The Guide to Community Preventive Services
THE COMMUNITY GUIDE
What Works to Promote Health

Behavioral and Social Approaches to Increase Physical Activity: Enhanced School-Based Physical Education (2000 Archived Review)

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Review Summary

Intervention Definition

This review evaluated the effectiveness of enhancing physical education (PE) curricula by making classes longer or having students be more active during class in order to increase the amount of time students spend doing moderate or vigorous activity in PE class.

Summary of Task Force Finding

The Community Preventive Services Task Force recommends implementing programs that increase the length of, or activity levels in, school-based physical education classes based on strong evidence of their effectiveness in improving both physical activity levels and physical fitness among school-aged children and adolescents.

Results from the Systematic Reviews

Fourteen studies qualified for the review.

- In all 14 studies reviewed, students' physical fitness improved.
- All five studies measuring activity levels during PE class recorded increases in the:
    - Number of minutes spent in moderate or vigorous physical activity
    - Percentage of class time spent in moderate or vigorous physical activity, and/or
    - Intensity level of physical activity during class
- The median estimates from the reviewed studies suggest that modifying school PE curricula as recommended will result in an 8% increase in aerobic fitness among school-aged children.
- Many interventions reviewed included:
    - Changing the activities taught (e.g., substituting soccer for softball)
    - Modifying the rules of the game so that students are more active (e.g., in softball, have the entire team run the bases together when the batter makes a base hit)
    - Health education
- Modified school PE curricula were effective across diverse racial, ethnic, and socioeconomic groups, among boys and girls, elementary- and high-school students, and in urban and rural settings.
- A separate literature review found that having students attend school PE classes was not found to harm academic performance.

These results were based on a systematic review of all available studies, conducted on behalf of the Task Force by a team of specialists in systematic review methods, and in research, practice, and policy related to increasing physical activity.

Publications

Kahn EB, Ramsey LT, Brownson R, et al. The effectiveness of interventions to increase physical activity: a systematic review [www.thecommunityguide.org/pa/pa-ajpm-evrev.pdf]. *Am J Prev Med* 2002;22(4S):73-107.

Task Force on Community Preventive Services. Recommendations to increase physical activity in communities [www.thecommunityguide.org/pa/pa-ajpm-recs.pdf]. *Am J Prev Med* 2002;22 (4S):67-72.

CDC. Increasing physical activity. A report on recommendations of the Task Force on Community Preventive Services [www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm]. *MMWR* 2001;50 (RR-18):1-16.

Task Force on Community Preventive Services. Physical activity [www.thecommunityguide.org/pa/Physical-Activity.pdf]. In: Zaza S, Briss PA, Harris KW, eds. *The Guide to Community Preventive Services: What Works to Promote Health?* Atlanta (GA): Oxford University Press;2005:80-113 (Out of Print).

Task Force Finding

Intervention Definition

These interventions involve modifying curricula and policies to increase the amount of time students spend in moderate to vigorous activity while in PE classes. Increasing the amount of time students are active can be achieved either by increasing the amount of time spent in PE class or increasing the amount of time students are active during already scheduled PE classes. Interventions in this review included changing the activities taught (e.g., substituting soccer for softball) and modifying the rules of the game so that students are more active (e.g., having the entire team run the bases together when the batter makes a base hit).

Task Force Finding (October 2000)*

School-based PE is strongly recommended because of its effectiveness in increasing physical activity and improving physical fitness among adolescents and children. Other positive effects associated with school-based PE are increases in physical activity knowledge and increases in muscular endurance. One potential harm suggested in the literature is that PE classes could take away from the time that schools can devote to academic subjects, thereby harming academic performance. Examination of these studies and a systematic search for other studies of the effects of PE on academic performance found no evidence of this harm. No qualifying economic information was identified from the literature.

*From the following publication:

Task Force on Community Preventive Services. Recommendations to increase physical activity in communities [www.thecommunityguide.org/pa/pa-ajpm-recs.pdf]. *Am J Prev Med* 2002;22 (4S):67-72.

Supporting Materials

Evidence Gaps

What are Evidence Gaps?

Each Community Preventive Services Task Force (Task Force) review identifies critical evidence gaps—areas where information is lacking. Evidence gaps can exist whether or not a recommendation is made. In cases when the Task Force finds insufficient evidence to determine whether an intervention strategy works, evidence gaps encourage researchers and program evaluators to conduct more effectiveness studies. When the Task Force recommends an intervention, evidence gaps highlight missing information that would help users determine if the intervention could meet their particular needs. For example, evidence may be needed to determine where the intervention will work, with which populations, how much it will cost to implement, whether it will provide adequate return on investment, or how users should structure or deliver the intervention to ensure effectiveness. Finally, evidence may be missing for outcomes different from those on which the Task Force recommendation is based.

Identified Evidence Gaps

Results from the Community Guide reviews of physical activity interventions indicate that a number of these interventions are effective in increasing physical activity across a range of settings. However, questions remain regarding more specific characteristics of how the intervention is implemented, with whom, and where. Evidence gaps are provided for the following categories:

- Campaigns and Informational Approaches
- Behavioral and Social Approaches
- Environmental and Policy Approaches
- General Research Issues

Campaigns and Informational Approaches

Community-Wide Campaigns

- What characteristics and components of community-wide campaigns are most effective?
- How can community-wide efforts be institutionalized?
- What are the most effective and efficient delivery settings and channels (e.g., media, work settings)?
- Do coalitions enhance the delivery and effectiveness of interventions in community settings? If so, is the enhanced effect worth the potential added cost and burdens of implementation?

Point-of-Decision Prompts

- What effect does varying the message or format of the prompt have on providing a “booster” to stair use among the targeted population?
- What type of prompt is most effective? What effect does format or size have, if any?
- Is there a "critical distance" from the elevator or escalator to the stairs, in which the effect of signage on stair use is reduced?

- Are there a minimum or maximum number of flights one must expect stair users to ascend in order for the prompt to be effective?
- How many individuals read the point-of-decision prompt and react (i.e., increase their use of the stairs) as a result, as opposed to reacting to other knowledge that the intervention is occurring?
- What strategies can be used to maintain the intervention effect after the intervention ends? Are periodic "boosters" necessary or helpful?

Behavioral Approaches

School-Based Physical Education (PE)

- Is school-based PE as effective for preschool, elementary, and high school students as for middle school students?
- Is effectiveness of school-based PE different in coed classes versus single-sex classes in junior high and high school?
- Are classroom teachers as effective as PE specialists?
- What is the relationship between PE class and overall daily physical activity? Is activity outside the school setting reduced when activity in PE is increased?
- Are before-school and after-school PE programs effective in increasing student's total daily activity levels or improving fitness?
- Does physical activity incorporated into regular classes result in effects similar to physical activity incorporated in a dedicated PE class?
- Is the effectiveness or efficacy of school-based PE affected by school setting (e.g., type of school, urban, suburban, etc.) or by population served (e.g., lower socioeconomic status, racial or cultural differences)?

Social Support Interventions in Community Settings

- What type of social support and what medium works for whom?
- Do intensity and structure of the support make a difference?
- How does effect size vary by frequency of social interaction?
- Does the effect of these interventions vary by gender?

Individually-Adapted Health Behavior Change

- What characteristics and components are most effective?
- What mode of delivery is most effective?
- Does the effectiveness of behavioral change method vary by type of physical activity?
- Are these interventions effective in increasing physical activity?
- Do these interventions promote positive or negative attitudes toward physical activity?
- Basic research questions remain because the effectiveness has not been established for the following:
    - College-based health education and PE
    - Classroom-based health education focused on reducing television viewing and video game playing
    - Family-based social support

Environmental and Policy Approaches

- What characteristics of a community are necessary for the optimal implementation of policy and environmental interventions?
- Does the effectiveness vary by type of access (e.g., worksite facility or community facility) or socioeconomic group?
- How can the necessary political and societal support for this type of intervention be created or increased?
- Does creating or improving access motivate sedentary people to become more active, give those who are already active an increased opportunity to be active, or both?
- If you build it, will they come? In other words, is enhanced access to places for activity sufficient to create higher physical activity levels, or are other intervention activities also necessary?
- What are the effects of creating new places for physical activity versus enhancing existing facilities?
- Which neighborhood features (e.g., sidewalks, parks, traffic flow, proximity to shopping) are the most crucial in influencing activity patterns?
- How does proximity of places such as trails or parks to residence affect ease and frequency

General Research Issues

Effectiveness

Several crosscutting research issues about the effectiveness of all of the reviewed interventions remain.

- What behavioral changes that do not involve physical activity can be shown to be associated with changes in physical activity?
    - For example, does a decrease in time spent watching television mean an increase in physical activity or will another sedentary activity be substituted?
    - Does an increase in the use of public transportation mean an increase in physical activity or will users drive to the transit stop?
- Physical activity is difficult to measure consistently across studies and populations. Although several good measures have been developed, several issues remain to be addressed.
    - Reliable and valid measures are needed for the spectrum of physical activity. Rationale: Current measures are better for vigorous activity than for moderate or light activity.
    - Sedentary people are more likely to begin activity at a light level; this activity is often not captured by current measurement techniques.
    - Increased consensus about “best measures” for physical activity would help to increase comparability between studies and would facilitate assessment of effectiveness.
- Note: This is not intended to preclude researchers’ latitude in choosing what aspects of physical activity to measure and to decide which measures are most appropriate for a particular study population. Perhaps a useful middle ground position would be the establishment of selected core measures that most researchers should use which could then be supplemented by additional measures. The duration of an intervention’s effect was often difficult to determine.

Applicability

Each recommended and strongly recommended intervention should be applicable in most relevant target populations and settings, assuming that appropriate attention is paid to tailoring. However, possible differences in the effectiveness

of each intervention for specific subgroups of the population often could not be determined. Several questions about the applicability of these interventions in settings and populations other than those studied remain.

- Are there significant differences in the effectiveness of these interventions, based on the level or scale of an intervention?
- What are the effects of each intervention in various sociodemographic subgroups, such as age, gender, race, or ethnicity?

Other Positive or Negative Effects

The studies included in this review did not report on other positive and negative effects of these interventions. Research on the following questions would be useful:

- Do informational approaches to increasing physical activity help to increase health knowledge? Is it necessary to increase knowledge or improve attitudes toward physical activity to increase physical activity levels?
- Do these approaches to increasing physical activity increase awareness of opportunities for and benefits of physical activity?
- What are the most effective ways to maintain physical activity levels after the initial behavior change has occurred?
- Are there other benefits from an intervention that might enhance its acceptability? For example, does increasing social support for physical activity carry over into an overall greater sense of community?
- Are there any key harms?
- Is anything known about whether or how approaches to physical activity could reduce potential harms (e.g., injuries or other problems associated with doing too much too fast)?

Economic Evidence

The available economic data were limited. Therefore, considerable research is warranted on the following questions:

- What is the cost-effectiveness of each of these interventions?
- How can effectiveness in terms of health outcomes or quality-adjusted health outcomes be better measured, estimated, or modeled?
- How can the cost benefit of these programs be estimated?
- How do specific characteristics of each of these approaches contribute to economic efficiency?
- What combinations of components in multicomponent interventions are most cost-effective?

Barriers

Research questions generated in this review include the following:

- What are the physical or structural (environmental) barriers to implementing these interventions?
- What resource (time and money) constraints prevent or hinder the implementation of these interventions?

Summary Evidence Table

See Appendix B on pages 103–106 of Kahn EB, Ramsey LT, Brownson R, et al. The effectiveness of interventions to increase physical activity: a systematic review [www.thecommunityguide.org/pa/pa-ajpm-evrev.pdf]. *Am J Prev Med* 2002;22(4S):73-107.

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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. Task Force 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 policies best meet the needs, preferences, available resources, and constraints of their constituents.

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