

Childhood Obesity and Academic Outcomes

A BRIEF REVIEW OF RESEARCH

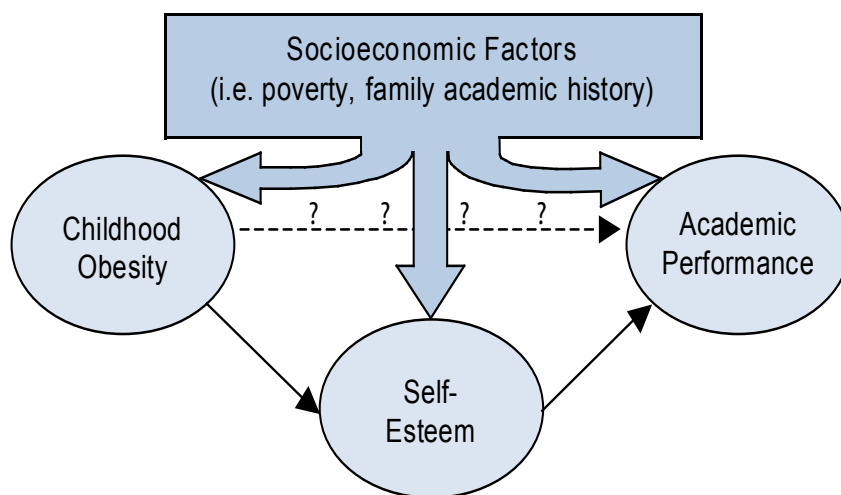
OVERVIEW

Childhood obesity is on the rise across the country and in North Carolina, with four times as many children exhibiting signs of obesity now as they did 20 years ago. The costs in terms of medical expenses alone are staggering, with one estimate putting the cost to North Carolina at \$16 million a year.¹ Some North Carolina legislators have expressed concern that obesity might also impede student achievement, resulting in even greater long-term social and economic consequences. In response, the Hunt Institute compiled this briefing to summarize research on the relationship between obesity and academic outcomes.

Researchers have not yet established a clear cause-and-effect relationship between childhood obesity and academic performance. However, studies have identified a link between childhood obesity and lower self-esteem, which is often related to lower academic achievement and attainment.² These findings suggest that childhood obesity may be merely a *warning sign* of possible academic underperformance.³ Notably, studies also reveal that *persistent socioeconomic factors* exert an even greater influence on obesity, self esteem, and school performance.⁴ The relationships suggested by these studies are illustrated in the figure above.

CHILDHOOD OBESITY IN NORTH CAROLINA

- The childhood obesity rate in North Carolina is higher than rates in all but five other states, and the state's adult obesity rate is 16th worst in the nation.⁵



- In North Carolina, nearly one in seven children between the ages of 2 and 4, one in four children between the ages of 5 and 11, and one in three adolescents between the ages of 12 and 18 are obese.⁶ The prevalence of childhood obesity among adolescents in our state has nearly tripled over the past 20 years.⁷
- More than half of all North Carolina high school students do not engage in recommended levels of physical activity, 35 percent watch three or more hours of television daily, and one in five play video games for three or more hours a day.⁸

DO WE KNOW HOW OBESITY AFFECTS ACADEMIC OUTCOMES AND FUTURE EDUCATION PROSPECTS?

Over the past 15 years, only a handful of researchers have attempted to identify links between academic performance and childhood obesity. While some of their studies offer promising insight into possible relationships, several raise as many questions as they answer. Consequently, the results reported here are suggestive only.

¹ Fit Families NC, 2005; Task Force (2008)

² Schwartz & Puhl, 2003

³ Datar *et al.*, 2004; Crosnoe & Muller, 2004; Taras & Potts-Datema, 2005

⁴ Ball, *et al.*, 2004; Datar *et al.*, 2004; Datar & Sturm, 2006; Laitinen *et al.*, 2002; Mikkilä *et al.*, 2003

⁵ Heaslip, 2008

⁶ NC NPASS 2007

⁷ Fit Families NC, 2005

⁸ Centers for Disease Control and Prevention, 2007

Academic outcomes

- Recent research at the elementary level indicates that obese kindergartners tend to score significantly lower on math and reading tests than do normal-weight children. Lower scores were also found among girls who became overweight between kindergarten and third grade. In addition, there is evidence that the effects of obesity on school performance are worse for children who *remain* obese for many years.⁹

- Studies at the middle and high school levels indicate that adolescents at risk of obesity typically earn lower grades, and individuals who were obese at age 16 complete significantly fewer years of schooling than do their non-obese peers. Also, obese girls tend to perform poorly on math and reading tests when compared to their non-obese peers, and obesity negatively impacts grade-point average for white teenage females.¹⁰

Future Education Prospects

- Recent studies find that obese girls are more likely to report being poor students,

obese boys are more likely to think they are poor students and to consider quitting school, and girls who simply *think* they are overweight exhibit lower school performance.¹¹

- Overweight students also rate their educational futures lower than do their normal-weight peers, obese women are less likely to pursue college or other post-high school training, and women who are obese as adolescents complete fewer years of schooling.¹²

Concluding Thoughts

Based on the Hunt Institute’s review of research, a clear link between childhood obesity and academic performance has not yet been established. But there is reason to believe that childhood obesity has at least an indirect effect on academic outcomes, with the clearest evidence suggesting an impact on self-esteem and pursuit of schooling beyond high school.

As North Carolina legislators strive for greater academic achievement in the state’s public schools, it is commendable

that some leaders have shown a willingness to consider factors of student health and well-being. Though research studies do not suggest that efforts to curb childhood obesity are a primary strategy for improving academic performance, it is possible that efforts to improve student health and wellness could also result in improved school outcomes for some students.

Obesity should not be among the many obstacles our children face today, and North Carolina currently is engaged in a variety of efforts to respond to this crisis (see Appendices A and B). The Hunt Institute remains committed to the task of helping members of the NC General Assembly identify research and evidence-based strategies that will improve outcomes for the students in our state.

CENTERS FOR DISEASE CONTROL AND PREVENTION WEIGHT CLASSIFICATION CHART

Classification	Body Mass Index for Age
Underweight	Less than 5 th percentile
Normal	5 th percentile to less than 85 th percentile
Overweight	85 th percentile to less than 95 th percentile
Obese	Greater than or equal to 95 th percentile

Health complications for children due to obesity include: increased risk of type II diabetes, cardiovascular problems, sleep apnea, asthma, liver disease, cancer, orthopedic complications, reduced quality of life, depression, anxiety, eating disorders, and increased risk for becoming obese adults.

⁹ Datar *et al.*, 2004; Datar & Sturm, 2006; Gable *et al.*, 2008

¹⁰ Crosnoe & Muller, 2004; Sargent & Blanchflower, 1994; Sabia, 2007

¹¹ Falkner *et al.*, 2001; Mikkilä *et al.*, 2003; Mellin *et al.*, 2002

¹² Mellin *et al.*, 2002; Ball *et al.*, 2004; Gortmaker *et al.*, 1993. Note: Gortmaker *et al.* (1993) did not find evidence of the same effects in male participants.

APPENDIX A: SELECTED PROGRAMS CURRENTLY FUNDED BY THE STATE OF NORTH CAROLINA

NC Department of Public Instruction (DPI) and NC State Board of Education

- DPI's Healthy Schools Section has been in operation for about a decade and receives funding from both state and federal sources, including about \$900,000 a year from the Centers for Disease Control and Prevention.¹ The Section sponsors childhood obesity reduction efforts and oversees the *Coordinated School Health Program* (CSHP). CSHP provides coordination and resources in eight areas of school health: health education, physical education; childhood nutrition services; health services; school environment oversight; mental health services; employee wellness services; and community involvement.²
- NC State Board of Education Policy HSP-S-000 (the Healthy Active Children Policy), updated in 2005, requires at least 30 minutes of physical activity per day for all students in grades K-8. The policy recommends that schools consider providing 150 minutes per week of formal physical education in elementary school and 225 minutes per week of formal Healthful Living Education in middle school.³

NC Department of Health and Human Services (DHHS)

- In 2007, the NC General Assembly and DHHS provided a total of \$250,000 for Gaston, Johnson, Nash, Robeson, and Wilkes counties to adopt WakeMed's *ENERGIZE!*, a 12-week, family-based healthy lifestyle program targeted at children aged 6 to 18 with type II diabetes, pre-diabetes, or risk factors.⁴
- In 2008, the NC Division of Public Health sponsored a *Childhood Obesity Prevention Demonstration Project* in Cabarrus, Dare, Henderson, Moore, and Watauga counties. Each county was granted \$380,000 to support strategies proven to prevent childhood obesity, including programs in preschools, child care centers, and other community outlets, as well as public awareness campaigns.⁵

NC Health and Wellness Trust Fund (HWTF)

- HWTF was established in 2000 as part of the Tobacco Master Settlement Agreement with an initial grant-making capacity of \$73 million. To date, it has invested nearly \$300 million statewide in various health-related programs.⁶ HWTF sponsored the 2004-2005 Fit Families Study Committee on Childhood Obesity and supports statewide childhood obesity initiatives, including:

Fit Kids, which promotes 30 minutes of physical activity in grades K-8. Eighty-eight of 115 Local Education Agencies (32,868 teachers) have received training;

A+ Fit School, begun in October 2008, which recognizes school efforts to provide a healthy environment for all students and staff. Each year, 10 schools receive \$1,000 in recognition of their efforts, while another 10 receive \$7,500 to support new health and wellness initiatives;

IN4Kids (Integrating Nutrition for Kids), which brings dieticians into primary care practices;

The North Carolina Alliance for Athletics, Health, Physical Education, Recreation, and Dance's (NCAAHPERD) *In-school Prevention of Obesity and Disease (IsPOD)* project, which has implemented a physical education and nutrition curriculum (Sports, Play, Active Recreation for Kids, or *SPARK*) in 135 schools; and

Fit Together, which has awarded 21 community grants totaling \$9 million in support of projects that promote fitness and healthy eating habits.⁷

¹ Collins (2008)

² North Carolina Healthy Schools (2008)

³ HSP-S-000 (2005); however, according to a recent Department of Public Instruction report, only 40 percent of all elementary schools and 44 percent of all middle schools meet these standards (Collins, 2008).

⁴ "Program to prevent" (2007)

⁵ "14 health departments" (2008)

⁶ "Health care commission" (2001); "NC Health and Wellness" (2008)

⁷ Annual Report (2008)

Joint Efforts

- In 2000, *Eat Smart, Move More*, including more than 60 agency partners, was established to promote healthy eating and physical activity. In 2008, the program provided one-time grants ranging in size from \$9,000 to \$20,000 to support projects in Buncombe, Carteret, Chatham, Davidson, Durham, Granville-Vance, Lee, Wake, and Warren counties.⁸
- DPI is working in partnership with NCAAPERD and with funding support from HWTF, BlueCross BlueShield of North Carolina, and the Kate B. Reynolds Charitable Trust to expand the *SPARK* curriculum to all Local Education Agencies.⁹
- In 2008, the NC General Assembly established the Task Force on Preventing Childhood Obesity, co-chaired by NC State Health Director Leah M. Devlin and NC State Board of Education Chair Howard Lee. This effort includes 19 members representing education, hospitals, public health, physicians, researchers, and the public. The Task Force has reviewed current DPI, DHHS, and HWTF efforts and is developing a comprehensive statewide strategic plan for preventing childhood obesity. The Task Force met between September and November 2008, and is expected to report final recommendations to the NC General Assembly in January 2009.
- The NC General Assembly provided \$500,000 in non-recurring FY 2008-09 funds for child obesity pilot programs. This effort is overseen by the 27-member Think Tank for Child Obesity, a group formed to complement the Task Force on Preventing Childhood Obesity. The Think Tank dedicated half of the funds to expand Department of Public Health *Child Obesity Prevention Demonstration Project* efforts in six Local Education Agencies (\$41,000 per LEA). The remaining funds will be used to support additional obesity-reduction pilot programs in 10 yet-to-be-identified schools.¹⁰

⁸ "14 health departments" (2008); Task Force (2008)

⁹ Collins (2008)

¹⁰ *Joint Conference Committee Report* (2008); P. H. Collins, Senior Policy Advisor for Healthy Responsible Students, State Board of Education Office (personal communication, 9 December, 2008)

APPENDIX B: RECENT LEGISLATION RELATED TO CHILDHOOD OBESITY

Passed

HB 855 (October 2005) set improvement goals for North Carolina's school nutritional standards.

SB 961 (August 2005) made North Carolina's standards for food sold in school vending machines among the nation's strictest.

Proposed but Not Passed

2001-2002

S725/H650 Proposed a moratorium on school contracts with soft drink distributors.

S1466 Proposed the transfer of a soft drink tax to education funds.

2003-2004

S34 Proposed the creation of a Commission on Childhood Obesity.

S797 Proposal to link soft drink taxes with school breakfasts.

2005-2006

S637 Proposed \$3 million in support for UNC obesity research.

H1126 Proposed two years of funding to DHHS for general obesity programs.

H1570 Proposed funds for a child health survey focused on obesity.

S269 Proposed statewide standards for school meals.

H694 Proposed the annual collection of child BMI data.

H773 Proposed requirements for physical activity in schools.

H755 Proposed improvement goals for North Carolina's school nutritional standards.

2007-2008 (Pending Bills)

H1453 Proposes support for childhood diabetes education and prevention.

S25 Proposes funds through 2009 for one full-time health worker per county to work on several issues, including childhood obesity.

H2053 Formally urges Congress to approve the use of locally grown foods in school cafeterias.

H2370/S1676 Proposes additional funds for Eat Smart, Move More.

H23 Proposes funds for statewide health promotion.

H2592 Proposes collection and public provision of data related to physical education, including data on student BMI for each Local Education Agency.

REFERENCES

- 14 health departments receive \$2 million in funding for obesity prevention projects. (2008). Press Release, North Carolina Department of Health and Human Services, 22 September, 2008. Retrieved on 21 October, 2008, from <http://www.eatsmartmovemorenc.com/HT/HotTopic.html?HotTopic=COPP>.
- Annual Report to the Joint Legislative Committee. (2008). North Carolina Health and Wellness Trust Fund, 1 November, 2008. Retrieved 4 November, 2008, from <http://www.healthwellnc.com/hwtfc/htmlfiles/annualreports.htm>.
- Ball, K., Crawford, D., and Kenardy, J. (2004). Longitudinal relationships among overweight, life satisfaction, and aspirations in young women. *Obesity Research*, 12(6), 1019-1030
- Centers for Disease Control and Prevention. (2007). *The obesity epidemic and North Carolina students*. Washington, D. C.: Department of Health and Human Services.
- Collins, P. H. (2008). Education initiatives to prevent childhood obesity. Presentation to the North Carolina State Board of Education and the North Carolina Department of Public Instruction, 18 September, 2008. Retrieved on 13 October, 2008, from <http://www.eatsmartmovemorenc.com/HT/Texts/Education%20Initiatives%20to%20Prevent%20Childhood%20Obesity.pdf>.
- Crosnoe, R., and Muller, C. (2004). Body mass index, academic achievement, and school context: Examining the educational experiences of adolescents at risk of obesity. *Journal of Health and Social Behavior*, 45(4): 393-407.
- Datar, A., Sturm, R., and Magnabosco, J. L. (2004). Childhood overweight and academic performance: National study of kindergartners and first-graders. *Obesity Research*, 12(1): 58-68.
- Datar, A., and Sturm, R. (2006). Childhood overweight and elementary school outcomes. *International Journal of Obesity*, 30: 1449-1460.
- Falkner, N. H., Neumark-Sztainer, D., Story, M., Jeffery, R. W., Beuhring, T., and Resnick, M. D. (2001). Social, educational, and psychological correlates of weight status in adolescents. *Obesity Research*, 9(1): 32-42.
- Fit Families NC. (2005). *Childhood obesity in North Carolina*. Raleigh, NC: North Carolina Health and Wellness Trust Fund.
- Gable, S., Britt-Rankin, J., and Krull, J. L. (2008). Ecological predictors and developmental outcomes of persistent childhood overweight. Contractor and Cooperator Report No. 42, Economic Research Services. Washington, D. C.: United States Department of Agriculture.
- Gortmaker, S. L., Must, A., Perrin, J. M., Sobol, A. M., and Dietz, W. H. (1993). Social and economic consequences of overweight in adolescence and young adulthood. *The New England Journal of Medicine*, 329(14): 1008-1012.
- Health care commission develops agenda. (2001). Press Release, Office of the Lieutenant Governor, State of North Carolina, 22 June, 2001. Retrieved on 20 October, 2008, from <http://www.ltgov.state.nc.us/News/PressReleases/PressRelease.asp?YR=2001&MN=08-August&FN=22%2Dhealth+care+commission+develops+agenda%2Exml>.
- Heaslip, J. (2008). Childhood obesity a particular problem in N.C. *Hendersonville Times-News*, 22 September, 2008. Retrieved on 20 October, 2008, from http://www.blueridgenow.com/article/20080922/NEWS/809210258/1042?Title=Childhood_obesity_a_particular_problem_in_N_C_.
- HSP-S-000. (2005). Student Health Issues Category, High Student Performance Series, Policy Manual, North Carolina State Board of Education. Retrieved on 15 October, 2008, from <http://sbepolicy.dpi.state.nc.us/>.
- Joint Conference Committee Report on the Continuation, Expansion and Capital Budgets: HB 2436*. (2008). General Assembly of North Carolina, 2007 Session, 3 July, 2008.

- Laitinen, J., Power, C., Ek, E., Sovio, U., and Järvelin, M. R. (2002). Unemployment and obesity among young adults in a northern Finland 1966 birth cohort. *International Journal of Obesity and Related Metabolic Disorders*, 26(10): 1329-1338.
- Mellin, A., Neumark-Sztainer, D., Story, M., Ireland, M., and Resnick, M. (2002). Unhealthy behaviors and psychosocial difficulties among overweight adolescents: The potential impact of familial factors. *Journal of Adolescent Health*, 31(2): 145-153.
- Mikkilä, V., Lahti-Koski, M., Pietinen, P., Virtanen, S. M., and Rimpelä, M. (2003). Associates of obesity and weight dissatisfaction among Finnish adolescents. *Public Health Nutrition*, 6(1): 49-56.
- NC Health and Wellness Trust Fund to aid low-income North Carolinians in accessing dental care. (2008). Press Release, Health and Wellness Trust Fund, 23 October, 2008. Retrieved on 4 November, 2008, from <http://www.healthwellnc.com/hwtfc/pdffiles/PressOralHealthRFP10-22-08.pdf>.
- North Carolina Health Schools Section. (2008). North Carolina Department of Public Instruction. <http://www.nchealthyschools.org/>
- Program to prevent type 2 diabetes in children expands. (2007). Press Release, North Carolina Department of Health and Human Services, 14 November, 2007. Retrieved 15 October, 2008, from <http://www.dhhs.state.nc.us/pressrel/11-14-07.htm>.
- Sabia, J. J. (2007). The effect of body weight on adolescent academic performance. *Southern Economic Journal*, 73(4): 871-900.
- Sargent, J. D., and Blanchflower, D. G. (1994). Obesity and stature in adolescence and earnings in young adulthood. Analysis of a British birth cohort. *Archives of Pediatrics and Adolescent Medicine*, 148(7): 681-687.
- Schwartz, M. B., and Puhl, R. (2003). Childhood obesity: A social problem to solve. *Obesity Reviews*, 4(1): 57-71.
- Taras, H, and Potts-Datema, W. (2005). Obesity and student performance at school. *Journal of School Health*, 75(8): 291-295.
- Task Force on Preventing Childhood Obesity. (2008). *Report from the North Carolina Task Force on Preventing Childhood Obesity*. Draft prepared for the North Carolina State Board of Education, 18 November, 2008.



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