

# Protein and energy intakes are skewed toward the evening among children and adolescents in the United States: NHANES 2013-2014

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## Background

Optimizing the amount of protein and calorie intake is critical to promoting growth and health in children and adolescents. Evidence suggests that the timing of energy and macronutrient intake may be as important as the amounts of these nutrients. Consumption timing may also impact specific biological responses that either promote health or cause alterations in health-related risk factors.

## Objective

To examine the timing, amounts, and distribution of protein and energy throughout the day among participants ages 4-18 in the United States, and the potential health implications related to chronobiology and nutrition.

## Methods

This cross-sectional analysis included data from 2,532 participants ages 4-18 years who completed the 24-hour dietary recall in National Health and Nutrition Examination Surveys (NHANES) 2013-2014.

## Results

Among all age groups, both protein (grams) and energy (daily percentage) intakes were significantly higher ( $p < 0.05$ ) in the evening than in the morning. There was also a shift to a later first eating occasion and later last eating occasion for older participants.

## Conclusion

Protein and energy intake among children and adolescents was lowest in the morning and afternoon, and highest midday and in the evening. It is unknown whether this shift to later eating occasions and increase in protein intake affects lean tissue or impacts metabolic outcomes in children. Evolving research in chronobiology and nutrition may help to improve the health of children and adolescents with a deeper understanding of the impact of reducing the evening meal nutrient load, and if this is best done by achieving a more even daily distribution or favoring the breakfast occasion over the evening meal.

The complete study may be accessed at:  
<https://pubmed.ncbi.nlm.nih.gov/28468929/>

