

# Nutrition & YOUR CHILD

USDA/ARS Children's Nutrition  
Research Center  
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## More sleep part of the prescription for obesity prevention in children

The consequences of not getting a good night's sleep are numerous, but one of the most important recent findings is how a lack of sleep can impact weight. Although there have been studies to show this relationship in adults, there have been few studies that show this objectively in minority children.

Experts at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine addressed this in a recent study published in *BMC Public Health* and found that in a group of low-income minority children, obese children slept less than children who fell within a normal weight range as indicated by their body mass index.

"Research has shown that people who do not get enough sleep tend to be overweight or obese, but there's not much data on children," said Dr. William Wong, professor of pediatrics at Baylor and first author of the study.

Wong and colleagues recruited children from inner city low-income families through 14 community centers in the City of Houston Parks and Recreation Department. Children were asked to wear accelerometers, or activity monitors, for 24 hours a day over seven days. Their awake time and sleep periods were measured by the activity monitors.

Of the 483 Hispanic and black children between the ages of 9 and 12 years in the study, only 12 were meeting the 10 to 12 hours of sleep recommended by the National Sleep Foundation. The study also found that obese children slept less than children with a normal body mass index and

## Extra serving could contribute to extra pounds

Oversized portions are thought to be a contributing factor to the obesity epidemic in children. Research has shown that when parents serve their children large portions, the children consume more calories than when they are served recommended portions. It's also been shown that how much food adults serve themselves and their children is influenced by the size of the dishware and utensils and the amount of food available.

But what happens when children serve themselves? Allowing children to dish out their own food is a practice that's encouraged so they can develop social and motor skills. Researchers at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine wondered if children, like adults, would be influenced by cues such as the size of the serving spoon and the amount of food in serving dishes on the table.

A recent study published in the *Journal of Obesity* showed that children's self-served portions are influenced by these factors. The study was led by Dr. Jennifer O. Fisher, formerly with the CNRC and now an associate professor at the Center for Obesity Research and Education at Temple University.

The study included 60 ethnically diverse 4- to 6-year old children. Over a period of several weeks, their self-serving patterns were observed and measured at study visits. At each visit, the size of the serving spoon varied and so did



the amount of the main entrée that was placed on the table.

Study results showed that on average, children served themselves 13 percent more of the entrée when using a tablespoon than when using a teaspoon. In addition, children served 40 percent more entrée when 550 grams (approx. 1 pound) of the entrée was available in the serving dish than when 275 grams was available.

Factors such as the child's weight, gender and ethnicity had no impact on serving size. However, a factor that did influence how much children served themselves was the feeding style of their parents, which was determined through a questionnaire. Children of indulgent feeders (those who exhibit little structure in the eating context) and authoritarian feeders (those who are highly controlling during feeding) served themselves twice as much as children whose parents were authoritative feeders (those who make appropriate demands and show sensitivity toward the child's eating needs) or



# School children experience weight gain during short summer months

Summer is a welcome respite from the rigor and routine of the school year for many children but unfortunately it can often lead to weight gain.

A study led by Dr. Jennette Moreno of the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine showed that children gained weight during the summer but lost weight during the school year. The research was included in a recent issue of the *Journal of School Health*.

"Kids tended to see an improvement in their weight during the school year but during the three short months of summer, we saw a dramatic increase," said Moreno, an instructor of pediatrics – nutrition. "There was a particularly pronounced summer weight gain in children who were already overweight or obese."

The study included more than 3,700 children in a Southeast Texas school district. They were enrolled in the study upon starting kindergarten in 2005 and followed throughout elementary school. The children were classified into one of four weight categories at the beginning of the study based on initial body mass index percentiles—underweight, normal weight, overweight, or obese.

Their heights and weights were measured in the fall and spring of each school year. Children in all weight categories gained weight over the summer; however, it was most significant among overweight and obese children. Only the overweight and obese children lost weight during the school year, with children in the other categories remaining the same.

There are several possible explanations for increased weight gain during summer compared to the school year Moreno notes. One is that some of the policies that have been

enacted like national school lunch and breakfast programs as well as requirements for physical activity during the school day are in fact beneficial to kids. Also, the school day provides more structure, and children do not have unlimited access to food during the day. Although not directly studied, these factors may help to promote healthy lifestyles, she said.

During the summer, however, there is potentially less structure for children. They likely have more access to food throughout the day while at home and may be engaging in more sedentary behavior, like watching television and playing video games, while having less structured physical activity.

"This study points to the fact that during the summer, more attention needs to be paid to a child's eating and physical activity habits," Moreno said. "It also indicates that not just a select group of severely obese kids but all kids need something in the summer in terms of intervention to prevent this slide toward obesity."

Future research will evaluate the weight gain from one year to the next to try to determine if it is a pattern that takes place over time, or if the weight gain is happening at a specific point during elementary school.

"The suggestion so far is that it's happening right after kindergarten but additional research will offer more direction," Moreno said.

Others who contributed to the study included Dr. Craig Johnston of the CNRC and Deborah Woehler of the Oliver Foundation. Funding for the study was provided by the Oliver Foundation.



that girls tended to sleep less than boys. The study indicated that black girls were getting the least amount of sleep.

“There are various social, cultural and biological factors that could be playing a role in these children not getting enough sleep,” said Dr. Nancy Butte, professor of pediatrics at Baylor and senior author of the study.

The National Sleep Foundation makes the following recommendations for sleep in children:

- Newborns (1 to 2 months old): 10.5 to 18 hours per day
- Infants (3 to 11 months old): 9 to 12 hours of sleep per night
- 1 to 3 years old: 12 to 14 hours of sleep per night
- 3 to 5 years old: 11 to 13 hours of sleep per night
- 5 to 12 years old: 10 to 11 hours of sleep per night

The Foundation also offers the following tips for parents to help their children get adequate sleep:

- Establish and maintain a regular bedtime routine and sleep schedule
- Make the sleep environment cool, quiet and dark
- Do not keep a television or computer in the bedroom

Others who took part in the study include Anne L. Adolph and E. O’Brian Smith of Baylor and the CNRC, consultant Karen L. Konzelmann, and Christina L. Ortiz, Debra Lathan and Louis A. Moore of the Houston Parks and Recreation Department.

The study was funded by the National Research Initiative of the USDA National Institute of Food and Agriculture grant #2008-55215-18875 with support from the USDA/ARS.

## Female mice who are overfed as infants become couch potatoes—for life

Female mice who are overfed in the first few weeks of life become obese adults—and are much less physically active—than mice who were not overfed as infants, perhaps because of epigenetic changes to DNA in the brain, said Baylor College of Medicine researchers from the USDA/ARS Children’s Nutrition Research Center in a report that appears online in the journal *Diabetes*.

“We have known for decades that when mice are overfed during the newborn period they tend to stay fatter for their entire lives, but we did not know why,” said Dr. Robert Waterland, associate professor of pediatrics at the USDA/ARS Children’s Nutrition Research Center at BCM. “It was generally thought that animals who are over-nourished in infancy just continue to have a tendency to overeat throughout life.”

To test this, Waterland and his colleagues studied mice that were suckled in small litters and compared them to mice suckled in normal sized litters. The mice in the smaller litters had easier access to mom’s milk, and took advantage of it. They became heavier and fatter than the others and remained that way into adulthood, even though all mice were fed the same normal mouse diet after weaning.

Detailed metabolic studies of the adult female mice showed, surprisingly, that those who had been over-nourished as infants did not eat more than their lean counterparts. Instead, they remained fatter as adults because they were much less physically active.

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### BREAKFAST STUDY

Children who are 8 to 10 years old are needed for a study on breakfast consumption and mental abilities. The study includes three overnight visits to the CNRC. There will be blood draws at each visit (numbing creams and sprays are available).

### BUTTERFLY GIRLS

8- to 10-year old African American girls and a parent are needed to participate in an 8-week online program promoting healthy eating and physical activity. No meetings to attend. Participate from the comfort and convenience of home. Watch an informative video on the study at <http://www.bcm.edu/cnrc/butterflygirl/butterflygirlintrovideo.html>.

### CARDIOVASCULAR STUDY

13- to 18-year old adolescents and young adults (normal weight and overweight) with and without type 2 diabetes are needed for a research study investigating risk for heart disease in youth. Study involves body composition, heart scan and blood tests.

### FATTY LIVER

11- to 21-year old overweight adolescents and young adults with and without liver disease are needed for a research study investigating risk for early heart disease in youth. Study involves body composition, liver scan and blood tests.

### PREGNANCY & CHILD HEALTH

Did you have a pregnancy complicated by preeclampsia or a baby with low birth weight? Can a complicated pregnancy in mom put the child at risk for future health problems? To answer this question, we are conducting a research study that looks at pregnancy history and its effect on the child’s health. 8- to 11-year old children of both eclamptic and non-preeclamptic pregnancies are needed as well as 8- to 17-year olds of pregnancies with high blood pressure. Study involves body composition and blood tests.

### TEEN IBS & GUT BACTERIA

Researchers at Texas Children’s Hospital and Baylor College of Medicine are interested in learning about gut bacteria in healthy 13- to 17-year old adolescents and in those with chronic belly pain.

### TEENS IN ACTION

11- to 13- and 15- to 17-year old boys and girls are needed for a study about physical activity. Teens will complete an online survey and wear a physical activity monitor for 7 days.

## Volunteers

Houston-area residents are invited to participate in the following nutrition research projects designed to help CNRC scientists learn more about the nutritional needs of children. Free parking is provided. For most studies, financial compensation is provided and transportation may be available.

For more information on any CNRC study call Marilyn Navarrete at 713.798.7002 or e-mail [rilynn@bcm.edu](mailto:rilynn@bcm.edu).



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Send comments or change of address information to

#### Children's Nutrition Research Center

1100 Bates Street  
Houston, TX 77030-2600  
cnrc@bcm.edu  
www.kidsnutrition.org

#### Center Director

Dennis M. Bier, M.D.

#### Publication Advisors

Janice C. Baranowski, M.P.H., R.D.  
Nancy F. Butte, Ph.D.  
Marta L. Fiorotto, Ph.D.  
Karen W. Cullen, Dr.P.H., R.D.  
Teresia Margareta O'Connor, M.D., M.P.H.  
Stephanie Sisley, M.D.  
Janice E. Stuff, Ph.D., R.D.  
Robert A. Waterland, Ph.D.

#### Editors

Dipali Pathak and Dana Benson  
Office of Communications & Marketing  
Baylor College of Medicine

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## Extra serving CONTINUED FROM PAGE 1

uninvolved feeders (those who exhibit a lack of overall control and involvement during feeding).

"The findings of this and other studies suggest that children take cues from their eating environments when deciding how much to serve themselves," Fisher said. "Parents can help promote healthy child portion sizes by using smaller plates and spoons as well as putting smaller amounts

of food on the table for family style meals, and keeping additional amounts of the foods on the stove and counter."

Others who participated in this research were Leann Birch, Pennsylvania State University; Jun Zhang, AdvanceMed Corp.; and Mike Grusak and Sheryl Hughes of the USDA/ARS Children's Nutrition Research Center. The study was funded by USDA National Research Initiative and USDA/ARS.

## Couch potatoes CONTINUED FROM PAGE 2

Using special DNA genomic studies, the researchers found there were significant changes in DNA methylation (a post-genetic or epigenetic change) in the hypothalamus of the brain during infancy (the hypothalamus is a key region for regulation of body weight).

"Infancy is a critical period for developmental epigenetics in the mouse hypothalamus," said Waterland. "Overnutrition in infancy is causing persistent changes that last into adulthood. These could mediate the persistent changes in physical activity."

Although the individual methylation changes were small, overall they had a profound effect.

"This underscores the idea that epigenetic changes induced by early nutrition are likely

to be subtle," said Waterland. "They are small changes occurring at many different regions in the genome. Cumulatively, however, these may have a major long-term impact on behavior and energy expenditure."

Others who took part in this research include Ge Li, John J. Kohorst, Wenjuan Zhang, Eleonora Laritsky, Govindarajan Kunde-Ramamoorthy, Maria S. Baker and Marta L. Fiorotto, all of BCM.

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