

Physical Activity: Interventions Including Activity Monitors for Adults with Overweight or Obesity

Community Preventive Services Task Force Finding and Rationale Statement Ratified August 2017

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CPSTF Finding and Rationale Statement

Intervention Definition

Physical activity interventions that include activity monitors provide participants with a combination of the following:

- Behavioral instruction in the form of counseling, group-based education, or web-based education
- Activity monitors that are used to provide regular feedback (i.e., pedometers or accelerometers) and may include enhancements to support or promote physical activity

Interventions must focus on physical activity or promote physical activity within a weight management program. Interventions may include one or more follow-up appointments with a healthcare provider.

CPSTF Finding (August 2017)

The Community Preventive Services Task Force (CPSTF) recommends physical activity promotion interventions that include activity monitors based on sufficient evidence of effectiveness in increasing physical activity in adults with overweight or obesity. Evidence was considered sufficient based on studies that found meaningful increases in daily walking (step counts per day) or time spent in moderate to vigorous physical activity over periods of 3 months or less. More research is needed to determine whether changes in physical activity are maintained over time.

Rationale

Basis of Finding

The Community Preventive Services Task Force (CPSTF) uses recently published systematic reviews to conduct accelerated assessments of interventions that could provide program planners and decision-makers with additional, effective options. The following published review was selected and evaluated by a team of specialists in systematic review methods, and in research, practice, and policy related to increasing physical activity.

de Vries HJ, Kooiman TJM, van Ittersum MW, van Brussel M, de Groot M. Do activity monitors increase physical activity in adults with overweight or obesity? A systematic review and meta-analysis. *Obesity* 2016;24(10):2076-91.

The team examined each of the studies included in the systematic review and abstracted supplemental information about study, intervention, and population characteristics.

The CPSTF finding is based on results from the published review, additional information from the included studies, and expert input from team members and the CPSTF.

The published systematic review included 14 randomized controlled trials (search period through July 2015) and a meta-analysis of 11 of these studies. Included studies compared effectiveness of these interventions with usual care or wait list controls (7 studies) or compared the incremental benefit of adding an activity monitor to a behavioral intervention without an activity monitor (7 studies). These two groups were analyzed separately, and findings of the meta-analysis are summarized in Table 1 below.

Table 1: Physical Activity Outcomes

Outcome	Number of Studies and Total Number of Participants	Meta-Analysis Results
Comparison: behavioral intervention with activity monitor versus usual care or wait list		
Steps per day	4 RCTs 417 participants	Standardized mean difference: 0.9 (95%CI 0.61 to 1.19)
Total moderate to vigorous physical activity in minutes per week	3 RCTs 651 participants	Standardized mean difference: 0.5 (95%CI 0.11 to 0.88)
Comparison: behavioral intervention with activity monitor versus behavioral intervention without activity monitor		
Total moderate to vigorous physical activity in minutes per week	3 RCTs 83 participants	Standardized mean difference: 0.43 (95%CI 0 to 0.87)

RCTs: randomized controlled trials

CI: confidence interval

The meta-analysis examined weight-related outcomes from a subset of five studies which compared the incremental effectiveness of adding an activity monitor to a behavioral intervention. The studies showed favorable but small effects which were not statistically significant (5 studies).

Three included studies used different physical activity measures, and could not be included in the meta-analysis. In all three studies, step counts increased to a greater degree among participants in the group with activity monitors, but differences with comparison subjects were not statistically significant.

Included trials examined the effectiveness of behavioral interventions to promote physical activity when integrated with the provision and use of pedometers (10 studies) or accelerometers (4 studies). Behavioral components included individual counseling (5 studies) and educational sessions (9 studies) on physical activity promotion or weight management. Activity monitor use was integrated within the behavioral intervention through specific step count goals (7 studies), participant activity logs (10 studies), and provider review and feedback (6 studies).

Studies were generally small (median number of recruited participants: 69, interquartile interval 32 to 107 participants). Intervention and study periods were of short duration (median 12 weeks; range 6 weeks to 52 weeks), and studies did not provide post-intervention follow-up to evaluate persistence of changes in physical activity. Only four studies had assessment periods longer than 3 months and improvements were mixed, indicating a need for additional research on longer-term effects.

Applicability and Generalizability Issues

Included studies were conducted in the United States (8 studies), Australia (4 studies), Canada (1 study), and Scotland (1 study). The de Vries et al. review did not include studies conducted on older adults (ages 60 years or older) so the

applicability of findings from this review to interventions targeting older adults is unclear. Studies with open enrollment recruited substantially more women (80% women; 9 studies), although interventions were also effective in gender-restricted studies for men (3 studies) and women (1 study).

There was limited evidence on recruitment and effectiveness based on participants' race, ethnicity, or socioeconomic status (SES). Only six studies (from the United States) reported participants' demographic characteristics, and while overall results were favorable, stratified results were not reported. While additional research is warranted, the CPSTF finding is likely applicable to recruited adults in the United States with overweight or obesity.

Data Quality Issues

The published systematic review included only randomized controlled trials. Study quality was evaluated using the Cochrane risk of bias assessment tool (Higgins et al., 2011). Common limitations in the body of evidence included unclear or incomplete reporting on randomization (7 studies) and allocation concealment (10 studies). Physical activity outcomes were based on objective measurements (9 studies) and self-report (5 studies).

Other Benefits and Harms

The review by *de Vries et al.* did not report or postulate on additional benefits of these interventions. Enhanced functions of current devices, such as interactive features and access to social support resources, may lead to improvements in recruitment, participation, and sustained engagement.

The included studies did not report any major adverse events associated with these interventions. Most studies promoted gradual increases in daily or regular walking to encourage participation and reduce risks of musculoskeletal injury to participants with overweight or obesity.

Considerations for Implementation

The review by *de Vries et al.* noted the increasing popularity of activity monitors and related capabilities available in smartphones. The authors encouraged clinicians and health systems to incorporate these devices into available interventions to promote and support physical activity among their patients. The CPSTF finding supports the integration of activity monitors into behavioral interventions as an effective way to promote graduated increases in daily walking.

The rapid evolution of activity monitor technology is likely to provide newer studies with opportunities to evaluate effectiveness of devices with substantially enhanced content and interactivity. This could include the integration of behavior change techniques such as social support, prompts and reminders, rewards, and behavioral self-monitoring (Lyons et al., 2014).

The results of this review support the use of basic pedometers, however, which may be more cost-efficient for scalable interventions that provide activity monitors to recruited participants. Pedometers might also be more feasible for groups and communities with limited budgets.

Evidence Gaps

Based on the evidence and findings of the *de Vries et al.* systematic review, the CPSTF identified several areas for future research. Additional studies are needed to evaluate the longer-term effectiveness of these combined interventions, especially studies with post-intervention follow-up extending to 6-12 months. Longer-term studies would also provide a more appropriate assessment of effects on clinical and health outcomes.

This review did not consider studies of older adults with overweight or obesity. A future systematic review may be able to provide guidance on the effectiveness of interventions in this population. More research is needed to understand intervention effectiveness by race, ethnicity, and SES.

Newer studies should evaluate participation in, and effectiveness of, interventions that integrate current, enhanced activity monitors or smartphones. Finally, studies could examine the effectiveness of interventions that integrate behavioral instruction or education with activity monitors and social support networks or groups.

References

de Vries HJ, Kooiman TJM, van Ittersum MW, van Brussel M, de Groot M. Do activity monitors increase physical activity in adults with overweight or obesity? A systematic review and meta-analysis. *Obesity* 2016;24(10):2076-91.

Higgins JP, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0. Updated March 2011: The Cochrane Collaboration, 2011. Available from URL: <http://handbook-5-1.cochrane.org/>.

Lyons EJ, Lewis ZH, Mayrsohn BG, Rowland JL. Behavior change techniques implemented in electronic lifestyle activity monitors: a systematic content analysis. *J Med Internet Res* 2014;16:e192.

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. CPSTF evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and other interventions best meet the needs, preferences, available resources, and constraints of their constituents.

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