

Strengthen the Evidence for MCH Programs: Environmental Scan of Strategies

National Performance Measure (NPM) #8: Physical Activity

Percent of children ages 6 through 11 and adolescents 12 through 17 who are physically active at least 60 minutes per day

Introduction

This environmental scan identifies collections of strategies to advance performance for NPM #8, Physical Activity. The information provided in this document focuses on strategies to achieve the NPM, not on the content of care or specified health outcomes. Please note that the quality of the evidence in this compilation has not been evaluated, and that data sources describing a single strategy, rather than a collection of strategies, have been excluded.

This compilation includes the following sections:

- **Reviews and Compilations:** Identifies existing compilations for strategies that intend to improve performance for each measure
- **Frameworks and Landmark Initiatives:** Frameworks includes conceptual models underlying strategy implementation; Landmark Initiatives include seminal programs/policies related to the NPM
- **Data Sources:** Indicates sources, search criteria, links to search strategy and selected organizational websites
- **Inclusion and Exclusion Criteria:** Denotes types of studies, setting, populations of interest and exclusion criteria

Technical assistance for State Title V MCH programs related to using evidence to inform State Action Plans, selection of strategies, and development of evidence-based or evidence-informed Strategy Measures may be requested at <http://www.semch.org/technical-assistance.html>

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Reviews and Compilations

Review/Compilation	Summary	Web Link
<p>Anderson & AAP Committee on Sports Medicine and Fitness and Committee on School Health. (2000). Physical Fitness and Activity in Schools. <i>Pediatrics</i>. [Target¹: B,C,D,F,G]</p>	<ul style="list-style-type: none"> • School personnel <ul style="list-style-type: none"> ○ Establish policies that promote enjoyable, lifelong physical activities: physical education and health education for children in grades kindergarten through 12, commitment of adequate resources, trained physical education specialists and teachers, PE instruction and programs that meet the needs and interests of all students ○ Provide physical and social environments that encourage and enable physical activity in a safe setting: adult supervision, teaching, and instruction in safe methods of physical activity training; safe facilities; appropriate use of protective equipment ○ Implement physical education and health education curricula that emphasize enjoyable participation in physical activity and that help students to develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles ○ Provide extracurricular physical activity programs that address the needs and interests of all students ○ Include parents and guardians in physical activity instruction and extracurricular physical activity programs ○ Provide education to personnel from teaching, coaching, recreation, health care, and school administration to effectively promote enjoyable, lifelong physical activity among youths ○ Regularly evaluate the school's physical activity programs ○ Establish relationships with community recreation and youth sports programs and agencies • Pediatricians & other health care professionals <ul style="list-style-type: none"> ○ Help the school adapt programs to meet the needs of children and adolescents who have activity limitations ○ Provide schools and individuals with safe options for continuing with physical activity when students are affected 	<p>http://dx.doi.org/10.1542/peds.105.5.1156</p>

	<ul style="list-style-type: none"> by illness, injury, or disability ○ Identify and encourage appropriate use of safety equipment ○ Assess activity patterns as part of routine health maintenance and provide advice about how physical activity levels can be increased ○ Encourage physical activity at the family and community levels ○ Help to identify and reduce barriers to regular physical activity ○ Ensure the availability of funding and personnel resources to permit children for being physically active and receive supervision and direction from educated adults 	
<p>Atkin et al. (2011). Interventions to Promote Physical Activity in Young People Conducted in the Hours Immediately After School: A Systematic Review. <i>International Journal of Behavioral Medicine</i>. [Target: D,F,G,H]</p>	<ul style="list-style-type: none"> ● Reviewed 10 papers reporting 9 studies (2 not conducted in the US) ● Findings <ul style="list-style-type: none"> ○ 3 out of 9 studies reported an increase/small decrease in physical activity amongst intervention participants compared with controls ○ Overall, findings indicated that interventions to promote physical activity delivered in the after-school setting have been ineffective ○ Issues with weaknesses in methodology or implementation may limit the impact ○ Some evidence that targeting physical activity alone, rather than in combination with diet or as part of a weight gain prevention program, may be a more effective strategy ○ Effective studies were located primarily in the school setting 	http://dx.doi.org/10.1007/s12529-010-9111-z
<p>Bagby & Adams. (2007). Evidence-Based Practice Guideline: Increasing Physical Activity in Schools—Kindergarten Through 8th Grade. <i>Journal of School Nursing</i>. [Target; F,G]</p>	<ul style="list-style-type: none"> ● Method 1: Increase Time Spent in MVPA in Structured Physical Education Classes <ul style="list-style-type: none"> ○ Increase managerial efficiency and reduce time students spend in passive learning ○ Alter existing activities to encourage participation of all students ○ Avoid activities in which students are eliminated or must wait for turns ○ Add activities designed to increase movement that allow for participation by more students 	http://dx.doi.org/10.1177/10598405070230030301

	<ul style="list-style-type: none"> ○ Use pre-developed curricula specifically designed to increase levels of physical activity in students during PE class ● Method 2: Increase Time Spent in MVPA During Recess or Free Play Time <ul style="list-style-type: none"> ○ Having a PE teacher instruct all students on proper use of playground equipment ○ Provide encouragement and motivation for activity ○ Increase the available permanent equipment on the playground ○ Increase the number of balls on the playground ○ Paint playground equipment with bright fluorescent colors- make sure equipment is safe, attractive, and inviting to all students ○ Paint playground markings on hard playground surfaces ○ Use pre-developed templates specifically designed to increase physical activity on the playground ● Method 3: Reduce Sedentary Activity <ul style="list-style-type: none"> ○ Increase awareness of time spent in sedentary behaviors by teaching self-monitoring techniques to children ○ Encourage group reporting of time spent viewing TV and playing video games to motivate children to reduce this behavior ○ Challenge students to a 7-day TV turnoff, during which time children are challenged to watch no TV or videotapes and play no video games ○ Develop a program of short- and long-term incentives to comply with a 7-hour per week television, videotape, or video game budget ○ Teach students how to watch TV selectively ○ Enlist children as advocates for reducing media use ○ Use available curriculum specifically designed to reduce sedentary behaviors 	
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<p>Barnett et al. (2011). Active Video Games for Youth: A Systematic Review. <i>Journal of Physical Activity and Health</i>. [Target: G]</p>	<ul style="list-style-type: none"> • Reviewed 13 articles • Findings <ul style="list-style-type: none"> ○ Average METs across 9 studies = 3.1 ○ AVGs are capable of generating energy expenditure in youth to attain PA guidelines ○ Sustainability of AVG appears to diminish after a short period of time 	<p>http://hdl.handle.net/10722/135694</p>
<p>Beets et al. (2009). After-School Program Impact on Physical Activity and Fitness: A Meta-Analysis. <i>American Journal of Preventive Medicine</i>. [Target: F]</p>	<ul style="list-style-type: none"> • Reviewed 13 articles describing findings from 11 interventions • Findings <ul style="list-style-type: none"> ○ After-school programs can improve physical activity levels and other health-related aspects 	<p>http://dx.doi.org/10.1016/j.amepre.2009.01.033</p>
<p>Biddis & Irwin. (2010). Active Video Games to Promote Physical Activity in Children and Youth. <i>Archives of Pediatrics & Adolescent Medicine</i>. [Target: G]</p>	<ul style="list-style-type: none"> • Reviewed 18 studies • Findings <ul style="list-style-type: none"> ○ Overall, mean % increases of 222% in energy expenditure and 64% in heart rate ○ Participation in AVG play should not be regarded as a replacement for vigorous physical activity but can increase energy expenditure from sedentary or passive video gaming levels and be regarded as light to moderate physical activity 	<p>http://dx.doi.org/10.1001/archpediatrics.2010.104</p>
<p>Dobbins et al. (2013). School-Based Physical Activity Programs for Promoting Physical Activity and Fitness in Children and Adolescents Aged 6 to 18. <i>Cochrane Database of Systematic Reviews</i>. [Target: F]</p>	<ul style="list-style-type: none"> • Included 44 studies (=36,393 participants) • Findings <ul style="list-style-type: none"> ○ Evidence that school-based physical activity interventions are effective in increasing duration of physical activity from 5 to 45 mins more per day, reducing time spent watching television from 5 to 60 mins less per day, and increasing maximal oxygen uptake or aerobic capacity ○ Children exposed to school-based physical activity interventions are approximately 3 times more likely to engage in vigorous physical activity during the school day than those not exposed ○ Printed educational materials and changes to the school 	<p>http://dx.doi.org/10.1002/14651858.CD007651</p>

	<p>curriculum that promote physical activity during school hours result in positive effects</p> <ul style="list-style-type: none"> ○ Suggest ongoing implementation of school-based physical activity interventions, given the positive effects on behavior and one physical health status measure 	
Erwin et al. (2014). Impact of Recess Interventions on Children's Physical Activity—A Meta-Analysis. <i>American Journal of Health Promotion</i> . [Target; F]	<ul style="list-style-type: none"> ● Reviewed 13 interventions ● Findings <ul style="list-style-type: none"> ○ Recess interventions (recess, materials on playground, playground markings, playground equipment, structured recess, allocating space for play, feedback on MVPA) can improve youth PA levels 	http://dx.doi.org/10.4278/ajhp.120926-LIT-470
Escalante et al. (2014). Playground Designs to Increase Physical Activity Levels During School Recess: A Systematic Review. <i>Health Education & Behavior</i> . [Target: F]	<ul style="list-style-type: none"> ● Reviewed 8 studies <ul style="list-style-type: none"> ○ Classified by intervention type: playground markings, game equipment, playground markings + physical structures, playground markings + game equipment ● Findings <ul style="list-style-type: none"> ○ Interventions based on playground markings, game equipment, or a combination of the two do not seem to increase the physical activity of preschoolers and schoolchildren during recess ○ Interventions based on playground markings + physical structures increase the physical activity of schoolchildren during recess in the short to medium term 	http://dx.doi.org/10.1177/1090198113490725
Hamel et al. (2011). Computer- and Web-Based Interventions to Increase Preadolescent and Adolescent Physical Activity: A Systematic Review. <i>Journal of Advanced Nursing</i> . [Target: F,G]	<ul style="list-style-type: none"> ● Reviewed 14 RCTs or quasi-experimental studies (11 US, 3 Belgium) <ul style="list-style-type: none"> ○ 8 web-based: 3 home-based, 3 school-based, 1 camp- and home-based, 1 scout troop- and home-based ○ 6 computer-based: all school-based ● Findings <ul style="list-style-type: none"> ○ Although most interventions demonstrated statistically significant increases in physical activity or positive health changes related to physical activity, findings were small or short-lived ○ Computer- and web-based interventions can promote 	http://dx.doi.org/10.1111/j.1365-2648.2010.05493.x

	physical activity among preadolescents and adolescents, particularly in schools; however, further efforts are needed to sustain positive changes	
Heath et al. (2006). The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review. <i>Journal of Physical Activity and Health</i> . [Target: H]	<ul style="list-style-type: none"> • Community-scale urban design and land use policies and practices (sufficient evidence) <ul style="list-style-type: none"> ○ Provide places people need/want to visit (retail or commercial establishments) or places of employment close enough to be reached by methods other than driving, and safe and attractive pathways to get there ○ Mixed land use (proximate residential and commercial areas) and sidewalk quality and connectivity • Street-scale urban design and land use policies (sufficient evidence) <ul style="list-style-type: none"> ○ Improved street lighting or infrastructure projects that increase the ease and safety of street crossing, ensure sidewalk continuity, introduce or enhance traffic calming (center islands or raised crosswalks), enhance the aesthetics of the street area (landscaping) ○ Creating/renovating playgrounds, forming squares, one-way streets, traffic calming, bicycle lanes ○ All interventions were related to access, aesthetics, and safety of street/sidewalks • Transportation and travel policies and practices (insufficient evidence) 	N/A
Hieftje et al. (2013). Electronic Media-Based Health Interventions Promoting Behavior Change in Youth. <i>JAMA Pediatrics</i> . [Target: B,C,F,G]	<ul style="list-style-type: none"> • Reviewed 19 studies <ul style="list-style-type: none"> ○ 7 studies focused on physical activity and nutrition (3 computer-based game, 1 each used a console video game, an Internet-based program, an Internet game, or integrated video clips) <ul style="list-style-type: none"> ▪ 4 studies focused on increasing physical activity in youth • Findings <ul style="list-style-type: none"> ○ 2 studies found that experimental subjects increased their physical activity and decreased their sedentary behaviors ○ Interventions using electronic media can improve health and safety behaviors in young persons 	http://dx.doi.org.ezp.welch.jhmi.edu/10.1001/jamapediatrics.2013.1095

<p>Hills et al. (2014). Supporting Public Health Priorities: Recommendations for Physical Education and Physical Activity Promotion in Schools. <i>Progress in Cardiovascular Diseases</i>. [Target: F,G]</p>	<ul style="list-style-type: none"> • PE and other PA opportunities such as recess, intramurals, interscholastic sports, classroom PA breaks, and walk and bicycle to school initiatives • Government mandates on PE and PA • Communication between physical educators and parents/families-family involvement 	<p>http://dx.doi.org/10.1016/j.pcad.2014.09.010</p>
<p>Ickes et al. (2013). Systematic Review of Recess Interventions to Increase Physical Activity. <i>Journal of Physical Activity and Health</i>. [Target: F]</p>	<ul style="list-style-type: none"> • Reviewed 13 interventions in US and internationally among preschools and elementary/primary schools <ul style="list-style-type: none"> ○ Interventions included added equipment/materials, markings, designated activity zones, teacher involvement, active video games, activity of the week, activity cards • Findings <ul style="list-style-type: none"> ○ 95% of studies demonstrated positive outcomes 	<p>N/A</p>
<p>Kahn et al. (2002). The Effectiveness of Interventions to Increase Physical Activity: A Systematic Review. <i>American Journal of Preventive Medicine</i>. [Target: F,G,H]</p>	<ul style="list-style-type: none"> • Details the findings in “Task Force on Community Preventive Services (2002) Recommendations to Increase Physical Activity in Communities” • List of “recommended” or “strongly recommended” interventions: point-of-decision prompts, community-wide campaigns, school-based PE, social support interventions in community settings, individually-adapted health behavior change programs, creation of or enhanced access to places for physical activity combined with informational outreach activities 	<p>http://dx.doi.org/10.1016/S0749-3797(02)00434-8</p>
<p>Kriemler et al. (2011). Effect of School-Based Interventions on Physical Activity and Fitness in Children and Adolescents: A Review of Reviews and Systematic Update. <i>British Journal of Sports Medicine</i>.</p>	<ul style="list-style-type: none"> • Reviewed 20 studies • Findings <ul style="list-style-type: none"> ○ School-based application of multicomponent intervention strategies was the most consistent, promising strategy while controversy existed regarding the effectiveness of family involvement, focus on healthy populations at increased risk or duration and intensity of the intervention ○ All studies showed a positive effect on in-school, out-of school or overall physical activity, and 6 of 11 showed 	<p>http://dx.doi.org/10.1136/bjports-2011-090186</p>

[Target: B,C,F,G]	<p>increase in fitness</p> <ul style="list-style-type: none"> ○ Multicomponent approaches combining educational, curricular, and environmental elements showed the highest level of evidence for increasing overall physical activity 	
Lamboglia et al. (2013). Exergaming as a Strategic Tool in the Fight Against Childhood Obesity: A Systematic Review. <i>Journal of Obesity</i> . [Target: G]	<ul style="list-style-type: none"> ● Reviewed 9 studies ● Findings <ul style="list-style-type: none"> ○ Exergaming was found to increase physical activity levels, energy expenditure, maximal oxygen uptake, heart rate, and percentage of physical activity engaged in and to reduce waist circumference and sedentary screen time 	http://dx.doi.org/10.1155/2013/438364
LeBlanc et al. (2013). Active Video Games and Health Indicators in Children and Youth: A Systematic Review. <i>PLOS One</i> . [Target: G]	<ul style="list-style-type: none"> ● Reviewed 51 unique studies presented in 52 articles (8 countries, mostly US) ● Findings <ul style="list-style-type: none"> ○ Controlled studies showed that AVGs acutely increase light-to moderate-intensity physical activity ○ Findings about if or how AVG lead to increases in habitual physical activity or decreases in sedentary behavior are less clear 	http://dx.doi.org/10.1371/journal.pone.0065351
Lonsdale et al. (2013). A Systematic Review and Meta-Analysis of Interventions Designed to Increase Moderate-to-Vigorous Physical Activity in School Physical Education Lessons. <i>Preventive Medicine</i> . [Target: F]	<ul style="list-style-type: none"> ● Reviewed 14 studies ● Findings <ul style="list-style-type: none"> ○ Overall, PE-based interventions were associated with 24% more active learning time compared with usual practice ○ Effective intervention strategies: teacher professional learning focusing on class organization to improve lesson preparation and management, management and instruction, and supplementing usual PE lessons with high-intensity activity (fitness infusions) 	http://dx.doi.org/10.1016/j.ypmed.2012.12.004
Lubans et al. (2008). A Review of Mediators of Behavior in Interventions to Promote Physical Activity among Children	<ul style="list-style-type: none"> ● Reviewed 7 studies ● Examined studies that investigated mediators between intervention and outcome (physical activity) ● Findings <ul style="list-style-type: none"> ○ Self-efficacy was the most commonly assessed mediator 	http://dx.doi.org/10.1016/j.ypmed.2008.07.011

<p>and Adolescents. <i>Preventive Medicine</i>. [Target: G]</p>	<p>and received strongest support for mediating the relationship between theory-based interventions and physical activity in youth</p> <ul style="list-style-type: none"> ○ Limited evidence for behavioral and interpersonal mediators 	
<p>Lubans et al. (2009). A Systematic Review of Studies Using Pedometers to Promote Physical Activity among Youth. <i>Preventive Medicine</i>. [Target: B,C,F,G]</p>	<ul style="list-style-type: none"> ● Reviewed 14 studies, 12 resulted in increases in physical activity <ul style="list-style-type: none"> ○ 3 used pedometers as open-loop feedback reward mechanisms, 10 used pedometers for self-monitoring, 1 incorporated pedometers into an integrated school curriculum ● Findings <ul style="list-style-type: none"> ○ Pedometers are useful for promoting physical activity among youth 	<p>http://dx.doi.org/10.1016/j.ypmed.2009.02.014</p>
<p>Metcalfe et al. (2012) Effectiveness of Intervention on Physical Activity of Children: Systematic Review and Meta-Analysis of Controlled Trials with Objectively Measured Outcomes (EarlyBird 54). <i>BMJ</i>. [Target: F,G]</p>	<ul style="list-style-type: none"> ● Reviewed 30 studies ● Findings <ul style="list-style-type: none"> ○ The pooled intervention effect across all studies was small to negligible for total physical activity and small for moderate or vigorous activity ○ Intervention effect did not differ between any of the subgroups (age, BMI, study duration, site of intervention, quality of study) ○ Physical activity interventions have only had a small effect on children's overall activity levels 	<p>http://dx.doi.org/10.1136/bmj.e5888</p>
<p>O'Connor et al. (2009). Engaging Parents to Increase Youth Physical Activity: A Systematic Review. <i>American Journal of Preventive Medicine</i>. [Target: B,C,D,E,F,G]</p>	<ul style="list-style-type: none"> ● Reviewed 35 articles ● 5 general parent involvement strategies: face-to-face educational programs or parent training, family participatory exercise programs, telephone communication, organized activities, educational materials sent home ● Findings <ul style="list-style-type: none"> ○ Interventions with educational or training programs during family visits or via telephone communication with parents appear to offer some promise ○ Little evidence for effectiveness of family involvement methods in programs promoting physical activity in children 	<p>http://dx.doi.org/10.1016/j.amjpre.2009.04.020</p>
<p>Parrish et al. (2013). The Effect of School</p>	<ul style="list-style-type: none"> ● Reviewed 9 articles <ul style="list-style-type: none"> ○ 6 UK, 1 Belgium, 1 Cyprus, 1 US 	<p>http://dx.doi.org/10.1007/s40279-013-0024-2</p>

<p>Recess Interventions on Physical Activity. <i>Sports Medicine</i>. [Target: F]</p>	<ul style="list-style-type: none"> ○ 8 RCTs, 1 CT ○ All elementary schools settings ● Intervention type: playground markings, games equipment and activity cards, physical structures, color-coded areas, non-fixed equipment, sports equipment, play space, active video games, organized recess activities, walking clubs ● Findings <ul style="list-style-type: none"> ○ 5 studies demonstrated a positive intervention effect on children's PA levels ○ Overall, levels of evidence concerning effectiveness of recess interventions in children were inconclusive, though some promising strategies were identified ○ Strategies that combined playground markings, playground coding or court rotation and non-fixed equipment increased recess PA significantly 	
<p>Pearson et al. (2015). The Effectiveness of Interventions to Increase Physical Activity Among Adolescent Girls: A Meta-Analysis. <i>Academic Pediatrics</i>. [Target: F,G]</p>	<ul style="list-style-type: none"> ● Reviewed 45 studies (34 independent samples- 21 US) ● Intervention types: educational, environmental, multicomponent ● Findings <ul style="list-style-type: none"> ○ The average treatment effect for adolescent girls involved in physical activity was significant but small ○ Larger effects for interventions that were theory based, performed in schools, were girls only, with younger girls, used multicomponent strategies, and involved targeting both physical activity and sedentary behavior 	<p>http://dx.doi.org/10.1016/j.jacp.2014.08.009</p>
<p>Piercy et al. (2015). Opportunities for Public Health to Increase Physical Activity Among Youths. <i>American Journal of Public Health</i>. [Target: D,F,G,H]</p>	<ul style="list-style-type: none"> ● Effective strategies <ul style="list-style-type: none"> ○ Schools <ul style="list-style-type: none"> ▪ Multicomponent: enhanced PE that increases less time, is delivered by well-trained specialists, and includes instructional practices that provide substantial moderate- to vigorous-intensity physical activity; provide classroom breaks; create activity sessions before and after school (including active transportation); build behavioral skills; provide after-school activity space and equipment ▪ PE: develop and implement a well-designed PE 	<p>http://dx.doi.org/10.2105/AJPH.2014.302325</p>

	<p>curriculum, enhance instructional strategies for PE, provide teachers with appropriate training</p> <ul style="list-style-type: none"> ▪ Active transportation: involve school personnel in intervention efforts, educate and encourage parents to participate with their children in active transportation to school ○ Preschool and childcare setting <ul style="list-style-type: none"> ▪ Provide portable play equipment on playgrounds and other play spaces ▪ Provide staff with training in delivery of structured physical activity sessions for children and increase the time allocated for such sessions ▪ Integrate physically active teaching and learning activities into pre-academic instructional routines ▪ Increase time that children spend outside ○ Community setting (built environment) <ul style="list-style-type: none"> ▪ Improve the land use mix to increase the number of walkable and bikeable destinations in neighborhoods ▪ Increase residential density so that people can use methods other than driving to reach places ▪ Implement traffic-calming measures ▪ Increase access to, density of, and proximity to parks and recreation facilities ▪ Improve walking and biking infrastructure ▪ Increase walkability of communities ▪ Improve pedestrian safety structures ▪ Increase vegetation ▪ Decrease traffic speed and volume to encourage walking and biking for transportation ▪ Reduce incivilities and disorders ● Potentially promising strategies <ul style="list-style-type: none"> ○ Family and home or primary care settings: insufficient evidence to make recommendations but present opportunities to promote physical activity for youths 	
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<p>Ridgers et al. (2006). Physical Activities of Children during School Playtime. <i>Sports Medicine</i>. [Target: F]</p>	<ul style="list-style-type: none"> • Reviewed 18 studies • Findings <ul style="list-style-type: none"> ○ Playground markings and fitness breaks stimulate short-term increases in physical activity ○ Playtime can contribute between 5-40% of recommended daily physical activity levels when no interventions have been utilized 	<p>http://dx.doi.org/10.2165/0007256-200636040-00005</p>
<p>Ridgers et al. (2012). Physical Activity During School Recess: A Systematic Review. <i>American Journal of Preventive Medicine</i>. [Target: F]</p>	<ul style="list-style-type: none"> • Reviewed 53 studies <ul style="list-style-type: none"> ○ Evidence for factors to include in a social-ecological model of recess physical activity behavior • Findings <ul style="list-style-type: none"> ○ Providing access to school facilities, providing unfixed equipment, and identifying ways to promote encouragement for physical activity have the potential to inform strategies to increase physical activity levels during recess periods 	<p>http://dx.doi.org/10.1016/j.amepre.2012.05.019</p>
<p>Sallis et al. (2012). Promoting Youth Physical Activity through Physical Education and After-School Programs. <i>Adolescent Medicine: State of the Art Reviews</i>. [Target: F,H]</p>	<ul style="list-style-type: none"> • Evidence-based strategies to increase physical activity in PE: enhanced curricula- replace less physically active games with those that are more active, modified game rules that increase physical activity, maximize equipment use to prevent inactivity and build sports skills, incorporate physical activity into otherwise sedentary activities • Impact of policies on PE quality has not been evaluated • More research is needed to develop and evaluate after-school programs • Interventions: policies, teacher training, use of activity-focused “enhanced” curricula, smaller class size • Schoolyard renovations have been found to lead to substantial increases in physical activity • School physical activity recommendations from health organizations (Table 1) • Resources for school physical activity advocacy (Table 2) 	<p>N/A</p>
<p>Salmon et al. (2007). Promoting Physical Activity among Children and Adolescents.</p>	<ul style="list-style-type: none"> • Reviewed 76 studies (57 school, 9 family, 6 primary care, 4 community- or internet- based settings) • Findings <ul style="list-style-type: none"> ○ Children’s physical activity interventions that were most 	<p>http://dx.doi.org/10.1093/epirev/mxm010</p>

<p><i>Epidemiologic Reviews.</i> [Target: B,C,F,G,H]</p>	<p>effective in school setting included some focus on PE, activity breaks, and family strategies</p> <ul style="list-style-type: none"> ○ Interventions delivered in family setting were not highly effective, but many were pilot studies ○ Use of motivationally tailored strategies and program delivery in the primary care setting showed promise among adolescents 	
<p>Soares et al. (2014). Systematic Review Shows Only Few Reliable Studies of Physical Activity Intervention in Adolescents. <i>The Scientific World Journal.</i> [Target: F,G,H]</p>	<ul style="list-style-type: none"> ● Reviewed 7 articles ● Findings <ul style="list-style-type: none"> ○ Behavior change was assessed in 43% of studies and 3 reported success in some way ○ Due to heterogeneity in their contents and methodologies, as well as lack of jobs that accompany adolescents after the intervention period, cannot draw conclusions about the actual effects of the intervention programs of physical activity on the behavior of young people 	<p>http://dx.doi.org/10.1155/2014/206478</p>
<p>Stone et al. (1998). Effects of Physical Activity Interventions in Youth: Review and Synthesis. <i>American Journal of Preventive Medicine.</i> [Target: F,G,H]</p>	<ul style="list-style-type: none"> ● Reviewed 22 studies ● Findings <ul style="list-style-type: none"> ○ School-based interventions (elementary, secondary, and college-level interventions): PE program changes, classroom health curricula, school lunches, out-of-school extracurricular physical activities, social marketing <ul style="list-style-type: none"> ▪ Strongest evidence base is in the upper elementary grades and school environment changes ○ Community-based interventions: educational sessions, fitness sessions, ○ Conclusion: few school and community-based studies of physical activity have been conducted, they included only a few age groups, and the results provide limited positive findings ● Recommendations for public health practice <ul style="list-style-type: none"> ○ Establish school policies and environments to provide space, equipment, and supervision for before and after school and lunch and recess periods to promote physical activity ○ Provide appropriate resources for more emphasis on 	<p>http://dx.doi.org/10.1016/S0749-3797(98)00082-8</p>

	<ul style="list-style-type: none"> ○ mastery of fundamental skills in children ○ Introduce more intramural and extramural activities ○ Promote more programs and resources for family participation and opportunities for physical activity through school and community programs ○ Increase attention by community organizations and agencies to noncompetitive sports and recreational activities with special attention to preadolescent and adolescent girls ○ Increase training opportunities for teachers at the college-prep stage, as well as after they are employed in the field, on the fundamentals and importance of physical activity ○ Provide more school-community linked physical activity programs that meet the needs and interests ○ Increase efforts to institutional programs shown to be effective 	
<p>Task Force on Community Preventive Services. (2002). Recommendations to Increase Physical Activity in Communities. <i>American Journal of Preventive Medicine</i>. [Target: F,G,H]</p>	<ul style="list-style-type: none"> ● Report provides recommendations on interventions that communities, policymakers, and public health providers can implement to increase physical activity <ul style="list-style-type: none"> ○ Recommendations are based on the effectiveness of interventions as determined by systematic lit review ● Informational approaches to increasing physical activity <ul style="list-style-type: none"> ○ Point-of-decision prompts (recommended): motivational signs placed by elevators or escalators to encourage people to use nearby stairs ○ Community-wide campaigns (strongly recommended) <ul style="list-style-type: none"> ▪ Television, radio, newspapers, and trailers in movie theaters ▪ Support and self-help groups; physical activity counseling; risk factor screening and education at worksites, schools, and community health fairs; environmental activities (community events, walking trails) ○ Mass media campaigns (insufficient evidence) ○ Classroom-based health education focused on information provision (insufficient evidence) ● Behavioral and social approaches to increasing physical activity 	<p>http://dx.doi.org/10.1016/S0749-3797(02)00433-6</p>

	<ul style="list-style-type: none"> ○ School-based PE (strongly recommended): modifying curricula and policies to increase the amount of time students spend in moderate to vigorous activity while in PE classes- changing activities taught and modifying rules of games ○ College-based health education and PE (insufficient evidence) ○ Classroom-based health education focused on reducing television viewing and video game playing (insufficient evidence) ○ Family-based social support (insufficient evidence) ○ Social support interventions in community settings (strongly recommended): changing physical activity behavior through building, strengthening, and maintaining social networks that provide supportive relationships for behavior change- “buddy” system, making “contracts” with others, setting up walking or other groups ○ Individually-adapted health behavior change programs (strongly recommended): behavioral skills needed to incorporate moderate-intensity physical activity into daily routines- setting goals, building social support, behavioral reinforcement, structured problem-solving, prevention of relapse ● Environmental and policy approaches to increasing physical activity <ul style="list-style-type: none"> ○ Creation of or enhanced access to places for physical activity combined with informational outreach activities (strongly recommended): change the local environment to create opportunities for physical activity- building trails or facilities, reducing barriers 	
<p>Taylor et al. (1998). Physical Activity Interventions in Low-Income, Ethnic Minority, and Populations with Disabilities. <i>American Journal of Preventive</i></p>	<ul style="list-style-type: none"> ● Reviewed 14 studies ● Interventions: individual/group educational/counseling sessions, individual/group fitness and exercise sessions and classes, walking clubs, social support, family contracting ● Findings <ul style="list-style-type: none"> ● Two main factors to target in physical activity interventions among low-income, ethnic minority, and populations with 	<p>http://dx.doi.org/10.1016/S0749-3797(98)00081-6</p>

<p><i>Medicine.</i> [Target: B,C,D,G]</p>	<p>disabilities</p> <ul style="list-style-type: none"> ○ Community involvement or meaningful participation of the community ○ Thorough assessment of needs, attitudes, preferences, and unique barriers prior to the implementation of the intervention 	
<p>Temple & Robinson. (2014). A Systematic Review of Interventions to Promote Physical Activity in the Preschool Setting. <i>Journal for Specialists in Pediatric Nursing.</i> [Target: D,E,F]</p>	<ul style="list-style-type: none"> ● Reviewed 14 articles ● Intervention type: environmental, cognitive/behavioral, a combination ● Findings <ul style="list-style-type: none"> ○ Positive interventions included manipulation of the playground with the number of children playing at one time, markings, or equipment, and goal setting and reinforcement 	<p>http://dx.doi.org/10.1111/jspn.12081</p>
<p>Van Sluigs et al. (2007). Effectiveness of Interventions to Promote Physical Activity in Children and Adolescents: A Systematic Review of Controlled Trials. <i>BMJ.</i> [Target: B,C,F,G]</p>	<ul style="list-style-type: none"> ● Reviewed 57 studies ● Interventions: school, family, and community-based interventions-enhanced physical education, health education curricula, and playgrounds; after-school clubs/programs; fitness center sessions; tools, information, and resources for families and parents; teacher trainings; focus on self-efficacy, goal setting, decision making skills, self-monitoring; online activities; behavior change skills ● Findings <ul style="list-style-type: none"> ○ Limited/inconclusive evidence in most interventions ○ Overall, 13% increase in play time spent in moderate to vigorous physical activities ○ Only school + community or family and multicomponent interventions targeting adolescents showed promising evidence (Table 4) ○ Adolescents: multilevel approach to promoting physical activity, combining school based interventions with family or community involvement and educational interventions with policy and environmental changes may make important differences in physical activity levels ○ Children: limited evidence for environmental interventions and interventions targeting children from low SES backgrounds 	<p>http://dx.doi.org/10.1136/bmj.39320.843947.BE</p>

<p>Webber & Loescher. (2013). A Systematic Review of Parent Role Modeling of Healthy Eating and Physical Activity for their Young African American Children. <i>Journal for Specialists in Pediatric Nursing</i>. [Target: G]</p>	<ul style="list-style-type: none"> • Reviewed 21 articles • Findings <ul style="list-style-type: none"> ○ Dearth of evidence on parent role modeling of healthy eating and physical activity as a strategy to influence healthy weight in young African American children 	<p>http://dx.doi.org/10.1111/jspn.12033</p>
<p>AMCHP (2013) Promoting Healthy Weight: The Role of Title V</p>	<ul style="list-style-type: none"> • Environmental scan of 2011 MCH Block Grant state narratives included in the Title V Information System (TVIS) online database • Common state strategies include <ul style="list-style-type: none"> ○ Health promotion, education and training efforts ○ Data monitoring, surveillance and education ○ Increasing collaboration and partnerships ○ Developing and implementing policies and guidelines ○ Capacity and systems building 	<p>http://www.amchp.org/programsandtopics/CHILD-HEALTH/resources/Documents/Healthy_Weight_Issue_Brief_FINAL.pdf</p>
<p>AMCHP Innovation Station [Target: F,H]</p>	<ul style="list-style-type: none"> • Georgia Shape (Emerging Practice) <ul style="list-style-type: none"> ○ Statewide, multi-agency, multi-dimensional initiative that brings together governmental, philanthropic, academic and business communities to address childhood obesity in Georgia ○ Initiatives <ul style="list-style-type: none"> ▪ Power Up for 30: trains educators to effectively add 30 mins of physical activity for every student throughout the school day in addition to PE (age 6-18) ▪ Georgia Safe Routes to School: expand implementation of safe routes to school 	<p>http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/ISDocs/Georgia-SHAPE.pdf</p>
<p>CDC. (2011). Strategies to Prevent Obesity and Other Chronic Diseases: The CDC Guide to</p>	<ul style="list-style-type: none"> • Findings on public health strategies that have been proven effective in increasing physical activity • Each strategy is listed along with its definition, rationale, evidence 	<p>http://www.cdc.gov/obesity/downloads/PA_2011_WEB.pdf</p>

Strategies to Increase Physical Activity in the Community. [Target: D,F,G,H]	<p>of effectiveness, key considerations, action steps, program examples, and resources</p> <ul style="list-style-type: none"> • Strategies include: <ul style="list-style-type: none"> ○ Community-wide campaigns ○ Point-of-decision prompts to encourage use of stairs ○ Individually adapted health behavior change programs ○ Enhanced school-based physical education ○ Social support interventions in community settings ○ Creation of or enhanced access to places for physical activity combined with informational outreach activities ○ Street-scale urban design and land-use policies ○ Community-scale urban design and land-use policies ○ Active transport to school ○ Transportation and travel policies and practices 	
Georgetown University: National Center for Education in Maternal and Child Health [Target: B,C,G,H]	<ul style="list-style-type: none"> • Nutrition, Physical Activity and Obesity in Child Care and Early Education Programs <ul style="list-style-type: none"> ○ Links to websites with information and tools for professionals and families about the promotion of physical activity in children 	http://ncemch.org/guides/ccnutrition.php
	<ul style="list-style-type: none"> • Overweight and Obesity in Children and Adolescents <ul style="list-style-type: none"> ○ Links to websites for health professionals/policy makers/researchers/program administrators about overweight and obesity in youth, ways to improve care, program development, and training resources and information 	http://ncemch.org/knowledge/overweight.php
	<ul style="list-style-type: none"> • Physical activity <ul style="list-style-type: none"> ○ Selection of resources for state MCH programs about physical activity (evidence-based information) 	http://ncemch.org/evidence/NPM-8-physical-activity.php
Physical Activity Guidelines for Americans Midcourse Report Subcommittee of the President's Council on Fitness, Sports & Nutrition (2012). Physical Activity	<ul style="list-style-type: none"> • Identifies interventions that aim to increase youth physical activity across a variety of settings (e.g. schools, preschool and childcare centers, community, family and home and primary care) • See Table 1 for a Summary of Findings that includes: <ul style="list-style-type: none"> ○ Setting and Strength of Evidence ○ Strategies to Increase Physical Activity Among Youth • Next Steps for Research 	http://health.gov/paguidelines/midcourse/pag-midcourse-report-final.pdf

Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth. [Target: B,C,D, F,G,H]		
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¹ Target specifies Target Audience for the strategies mentioned in each Review/Compilation: A = Hospital Inpatient (includes physical, mental, and oral health); B = Hospital Outpatient (includes physical, mental, and oral health); C = Non-Hospital Outpatient Providers (e.g. community health centers, private medical groups, health maintenance organizations); D = Community Organizations (e.g. WIC, advocacy organizations, child care providers, home visiting services); E = Social Service Organizations (e.g. Head Start, child welfare); F = Schools and School Systems; G = Consumers/Families; H = Other

Frameworks and Landmark Initiatives

Framework/Initiative	Summary	Web Link
McCambridge & Council on Sports Medicine and Fitness and Council on School Health. (2015). Active Healthy Living: Prevention of Childhood Obesity Through Increased Physical Activity. <i>Pediatrics</i> .	<ul style="list-style-type: none"> • Council on Sports Medicine and Fitness and Council on School Health • Statement outlines ways pediatric health care providers and public health officials can encourage, monitor, and advocate for increased physical activity for children and teenagers. 	http://dx.doi.org/10.1542/peds.2006-0472
Spence & Lee. (2003). Toward a Comprehensive Model of Physical Activity. <i>Psychology of Sports and Exercise</i> .	<ul style="list-style-type: none"> • Ecological model <ul style="list-style-type: none"> ○ Main goal: physical activity ○ Components <ul style="list-style-type: none"> ▪ Physical ecology (climate), pressure for macrosystem change (urbanization, modernization) ▪ Macrosystem dimensions (social values, neighborhoods), exosystem dimensions (parental workplace support, mass media), mesosystem dimensions (parental support, school involvement), microsystem dimensions (playground facilities, 	http://dx.doi.org/10.1016/S1469-0292(02)00014-6

	<ul style="list-style-type: none"> ▪ verbal encouragement) ▪ Biological and genetic factors (heritability, ability-stat), psychological factors (attitudes, efficacy, perceived norms) 	
Pratt et al. (2015). Can Population Levels of Physical Activity Be Increased? Global Evidence and Experience. <i>Progress in Cardiovascular Diseases</i> .	<ul style="list-style-type: none"> • Social ecological model <ul style="list-style-type: none"> ○ Intrapersonal: individually adapted health behavior change, classroom-based/college-based/healthcare based physical education and health education ○ Interpersonal: family-based social support, non-family social support ○ Community/organization: community-wide campaigns, workplace-based, school-based physical education, mass media campaigns, community physical activity classes, delivery of short physical-activity-related messages ○ Physical and policy environment: access to places for physical activity + activities in informational outreach, “point of decision” prompts, community-scale urban design and land-use policies and practices, street-scale urban design and land-use policies and practices, community-wide policies and planning 	http://dx.doi.org/10.1016/j.pcad.2014.09.002
The Alliance for a Healthier Generation (2014) Healthy Schools Program: Framework of Best Practices	<ul style="list-style-type: none"> • Establishes specific criteria that constitute a healthy school environment • Schools that demonstrate best practices in the following areas work toward the Alliance’s National Healthy Schools Award: <ul style="list-style-type: none"> ○ School health and safety policies and environment ○ Health education ○ Physical education and other physical activity programs ○ Nutrition services ○ Health promotion for staff ○ Family and community involvement 	https://www.healthiergeneration.org/asset/l062yk/07-278_HSPFramework.pdf
CDC Adolescent and School Health. (2015). Youth Physical Activity	<ul style="list-style-type: none"> • Aerobic, muscle-strengthening, and bone-strengthening activities 	http://www.cdc.gov/HealthyYouth/physicalactivity/guidelines.htm

Guidelines Toolkit.		
CDC. A Conceptual Framework for Organizational Readiness to Implement Nutrition and Physical Activity Programs in Early Childhood Education Settings.	<ul style="list-style-type: none"> • Overarching theme: nutrition and physical activity program objectives • Organizational level: ECE director, individual level: ECE director and teacher • Antecedents to readiness <ul style="list-style-type: none"> ○ Structural and external factors: resources, policies, professional growth and training, communication, parent engagement ○ Staff attributes: staff cohesion, stress, staff authority, openness to change, clarity and goals, self-efficacy ○ Other psychological factors: motivation (perceived need and time, pressure for change), perceived authority, trust in leadership • Readiness to change: readiness to change for program objectives at organization and individual level • Outcomes: program implementation success 	http://www.cdc.gov/pcd/issues/2014/14_0166.htm
CDC Partnership for Prevention. School-Based Physical Education.	<ul style="list-style-type: none"> • “Working with Schools to Increase Physical Activity Among Children with Adolescents in Physical Education Classes” (2008) • Action guide 	http://www.prevent.org/data/files/initiatives/schoolpe.pdf
CDC. (2013). Results from the School Health Policies and Practices Study 2012.	<ul style="list-style-type: none"> • Largest, most comprehensive assessment of school health policies and practices in the US. • Conducted in state, district, school and classroom levels nationwide • Assess characteristics of eight components of school health at the elementary, middle, and high school levels (health education, physical education and activity, health services, mental health and social services, nutrition services, healthy and safe school environment, faculty and staff health promotion, and family and community involvement). 	http://www.cdc.gov/healthyouth/shpps/2012/pdf/shpps-results_2012.pdf
Guide to Community Preventive Services	<ul style="list-style-type: none"> • School Based Physical activity 	http://www.thecommunityguide.org/pa/behavioral-social/schoolbased-pe.html
	<ul style="list-style-type: none"> • Campaign and informational approaches 	http://www.thecommunityguide.org/pa/campaigns/index

	<ul style="list-style-type: none"> Environmental and Policy Approaches 	html http://www.thecommunityguide.org/pa/environmental-policy/index.html
Institute of Medicine. (2013). <i>Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation</i> . Academic Press.	<ul style="list-style-type: none"> The IOM evaluated prior obesity prevention strategies and identified recommendations to lower obesity rates in children and integrate more physical activity into daily life. 	http://books.nap.edu/openbook.php?record_id=13275
Institute of Medicine (2013) <i>Educating the student body: Taking physical activity and physical education to school</i> . The National Academies Press.	<ul style="list-style-type: none"> The IOM's Committee on Physical Activity and Physical Education in the School Environment reviews the current status of physical activity (PA) and physical education (PE) in school environment (before, during, and after school) and PA/PE's influence on student's cognitive, physical, and psychological health. Conclusion: scientific evidence finds regular physical activity to positively affect physical, mental, and cognitive health. 	http://www.nap.edu/catalog.php?record_id=18314
Report of the Surgeon General Executive Summary. <i>Physical Activity and Health</i> .	<ul style="list-style-type: none"> Summary of history, physiological benefits of exercise, health benefits, and promotion of physical activity Not in scope of just children 	http://www.cdc.gov/nccdphp/sgr/pdf/execsumm.pdf

Data Sources

Data Source*	Search Criteria	Web Link
Cochrane Library	Search Term: physical activity children	N/A
	Search Term: active living children	
	Search Term: active children	
Campbell Systematic Reviews	Search Term: physical activity	
	Search Term: active living children	
	Search Term: active children	
PubMed	Search Term: increase physical activity Article Types: Meta-analysis, Review, Systematic Reviews Species: Humans	http://www.ncbi.nlm.nih.gov/pubmed/?term=increase+physical+activity

	Languages: English Ages: Child: birth-18 years Sort by relevance	
	Search Term: increase physical activity children Article Types: Meta-analysis, Review, Systematic Reviews Species: Humans Languages: English Ages: Child: birth-18 years Sort by relevance	http://www.ncbi.nlm.nih.gov/pubmed/?term=increase+physical+activity+children
	Search Term: active living children Article Types: Meta-analysis, Review, Systematic Reviews Species: Humans Languages: English Ages: Child: birth-18 years Sort by relevance	http://www.ncbi.nlm.nih.gov/pubmed/?term=active+living+children
	Search Term: active children Article Types: Meta-analysis, Review, Systematic Reviews Species: Humans Languages: English Ages: Child: birth-18 years Sort by relevance	http://www.ncbi.nlm.nih.gov/pubmed/?term=active+children
Google Scholar	Search Term: increase physical activity in children Sort by relevance	https://scholar.google.com/scholar?hl=en&q=increase+physical+activity+in+children+&btnG=&as_sdt=1%2C21&as_sdtp=
	Search Term: active living children Sort by relevance	https://scholar.google.com/scholar?q=active+living+children&btnG=&hl=en&as_sdt=0%2C21
	Search Term: active children Sort by relevance	https://scholar.google.com/scholar?q=active+children&btnG=&hl=en&as_sdt=0%2C21

CINAHL Plus	Search Term: physical activity Source Types: all results Sort by relevance	N/A
	Search Term: active AND living AND children Source Types: all results Sort by relevance	N/A
	Search term: active AND children Source Types: all results Sort by relevance	N/A
AMCHP Innovation Station	State: all Region: all Practice Category: all Primary Topic: all National Performance Measures: all Year: N/A Keywords: N/A	http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/Pages/default.aspx
Georgetown Knowledge Base	MCH Knowledge Base and Library Collection → Professional Resource Guides and Briefs → Physical Activity Evidence	http://ncemch.org/knowledge/physical-activity.php http://ncemch.org/evidence/NPM-8-physical-activity.php
Healthy People 2020 Structured Evidence Queries	Search by Topic Area → Physical Activity	http://phpartners.org/hp2020/
AAP Institute for Healthy Childhood Weight	Search Term: physical activity children	https://ihcw.aap.org/Pages/default.aspx
Active Living Research	Search Term: physically active children	www.activelivingresearch.org
CDC Division of Nutrition, Physical Activity, and Obesity	N/A	http://cdc.gov/nccdphp/dnpao
CDC Centers for Disease Control and Prevention	Search Term: physically active children	http://search.cdc.gov/search?query=physically+active+children&utf8=✓&affiliate=cdc-main
MCH Nutrition Training, Leadership Education in Adolescent Health (LEAH)	N/A	http://leah.mchtraining.net/
National Adolescent and Young Adult Health Information Center	Search Term: physical activity children	http://nahic.ucsf.edu/

**The Strengthen the Evidence Team of Experts and selected HRSA discretionary grantees contributed to the identification of data sources*

*Women's and Children's Health Policy Center, Johns Hopkins University
Revised May 20, 2016*

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Reviews of studies, websites, compilations of specific interventions/strategies aimed at promoting physical activity in children and adolescents as a primary goal • Language: English • Populations of interest: children 6-11 years, adolescents 12-17 years 	<ul style="list-style-type: none"> • Articles describing single strategies that are not part of a larger review • Studies performed or primarily focused on international populations (included reviews of studies if US studies were included) • Studies without specific information regarding implementation of interventions • Studies including interventions/strategies aimed at promoting nutrition and physical activity and/or preventing obesity in children and adolescents in which the effects of the physical activity component was difficult to isolate