

# BMI and shuttle run among techniques IOM Report recommends for youth fitness testing

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Techniques ranging from running to push-ups to sit-and-reach tests have been used to measure various aspects of fitness in children and adults. However, evidence is sparse on how well some of these techniques correspond to desired health outcomes in children, fueling debate about the best fitness measures for youth.

[Fitness](#) testing has traditionally focused on four aspects: heart and lung function, body composition, muscular and skeletal fitness, and flexibility. A committee convened by the Institute of Medicine undertook a comprehensive review of the science and found that it supports the use of specific ways to measure three of these components—cardiorespiratory endurance, body composition, and musculoskeletal fitness—in young people. These measurements should be used in national youth fitness surveys and school-based fitness tests, says the committee's report.

Recent events underscore the importance of evaluating the evidence base for different elements of fitness testing. Earlier this year, the [Centers for Disease Control and Prevention](#) launched the 2012 NHANES National Youth Fitness Survey, the first nationwide survey of fitness in young people since the mid-1980s. And earlier this month, the President's Council on Fitness, Sports, and Nutrition announced it is adopting FITNESSGRAM, a battery of tests provided by the nonprofit Cooper Institute, as the assessment for the Presidential Youth [Fitness Program](#). This is the program under which much school-based fitness testing is conducted.

"This report's recommendations offer helpful guidance to those designing fitness batteries targeted at children and adolescents," said committee chair Russell R. Pate, professor of exercise science, Norman J. Arnold School of Public Health, University of South Carolina, Columbia. "Collecting more data through surveys and in schools will advance our understanding about how fitness in early years translates into better health throughout a lifetime."

Studies have found cardiorespiratory endurance to be associated with risk factors for developing heart disease later in life. The progressive shuttle run—an exercise in which participants sprint back and forth between two points—is a good measure of cardiorespiratory endurance, the committee concluded. If space is limited and resources permit, cycle ergometer and treadmill tests are valid and reliable alternatives for the shuttle run in national surveys.

Body mass index (BMI), a calculation of body weight in relation to height, is related to young people's risk for obesity-related conditions such as diabetes. BMI measurements can easily be done in both national surveys and schools to measure body composition, the committee said. Those conducting national surveys should also measure each participant's waist circumference and skinfold thickness.

Emerging evidence from studies involving children and adolescents suggests that musculoskeletal fitness is related to bone health and [body composition](#). Handgrip strength and the standing long jump should be used to measure musculoskeletal fitness by both national fitness surveys and schools, the report says. The committee found insufficient evidence linking flexibility to health outcomes in young people and therefore did not recommend techniques to measure flexibility.

Other techniques besides those recommended by the committee are commonly used in schools to measure fitness in youth. Schools use

fitness tests to teach children and their families about the importance of physical fitness and to guide individuals on ways to maintain fitness and health. Tests such as a 1-mile run, modified pull-ups or push-ups, and sit-and-reach tests can have educational value and therefore could be used as supplementary measurements of fitness in schools, the committee said. All methods that are used should be safe, reliable, and feasible to conduct in school settings. The committee emphasized that school staff members need to take into consideration confidentiality, self-esteem, and other sensitivities surrounding physical fitness testing when they share test results with students and their families.

Provided by National Academy of Sciences

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