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Children's Nutrition Research Center
at Baylor College of Medicine



TOOL HELPS WOMEN STAY WITHIN IDEAL PREGNANCY WEIGHT-GAIN RANGE

Weight gain during pregnancy has long been a concern among women and their physicians. A new mathematical model developed by researchers has been turned into a user-friendly app that can help pregnant women stay within their appropriate weight-gain range. "Every woman wants to do what's best for her developing child, and they often have a quandary about just how much they should be eating during pregnancy," said Dr. Nancy Butte, professor of pediatrics at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine. Butte helped develop the model, which was published in a recent issue of the *American Journal of Clinical Nutrition*.

"The idea is that this model can inform women how much energy (calorie) intake is required for them to stay within their recommended pregnancy weight gain range," Butte said.

The app simply requires the input of the woman's pre-pregnancy age, height and weight. By varying the energy intake at a given trimester, the model will predict the resulting gestational weight gain.

The Institute of Medicine recently updated its guidelines on weight gain during pregnancy based on a woman's pre-pregnancy Body Mass Index (BMI).

These recommendations include:

- Pre-pregnancy BMI – Underweight (BMI less than 18.5 kg/m²)
Total weight gain range (pounds): 28.0 to 40.0
Rates of weight gain in second and third trimesters (pounds per week): average 1.0 (range 1.0 to 1.3)

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Active Video Games

DO THEY INCREASE PHYSICAL ACTIVITY IN CHILDREN?

In a recent study, researchers found that just providing children with an active video game did not result in an increase in physical activity levels. The findings were published by researchers at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine in the journal *Pediatrics*.

"Simply having active video games available at home will not by itself contribute to increased physical activity," said Dr. Tom Baranowski, professor of pediatrics at BCM and first author of the report.

The study followed 78 children between 9 and 12 years of age. All were given Nintendo Wii consoles as a part of the study.

Researchers measured the physical activity of all participants using a device called an accelerometer for seven days before the beginning of the study.

Participants were divided into a study group and a control group. Children in the study group were asked to select one of five active video games, defined as those that promoted physical activity, at week one and week seven of the study. Children in the control group were asked to select one of five

inactive video games at week one and week seven of the study. Researchers used sales data to be sure that both groups had popular games from which to choose. Participants were also provided with all the materials needed to play the games.

Using the accelerometer, researchers measured physical activity in both groups at week one, six, seven and 12 and found no difference in physical activity levels between the control and study groups.

"It's not clear whether those in the study group were more active as a result of the video games but compensated by being less active later in the day or if they found a way to manipulate the game controls to minimize the amount of physical activity," said Baranowski. "It doesn't appear that there's any public health value to having

active video games available at home—simply having those active video games available at home doesn't automatically lead to increased levels of physical activity in children."

Baranowski notes that it would be useful to design public health interventions using these active video games as a part of a

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RESEARCHERS IDENTIFY BEHAVIORS ASSOCIATED WITH HIGH FRUIT AND VEGETABLE CONSUMPTION IN CHILDREN

Why are some children more successful than others in their goals to eat more fruits and vegetables, and what can researchers learn from them that might be useful for other children? These important questions were addressed in a recent paper by a researcher from the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine.

The paper, co-authored by CNRC researcher Debbe Thompson, an associate professor of pediatrics—nutrition at Baylor College of Medicine, appeared in the international journal *Eating Behaviors*.

The benefits of fruit and vegetable consumption include a reduced risk of cardiovascular disease, diabetes, obesity and multiple types of cancers but, unfortunately, many adolescents are not eating the recommended five servings per day, according to Thompson. This is especially true of adolescents from low-income families.

"The purpose of the study was to try to identify the processes associated with behavior change among low-income African American adolescents," Thompson said. "If we can figure out why some children are successful in changing their behavior to eat five servings of fruits and vegetables a day, then we can use that information in the future to design interventions that will benefit even more children."

It is based on a model that describes how people change their behavior or adopt a new behavior. A component of this model includes the stages of change and the processes that are involved in each stage of changing a behavior. This model is considered an important guide for the development of health interventions such as smoking cessation programs. It's been used mainly in adults, however.

The study included 549 African American adolescents who were enrolled in dietary intervention studies through various organizations in the New York City area. Their average age was 12 ½ years. Participants were assessed to determine their level of fruit and vegetable consumption and were classified into two groups—low consumers and high consumers.

The behaviors that were significantly associated with the high-consumption group included:

- **Consciousness raising:** being aware of the benefits of changing their behavior to eat more fruits and vegetables.
- **Environmental reevaluation:** knowing they could serve as a role model by influencing others to eat healthy choices.
- **Healthy relationships:** seeking and using social support that encouraged them to engage in healthy behavior.

- **Stimulus control:** removing cues or adding cues to engage in healthy behaviors. For example, serving carrots as snacks or leaving reminders to eat fruits and vegetables.

"This study provides useful information for researchers designing interventions for low income African American adolescents, specifically that interventions need to include a component that lets kids know why it is important to eat fruits and vegetables and that it makes them a role model for others," Thompson said.

But the study provides a broader message for parents and others as well, she said.

"For parents—eat more fruits and veggies with your child. Don't just tell them to do it but demonstrate it yourself. Encourage kids to support each other, and serve healthy fruits and veggies for snacks, like cut up carrots or fruit. Remove the temptation to make unhealthy choices and instead make fruits and vegetables more accessible and available."

The principal investigator of the study and lead author of the paper was Jennifer Di Noia of William Paterson University in New Jersey. The research was supported by funding from the National Cancer Institute.

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, contact Marilyn Navarrete at 713-798-7002 or rilynn@bcm.edu.

Visit CNRC study opportunities online by scanning the QR code to the right using your smart phone.



CARDIOVASCULAR STUDY NEW!

13- to 21-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.

VEGGIE KIDS STUDY NEW!

Researchers at Baylor College of Medicine are seeking healthy vegetarian (no red meat for the past 6 months) children ages 4 to 10 years to participate in a nutrition study looking at iron absorption. Three short study visits to the Children's Nutrition Research Center in Houston are required. Compensation and free parking provided.

PUBERTY & INSULIN RESISTANCE NEW!

Texas Children's Hospital and Baylor College of Medicine are recruiting study subjects to participate in a research study to see how weight and puberty influence sugar metabolism. Both lean and overweight children who are approximately 8 to 17

years old are needed. The study requires two office visits in a research unit. Financial compensation provided. A no-cost health exam will be included. Saturdays and Sundays are available for your visits.

INTERNET SURVEY FOR PARENTS

Do you have a 6- to 12-year-old child? Do you live in Harris County? You may be eligible to complete an online survey about your neighborhood, parenting and your child's activities. Log on to www.cnrcparentsurvey.com to sign up!

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. Study involves body composition and blood tests.

REMOVING RECEPTOR FOR “HUNGER HORMONE” KEEPS AGING MICE LEAN

“Knocking out” the cellular receptor for the “hunger hormone” ghrelin improves the ability of aging mice to burn calories and reduces fat storage, said researchers from the USDA/ARS Children’s Nutrition Research Center at Baylor College of Medicine in a report in the journal *Aging Cell*. Researchers are now exploring how this could impact human obesity and weight gain.

Researchers have for years studied white fat, which is used to store energy in the body. But there are also cells that contain brown fat that generate heat and help keep the body warm. Brown fat was long ago identified in mice and human infants, but significant quantities of brown fat were recently discovered in human adults. Research shows that aging reduces brown fat cell’s ability to burn calories and increases the amount of white fat.

Dr. Yuxiang Sun, assistant professor of pediatrics—nutrition at BCM, and colleagues studied how ghrelin—the so-called “hunger hormone,” which is secreted in the gut—is linked to brown fat. Ghrelin levels increase when you are hungry and decrease after you eat.

Sun and colleagues used mice that are modified in a way that prevented them from making a cellular receptor for ghrelin. They found that aging mice lacking this receptor

were much leaner than those that had the receptor. This response was seen even though both types of mice ate the same amount of food and were equally active. The scientists discovered that the mice lacking the receptor for ghrelin have highly activated brown fat cells, which generate more heat. Unlike normal aging mice, mice lacking the receptor are able to maintain normal body temperature in a cold environment. They also have less white fat because the white fat is broken down to provide heat-generating fuel for brown fat cells.

These observations are exciting, because they suggest that reducing the amount of ghrelin receptor will have a beneficial role in both brown fat and white fat cells.

Researchers also looked at potential changes in metabolism and insulin resistance in the mice lacking the receptor for ghrelin. They found significantly lower levels of triglycerides and cholesterol in the blood, and beneficial changes in insulin resistance.

“You have old mice with a lean and healthy metabolic state, but without changing food intake or activity,” said Sun.

However, Sun warns that changes to one’s brown fat will not prove to be a magic pill for weight loss.

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IDEAL PREGNANCY WEIGHT *(continued from page 1)*

- Pre-pregnancy BMI – Normal Weight (BMI = 18.5 to 24.9 kg/m²)
Total weight gain range (pounds): 25.0 to 35.0
Rates of weight gain in second and third trimesters (pounds per week): average 1.0 (range 0.8 to 1.0)
- Pre-pregnancy BMI – Overweight (BMI = 25.0 to 29.9 kg/m²)
Total weight gain range (pounds): 15.0 to 25.0
Rates of weight gain in second and third trimesters (pounds per week): average 0.6 (range 0.5 to 0.7)
- Pre-pregnancy BMI – Obese (BMI = 30.0 or higher kg/m²)
Total weight gain range (pounds): 11.0 to 20.0
Rates of weight gain in second and third trimesters (pounds per week): average 0.5 (range 0.4 to 0.6)

Pregnancy weight gain is a concern for all women but perhaps especially for overweight and obese women. Studies suggest that women who have a high pre-pregnancy BMI and who exceed their recommended pregnancy weight gain increase their risk of long-term postpartum weight retention. Meanwhile, women whose pregnancy weight gain stays within the recommended ranges are more likely to have positive outcomes in terms of postpartum weight retention and infant birth weight.

“This will be a very useful tool for counseling pregnant women by physicians, dietitians and other health professionals. The mathematics behind the model are complicated but it’s been made into a downloadable, easy to use app,” Butte said.

The app is available online at the Pennington Biomedical Research Center at <https://www.pbrc.edu/the-research/tools/gwg-predictor/>.

Others involved in the study include Diana Thomas and Carl Brelau of Montclair State University; Jesus Navarro-Barrientos and Daniel Rivera of Arizona State University; Steven Heymsfield, Leanne Redman and Corby Martin of Pennington Biomedical Research Center; Sally Lederman of Columbia University; and Linda Collins of Pennsylvania State University.

It was supported by the Herman and Margret Sokol Institute for Pharmaceutical Life Sciences Fellowship, the National Institutes of Health and the USDA/Agricultural Research Service.

TEXTMe

14 to 17 year olds are needed for a study to test whether text messages help teens be physically active.

SUGAR METABOLISM

Are you 10 to 17 years old? Overweight? Not on any prescription medications? You may qualify to participate in a research study about sugar metabolism in the body.

DIET AND STOMACH PAIN

Does your child have stomach pain that you believe is related to his/her diet? Children between the ages of 7 and 17 are needed for a research study. Researchers are interested in learning more about the role of diet in childhood stomach pain. Participants will be asked to start a specific diet on two separate weekends to determine whether this will help the pain. Food will be provided.

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).

LACTATION STUDY: PRODUCTION OF MILK SUGARS & TRIGLYCERIDES

Are you 18 to 35 years old, healthy and exclusively breastfeeding? Is your baby less than 10 weeks old? If so, you are needed for a study investigating factors that affect breast milk production. The study includes a 24-hour stay at Texas Children’s Hospital with your baby.

LACTATION STUDY: GENE EXPRESSION

Pregnant mothers who are healthy, between 13 and 35 years of age, who will exclusively breastfeed for the first two months and who will be delivering at Texas Children’s Pavilion for Women or Ben Taub Hospital are needed for a research study that will investigate factors (the regulation of gene expression) that affect breast milk production during the first six weeks.

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ACTIVE VIDEO GAMES *(continued from page 1)*

prescribed intervention program and give participants guidance as to how, when and how often they should use the active video games.

Researchers are now considering conducting studies with other game consoles, which visually monitor full body movements to play the game, to see if they result in increased physical activity.

Others who took part in the study include Dina Abdelsamad, Janice Baranowski, Teresia O'Connor, Deborah Thompson and Tzu-An Chen of BCM and Anthony Barnett and Ester Cerin of the University of Hong Kong.

Funding for the study came from the National Cancer Institute and the United States Department of Agriculture, Agricultural Research Service.

The full report can be found at <http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2011-2050>.

HUNGER HORMONE *(continued from page 3)*

"You still need to exercise and maintain a healthy diet," she said.

Sun and colleagues will continue their research into the role of the ghrelin receptor in brown fat cells. They hope to determine whether boosting the function of brown fat cells would be a unique way to combat human obesity.

Others who took part in the study include Ligen Lin, Pradip Saha, Xiaojun Ma, Iyabo O. Henshaw, Longjiang Shao, Benny H.J. Chang, Eric D. Buras, Qiang Tong and Dr. Lawrence Chan of BCM, and Owen P. McGuinness of Vanderbilt University School of Medicine.

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