. Skipping lunch was associated with lower micronutrient intakes, with the lunch meal primarily responsible for the higher micronutrient intakes of lunch consumers as compared to lunch skippers. Lunch skipping was also associated with lower energy, fiber, and sodium intakes. Added sugar and solid fat intakes of lunch consumers and lunch skippers were not significantly different. In conclusion, these findings show that a large percentage of children are skipping lunch on both weekdays and weekends and that the lunch meal is an important source of both essential nutrients as well as less healthful dietary components.

Purpose

To examine differences in dietary intakes between children that consumed lunch versus children that skipped lunch on any given day in the US.

Methods

Linear regression models were used to compare total day and non-lunch source nutrient intakes between lunch consumers and lunch-skippers (controlling for age, gender, race/ethnicity, household federal poverty level, and weekend (dietary assessment taken from a weekend or weekday)). **Comparing intakes of non-lunch sources between lunch consumers and lunch skippers provides the ability to estimate the extent to which lunch contributed to higher total day micronutrient intakes among children that consumed lunch as compared to those that skipped lunch.**

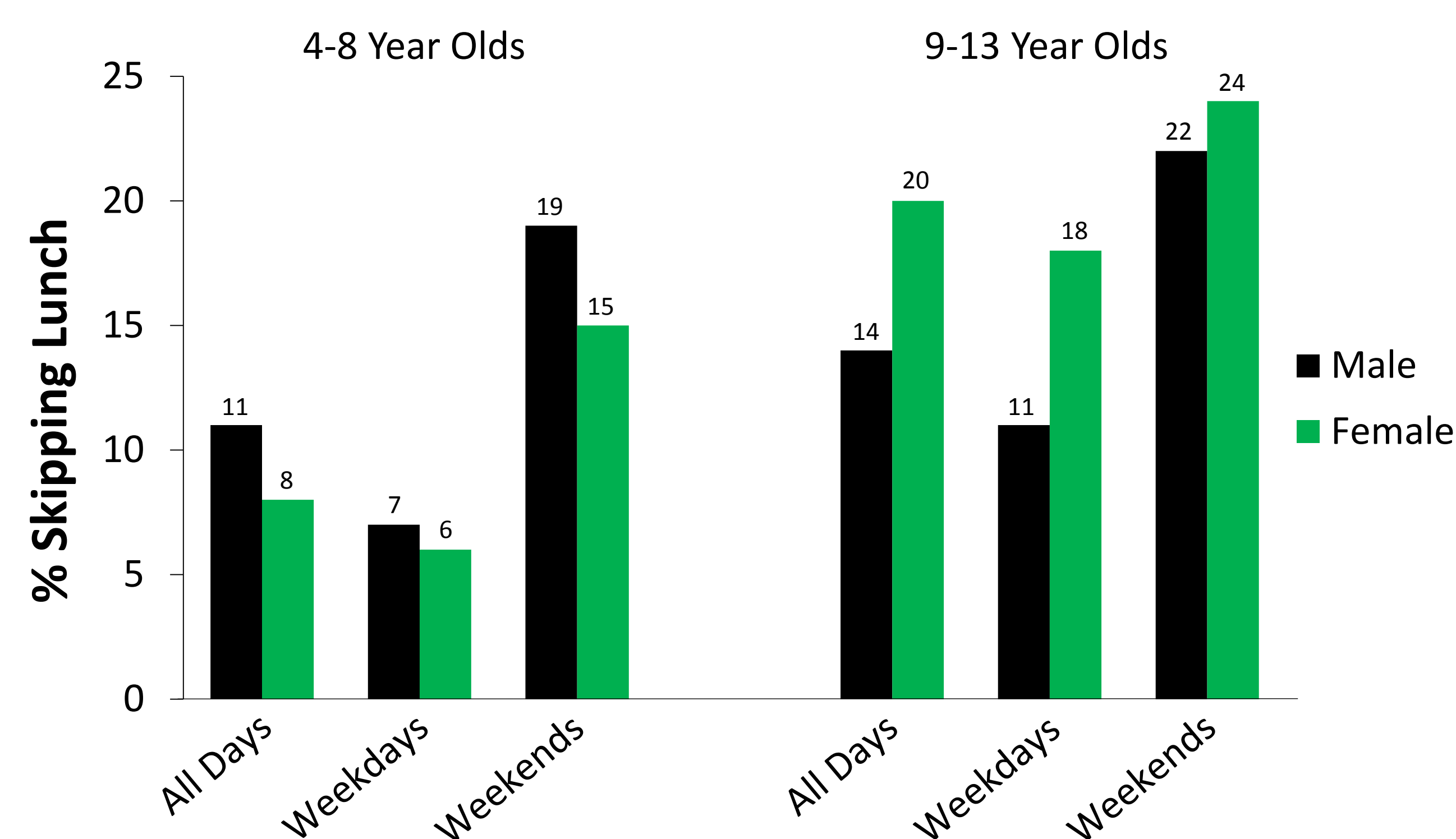
Results

- Large percentages of children in the US are skipping lunch; particularly on weekends as compared to weekdays
- Skipping lunch was associated with lower micronutrient intakes, with the lunch meal primarily responsible for the higher micronutrient intakes of lunch consumers as compared to lunch skippers
- Lunch skippers had lower daily energy, fiber, and sodium intakes
- Daily intake of added sugar and solid fats were not significantly different between lunch consumers and lunch skippers

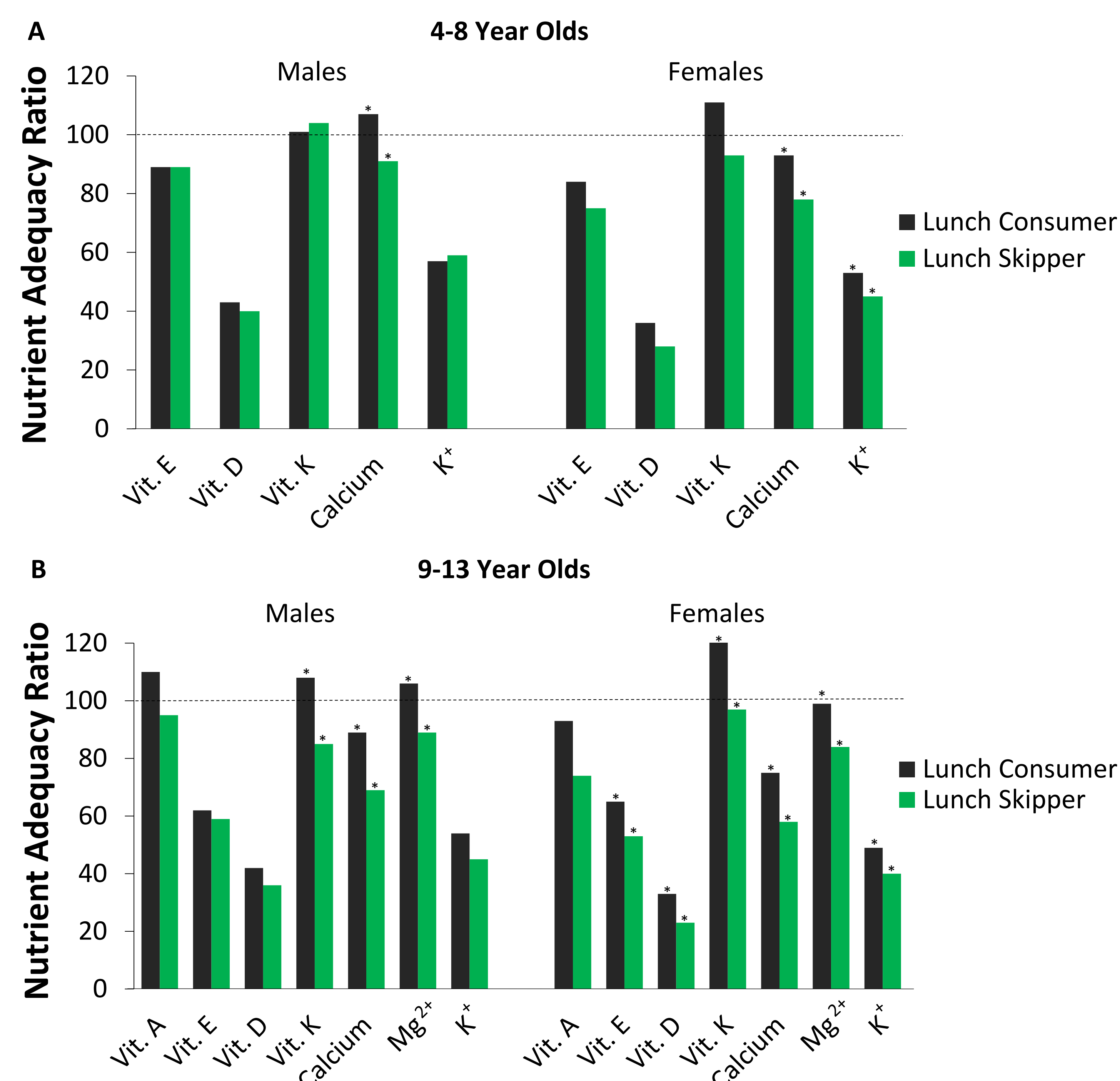
Conclusion

This study highlights an opportunity for both government and food industry players to develop strategies to encourage consumption of lunches that provide essential nutrients and low amounts of less healthful dietary components.

Percentage of Children Skipping Lunch on Weekdays and Weekends



Total Daily Micronutrient^a Intakes of Lunch Consumers and Lunch Skippers



Nutrient Adequacy Ratio (NAR) for micronutrient intakes among lunch consumers and lunch skippers for male and female 4-8 year olds (A), 9-13 year olds (B). NARs were calculated by dividing the average intakes from one 24-hr recall by the population specific Recommended Dietary Allowance and multiplying this ratio by 100.

^aIntakes of B vitamins, vitamin C, copper, iron, and zinc were included in the analysis. Significant differences were observed; however, the results were not included in the figures or tables because the NAR values for both lunch consumers and skippers were well above 100%.

*Indicates a significant difference (P<0.05) in the total day micronutrient intakes between lunch consumers and lunch skippers.

Micronutrient Intakes from Lunch and Non-lunch Sources

Nutrients	4-8 Year Olds			9-13 Year Olds		
	Lunch Consumer		Lunch Skipper	Lunch Consumer		Lunch Skipper
	Lunch ^a	non-Lunch	non-Lunch	Lunch ^a	non-Lunch	non-Lunch
Vitamin A (ug)	134	451*†	521*†	156	454	506
Vitamin E (mg)	1.8	4.3*	5.8*	2.1	4.9*	6.0*
Vitamin D (ug)	1.5	4.5†	5.3†	1.3	4.4†	4.5†
Vitamin K (ug)	19	40*	54*	20	50†	54†
Calcium (mg)	280	720*†	864*†	300	763†	841†
Magnesium (mg)	62	159*†	206*†	71	176*†	207*†
Potassium (mg)	621	1475*	2011*	683	1618*†	1903*†

Macronutrient and Sodium Intakes from Lunch and Non-lunch Sources

Nutrients	4-8 Year Olds			9-13 Year Olds		
	Lunch Consumer		Lunch Skipper	Lunch Consumer		Lunch Skipper
	Lunch ^a	non-Lunch	non-Lunch	Lunch ^a	non-Lunch	non-Lunch
Energy (kcal)	506	1283*†	1685*†	608	1431*†	1837*†
Saturated Fat (g)	7	16*	21*	8	18*	24*
Total Sugar (g)	28	89*†	108*†	31	94*	126*
Fiber (g)	4	9*	12*	5	11*†	12*†
Added Sugar (g)	15	53*	66*	20	61*	86*
Solid Fat (g)	9	25*	32*	11	27*	38*
Sodium (mg)	906	1873*†	2554*†	1130	2242*†	2796*†

^aIntakes at lunch were calculated by subtracting the predicted non-lunch intakes shown above from the total nutrient intakes.

*Indicates a significant difference (P<0.05) between the non-lunch nutrient intakes of lunch consumers and lunch skippers.

†Indicates a significant difference (P<0.05) in total day nutrient intake between lunch consumers and lunch skippers.