

Life Course Indicator: Physical Activity Among High School Students

The Life Course Metrics Project

As MCH programs begin to develop new programming guided by a life course framework, measures are needed to determine the success of their approaches. In response to the need for standardized metrics for the life course approach, AMCHP launched a project designed to identify and promote a set of indicators that can be used to measure progress using the life course approach to improve maternal and child health. This project was funded with support from the [W.K. Kellogg Foundation](#).

Using an RFA process, AMCHP selected seven state teams, Florida, Iowa, Louisiana, Massachusetts, Michigan, Nebraska and North Carolina, to propose, screen, select and develop potential life course indicators across four domains: Capacity, Outcomes, Services, and Risk. The first round of indicators, proposed both by the teams and members of the public included 413 indicators for consideration. The teams distilled the 413 proposed indicators down to 104 indicators that were written up according to three data and five life course criteria for final selection.

In June of 2013, state teams selected 59 indicators for the final set. The indicators were put out for public comment in July 2013, and the final set was released in the Fall of 2013.

Basic Indicator Information

Name of indicator: Physical Activity Among High School Students (LC-33)

Brief description: Proportion of high school students who are physically active for at least 60 minutes per day on five or more of the past seven days.

Indicator category: Family Well-being

Indicator domain: Risk/Outcome

Numerator: Number of high school students who report being active for at least 60 minutes per day on five or more of the past seven days.

Denominator: All high school students

Potential modifiers: race, Hispanic ethnicity, gender, high school grade (9-12), state, urban school district

Data source: Youth Risk Behavior Surveillance System (YRBSS)

Notes on calculation: Analysts who use the raw datasets should apply the appropriate survey weights to generate the final estimates.

Similar measures in other indicator sets: HP 2020 Focus area PA-3; NQF measure 1348; Chronic Disease Indicator

Life Course Criteria

Introduction

The Centers for Disease Control and Prevention (CDC) recommends children and adolescents should participate in 60 minutes or more of physical activity each day.³ Most of this activity should come in the form of moderate- or vigorous-intensity aerobic activity, which is defined as activity that increases heart rate and makes you breathe hard for some of the time.³ Moderate physical activity is activity such as brisk walking, while vigorous physical activity is an activity that involves mostly running. Two other types of physical activity include muscle strengthening (gymnastics, pushups, sit-ups, etc.) and bone strengthening (jumping, hopping, jump roping). The majority of adults and adolescents in the United States do not achieve CDC recommended activity levels.⁴ According to YRBSS, only 49.5 percent of high school students reach recommended physical activity levels nationally and these percentages drop for racial/ethnic minorities as well as females. Intervention is needed to improve this indicator overall and within specific populations in order to improve health and equity.

Regular physical activity decreases the risk of the leading causes of morbidity and mortality in the United States including high blood pressure, heart disease, diabetes, obesity, and certain types of cancer.^{5,6} An active lifestyle during early childhood and youth increases the chances that an individual will remain active in adulthood,⁷ making intervention in youth particularly important. Physical activity has the ability to improve intergenerational health as well as individual health. Healthy weight prior to pregnancy can improve birth outcomes and lowers risk for maternal morbidity and mortality. Regular physical activity throughout pregnancy can help women control their weight, make labor more comfortable, and reduce their risk of pregnancy complications and postpartum depression.^{8,9,10} In addition, parents that maintain a healthy weight by modeling a healthy lifestyle are setting good examples for their children to follow to maintain better health outcomes as adults.

Implications for equity

National data from the 2011 YRBSS shows Black, Asian, and Hispanic high school students are less likely to achieve at least 60 minutes of physical activity on five or more days of the last week compared to White high school students.⁴ Children of low socioeconomic status (SES) also achieve fewer minutes per day of moderate to vigorous physical activity than high SES children.¹¹ Racial/ethnic minority and low SES youth living in urban, low-resource communities have barriers to adequate physical activity in school and outside of school. Access to school sports facilities and equipment storage space increase recreational opportunities among youth, which is associated with increased levels of physical activity.¹² Low-income schools suffer from limitations in providing these and other resources, which is likely a contributor to the inverse relationship that has been observed between a school's median household income and average body mass index.¹² Outside of school, low SES, urban neighborhoods may lack infrastructure necessary for activity such as sidewalks, or may not be safe enough for outdoor activity. A study examining data from the National Longitudinal Study of Adolescent Health found low SES adolescents were more likely to live in an area without a physical activity or recreation facility and these adolescents were at a greater risk for not achieving adequate moderate to vigorous physical activity levels.¹³ Even when there are recreation facilities available in low-income communities, the quality of those facilities is typically not on par with facilities in high-income communities.¹⁴

Disparities in attaining recommended physical activity levels also exist by gender. Girls are less active than boys at all ages, and many females experience a transition away from sport and physical activity in early adolescence that leads to a sedentary lifestyle in later adolescence.¹⁵ Nationally, only 38.5 percent of female high school students achieve 60 minutes of physical activity on five or more days per week compared with 59.9 percent of high school males. Racial/ethnic minority females fare even worse with only 31.9 percent of Black, 33 percent of Hispanic, and 24.7 percent of Asian high school females reaching recommended activity levels.⁴ Limited involvement in physical activity by high school age females may be due to social constraints. Girls in a study by Youngbult, Schinke, and McGannon (2011) listed numerous social reasons such as judgment for not being good enough, not having other active friends, or lack of peer support in sports as reasons for limited participation in physical activity.¹⁵

Public health impact

Physical inactivity is a contributing factor to some of the most prevalent and costly public health issues in the U.S. Sedentary lifestyle is highly correlated with overweight and obesity,¹⁶ which are risk factors for heart disease, stroke, type II diabetes and certain types of cancer.¹⁷ Health care and lost productivity costs associated with obesity are \$147 billion

annually in the United States and are expected to increase by \$48 billion annually by 2030.¹⁷ Much of these costs fall on government funded health care as estimates for the percentage of health care costs that are financed through Medicaid and Medicare are as high as 50 percent.¹⁸ Economic models show if just 10 percent of U.S. adults began a regular walking program, approximately \$5.6 billion in heart disease costs could be eliminated, yet, 56 percent of adults report they do not engage in any vigorous activity at all.¹⁹

Randomized control trials have found increasing physical activity results in weight loss and decreases in body fat composition, indicating increasing physical activity is an effective intervention against obesity.¹⁶ Adequate physical activity also has a role in chronic disease prevention that is independent from overweight or obesity. Research suggests inactivity and low cardiorespiratory fitness are independently equal predictors of mortality as overweight and obesity.¹⁶ Developing physically active habits in youth is critical to successfully achieving a rise in physical activity among the U.S. population as tracking physical activity levels has shown moderate to high stability throughout life periods.⁷

In addition to affecting important physical health outcomes in both adolescence and adulthood, increasing physical activity in youth could help to achieve improved academic outcomes.²⁰ Studies have found positive associations between school-based physical education, recess, classroom physical activity, and extracurricular physical activity with academic performance indicators such as grades and standardized test scores as well as improved cognitive skills and attitudes.²⁰

Leverage or realign resources

The health care sector currently has emerging opportunities for engagement in increasing physical activity for high school students through prevention provisions in the Affordable Care Act (ACA). Children under the age of 21 are eligible for preventive and comprehensive health services under the Medicaid Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit.²¹ The screening component of EPSDT entitles children to periodic physical examinations as well as health education, which enables discussions surrounding health concerns between children, their parents, and a health care provider. These discussions present an opportunity for health care providers and parents to discuss increasing physical activity in children who are not meeting recommended levels. Additionally, section 4108 of the ACA authorizes grants to states to provide initiatives or programs to Medicaid enrollees to accomplish a number of chronic disease prevention goals that are related to physical inactivity including lowering blood pressure, avoiding the onset of diabetes, and controlling or reducing weight.²¹ These initiatives may be geared toward youth as Medicaid beneficiaries of all ages are eligible to be the target of these programs.

The education sector is an equally important partner in improving the high school students' physical activity indicator. More than 49.8 million students can be impacted by working with public schools, and 14.9 million of these are in grades nine through 12.²² Schools have an added stake in the issue of students' sedentary lifestyle as educational outcomes have been tied to physical activity in a number of studies.²⁰ Physical education (PE), recess activity plans, improved recess space design, and classroom activity breaks have all produced increases in the amount of moderate to vigorous physical activity in students, with classroom activity breaks also yielding improvements in students' on-task behavior.²² Quality PE is key in developing activity patterns throughout the life course and schools need proper resources, trained PE staff, and time to achieve national and state standards. The following six content standards for PE are listed by the National Association of Sport and Physical Education (NASPE):

1. Demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities
2. Demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities
3. Participates regularly in physical activity
4. Achieves and maintains a health-enhancing level of physical fitness
5. Exhibits responsible personal and social behavior that respects self and others in physical activity settings
6. Values physical activity for health, enjoyment, challenge, self-expression²³

Low budgets for school PE programs have become commonplace in the U.S. In 2010, the NASPE conducted the Physical Education Trends in Our Nation's Schools: A Survey of Practicing K-12 Physical Education Teachers and found the median PE budget for schools in the U.S. is only \$764 per school year.²⁶ Schools often reduce PE programs in order to increase classroom time, assuming that this will improve academic performance measures, however, the data on physical fitness, physical activity, PE, and academic performance measures indicate this may be counterproductive.²⁵ Studies in California and Texas have shown positive relationships between physical fitness and standardized test scores.²⁷ Research and analysis by the CDC found only positive correlations or no correlations between PE, recess, classroom physical activity, and extracurricular physical activity with academic achievement measures.²⁷ The Alliance for a Healthier Generation's Healthy School Program provides a framework for promoting healthier school environments through best practices related to physical activity, healthy eating, and wellness.²⁸ Schools can enroll in the program at no cost and gain access to customized action plans and other online resources.²⁸ Funding for implementing PE and health programs identified through the Healthy School Program can be found through the [SPARK Grant-Finder Tool](#), which locates grants for PE and health-related programs. In South Carolina, the Healthy Schools Program provides tools and resources for physical activity and health education at 330 schools to over 160,000 students and is funded completely through a grant from the Robert Wood Johnson Foundation.³¹ In Florida, improvements have been made in time spent in physical and health education through the Healthy Schools Program with funding from multiple organizations and grants.³¹ Another resource for improving PE in schools is the Presidential Youth Fitness Program, which provides a model to enhance school PE programs.³⁰ Funding is currently available for eligible schools to implement the [Presidential Youth Fitness Program](#) through the year 2017.³⁰ The grant covers professional development for physical educators, fitness assessment resources and software, and awards for students who meet fitness standards through the program.³⁰

Targeted interventions toward young females may be necessary to create equally healthy physical activity patterns among males and females. The Trial of Activity for Adolescent Girls (TAAG) was a large national study on increasing physical activity opportunities for girls and was conducted in 36 middle schools in conjunction with local universities. The TAAG intervention provided physical education, health education with physical activity homework challenges, partnerships between universities, communities, and schools to promote physical activity, and social marketing promoting an active lifestyle.²⁴ Results of evaluation of TAAG indicated an increase in physical activity programs for girls at participating schools, increased collaborations with community agencies to promote physical activity in girls, and that as girls' enjoyment of physical activity levels increased so did their perceived benefits of physical activity and self efficacy for physical activity outside of school.²⁴

Access to recreation facilities and community physical activity programming is positively associated with physical activity in young people.¹⁴ Low-income groups typically have less access to community physical activity programming and quality, safe parks.¹⁴ Efforts to increase community physical activity programming and the quality of recreation facilities, such as parks and community centers, in low-income neighborhoods may increase physical activity levels in the youth of these communities. The President's Challenge is an online resource that can be used by families and communities to boost physical activity levels. The program was originally designed for youth but now has resources, activity tools, and award recognition for people of all ages.²⁹ The goal of the President's Challenge is to help "people of all ages and abilities increase their physical activity and improve their fitness through research-based information, easy-to-use tools, and friendly motivation."²⁹ The challenge website (www.presidentschallenge.org) provides free resources such as youth fitness programs, fitness challenges, activity trackers, and recognition for reaching fitness milestones.²⁹ Since the conception of the President's Challenge, over 50 million youth have been recognized for reaching fitness achievements with the help of the program.²⁹

Predict an individual's health and wellness and/or that of their offspring

Physical inactivity has been identified by the World Health Organization as the fourth leading risk factor for global mortality.⁶ People who do not engage in at least 30 minutes of moderate intensity physical activity are at a 20 to 30 percent increased risk of death than people who do achieve this level of activity.⁶ Research has shown that physical activity levels impact an individual's risk for overweight/obesity, cardiovascular disease, type II diabetes, certain cancers, and many other health conditions.^{5,6} Regular physical activity helps maintain health through improved muscular and cardio-respiratory fitness, improved bone and functional health, reduction in risk of chronic disease, and a reduction in risk of falls and fractures.⁶ Increased physical activity has been shown to improve patients' quality of life and nutrition, reduce inflammation and depression, and decrease treatment costs and the need for hospitalization.⁶

Studies tracking physical activity from childhood through youth and into adulthood have found rates of physical activity in early life correlate with physical activity rates in adulthood.⁷ In order to increase the chances that an individual will remain physically active over the life course and receive the health benefits of physical activity in each life stage, it is crucial to instill activity habits in youth. Increasing activity before a person reaches high school should help them remain active throughout their life course.

Data Criteria

Data availability

The Youth Risk Behavior Surveillance System (YRBSS) monitors priority health-risk behaviors and the prevalence of obesity and asthma among youth and young adults. The YRBSS includes a national school-based survey conducted by the CDC, state, territorial, and local education and health agencies and tribal governments.

YRBSS monitors six categories of priority health-risk behaviors among youth and young adults, including behaviors that contribute to unintentional injuries and violence; sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection; alcohol and other drug use; tobacco use; unhealthy dietary behaviors; and inadequate physical activity. In addition, YRBSS monitors the prevalence of obesity and asthma.

The YRBSS is administered every other year (odd years), generally in the spring semester in schools via a pencil and paper mode. The YRBSS survey contains no skip patterns. In the even-numbered years, CDC leads a process of examining and revising the questionnaire, using both expert opinion and votes from the YRBS coordinators in states. The final result is a standard questionnaire that can be modified by states to meet their needs, but modifications must be within certain parameters: 1) the modified questionnaire must contain at least two-thirds of the original standard questionnaire, 2) questions that are added are limited to eight mutually exclusive response options, 3) the questionnaire may not have skip patterns or fill in the blanks, and 4) the questionnaire may not exceed 99 questions, and the state must retain the height and weight questions. The 2011 YRBSS included a national school-based survey conducted by CDC and 47 state surveys, six territory surveys, two tribal government surveys, and 22 local surveys conducted among students in grades nine through 12 during October 2010-February 2012. Data collected by CDC represent both public and private schools with students in grades nine through 12; data collected by states, territories, tribes, and localities represents primarily public school students.

The relevant survey question for this indicator is: “During the past seven days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spend in any kind of physical activity that increases your heart rate and makes you breathe hard some of the time.)” which is a part of the standard questionnaire.

Data quality

From the available YRBSS documentation, the 2011 national YRBS school response rate was 81 percent; the student response rate was 87 percent; and the overall response rate was 71 percent. Comparisons between estimates for states and districts from the national data collection effort and the surveys collected by states, territories, tribes, and localities can be found on the CDC YRBSS website. Each jurisdiction reached a minimum site response rate of 60 percent and therefore had weighted data for that year. Weighted data allows a jurisdiction to make statements from the data that generalize to all high school students in that jurisdiction.

Studies by CDC and others indicate that data about risk behaviors can be gathered as credibly from adolescents as from adults. YRBSS performs internal reliability checks to help identify the small percentage of students who falsify their answers. To obtain truthful answers, students must perceive the survey as important and know procedures have been developed to protect their privacy and allow for anonymous participation.

A test-retest study of the 1999 version of the questionnaire found that 47 percent of items had at least “substantial” reliability, with kappa statistics of agreement of 61 percent or greater, and 93 percent of items had at least “moderate” reliability, with kappas of 41 percent or greater.¹ The study found no differences in reliability by gender, grade, or race/ethnicity. The study found that items related to tobacco use, alcohol and other drug use, and sexual behavior had the highest reliability. By comparison, items asking about dietary behaviors, physical activity, and other health-related topics were less reliable. A study of mode and setting using the YRBSS questions² determined that students were more likely to report risk behaviors when they took the survey at school compared with taking the survey at home.

Simplicity of indicator

The numerator and denominator are simple to calculate. This indicator is easy to explain and can be understood by all stakeholders.

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