

Physical Activity: Moving Toward Obesity Solutions— Workshop in Brief

On April 14-15, 2015, the Roundtable on Obesity Solutions held a 2-day workshop titled “Physical Activity: Moving Toward Obesity Solutions.” While the idea that physical activity impacts health can be traced as far back as Hippocrates, workshop planning committee chair Russell Pate stated that the scientific study of physical activity did not begin until the 20th century. By the 1990s, he said, researchers had collected enough evidence on the health implications of physical activity that the first of what would become many public health statements on the importance of exercise was put forth. In 2008, the U.S. federal government issued for the first time fully approved physical activity guidelines. The science has continued to accumulate, Pate said. The goal of the April 14-15 workshop was to provide an expert summary of the state of the science regarding the impact of physical activity in the prevention and treatment of overweight and obesity and to highlight innovative strategies for promoting physical activity across segments of the population. This Workshop in Brief highlights key points made during the presentations and discussion.¹ The information and suggestions for future action summarized here reflect the knowledge and opinions of individual workshop participants and should not be construed as consensus.

Physical Activity and Obesity—State of the Science

The day 1 goals of the workshop were to (1) provide authoritative summaries of the state of the science regarding the effects of physical activity on development of overweight and obesity in children and adults; and (2) review current knowledge of the effects of physical activity in individuals with obesity.

Keynote: Does Physical Activity Have a Role in Reducing Obesity?

Media headlines have been proclaiming the “myth about exercise,” keynote speaker James Hill remarked. Some peer-reviewed scientific publications have been sending the same message. However, strong evidence indicates that the net impact of adding physical activity to a weight loss program is a total increase in energy expenditure. In other words, most people lose weight. The few who gain weight do so because they increase their energy intake at the same time. “There is no magic here,” he said. Even more important than its affect on energy expenditure, in Hill’s opinion, is physical activity’s affect on the regulation of energy balance. He referred to the “amazing science” conducted over the past decade on brain circuitry that regulates food intake and the way physical activity affects that circuitry, with important differences between people who occupy what he called the “regulated zone” versus the “unregulated zone.” People who occupy the regulated zone are physically active, and their bodies match intake and expenditure. People who occupy the unregulated zone, which Hill suspects is the majority of the human population, are physically inactive or not as physically active and their bodies are not doing a good job matching food intake and energy expenditure. In fact, food is, he said, “driving the bus” for people who occupy the unregulated zone. In his opinion, the first step to obesity prevention and treatment should be to move people from the unregulated into the regulated zone. The challenge, he said, is getting people to move.

¹ A comprehensive summary of the workshop will be publicly available in a forthcoming publication.

Physical Activity Disparities: Socio-Demographic Dimensions

Moving from the unregulated to the regulated zone will be a longer journey for some populations, Aviva Must stated, given significant socio-demographic disparities not just in obesity, but in physical activity too. She highlighted the striking decline among older children (12-19 years of age) in moderate to vigorous activity, with only the youngest children (6-11 years of age) meeting the national recommendation of 60 minutes every day. The decline, she said, cuts across all major racial and ethnic groups. Among adults, the rates of moderate to vigorous physical activity are likewise strikingly low, with only about 20 to 25 percent of adults meeting the recommended levels. Adults show more variability than children across race and ethnicity, according to Must, with blacks and Hispanics being more likely to be completely physically inactive compared to whites. While the minutes per day spent on moderate to vigorous physical activity are too low for most people, she said, evidence indicates that it is especially low for people with mobility disabilities. Must described ways that disparities both in the built environment (e.g., availability of nearby physical activity facilities) and in policy (e.g., recess policies) impact physical activity and she urged more equitable access to physical activity opportunities.

Physical Activity and Primary Prevention of Obesity in Youth

Researchers involved with the Iowa Bone Development Study, a 16-year longitudinal study, found that children and youth who are more moderately to vigorously active have lower adiposity. Kathleen Janz, who was involved in that study, identified it as one of several observational studies on the association between physical activity and adiposity in youth. Other prospective studies, but not all, have likewise shown high levels of adiposity being associated with low levels of physical activity. The relationship between adiposity and physical activity, Janz continued, is bidirectional, with other evidence indicating that adiposity leads to less moderate to vigorous activity. She suspected a positive feedback loop between adiposity and physical activity in youth. The good news, Janz opined, is that some families are doing it right—their children are maintaining healthy levels of activity and adiposity throughout childhood. She encouraged learning from them and underscored the importance of starting early, before children begin school.

Speaking of starting early, Shari Barkin and her research team found that preschoolers average more than 100 minutes per day of moderate to vigorous physical activity, but they get that activity in spurts and sporadically. These findings suggested to Barkin that providing “structured” time to play does not capitalize on normal development. She stressed the importance of aligning policies with childrens’ natural movement patterns. Barkin went on to describe results from three intervention trials on physical activity in preschool and kindergarten school settings, with promising results regarding the sustainability of the beneficial effects of physical activity interventions. Moving from the school setting to the greater community, Barkin highlighted the importance of teaching families, both children and adults, how to use nearby parks and recreation facilities and other physical activity—promoting features of their built environments.

Physical Activity and Primary Prevention of Obesity in Adults

The workshop discussion shifted from a focus on children to a focus on adults. Ulf Ekelund described evidence showing only a very weak association between physical activity and weight gain and other evidence suggesting that physical activity reduces the risk of obesity but only in people with normal weight status at the baseline. In contrast, Ekelund continued, other evidence indicates a strong relationship between physical activity and other health outcomes, including all-cause mortality. Increasing physical activity by simply adding 20 minutes of brisk walking each day has shown to reduce the risk of mortality by 24 percent in people of normal weight and by 16 percent in people who are obese. Ekelund called for a greater focus on promoting physical activity for health rather than for weight.

Robert Ross differentiated between efficacy studies on the association between physical activity and weight gain versus effectiveness studies on the association between encouragement to increase physical activity and weight gain. Those are two different questions, he said, and they require different study designs. Based on a review of evidence from randomized controlled efficacy trials, Ross concluded that unless individuals eat more, exercising in supervised conditions increases energy expenditure and leads to both weight loss and reduced waist

circumference. Echoing keynote speaker James Hill’s sentiment, he said, “I just don’t think there is any ambiguity there. I think the information is very clear.” Based on a review of evidence from randomized controlled effectiveness trials, Ross further concluded that lifestyle interventions designed to prevent weight gain are generally effective, although it is unclear which component of the interventions—diet or exercise—is responsible. He suggested that treatment of obesity may be too great a challenge and that a more desirable outcome might be prevention of weight gain.

Physical Activity-Related and -Induced Outcomes with Overweight and Obesity

Several speakers agreed that most youth who are obese will probably remain obese for the rest of their lives, raising the question of whether it is possible for overweight or obese children and adults to have healthy metabolic profiles. The final session of the first day focused on that question.

First, Andrea Kriska discussed the results of the Diabetes Prevention Program (DPP) and its 10-year follow up. Among other findings, the researchers reported decreased diabetes incidence in the lifestyle intervention arm, with physical activity being a critical component of that intervention. The researchers are still analyzing data from an expanded community-wide follow-up study, but Kriska noted that they observed increased physical activity, reduced weight, and significant improvements in cardiovascular risk factors. For Kriska, the evidence indicates that physical activity levels in adults who are overweight and showing signs of pre-diabetes can be increased and that improvement in physical activity levels may have significant impact on diabetes prevention and other health outcomes. She echoed earlier calls to better understand the impact of mild activity, not just moderate to vigorous activity.

Shifting the focus back to children and youth, Gabriel Shaibi examined evidence demonstrating that regardless of its effect (or lack of effect) on weight gain or loss, physical activity is nonetheless protective against morbidity and mortality in children who are overweight or obese. He cautioned that researchers need to think more carefully about the outcomes they are measuring. Instead of weight he suggested cardio-metabolic health risk factors relevant for children (i.e., not based on what has been reported in adults). Among other findings, researchers have reported that exercise increases stroke volume in obese children and youth (with stroke volume representing how much blood the heart is able to pump), essentially normalizing myocardial dysfunction even without weight loss. Shaibi also stressed thinking about the kind of exercise or physical activity that children and youth like to do and suggested that incentives to get children and youth moving might be worth considering.

If obesity is not part of the discussion on the effects of physical activity on health outcomes, John Jakicic cautioned, “we will miss something.” He discussed evidence demonstrating that, indeed, weight matters. For example, data from the Look AHEAD trial show that while physical activity predicts hypertension, weight has an independent effect as well. Studies on adults with knee osteoarthritis show the same, that is, that exercise improves outcomes, but exercise combined with weight loss improves those outcomes even more. “Yes, we can get the effect [with exercise alone],” he said. “But how do we maximize the effect?” In the question and answer period following Jakicic’s talk, a key topic of discussion was identifying weight loss interventions that work in the long run. The challenge, in Jakicic’s opinion, is not to figure out which dose of physical activity to prescribe, but rather how to get more people to adopt the actions that researchers know work. “I think that’s where the action really should be,” he said.

Innovative Strategies for the Promotion of Physical Activity

The day 2 goal was to highlight innovative policy, community, and institutional strategies for promoting physical activity among children and adults.

Policy Strategies for Promoting Physical Activity

The day began with a discussion of policies aimed at promoting physical activity. First, Amy Eyler asked, why policy? In her opinion, two key advantages of policies are that they reach a large percentage of the population and they remain sustainable over time. She described public policies across several sectors that impact physical activity

and identified barriers to promoting and implementing innovative policies. In community planning and zoning, a major challenge is not only to build sidewalks and places where people can walk, but also to maintain those areas. In the public transportation sector, ballot issues related to increasing public transit policies that would encourage physical activity often receive widespread support (e.g., installing a bus stop that would encourage walking); however, funding remains a challenge (e.g., people are not willing to approve tax increases). In Eyster's opinion, promoting physical activity will require a culture change, much the same way that tobacco policies did, and that this culture change will likely emerge from a convergence of top-down (public) and bottom-up (organizational) policies.

Jamie Chriqui discussed research results on a wide range of public policies and explained how that research has helped to identify challenges to promoting and implementing policies that encourage physical activity. Most of the work, she said, has been in the education sector. For example, studies have shown that many state laws do not address the actual amount of time in physical education classes spent doing moderate to vigorous physical activity. That reality, combined with the confusing wording of many state laws regarding what physical activity actually means, leads to many students missing their nationally recommended physical activity time. Outside of education, zoning and land-use policy is another key sector with implications for physical activity. But there are many gaps in the evidence base, Chriqui said; for example, the lack of data on how complete streets policies impact not just health outcomes but economic development outcomes as well. In Chriqui's opinion, too often studies are done on single policies, mostly in education, and only after a policy has been implemented. She called for longitudinal studies that look at the collective impact of policies across multiple sectors.

Community Strategies for Promoting Physical Activity

“Do built environments matter?” Jim Sallis asked. The short answer is, yes. In Sallis's opinion, the American landscape of residential subdivisions and highway interchanges has dramatically reduced active travel. Highways are built not to accommodate walking or biking and traveling on a highway by foot or bike is against the law. Sallis discussed evidence on the design of active-friendly communities and their impact on physical activity. For example, data from one study show that people who live in “walkable” neighborhoods are 5 to 7 minutes more active every day. That may not sound like much on a daily basis, Sallis said, but it amounts to about 50 minutes or 2 miles of additional walking per week, or about 100 additional miles and 10,000 extra calories spent per year. Theoretically, 10,000 calories could prevent a weight gain of about 3 pounds, which is more than the average American weight gain. While it may be difficult to change a landscape once roads and buildings have been laid out, Sallis continued, it is possible to change “micro-scale” features of the landscape to make it more walkable. He described data showing that benches, street lights, and similar structures can encourage more walking among different age groups. The bad news, he said, is that there are disparities in many of the variables studied, with lower-income neighborhoods having, for example, fewer streetlights and fewer marked crosswalks.

Although technology has engineered regular movement out of our daily lives, Abby King asked whether technology could be harnessed to do the opposite. In her opinion, the way that technology captures real-time information and delivers personalized messages could have extraordinary population reach and impact on physical activity. However, the explosion of mobile devices, she said, has created what she called a “wild west,” with traditional science not agile enough to capture trends. She advocated for community engaged citizen science and encouraged partnering with industry to capture the tremendous amount of real-time self-movement data being collected by individuals. She also envisioned tremendous potential for personalized information technology advising; for example, through the use of “Carmen,” a bilingual virtual adviser developed for use in community centers as a way to increase walking among older Latino adults.

Institutional Strategies for Promoting Physical Activity

A key finding in the 2012 *Physical Activity Guidelines for Americans Midcourse Report*, according to Allison Nihiser, was that strong evidence calls for a multi-component approach to promoting school physical activity, with physical education as an essential part of the approach and with the majority of physical education class time spent keeping students active. Other recommended components include active transportation (e.g., walking or biking to school)

and activity breaks (e.g., classroom-based physical activity, recess). She discussed how recommendations put forth in that report helped to inform and strengthen the Centers for Disease Control and Prevention's (CDC's) and SHAPE America's Comprehensive School Physical Activity Program, a national framework for addressing physical activity in schools, and how other national initiatives are helping states to implement the report recommendations. Among other signs of progress, CDC provided funding in 2013 for the first time to all 50 states to address physical activity in schools.

Turning the focus of the discussion toward the workplace, Nico Pronk explained how a subtle shift over the past five decades in energy requirements for jobs has led to approximately 100 calories per day in reduced energy expenditure among workers. While that may not sound like much on a daily basis, Pronk said, when added over five decades, it accounts for 80 percent of the increased weight in the workforce over that time period. He emphasized that many workplace physical activity promotion programs have been shown to be effective, but their effectiveness depends on design. He discussed design principles underlying successful strategies, with the culture of an organization being a strong predictor of success, and used IBM as a case study of a worksite physical activity program that led to improvements in physical activity–related risks and health care costs.

Implementation of Strategies That Promote Physical Activity

While many interventions to promote physical activity are known to be effective in specific populations and situations, the challenge, in Bill Kohl's opinion, is to determine whether those same interventions are translatable in other scenarios and, more importantly, scalable and sustainable. Often, when rolled out, he said, interventions lose their resources or their champions and they disappear. In the final session, three panelists discussed programs that Kohl viewed as being not only effective at promoting physical activity, but also translatable, scalable, and sustainable.

First, Linda Fondren described the origins and activities of Shape Up Sisters, a gym she founded in Vicksburg, Mississippi, and then expanded into the nonprofit Shape Up Mississippi. The Shape Up programs led to the town of Vicksburg collectively losing 15,000 pounds. Then, Sean Hinkle from DC Scores, an after-school program in Washington, DC, which he described as a unique combination of soccer, poetry, and service learning, shared with the workshop audience results from a recent evaluation showing that 78 percent of participants improved their body mass index (BMI) percentile, 65 percent increased their aerobic capacity, 100 percent expressed feeling confident that they would graduate from high school, 95 percent felt pride in themselves, and another 95 percent felt like they were a positive part of their community. He noted that the program, founded in 1994, has since expanded into America Scores, serving about 8,000 children and youth in 14 cities. Finally, Marisa Molina described CDC-funded work being done by the Institute for Behavioral and Community Health in San Diego, California. It is an exercise and healthy lifestyle intervention to promote physical activity among Latinos through the training of community health workers. Preliminary results after two funding cycles showed improvements in blood pressure, waist circumference, BMI, and flexibility.

The panelists' descriptions of their programs triggered a lively discussion with the audience. Several major themes emerged, with all three panelists agreeing on the important roles of social support (i.e., social support is what keeps participants coming back), leadership (i.e., having a champion, or champions, to help expand their program), and partnerships (e.g., with the public health sector and with schools).

In response to whether their goal is for participants to increase physical activity, lose weight, or both, Hinkle replied that DC Scores is about "having fun." While physical activity is built into the program, the goal is to provide kids with supportive environments where they can thrive. Within that environment, the soccer, he said, "takes its own route." Molina described the San Diego program as a healthy lifestyle intervention, with a focus on many different components of health and well-being, not just physical activity. That said, exercise is the main part of the intervention. Finally, in Shape Up Sisters and Shape Up Vicksburg, Fondren said, "I push physical activity. When you do it, you feel good." And when you feel good, she said, you start thinking about how to eat better and make other healthy lifestyle changes. 🌀

Roundtable on Obesity Solutions

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REVIEWERS: To ensure that it meets institutional standards for quality and objectivity, this workshop in brief was reviewed by **Loretta DiPietro**, George Washington University, and **Russell Pate**, University of South Carolina. **Chelsea Frakes**, Institute of Medicine, served as review coordinator.

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For additional information regarding the workshop, visit www.iom.edu/PAandObesity.