Medical Xpress

Math model predicts effects of diet, physical activity on childhood weight

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Researchers at the National Institutes of Health have created and confirmed the accuracy of a mathematical model that predicts how weight and body fat in children respond to adjustments in diet and physical activity. The results will appear online July 30 in *The Lancet Diabetes and Endocrinology*.

While the model may help to set realistic expectations, it has not been tested in a controlled clinical trial to determine if it is an effective tool for weight management.

The model evolved from one developed at the NIH in 2011 to predict weight change in adults. The model for children considers their unique physiology, including changes in body composition as they grow.

"Creating an accurate model of energy balance in children was challenging, because they are still growing," said Kevin Hall, Ph.D., a researcher at the NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the paper's first author. "Our model, which takes growth into consideration, helps quantify realistic goals for weight management in children and adolescents."

The researchers analyzed data from children ages 5-18 years to create the model, and tested it by comparing predictions to actual changes in children as measured in clinical studies that were not used to build the model. The model accurately simulated observed changes in body composition, energy expenditure, and weight.

Model simulations also suggest that obese children may be eating far more calories for each pound gained, compared to adults. For example, children under age 10 were predicted to require more than twice the calories per pound of extra weight than an adult would need to gain a pound. Additionally, the model suggests that there may be therapeutic windows of weight management when children can "outgrow" obesity without requiring weight loss, especially during periods of high growth potential in males who are not severely obese at the onset of treatment.

More than one-third of children and adolescents in the United States are overweight or obese. Excess weight in children can lead to lifelong health problems such as type 2 diabetes and high blood pressure. As recommendations for managing weight may vary based on health and age, parents should work with a health professional before beginning any weight-loss regimen for their overweight or obese child.

"Obese children are much more likely to become obese adults, which makes achieving or maintaining a healthy weight early in life vitally important," said NIDDK Director Griffin P. Rodgers, M.D. "This study suggests that we may need to approach weight management and obesity prevention differently in youth than in adults."

Looking forward, NIDDK is exploring options for developing a user-friendly online tool for health professionals and others, and the code for the model is available on request through NIDDK's Technology Advancement Office.

Provided by National Institute of Diabetes and Digestive and Kidney Diseases

diet-physical-childhood.html