Evidence Brief: Promoting active play for children 0-12: A review of community-based interventions

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Issue and Research Question

It is well-accepted that being physically active contributes to the health and well-being of children.[1,2] One way that children are active is through engaging in active play.[3,4] Active play has several key components differentiating it from other forms of physical activity, such as sport. Active play can be defined as unstructured, child-led, and often spontaneous physical activity that expends energy well-above resting levels. [5] Active play can occur alone, with friends, or with family and it most often occurs outdoors.[3,6] Importantly, active play is perceived as enjoyable by the child.[3,7] Active play has been associated with many of the health benefits of other forms of physical activity and may provide additional social and cognitive benefits to children.[3,4,8,9] As a result, promoting active play may be a feasible strategy to increase children's physical activity and thereby improve the health of Ontario children.

One approach used to promote health behaviour changes in children is through community-based interventions. Community-based interventions most often refer to using the community setting (e.g., schools, local parks, neighbourhoods) as a target for intervention initiatives to promote population level changes, or changes in a subset of the

population (e.g., children).[10-12] Community-based approaches have been used to promote physical activity in children with varying effectiveness.[10] As such, effective community-based interventions may be a useful strategy to promote active play.

This Evidence Brief asks: *What types of community-based interventions are being implemented to promote active play in children and youth aged 0 to 12, and are they effective?*

Methods

Medline, Embase, CINAHL, Academic Search Premier and SPORTDiscus were searched on November 28th 2014 by PHO Library Services for articles published between the databases' inceptions to present. Search terms included: active play, playground, recess, motor activity, exercise, recreation, obesity, body weight, child, preschool, adolescent, tween, child development, students, schools and child day care centers. Articles retrieved by this search were assessed for eligibility by two reviewers. Reviews in the English language were eligible if they reported on interventions that involved physical or social changes that promote active play (i.e., not adult-led) in children in community, neighbourhood or school settings. Outcome(s) on play, physical activity or related to physical activity must have been reported in order to be eligible. The search strategy was focused on only review level evidence; however, some primary studies that appeared in the search were considered and evaluated using the same criteria. All titles and abstracts were screened by one PHO staff member and 20% of these were screened by a second reviewer for verification. Any disagreements on inclusion were resolved by discussion until consensus was reached. Full text articles were retrieved, reviewed and relevant information was extracted from each article. The full search strategy can be obtained from PHO.

There was insufficient detail provided in the reviews to determine whether the primary studies that were synthesized included only child-led interventions, and excluded adult-led interventions. As a result, reference lists from ten reviews that otherwise met the inclusion/exclusion criteria were hand searched for relevant primary studies that met all inclusion/exclusion criteria. These studies were combined with primary studies included as part of the initial search. Therefore only primary level evidence is included in this evidence brief.

Main Findings

The search identified 443 articles, from which six primary studies and 10 reviews were originally included. Upon finding that the 10 reviews synthesized primary studies which included some adult-led interventions, reference lists for these reviews were investigated further, which yielded 27 unique articles. Screening resulted in the inclusion of 14 of these additional studies. As such, 20 primary studies were included in this evidence brief. The results consisted of interventions in schools, child-care centres (e.g., pre-school), and community parks. In most cases, the studies focused on either school-aged children (children aged 5 to 11 years) or pre-school aged children (children less than 5 years of age). In some studies, specific demographic groups such as low-income, or Latino populations, were targeted. The results are presented by setting, with target population results grouped where appropriate.

School-Based Interventions Promoting Active Play

Several school-based strategies involved playground modifications were tested with school-aged and pre-school children.

School Playground Modifications for School-aged Children

Equipment and playground marking modifications

Three articles reported on one large study where bright multi-coloured markings of various designs (i.e., castle, dragon, pirate, ship, hopscotch and mazes) were painted in school yards.[13-15] The studies by Stratton, (2000) and Stratton and Leonard, (2002) took place in two schools (one randomly selected as a control) located in an urban industrialized area of north-west England.[13,14] A total of 60 children aged 5 to 7 years were randomly selected with 18 boys and 18 girls in the experimental group and 12 boys and 12 girls in the control group. [13,14] Stratton, (2000) reported increases in moderate to vigorous physical activity (MVPA) by 10% during playtime, vigorous physical activity (VPA) by 5% during playtime, increased mean heart rate by 6 beats min^{-1} and increased MVPA duration by 18 minutes, in the experimental group compared to the control group.[13] Stratton and Leonard, (2002) reported a 6% increase in the rate of energy expenditure and 35% increase in total energy expenditure during the intervention.[14] In comparison with the control group, the experimental group demonstrated a significantly higher rate of energy expenditure by 7.8%, and a 17% greater total energy expenditure.[14] Boys were found to have about a 20% higher rate and total energy expenditure than girls.[14] Stratton and Mullan, (2005) also studied eight schools, including two early primary (4-7 years) and two late primary (7-11 years) schools from deprived Northeast Wales area, and two early and two late primary matched schools from Northwest England as controls.[15] A total of 99 children, 35 boys and 32 girls in the intervention schools and 16 boys and 16 girls in the control schools had complete data sets for analysis. Results showed an increase of 36.7% to 50.3% of playtime spent in MVPA in the intervention group compared to a decrease of 39.9% to 33.4% in the control group.[15] VPA increased from 7.9% to 12.4% in the intervention group while the control group remained the same at 8.0%.[15]

Four articles studied the impact of providing extra outdoor equipment to school playgrounds.[16-19] A study by Lopes and colleagues, (2009) investigated the effects of extra outdoor play equipment (e.g., balls, skipping ropes and arches) and painted the floor for playing traditional games on physical activity levels in 158 Portuguese children aged 6 to 12 years old.[19] Children were grouped into two age groups, 6-7 year olds and ≥ 8 years old and were stratified by gender and body mass index (BMI). Results showed a significant increase of time spent on physical activity with the intervention.[19] There was significant interaction between gender and age group that suggested physical activity increased significantly more in the younger group of girls. There was no significant effect of the intervention on moderate physical activity (MPA) however there were significant interactions with gender and intervention, whereby MPA increased in girls and decreased in boys.[19] There was also a significant interaction between BMI and gender that suggests time spent in MPA increased significantly more in the overweight/obese group of girls. Time spent in vigorous and very vigorous physical activity (VVVPA) increased significantly with the intervention.[19] Specifically, younger rather than older children, boys rather than girls, and overweight/obese boys rather than normal weight boys increased their VVVPA by a significantly greater amount.

A study by Engelen and colleagues, (2013) investigated the effects of adding loose, primarily recycled materials in the school playground on physical activity for 13 weeks in 226 children ages 5-7 years old that were randomly selected from 12 primary schools in Sydney, Australia.[18] Materials had no obvious play value, encouraged co-operation and gross motor development, were multipurpose, could be used in challenging, creative and uncertain ways, promoted interesting sensory experiences, and were re-usable or very inexpensive items. Examples of materials included car tires, milk crates, weighted boxes, crash mats and fabric. Interestingly, potential hazards were easily seen or managed by children. Results demonstrated that the

intervention was associated with significant increases in total counts and minutes of MVPA, as well as decreases in sedentary activity. Children in the intervention schools engaged in 12% more MVPA than control school children at post-test.[18] Overall, boys spent more time in MVPA than girls during break times. Other factors such as year, BMI, Index of Community Socio-Educational Advantage and available playground space did not significantly influence physical activity. There were no significant effects of the intervention for any physical activity outcomes when assessed during the whole day.[18] A two year follow-up in one school (n = 16) revealed the effects of the intervention persisted, with a non-significant increase in total accelerometer counts and MVPA compared to the previous data.[18]

Two articles both by Bundy and colleagues, (2008 & 2009) investigated the effects of introducing loose parts or scrounge materials in the playground for 11 weeks on 5 to 7 year old children attending a primary school in Sydney, Australia.[16,17] Materials were not considered conventional play things for children. Items included car and bicycle tires, hay bales wrapped in plastic, cardboard boxes, plastic barrels and water containers, lengths of tubing, pieces of fabric, sacks stuffed with foam, crates, wooden planks, trash can lids and strips of foam. Bundy and colleagues, (2008) reported outcomes on 20 children using Test of Playfulness (ToP) and teachers' description of children's activities.[16] Results showed a significant difference between pre- and post-intervention means of ToP.[16] Teachers' described the children's play as more active and progressively more creative over time and that cooperative play and social play had increased (e.g., more discussions of play among children).[16] All teachers agreed that the children enjoyed playing with the materials. Overall, playfulness increased significantly after loose-part materials were added to the school playground.[16]

Bundy and colleagues, (2009) reported outcomes on 12 children using Actigraph accelerometers for measuring physical activity and teachers' perceptions of play materials on the playground.[17] Results showed children's physical activity was greater after the introduction of loose parts play material. The mean counts significantly increased from 1028 to 1612.[17] Teachers' perceptions were organized into two themes 'Flavours and favours of play' and 'Risk: real or imagined?' Teachers' 'Flavours and favours of play' had similar findings to the previous article with some added details. Access to materials on the playground generated more physically active play such as aerobic exercise (e.g., running and jumping) and resistive exercise (e.g., lifting, pushing and pulling of large, heavy objects like hay-bales).[17] One teacher observed that previously sedentary children were more active because of the materials. Also, children who do not usually play together (e.g., different age groups) were more likely to play with each other due to availability of the materials. Teachers' 'Risk: real or imagined' revealed perceptions of risk to children's safety increased with the introduction of materials to the playground. Risk was seen to have increased because of children's frenetic attraction to materials and opportunities for 'risky' behaviour (e.g., wooden planks could be used as a weapon).[17] However, incidence of injuries did not increase during the study period; therefore concerns arose more from what might have happened rather than what was actually observed.[17]

Renovation modifications

Three articles reported on two Canadian studies that modified entire playgrounds.[20-22] Dyment and Bell, (2008) studied 'green' school grounds, which are hard, barren turf and asphalt grounds transformed into a diversity of natural and built elements such as shelters, rock amphitheaters, trees, shrubs, wild-flower meadows, ponds, grassy berms and food gardens.[20] Based on questionnaires representing 59 schools across

Canada, the majority of the participants, who were principals, teachers or parents, reported more trees, shrubs, rocks/boulders and wildflower gardens.[20] Most students were observed using all parts of the school ground to engage in physical activity where 66% were reported using greened areas of the school ground for active play.[20] Turf and asphalt supported more vigorous and moderate levels of activity, play structures supported more moderate levels of activity and greened areas supported moderate and light levels of activity. Participants indicated that green school grounds appeal to a wider variety of students (90%) and provide space for alternative forms of active play (85%).[20] Approximately 80% reported that green school grounds promoted more active, imaginative and civil behaviour, as well as better integration of physical activity into school life and strengthened playing with learning.[20]

An article by Brink and colleagues, (2010) and an article by Anthamatten and colleagues, (2011) both examined Learning Landscape (LL), a novel type of schoolyard that offers a diversity of elements such as gateways, shade structures, banners, gardens, public art, student art and art tile projects.[21,22] Nine elementary schools were selected in Denver, Colorado, from neighbourhoods facing significant social, economic and educational challenges. The schools were divided into three groups based on location. Each group included an established LL (in place for at least two years), a recently built LL (within the past year) and a control school. [21,22] Brink and colleagues, (2010) found that there was a higher student traffic in LL schools than control schools.[21] Stratified by gender and activity level (sedentary versus active), there were significantly higher percentage of active boys in the LL schools compared to controls, while active girls were higher in the control than in LL schoolyards.[21] There were no significant differences among sedentary boys or girls between the schools. Energy expenditure was significantly higher for boys and girls in the recent and established LL schoolyards compared to control.[21] Both boys' and girls' activity rates were significantly greater on LL soft surface structured areas (e.g., play equipment requiring fall zones and play fields with grass) than control environments.[21] There were no significant differences in hard surface structured areas (i.e., basketball and tetherball asphalt areas) between LL and control schools. Active boys were significantly more active in hard surface unstructured areas (i.e., un-programmed creative play or educational marking areas, sitting or social gathering areas, and overhead structure or shade areas) while girls were non-significantly less active. Soft surface unstructured areas (e.g., planted areas with or without sitting areas and trails, cultivated or habitat garden areas, and grassed or planted un-programmed areas) could not be compared to control schools because these areas did not exist; however, there were no significant difference between active boys and girls in this area.[21]

Anthamatten and colleagues, (2011) also found LL schoolyards had significantly greater use.[22] Overall there was greater utilization per 100 children in LL (more so for recently renovated LL schools than established LL) when compared to un-renovated schoolyards.[22] However, there was no significant difference in percentage of children engaged in moderate to vigorous physical activity between LL and control schools during any of the utilization periods.[22]

Playground and Child-Centre Modifications for Pre-school Children

Equipment and playground marking modifications

Two studies included interventions to modify the pre-school outdoor environment through the provision of play equipment and/or the addition of playground markings.[23,24] One study by Hannon and Brown (2008) explored whether adding activity-friendly equipment into a pre-school outdoor play space during outdoor play time would increase the activity of pre-

schoolers (N=64) between the ages of 3 and 5 years.[24] Objectively measured physical activity (using accelerometers) was observed for 5 days pre-intervention (baseline equipment) and 5 days post-intervention with the addition of activity-friendly equipment in the same children. Results revealed that the intervention was effective at significantly increasing child physical activity levels and reducing sedentary activities.[24] Specifically, children significantly reduced their sedentary activities by 16%, and increased their time spent performing light, moderate, and vigorous physical activity by 3.52%, 7.76%, and 4.66% respectively.[24]

In a similar study, Cardon and colleagues (2009) objectively measured (accelerometer) the physical activity of pre-school children (N=583) to determine if their activity increased as a result of providing play equipment (intervention group 1), painting markings on pre-school outdoor space (e.g., hopscotch, river with crossings; intervention group 2), or both (intervention group 3) versus a control group.[23] Interestingly, in none of the three intervention groups (or the control group) did engagement in sedentary activities significantly decline or engagement in light, moderate, or vigorous physical activities significantly increase.[23] Importantly, this study performed post data collection 4-6 weeks after providing the play equipment and/or markings [23] whereas in the previous study, post intervention measures were taken in the days immediately following the provision of equipment.[24]

Renovation modifications

Studies by Cosco and colleagues (2014), and Nicaise and colleagues (2012) explored the effectiveness of renovating outdoor play spaces at child-care centres on the activity levels of pre-school aged children.[25,26] In the study by Cosco and colleagues (2014), 27 child-care centres underwent Preventing Obesity by Design (POD) style renovations which focused on integrating diverse outdoor environments (e.g., fruit and vegetable gardens) into their outdoor space.[25] The Children's Activity Rating Scale (CARS) tool was used to observe child activity levels before and after the renovation. Behaviour mapping was used to assess social interactions in relation to activity levels. Results revealed that overall the renovation was associated with greater physical activity, particularly involving the added looped pathways for mobility and wheeled toys.[25] Interestingly, any child teacher interaction was associated with less physical activity, with trained teachers being less likely to intervene in child play activities.[25]

In the study by Nicaise and colleagues (2012), renovations of the pre-school playground were based on an urban naturalism concept promoting exploration (e.g., looping paths and increased green space).[26] Physical activity was measured objectively using accelerometers and through direct observation using the Observational System for Recording Physical Activity in Children – Preschool Version (OSRAC-P) to determine where physical activity was occurring. Accelerometer results revealed no significant change in physical activity or time spent sedentary; however, observational results revealed an increase in light, moderate, and vigorous physical activity and a reduction in sedentary time from baseline.[26] Particular renovation aspects like the looping bike path, grassy hill, and open space were associated with greater variability in observed physical activity and more observed moderate to vigorous physical activity.[26]

Recess Interventions for Pre-School Age Children

Two studies explored whether adapting recess characteristics would increase pre-schoolers engagement in physical activity through play.[27,28] Alhassen and colleagues (2007) performed a pilot randomized controlled trial to assess whether increasing outdoor recess (free play) by 60 minutes per day would increase the school day physical activity and total daily physical activity of Latino pre-schoolers (N=17

intervention; N=15 control).[27] The intervention effects were acutely assessed with physical activity being objectively measured for two days pre- and post-intervention in the intervention and control group. Results revealed no significant differences in physical activity during the school day, or throughout the total day, in either the intervention or control group.[27]

In a separate recess intervention pilot study, Van Cauwenberghe (2012) explored whether reducing the playground density (i.e., number of children/m^2 of outdoor play space) during recess would promote more free play and increased physical activity for pre-schoolers.[28] Using a within-subjects design, pre-schooler physical activity (N=128) was objectively measured using accelerometers pre- and post-intervention. The intervention was created by varying the school recess times so that only half of the children were on the playground for a given recess time which decreased the playground density from 7.4 m^2 per child to 16.7 m^2 per child. Results demonstrated that decreasing playground density significantly reduced sedentary time by 5.1%, and increased light to moderate, and moderate to vigorous physical activity by 5.1% and 4.8% respectively during recess.[28] The intervention was more effective in girls versus boys.

Interventions in the Community Promoting Active Play

Renovation of community parks and playgrounds

Three studies assessed the impact of renovating community parks or playgrounds on the physical activity of children living in the community through engagement in active play.[29-31] Colbianchi and colleagues (2009) assessed physical activity in child attendees of 10 school playgrounds that had been renovated for at least 1 year as a part of the "School Grounds for Community Parks" program against 10 matched control school playgrounds in Cleveland, Ohio.[29] Due to the timing of the renovations, only a post-intervention data collection occurred up to one year after renovations. Although renovations were on school playgrounds, data was collected after school hours to assess the physical activity of children in the community, not exclusively students at the school. Observation using the System for Observing Play and Leisure Activity in Youth (SOPLAY) tool assessed the number of children on the playgrounds and their activity levels. Results demonstrated that more children attended the renovated (mean=2.34) versus un-renovated playgrounds (mean=1.64) although overall use for both playground types was low.[29] There was no difference in the proportion of children who were moderately active in the renovated versus control playgrounds; however, children (especially boys) were significantly more likely to be vigorously active at the renovated playgrounds.[29] Interestingly, girls were moderately active significantly more at un-renovated playgrounds versus at renovated playgrounds.[29]

A similar study by Cohen and colleagues (2009) observed differences in usage and activity levels of youth (note: participant population not clearly defined) at a renovated and matched un-renovated skate park in Los Angeles, California.[30] Using the System for Observing Parks and Recreation in Communities (SOPARC), it was observed that although usage in both skate parks increased, there was a significantly greater increase in the renovated park versus the un-renovated park, with the greatest increase being in females.[30] It was noted that the intensity of the activity in the renovated park increased more than in the un-renovated park, with vigorous activity being greater at follow-up in the renovated park and sedentary behaviour being greater at follow-up in the un-renovated park (note: no statistical information was reported).[30]

A study by Quigg and colleagues (2011) observed changes in physical activity of children (aged 5 to10 years) living in communities where community parks were renovated within

Dunedin, New Zealand.[31] Children (n=77) living in the community with renovations and children (n=79) living in a matched control community had their total daily physical activity objectively measured using accelerometers at baseline (pre-renovations) and follow-up (post-renovations). Their parents also completed a survey on neighbourhood perceptions, and Body Mass Index (BMI) was collected by measuring heights and weights in schools. There was no significant difference in physical activity between intervention and control children over time.[31] When BMI was considered in the analyses, there was a significant difference in that across the intervention community, children with a higher BMI decreased their physical activity whereas children with a lower BMI increased their physical activity (note: small sample size for this analysis).[31]

Extended use of community parks

A single study by Farley and colleagues (2007) explored the impact of extending the use of a school-yard playground as a community-playground in the after-school hours on the physical activity of inner-city children in New Orleans, United States.[32] Specifically, one school opened their playground to community children after school hours and on weekends between certain hours with supervision while a school playground in a matched community remained locked after school hours. Physical activity of community children on the playground, as well as physical activity of children outside in the intervention and control communities, was observed using the SOPLAY instrument. Sedentary behaviour was assessed in the intervention and control schools corresponding to the playgrounds through a survey. Playground observations revealed that attendance was significantly higher on weekdays versus weekends, that most children using the playground attended the school (70%), and the majority of observations were active (66%).[32] Neighbourhood outdoor play observations indicated that children in the intervention community were 30% more active than in the control community; however, fewer children were observed outdoors in both communities at follow-up which may be in part attributed to more variable weather at follow-up. When including the schoolyard observations, children in the intervention community were 84% more active than in the control community at follow-up. Children attending the school with the intervention playground demonstrated a reduction in sedentary behaviour whereas control children increased their reported sedentary behaviour.[32]

Discussion and Conclusions

Overall, there are many different interventions that can be used to promote active play to children in hopes of increasing their physical activity. Commonly reported community-based interventions either modified the school outdoor play environment (e.g., provided equipment, renovated the area, added playground markings), the community outdoor play environment (e.g., renovated community parks) or modified children's exposure to environments where play commonly occurs (e.g., increased available hours for park use, reduced playground density). Within intervention types, and between pre-school and school-aged child populations, studies had varying conclusions which will be discussed.

For school-aged children, modifying the school playgrounds with markings or equipment had a significant impact on physical activity and playing.[13-19] However, in one study there were concerns perceived by teachers that the addition of non-traditional equipment would increase risky behaviour among children, despite no observable increase in injury rates or litigation.[17] This suggests that children will readily accept and play with novel equipment but teachers may be reluctant for children to play with these materials due to safety concerns and risk of litigation.

Modifications to the school environment also showed promising results in promoting active play in school-aged children. Changing the whole school environment promoted greater use of playgrounds and play spaces and increased active play but not necessarily physical activity.[20-22]

For pre-school aged children, modifying the playground environment at child centres demonstrated positive short-term effects on physical activity and a reduction in sedentary behaviour but no difference when a longer intervention follow-up was introduced.[23-26] This suggests that perhaps adding equipment in the short-term can be effective at increasing active play; however, strategies are needed to maintain these effects in pre-schoolers. Of two studies that renovated the outdoor pre-school environment both observed a significant increase in child physical activity; [25,26] however, one of the studies revealed no increase in objectively measured physical activity.[26] Looping paths (for riding/cycling activities, running, or playing), grassy hills, and open space emerged as specific playground characteristics that may be useful to promote active play in pre-schoolers.[25,26]

A pilot study increasing the open space per pre-school child (i.e., decreasing playground density) supports the importance of having adequate open space on the playground to increase physical activity and that this may be achievable by varying recess times within the school.[28] Interestingly, a separate pilot intervention which increased recess duration for Latino pre-schoolers found no improvements in child activity when measured acutely.[27] Although these studies serve as a starting point in the pre-school population, more research is needed as both studies are pilot (small sample size) and in different ethnic populations.[27,28]

When considering the community setting more broadly, renovations to school playgrounds that are open to the community outside school hours, [29] public parks renovations,[31] and a skate park renovation showed increased usage in children, [30] with varying impacts on physical activity. Interestingly, Quigg (2011) discovered varying effectiveness by BMI and suggested that the intervention actually decreased physical activity in children with higher BMIs, although this finding should be interpreted with caution due to the small sample size.[31] As such, renovating community parks may increase park usage and physical activity in some cases; however, careful consideration regarding the type of renovation (e.g., adding open space, looped pathways) may be necessary to impact physical activity through active play and to successfully target key populations.

Providing community access after school and on weekends to a supervised school playground in the inner-city revealed that many children used the park and were active while doing so.[32] Children in the community were also more active outside of the park suggesting that this may be a useful strategy to promote active play in lower-income neighbourhoods.

Limitations:

This evidence brief is not without limitations. Although review-level evidence (where available) is the typical focus of an evidence brief, in the case of this topic area, the element of child-led interventions meant that the best available evidence was at the primary study level. Given that existing reviews included both adult-led and child-led interventions, primary studies with child-led interventions were extracted to address the research question and purpose of the evidence brief. The reviewed studies included a variety of interventions and methods (e.g., study designs measurement tools, and sample sizes) which limits our ability to generalize the results and draw overall conclusions. Some of the studies did not include control groups and instead adopted a pre-post or observational study design.[16,17,19,20,24-26] Various measurement tools (e.g., accelerometers, observational tools, heart rate

monitors, etc.) present different degrees of rigour in their results. In addition, the length of follow-up varied with some studies noting the possibility of a novelty effect due to results being captured immediately following intervention implementation.[13-15,19,24,28]

Implications for Practice

Interventions in the school and the community show promise for increasing physical activity in children through the promotion of active play. Although not addressed by this evidence brief, the social and cognitive co-benefits of active play should also be considered. Due to the short-term follow-up of many studies, long term efficacy is unknown; therefore, program co-ordinators should evaluate programs to make sure they are promoting active play in children, both acutely and in the long term. Also, as community-based interventions tend to have the setting embedded in the intervention, results may not be generalizable to every community or to every population within a given community. Therefore, program planners should conduct a needs assessment to evaluate the community and population intended to be targeted before selecting a potential intervention strategy. The variety of interventions presented various degrees of required resources (e.g., time and money), which emphasizes that there are many opportunities to develop cost-effective interventions that can be tailored to a given community setting.

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Specifications and Limitations

This Evidence Brief presents key findings from the scientific literature. Its purpose is to investigate a research question in a timely manner in order to help inform decision making. This report is not a comprehensive review of the literature, but rather a rapid assessment of the best available research evidence. There may be relevant pieces of evidence that are not included and these may alter the conclusions drawn from the document.

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