

Childhood Obesity Prevention in Pennsylvania, 2005 – 2015



Introduction

Obesity, particularly childhood obesity, is the focus of many public health efforts in the United States. New regulations have been implemented by the United States Department of Agriculture (USDA) for food packages in the Special Supplemental Nutrition Program for Women, Infants and Children; the Centers for Disease Control and Prevention (CDC) has funded state- and community-level interventions. In addition, numerous reports and recommendations have been issued by the Institute of Medicine, the U.S. surgeon general and the White House.

The problem of obesity is serious enough that it became widely recognized as the “obesity epidemic” after then Surgeon General Dr. David Satcher’s 2001 report, *The Surgeon General’s Call to Action to Prevent and Decrease Overweight and Obesity*. In addition, medical science has recognized the connections between being obese and the onslaught of chronic health conditions, such as cancer, Type 2 diabetes and cardiovascular disease, that gradually burden individuals and increasingly draw on

societies’ medical and public health resources. Accidental injury and disabling orthopedic problems also contribute to the problem of obesity. Although obesity continues to be a pervasive global public health problem, it has created a culture with an emphasis on healthful living and prevention that combines lifestyle, physical activity, diet and nutrition for adults and children. While the culture is changing, behaviors and lifestyles among the U.S. population have not changed enough to stem the obesity epidemic.

Numerous culture changes that facilitated weight gain began more than 50 years ago with the introduction of television and fast food restaurants, and silently grew into a new and different environment that profoundly influenced population health status. Currently, as a result of newer and other advanced technology (video games, cell phones, tablets, etc.), children are more sedentary than ever before. Contributing to the obesity problem is aggressive marketing and food advertising, as well as a lack

of both structured physical education and/or unstructured recess in many schools. Many school districts have eliminated physical education to allot for additional instruction and/or time for testing.

Childhood overweight and obesity remain a serious problem in the United States. Despite recent declines in the prevalence among preschool-aged children, obesity among children is still too high. A significant and encouraging development is that obesity and extreme obesity rates have declined among low-income preschool children. If the current trends in childhood obesity can be reversed, children will have greater opportunities for healthier lives with better results.

This document examines childhood obesity in Pennsylvania and efforts made by stakeholders, such as philanthropists, government, communities, schools, employers, insurers, business leaders, and parents and families to implement promising solutions to improve children's health outcomes. These stakeholders can learn from each other and enhance efforts to reduce childhood obesity through partnerships. Since 2001, the Highmark Foundation has made significant investments of more than \$25 million to support child health and wellness initiatives. These investments range from increasing access to health services to promoting healthy lifestyles to reducing disparities.

Definition of Obesity

Obesity has been defined by the National Institutes of Health as a body mass index (BMI) of 30 and above. For example, a BMI of 30 is about 30 pounds overweight. The BMI, a key index for relating body weight to height, is a person's weight in kilograms divided by their height in meters squared. For adults, obesity is defined as BMI of 30 to 39 and severe obesity as BMI of 40 or higher. Since the BMI describes the body weight relative to height, it correlates strongly (in adults) with the total body fat content. Some very muscular people may have a high BMI without undue health risks.

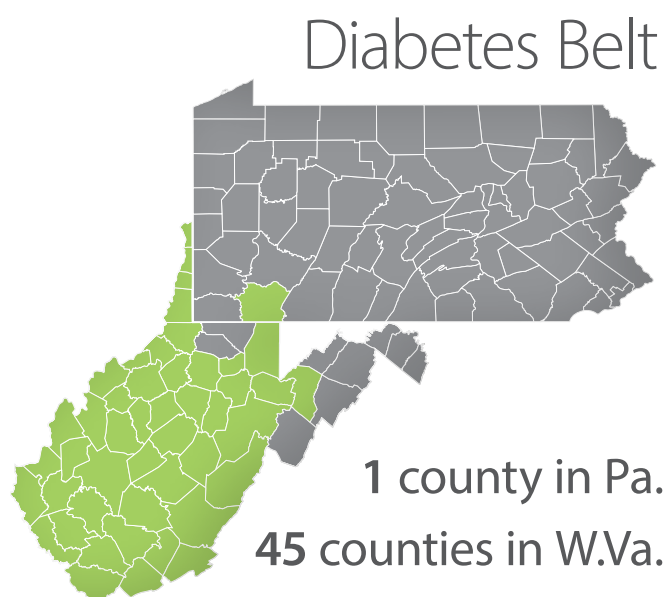
Similarly, overweight, obesity and severe obesity for youth are determined by using height and weight to calculate BMI. Since a number of factors influence height and weight in children and adolescents, BMI categories are derived from age- and sex-based growth charts developed by the CDC and expressed in percentiles, with 2000 as the growth reference year. In children and adolescents ages 2 to 19 years, overweight is defined as \geq 85th percentile but less than 95th percentile and obese is defined as \geq 95th percentile but less than 1.2 times 95th percentile. Severe obesity is at or above 1.2 times 95th percentile, or 35 of absolute BMI value regardless of age and sex. The rapid increase in population BMI was only first detected between 1990 and 2000.

Obesity is often multifactorial, based on genetic, environmental and behavioral factors. Accordingly, treatment of obesity usually requires more than just dietary changes.

Exercise, counseling and support, and sometimes medication, can supplement diet to help patients conquer weight problems. Extreme diets, on the other hand, may actually contribute to increased obesity. Being overweight is a significant contributor to health problems because it increases the risk of developing a number of preventable diseases.

Obesity has had a dramatic impact on population health and has been linked to increasing rates of cancer, Type 2 diabetes, nonalcoholic fatty liver disease, osteoarthritis and cardiovascular disease, as well as accidental injury and disabling orthopedic problems. Diseases such as Type 2 diabetes cause damage to organs and structures throughout the body, including blood vessels and nerves, which commonly lead to disability and premature death. In fact, the American Cancer Society estimates that excess body weight contributes to one out of every five cancer deaths in the United States today, and the CDC estimates that as many as one in three adults will have diabetes by 2050 if current trends continue. A new word, "diabesity," was coined to highlight this dramatic relationship between obesity and Type 2 diabetes. A "diabetes belt," comprising counties within states that have high rates of Type 2 diabetes, has even been identified. In the diabetes belt (644 counties in 15 states) where residents are more likely to be obese and have Type 2 diabetes than people who live in other parts of the United States.

In Pennsylvania, the obesity rate rose from less than 10 percent in 1990 to 30 percent today, ranking Pennsylvania 30th among the 50 states. Among Pennsylvania counties, Chester in the southeast ranks lowest for obesity at 24 percent and, at 37 percent, Fayette in the southwest ranks highest. At 21.3 percent, Colorado has the lowest obesity rate among the 50 states; West Virginia has the highest at 35.1 percent. Of the 67 counties in Pennsylvania, one county in Pennsylvania, Fayette, and 45 counties in West Virginia are located in the diabetes belt.



The diabetes belt was determined by county, rather than state, so that community leaders can identify areas most in need of efforts to prevent new cases of Type 2 diabetes. People who do not already have diabetes can reduce their risk by being physically active and, if they are overweight, losing weight. Obesity and inactivity account for nearly one-third of the increased risk for Type 2 diabetes that scientists observed in people who live in the diabetes belt.

Counties were placed in the diabetes belt if at least 11 percent of residents had been diagnosed with diabetes and if the counties were near each other in the Southeast, which has the highest rates of diabetes, or adjoining areas with high rates of diabetes. Within the diabetes belt, 11.7 percent of the people

have diagnosed diabetes. Outside the belt, 8.5 percent have diagnosed diabetes. There were some counties in other parts of the United States that had diabetes rates of 11 percent or more, but they are not included in this belt because they are isolated from other counties with high diabetes rates.

Some other factors for the increased risk cannot be changed, such as age and race. The diabetes belt has higher rates of obesity and physical inactivity than other U.S. regions. If these rates are reduced, CDC scientists expect that eventually the difference in diabetes rates also would be reduced.

Causes of the Obesity Epidemic

The current worldwide obesity epidemic, with well-defined pathologic consequences, now recognized as a public health crisis, is less than a century old. Previously, malnutrition due to chronic food shortages was a historic, major problem. In fact, through most of human history the risk of starvation was a much greater concern; individuals needed to put on weight when food was plentiful in order to survive when food was scarce, especially if the food provided a great number of fat calories and tasted sweet. In addition, in many locations an essential mineral, salt, was hard to acquire. As a result, for most of human history consuming high-calorie, fatty foods and salt, when available, was most often beneficial and even necessary for survival. Ironically, food scarcity led to a belief that being fat was good, and that fat and increased “flesh” were desirable as reflected in the arts, literature and medical opinions of the times.

Throughout history most individuals were able to maintain a normal weight by practicing two behaviors: relatively healthy eating and regular, moderate physical activity, primarily walking. However, over the past 50 to 60 years, the environmental factors that influence weight changed, making it difficult for many individuals in the United States to engage in the behaviors that allowed maintaining a healthy weight. As a result, many who in the past would not have had a weight problem are now having difficulty maintaining a healthy weight.

Only after the technological advances of the 18th century did a gradual increase in food supply become available. The initial effects of these advances in improved public health and the greater amount, quality and variety of foods were increased longevity and body size. These positive outcomes notwithstanding, their incremental effect since World War II has been an overabundance of easily accessible food, environmental changes over time influenced food consumption patterns along with reduced physical activity account for the recent increased prevalence of obesity. Beginning in the latter half of the 19th century, being obese began to be stigmatized for aesthetic reasons; during the 20th century, its association with increased mortality was recognized.

Most environmental changes that negatively impact BMI and obesity, leading to increased overweight rates among children and youth, occurred in their schools, homes and surrounding neighborhoods. Children spend the majority of their waking hours in schools, sometimes eating three meals at school in one day. These meals may or may not be the healthiest; but depending on their home environments, they may be the only daily meals some children receive. Backpack programs offer prepared foods that are inexpensive and easy to prepare at home, but may also be high in fat and sodium. While none of these environmental changes alone caused obesity, they may, in combination and with increased frequency, all have contributed. Changes that have been known to affect child and adolescent nutrition and physical activity patterns include:

- Pressure on school administrators to raise additional funds for materials, equipment and student activities, often through sales of less healthy foods and beverages
- Contracts with soft drink and snack food companies that require widespread placement of vending machines throughout school buildings and grounds
- Less healthy, competitive foods sold in school cafeterias and at concession stands
- Replacement of milk with carbonated and other beverages
- Lack of access to water, either bottled or fountain
- Use of other foods, such as pizza, sweets and soda, as rewards

- Allowing students to leave school grounds at lunch time to eat at fast food restaurants or convenience stores
- Reduction or elimination of physical activity, building of schools away from communities, increased screen time and neighborhood public safety concerns

Research studies and public health surveillance system reports provide several pertinent nutrition and physical activity findings that likely are associated with these environmental changes. Over 10 years, overweight young children in the United States were found to gain just under 1 pound of excess weight per year. This 9 to 10 pound excess weight gain could be prevented by reducing energy intake and/or increasing energy expenditure by 110 to 165 calories per day, a relatively small, manageable amount. In comparison, overweight U.S. adolescents were found to consume 678 to 1,017 calories per day more than was needed to maintain a healthy weight, resulting in excess weight gain of approximately 58 pounds over 10 years. An indirect but critical point is that initial prevention of excess weight gain in children and adolescents is easier to achieve than either initial weight loss or weight loss maintenance for individuals who have already gained excess weight over time.



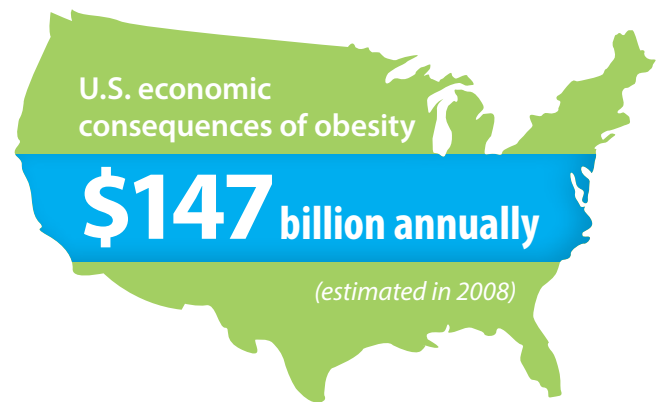
Financial Impact and Health Consequences

In summary, no one event caused the rapid national increase in population obesity. Many societal changes began in the 1950s and silently grew over 40 to 50 years into a new and different human environment that profoundly influenced both population weight and health status. This rapid increase in unhealthy weight was only first detected between 1990 and 2000.

From 1990 to today, the U.S. obesity rate doubled from less than 15 percent of adults to 29.4 percent. By 2030, the adult U.S. obesity rate is projected to climb from the current 29.4 percent to over 40 percent, with severe obesity increasing even faster. For Pennsylvania the obesity rate rose from less than 10 percent in 1990 to 30 percent today — ranking it 30th among the 50 states.

Today's youth are the adults of 2030 and, unfortunately, obesity has already dramatically expanded among U.S. youth of all ages, with immediate negative physical health consequences, including pre-diabetes, hypertension, high cholesterol, sleep apnea, accidental injury, and bone and joint problems. Negative emotional and social consequences include poor self-esteem and stigmatization. Those who are overweight or obese as children and teenagers are highly likely to become or remain obese or severely obese as adults. Childhood obesity alone is responsible for \$14 billion in direct medical costs. If all 12.7 million obese youth in the United States become obese adults, the individual cost on average is just over \$92,000, and the societal costs over their lifetimes may exceed \$1.1 trillion.

Obesity is very costly. The total U.S. economic consequences of obesity (health care costs plus lost productivity) are minimally estimated at \$147 billion annually (in 2008). Much of the cost of obesity and obesity-related disease is paid by the public sector health plans, Medicaid and Medicare. Even if obesity rates stabilize over time, both obesity-related disease and



obesity-related costs will increase due to severe obesity. Since obesity rates vary from state to state, costs are not uniform. Differences, such as the lower cost of less-healthy foods in some states, can affect obesity and severe obesity rates along with current and projected health care costs.

Where Pennsylvania Stands: Child and Adolescent Obesity Rates, Trends and Projections, 2007 – 2018

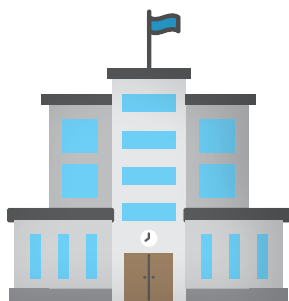
Understanding the severe consequences and costs of obesity, Pennsylvania is addressing the problem with proactive strategies and approaches that involve a variety of sources. Over the past decade, Pennsylvania schools, in collaboration with the Pennsylvania Departments of Education and Health and charitable foundations, such as the Highmark Foundation, have substantially improved health policies and related school breakfast and lunch programs, wellness programs, nutrition education, physical education and opportunities for physical activity.

Since 2001, the Highmark Foundation has been at the forefront of combatting the childhood obesity epidemic. Its goal is to promote and encourage adoption of best practices in childhood obesity prevention in communities where children are most at risk and where the Foundation's resources can be used effectively to fill significant gaps. During the past decade, the Highmark Foundation has taken a leadership position regionally in grappling with this public health issue and remains committed to funding programs that are sustainable and replicable, and achieve measurable outcomes.

Behavior-focused physical activity and nutrition programs have been key elements of the Highmark Foundation's plan to address this national public health epidemic. To complement these efforts, the Foundation also supports the endeavors of hundreds of school districts and other community-based

programs that educate children and families through its school grant program, *Creating a Healthy School Environment Grants and Awards Program*. These grants fund evidence-based programs that have a direct impact on children and adolescents, and are designed to build lasting and sustainable changes in schools through bullying prevention, child injury prevention, healthy eating and physical activity, and environmental health. Combined, these efforts have reached more than one million children and more than 1,500 schools across Pennsylvania, and there is still work to be done. Schools cannot solve the obesity problem, but they can be a large part of the solution.

Based on 93 repeated questions a Pennsylvania statewide school health policy and program (SHP) survey administered to representative samples of secondary schools in 2008, 2010, 2012 and 2014, it was determined that:



Schools cannot solve the obesity problem, but they can be a large part of the solution.

- In almost every category, favorable levels already in place in 2008 were maintained in 2010 or, in many instances, improved between 2008 and 2012, the year when new USDA regulations about the nutritional quality of foods in schools went into effect.
- For many areas addressed by SHP questions, favorable levels of policy and program implementation in 2010 or 2012 eroded substantially by 2014.
- Regarding significance of changes, the trend lines for 19 questions had moved significantly in the unfavorable direction by 2014, compared to 6 that had moved significantly in the favorable direction — a 3:1 ratio of unfavorable to favorable.

Although no cause-and-effect relationship can be claimed, it appears that downward trends in student BMI from 2007 to 2013 (see Figure 2), especially for overweight among secondary school students, coincided with improvements in school health policies and programs over the same time span.

De-identified BMI data (see Figures 1 and 2), originated from 1,114 Pennsylvania schools in 293 districts and 53 counties, and was collected through the student health record section of a web-based school health information system, Health eTools for Schools (Pennsylvania's 10 largest cities and 18 largest counties are represented). Health eTools for Schools, used in hundreds of school buildings throughout the Commonwealth, was developed by InnerLink with funding from the Highmark Foundation. Currently, the system is owned and technically supported by Population Health Innovations LLC (populationhealthinnovations.com), which provides schools access for a small subscription fee with subsidy through a grant from the Force for Health Foundation (force4health.org).

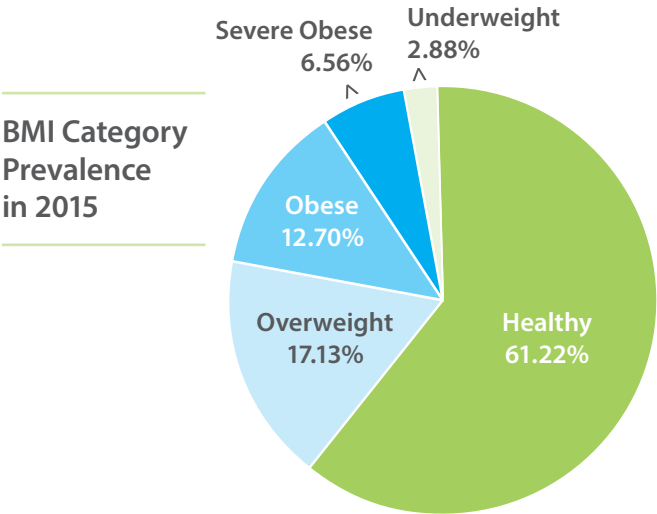
Health eTools (healthetools.com) enables school personnel to more effectively provide access to real-time data. It was designed to record and monitor student health and fitness parameters, help schools meet wellness mandates, and support a culture of wellness using technology with best practices to provide online resources that help schools create healthier learning environments. It is the only web-based program that captures data under the framework of the CDC's multidisciplinary coordinated school health model.

The student health record allows the school nurse to efficiently enter student health data for early and periodic screening, diagnosis and treatment, including measurement of exact height and weight used to calculate BMI. Data are entered directly online, through either a mobile device or tablet. Student health record data are downloaded monthly by participating schools and, using computerized programming, are regularly compiled by Population Health Innovations. Capturing BMI data was possible because school nurses in Pennsylvania are required by state law to measure the

height and weight of all students annually by following steps recommended by the CDC. School nurses are also required by law to mail annual letters to parents/guardians that include the child’s calculated BMI plus an explanation of age and gender factors that can influence BMI. These letters include suggestions that parents share the BMI and other information in the letter with their child’s physician.

Approximately 2.2 million de-identified student BMI measures were accessed from Health eTools and analyzed. Results are presented in the following figures:

Figure 1: Current BMI Rates

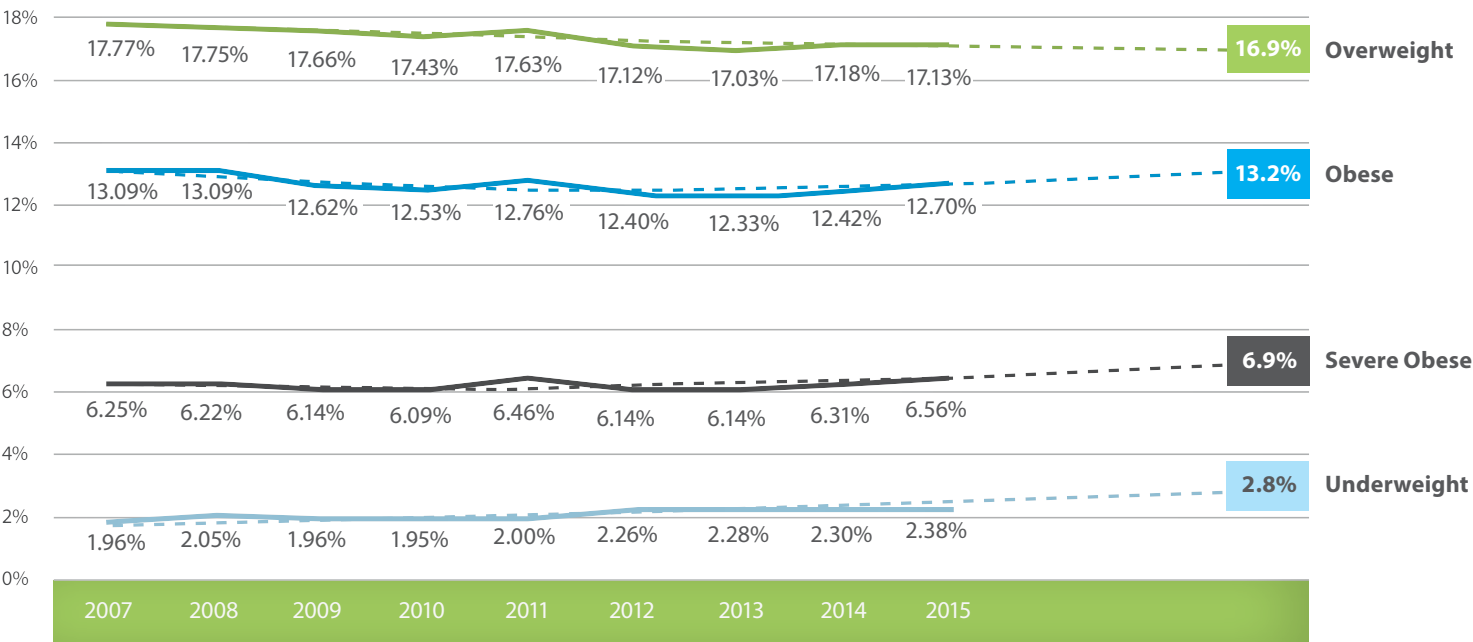


These figures illustrate the following BMI rates and trends among school-aged Pennsylvania children and adolescents:

- Through 2015, healthy weight still predominates and is projected to predominate; 6 of every 10 school-aged Pennsylvania children and adolescents have a BMI within the healthy range.
- Levels of overweight among the Pennsylvania school-aged population slightly but steadily decreased from 2007 to 2012 and then leveled off from 2013 to 2015.
- After declining from 2007 to 2013, levels of obesity increased slightly in 2014 and again in 2015.
- After holding steady from 2007 to 2013, levels of severe obesity rose by 2015 to a rate that exceeded the 2007 baseline.
- Based on statistical projections (see Figure 2), the combined prevalence rates of obesity and severe obesity in 2018 could possibly exceed those of 2007.
- Despite a projected decline in overweight, the combined prevalence of overweight, obesity and severe obesity in 2018 (37 percent) is projected to approach that of 2007 (37.11 percent).
- The obvious conclusion to be drawn from the BMI change analysis is that too many individuals are still moving in

Figure 2: BMI Trends and Projections

BMI Category Prevalence Forecast for 2018, All Students



the unhealthy direction. Nevertheless, additional analysis (see Figure 14 in the full report) also demonstrates that movement in the desired, healthy direction is possible; considerable percentages of individuals with an unhealthy weight can and do move to a healthy weight within a relatively short time span (i.e., two years).

- Though not a focus of this report, underweight was found for a small percentage of children and adolescents. However, overweight and obesity affect far, far more youth.

Projections need not be destiny. Increases in child and adolescent obesity and severe obesity projected by 2018 are only likely if current trends continue. Trends on which these predictions are based could be reversed if the many well-documented environmental conditions that foster unhealthy eating and inadequate physical activity are modified or discontinued. Every role in the community needs to address the problem. The goal should be to create a culture of wellness where the healthy choice is the easy choice so that every child and adolescent can attain a healthy weight.

Call to Action: Enhanced Community Involvement and Family Engagement

The child and adolescent obesity epidemic in Pennsylvania peaked in 2008 and slightly declined by 2013, which is the essential first step in controlling any epidemic. However, BMI data from 2014 and 2015 indicate that this progress may be in jeopardy. While various school-based policies, programs and activities implemented by 2012 likely facilitated positive BMI trends through 2013, **schools simply cannot be expected to bear disproportionate responsibility for reversing the child and adolescent obesity epidemic.**



To prevent the projected BMI increases identified earlier and simultaneously begin the process of reversing this epidemic over time will require both greater family engagement and intensive community involvement at all levels, while simultaneously maintaining the health-positive policies and practices already adopted by schools.

Clearly, everyone has a vested interest in reversing obesity and preventing associated diseases that cause needless distress and human suffering. For communities, improving population health makes additional sense because healthy citizens are essential to economic development. Employers have an added vested interest in child and adolescent health because today's youth are the employees of tomorrow. Investing in child and adolescent health is good business.

The full report lists many recommended actions for multiple community stakeholders, including community leaders, medical providers, insurers, philanthropic organizations, faith communities, employers, school districts and parents to implement in order to encourage, support and reinforce the healthy eating and regular physical activity habits that help children and youth maintain a healthy, normal weight. Highlights include:

A. Community Decision Makers

- Convene community stakeholders for the purpose of creating a broad-based force for health by adopting common and consistent policies and programs, delivering a common message, facilitating resource sharing and providing meaningful incentives for “making the healthy choice the easy choice”
- Include “healthy choice the easy choice” initiatives in economic development plans
- Ensure that neighborhoods are safe for children and families
- Construct or modify physical structures to facilitate physical activity (e.g., parks and playgrounds, neighborhood walking trails, sidewalks in subdivisions, etc.)
- Adopt a “complete streets” program to facilitate and encourage walking and biking
- Provide additional resources for schools so they do not have to rely on food and beverage sales and advertising for raising additional funds
- Initiate community-wide, family-friendly opportunities for physical activity
- Conduct assessments to determine if food deserts exist and, if so, rectify so that affordable, healthy food options are available to all families

B. Business Leaders

- Adopt a school for student and staff wellness, and assist with needs assessments, planning, community report preparation and dissemination, and fund-raising; coordinate corporate employee wellness programs with school employee wellness programs
- Encourage employees to volunteer for school and community wellness activities
- Adopt “healthy choice the easy choice” environments and practices in all facilities to especially support and encourage employees with children
- Provide incentives and opportunities for employees and their families to be physically active
- Encourage more healthful eating by providing nutrition education and food preparation programs for employees

C. Parents and Families

- Provide healthy meals and snacks at home and require that your child(ren) makes healthy choices when eating away from home
- Support your child in being physically active — do this as a family, provide opportunities, and turn off the screens
- Personally model healthy eating and being physically active
- Get informed — know what your school is doing with regard to nutrition and physical activity
- Volunteer — join your school district’s wellness policy advisory group
- Help implement the wellness policy — work with designated officials to ensure wellness policy compliance in your child’s school
- Demand accountability — ensure that schools monitor wellness policy implementation and regularly report progress to the community

D. School Decision Makers

- Ensure compliance with USDA standards for all foods sold in schools, on school grounds and during school-sponsored events, activities and celebrations, including fund-raisers

- Develop, implement and continually maintain a comprehensive wellness policy along with plans for assuring policy compliance in every school
- Solicit active participation of members from diverse stakeholder groups in district-level and school-level wellness councils
- Encourage family engagement and community involvement in implementing and monitoring plans to ensure wellness policy compliance
- Establish a “health and wellness” account within a school district foundation to allow targeted giving

Conclusion

Despite successes, ground is being lost where schools and communities have lost focus. While the overall total combined overweight, obese and severe obese rate among children and youth may have plateaued, the percentage that is obese and severe obese is on track to return to or exceed 2008 levels. Thus, intensified interventions with those who are already overweight or obese may be a cost-effective focus of prevention efforts. The obesity epidemic emerged over many years and there is no quick fix. Nevertheless, with coordinated efforts involving federal, state and local government agencies, public health departments, medical providers, insurers, philanthropic organizations, faith communities, employers, school districts and average citizens, over time, the rate of increase in obesity can first be stopped and then turned back. This does not mean society should return to the way things used to be 30 or 40 years ago, which is not possible. What this does mean is that modifications can be made to provide every opportunity to reduce childhood overweight and obesity.

Pennsylvania secondary schools made substantial improvements in health practices from 2008 to 2012. However, erosion occurred in some areas by 2014. The reasons for this erosion are unknown, but it might have been caused by such factors as fatigue due to having to maintain efforts at an elevated level over time or to a change of focus by elected officials, administrators, faculty members and school staff members to other pressing issues, such as student achievement test scores, school funding and/or reduced availability of the

time and resources required to maintain positive health practices. Regardless of the reasons, this development means that other stakeholders who care about healthy children and adolescents must intensify their efforts.

The good news for Pennsylvania is that the many processes required to prevent further increases in overweight and obesity among children and adolescents began almost 10 years ago, and due to recent efforts at many levels, a substantial number of beneficial actions continue to occur in schools and communities across the commonwealth.

Recommendations

Realizations about the many combined causes of the obesity epidemic should make one crucial point quite clear. Engaging in the healthy eating and physical activity behaviors needed to maintain a healthy weight has become increasingly difficult for individuals in the present-day environment.

Diverse efforts implemented at many levels, from national to local, should support healthy eating and regular physical activity with the goal of attaining a healthy weight, without stigmatizing and alienating individuals who are obese. Several recommendations are proposed to close the gaps and develop criteria with the realization that lags will occur between the time any one step is taken and positive results are realized:

1. Collect accurate baseline, surveillance data to document the extent of the obesity epidemic across all age groups, including children and adolescents
2. Adopt sound policies and practices designed to create healthy food environments and encourage physical activity with the goal of making the healthy choice the easy choice
3. Implement and sustain evidence-based actions and programs, small and large, at many levels, including social marketing campaigns
4. Continue to identify and share new and promising initiatives that can be added to ongoing efforts
5. Regularly monitor progress toward creating healthy food environments and physical activity opportunities; use results to make adjustments to plans and time lines as well as modify and expand activities over time in order to maximize effect
6. Monitor participation in healthy eating and physical activity events and programs, and adjust as needed to maximize participation rates
7. Monitor trends in overweight and obesity, over time, among all age groups
8. Be both exceptionally persistent and patient over time

Mission

The Highmark Foundation is a private, charitable organization dedicated to improving the health, well-being and quality of life for individuals and communities throughout the areas served by Highmark Inc. and its subsidiaries and affiliates. We fulfill our mission by awarding high-impact grants to charitable organizations that implement evidence-based programs aimed at improving community health. Central to the Foundation's mission is identifying and continually re-evaluating our region's prevailing health care needs. By doing so, the Foundation remains at the forefront of those needs, well equipped to pinpoint issues that most urgently need support.

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To access the entire report, *Stemming the Flood: Childhood Obesity Prevention in Pennsylvania, 2005 – 2015*, please visit: highmarkfoundation.org

Sources

The following resources were used to inform the preparation of this report:

1. AMA Adopts New Policies on Second Day of Voting at Annual Meeting. American Medical Association. <http://www.ama-assn.org/ama/pub/news/news/2013/2013-06-18-new-ama-policies-annual-meeting.page>.
2. Division of Nutrition, Physical Activity and Obesity. Centers for Disease Control and Prevention <http://www.cdc.gov/obesity/>.
3. County Health Rankings and Roadmaps. Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/>.
4. America's Health Rankings. United Health Foundation <http://www.americahealthrankings.org/ALL/Obesity/>.
5. Adolescent and School Health. Centers for Disease Control and Prevention <http://www.cdc.gov/HealthyYouth/index.htm>.
6. American Cancer Society www.cancer.org/cancer/cancercauses.
7. Centers for Disease Control and Prevention <http://www.cdc.gov/media/pressrel/2010/r101022.html>.
8. Centers for Disease Control and Prevention <http://www.cdc.gov/healthyschools/obesity/facts.htm>.
9. American Academy of Pediatrics <https://healthychildren.org/English/health-issues/conditions/obesity/Pages/The-Physical-Toll-of-Obesity.aspx>.
10. American Diabetes Association <http://www.diabetes.org/advocacy/news-events/cost-of-diabetes.html>.
11. Kessler DA. *The End of Overeating — Taking Control of the Insatiable American Appetite*. New York: Rodale Inc.; 2009.
12. Crister G. *Fat Land: How Americans Became the Fattest People in the World*. Boston: Houghton Mifflin; 2003.
13. Hamid, TKA. *Thinking in Circles about Obesity: Applying Systems Thinking to Weight Management*. New York: Springer; 2009.
14. Kaufman FR. *Diabesity: The Obesity-Diabetes Epidemic that Threatens America — and What We Must Do to Stop It*. New York: Bantam Books 2005
15. Lohrmann, D.K., Youssefagha, A.H., Jayawardene, W.P. (2014). Trends in BMI and Prevalence of Extreme High Obesity among Pennsylvania Children and Adolescents, 2007–2011: Promising but Cautionary. *American Journal of Public Health*. 104 (4) e69 — Online Only Article.
16. Youssefagha, A. H., Lohrmann, D.K. (2013). Use of Data-Mining to Reveal Body Mass Index (BMI) Patterns among Pennsylvania School Children, PK–12. *Journal of School Health*. 83 (2) 85-92.
17. Centers for Disease Control and Prevention, Adolescent and School Health <http://www.cdc.gov/healthyyouth/data/profiles/index.htm>
18. Cawley J and Meyerhoefer C. The Medical Care Costs of Obesity: An Instrumental Variables Approach. *Journal of Health Economics*, 31(1): 219-230, 2012; And Finkelstein, Trogon, Cohen, et al. Annual Medical Spending Attributable to Obesity. *Health Affairs*, 2009.
19. http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html.
20. <http://www.cdc.gov/obesity/data/childhood.html> childhood obesity facts (6/24/16).
21. Adult Obesity Facts. <http://www.cdc.gov/obesity/data/adult.html>. Retrieved July 2, 2016.
22. Ogden, CL. Carroll, MD, Kit, BK and Flegal, KM. Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA*. 2014; 311(8):806-814. doi:10.1001/jama.2014.732.
23. Fast Facts on the State of Obesity in America. <http://stateofobesity.org/fastfacts/>
24. Societal cost of obesity could exceed \$1.1 trillion, new Brookings research finds. <http://www.brookings.edu/blogs/brookings-now/posts/2015/05/societal-costs-of-obesity>, May 12, 2015 4:44pm.
25. <http://www.cdc.gov/diabetes/pdfs/data/diabetesbelt.pdf>. Accessed August 19, 2016.



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