Evaluation of Social Impact Within Primary School Health Promotion: A Systematic Review

Dianne Robertson, MHu, BBus(Hons), GDipEd, BPsych \(^a\) Julia Carins, PhD \(^b\) Sharyn Rundle-Thiele, PhD \(^c\) Jessica Harris, BBus(Hons) \(^d\)

**ABSTRACT**

**BACKGROUND:** Health promotion programs and interventions are designed to encourage behavioral changes in children, encouraging them to make safe and healthy life choices. This systematic review seeks to examine how social impact is measured in primary school health promotion interventions.

**METHOD:** A systematic search and review process was used to identify and examine primary school health promotion interventions. The PRISMA guidelines were followed to source articles from 6 electronic databases reporting school health promotion programs or interventions in Australia, Canada, New Zealand, or the United Kingdom.

**RESULTS:** A total of 77 studies were located, representing 55 health promotion interventions delivered in primary school settings. Of these interventions, only 8 (15%) measured or attempted to measure social impact, whereas another 8 (15%) alluded to social impact. The predominant theories reported were social based theories (theories which examine the social influences on people, environments, and behaviors) \((n = 17, 59\%)\), with almost a third not informed by an overt health promotion framework or model \((n = 34, 59\%)\). A systematic rating system identified some level of stakeholder engagement \((n = 30, 53\%)\).

**CONCLUSIONS:** This systematic review highlights the need for social impact measurement within health promotion to illuminate the role of school programs in delivering lasting change.

Keywords: health promotion; social impact; primary school; evaluation; stakeholder engagement.

Citation: Robertson D, Carins J, Rundle-Thiele S, Harris J. Evaluation of social impact within primary school health promotion: a systematic review. J Sch Health. 2022; 92: 739-764. DOI: 10.1111/josh.13160

Received on September 8, 2021
Accepted on January 23, 2022

Health promotion was first defined in the *Ottawa Charter* (1986), and subsequently updated in the *Bangkok Charter for Health Promotion in a Globalized World* (2005) and is now defined as “the process of enabling people to increase control over their health and its determinants, and thereby improve their health.” \(^{1,2}\)

Health promotion includes awareness and knowledge campaigns, health information and advice, and actions which aim to influence broader change at the social, environmental, policy, or economic levels. \(^3\) Within a school context, health promotion has been defined as a project, program, or initiative which aims to “promote health, health behaviour, health-related competencies or other social and material determinants of health for students or other school-related stakeholders.” \(^4\)(p. 196)

This definition indicates a desire for broader change elements or a focus beyond individual behavior change within school health promotion programs.

Worldwide, a huge array of health promotion interventions have targeted children’s health behavior, in response to a range of complex issues. Health behaviors targeted within school-based contexts include mental health, \(^5,6\) obesity, \(^7,8\) nutrition, and physical activity. \(^9,11\) Regardless of the behavior targeted, health
promotion in schools is considered important to lay the foundations of healthy living as schools are perceived as the most accessible and consistent platform, with important environmental and social structures to support engagement with children.12

Despite definitions of health promotion indicating a desire to create broader change or to have impact at a broader level, the literature on primary school-based interventions does not show a clear translation into practice. Currently, the majority of the literature reports measuring or evaluating the effect at an individual level or for an individual health determinant, rather than exploring the impact for an individual, or for a broader cohort, community, or population.13-15 Furthermore, systematic reviews on children’s health promotion interventions have synthesized information differently, which can make comparisons challenging when evaluating the theories, intervention durations, intervention components, outcomes and impacts of the health promotion.16-18 This variation in synthesis of studies reporting health promotion interventions leads to a lack of clarity around the theoretical basis for creating health behavior change; limited capacity to make clear links that attribute any changes observed, or resulting impact, to program elements; and a lack of a consensus about the most appropriate methods for evaluating effectiveness of health promotion interventions.

Social Impact Resulting from Primary School Health Promotion

Defining impact remains challenging as variation occurs in conceptualization and operational definitions of social impact.19 Within the health promotion context, social impact has been defined as the process of analyzing and measuring the economic, social, and environmental consequences of business activity, both the positive and negative, regardless of the purpose or perceived or real benefits of the activity.20 Within health promotion, impact is often discussed as an outcome or an effect rather than a benefit. There appear to be 2 main drivers for examining the social impact of health promotions within primary schools. Firstly, there is a growing need for outcome measurement to demonstrate and evidence the impact and value of the health promotion, with increasing pressure for standardization, verifiability, and accountability in meeting delivery and reporting requirements.21,22 Secondly, there are calls within the literature for broader measures beyond outputs and short-term individual measures to support investment in initiatives that deliver lasting behavioral changes within complex systems.23

Behavioral change programs that target health issues need to consider broader social, economic, and environmental consequences (both positive and negative) when designing, implementing, and evaluating interventions. This requires consideration of and collaboration with stakeholders to establish 3 key things: what the impact is, who the impact is for, and how to evidence impact.24 Consultation with multiple stakeholders in children’s health promotion is required to understand the desired behavioral outcomes and objectives, which will guide what should be measured to show if behavioral change has occurred, and to understand the impact beyond individual behavior change following the intervention.25,26 Stakeholder engagement may be critical for effective health promotion that aims to achieve social impact.

Previous Research Reviews

Recent systematic reviews on health promotion have focused on direct, measurable outcomes of interventions such as awareness, knowledge, behavior (either observed or reported, for example, increased consumption of fruit, levels of physical activity, or intentions to not start smoking)27,28 or anthropometric measurement (standard body measurements such as weight, height, skinfolds, and waist circumference).29,30 This focus on direct, measurable individual outcomes is reflected in current reviews on healthy eating (inclusive of nutrition and obesity prevention) which have found that outcomes were predominately anthropometric change, with mixed results reported for efficacy and use of theoretical frameworks.12 Physical activity reviews found similar results with a strong focus on measurable outputs and objective measures of moderate to vigorous physical activity (MVPA) levels.31 Multiple component interventions, predominately targeting healthy eating, physical activity, and/or healthy living habits, have also focused on individual outcomes such as intentions and behaviors toward health living32 and change in anthropometric measures and physical activity levels.33 Some previous reviews have considered the role of stakeholders in the process.13,34 Although these reviews are important for establishing how programs lead to direct, measurable outcomes, they do not increase understanding of how programs may lead to social impact. Reviews of the social impact arising from school health promotion interventions are lacking.

This systematic review seeks to broaden the current focus of health promotion in primary schools beyond the outcomes that are normally considered (eg, a behavior change or awareness) to understanding the potential or perceived social impacts that are being achieved. To do this, the literature on current health promotion interventions was examined to determine whether the social impact is being considered, and what the current trends are for capturing or measuring social impact in primary school contexts. The purpose of the review is 2-fold: firstly, to understand how social impact is considered and measured in health...
promotion; and secondly, to highlight the key learnings for social impact measurement in health promotion for primary school children to guide future health promotion interventions.

METHOD

Primary school health promotion interventions were sought from 4 Commonwealth countries deemed to have comparable health systems and similar approaches to public health prevention and health promotion in schools. The PRISMA protocol was used to ensure the review was a measurable, reproducible, and comprehensive method to map the relevant literature. Six databases were searched (EBSCO, Emerald, Ovid, ProQuest, Scopus, and Web of Science) with the following search terms: ("health promotion" OR "health prevention" OR "health program" OR "health initiative" OR "health intervention" OR "health education") AND ("sex" OR "drug" OR "alcohol" OR "tobacco" OR "nutrition" OR "obesity" OR "physical activity" OR "fruit*" OR "vegetable*" OR "healthy eating" OR "mental health" OR "wellbeing" OR "well-being" OR "well being") AND ("primary school" OR "elementary school" OR "primary school-based" OR "primary school based").

Records were screened against the following exclusion criteria: (i) papers not in English; (ii) no full text available, (iii) not relevant to health promotion in children, (iv) interventions, initiatives or programs for diagnosed medical or psychological conditions or treatment focused; (iii) countries other than the 4 Commonwealth countries (Australia, Canada, New Zealand, and the United Kingdom); (iv) studies that were not in a primary-school setting delivered to students; and (v) studies that were conceptual or review papers. Full-text articles for the retained articles were retrieved, and grouped according to country. Study details were recorded by: (1) author and year of publication, (2) type of theory and/or health promotion framework reported, (3) behavioral focus/intervention approach of the health promotion intervention, (4) sample set used in the evaluation, (5) duration of the intervention, (6) type of evaluation study design and methods used for intervention, (7) the reported outcome effects/results of the intervention, (8) the level of stakeholder engagement in the intervention, and (9) presence and nature of any social impact measurement. Stakeholder engagement was assessed as 1 of 5 levels: (i) inform (informing or educating), (ii) consult (feedback/information), (iii) involve (with consideration and understanding), (iv) collaborate (engaged in a partnership toward plans/actions), and (v) empower (involved in decisions or desired outcome processes) or “not reported.”

The National Health and Medical Research Council’s (NHMRC) quality assessment framework was used to grade the study evaluation design used in each intervention, from I (highest) to IV (lowest) to assess the level of evidence each evaluation’s contribution to the evidence base. Data extraction and assessments were completed by 3 researchers, and when disagreements (n = 4 issues) were encountered, consensus was achieved through discussion. Variation in outcome measures was expected; therefore, meta-analysis was deemed an inappropriate method of analysis without substantial data transformation and assumptions.

RESULTS

The systematic search retrieved 1333 records. Once duplicates were removed, 964 unique titles and abstracts were screened against the inclusion and exclusion criteria to ensure they were within the scope of the study. After screening, 56 studies remained. Backward/forward searching identified 20 additional records, resulting in a data set of 77 articles representing 55 health promotion interventions. This process is outlined in Figure 1.

These 55 interventions included: 20 Australian interventions, 10 Canadian interventions, 2 New Zealand interventions, and 23 UK interventions. The health promotion interventions commonly focused on healthy eating (n = 29, 52%) and physical activity (n = 25, 45%). They were predominantly focused on a single issue (n = 43, 78%), such as healthy eating (including multiple aspects such as obesity prevention, fruit and vegetable consumption, and reduced intake of sweet drinks), with a small number having multiple foci (n = 13, 24%), such as healthy eating and physical activity. Multiple foci interventions had a broader policy or environmental strategy. Single focused interventions often aimed at preventative or reduction behaviors of harm such as sun safety, sexual health or drug, and alcohol strategies, with the exception of interventions which targeted increasing fruit or vegetable consumption. The NHMRC evidence rating process rated 20 studies at level II (36%), 12 studies at level III-2 (21%), 7 studies at level III-3 (13%), and 17 studies at level IV (30%). This represents a body of evidence of sufficient size and quality to be able to guide practice. However, the variation in outcomes measured makes it difficult to draw any conclusions on whether these interventions resulted in social impact. Sample size and duration also demonstrated this same variation. Sample sizes ranged for students (from “not reported” to 4808) and schools (1-193) making meaningful comparison equally challenging. Most of the evaluation study designs were randomized control trials (RCTs; cluster or groups) (36%), cases studies (30%), or comparative studies (with concurrent controls) (21%), and without concurrent controls (7%). Regardless of study design, most conducted pre-post/post-test. Interventions were a mix of
process evaluations (13%), process and outcome evaluations (5%), impact evaluations (5%), a mixture of process, outcome or impact evaluations (4%), Research, Effectiveness - Adoption, Implementation and Maintenance (RE-AIM) evaluations (2%) or a realist evaluation (2%). See Table 1 for details of the included studies.

**Social Impact Versus Outcomes**

Social impact was rarely measured in the interventions. Only 16 studies (29%) indicated they had considered or attempted to measure social impact. Social impact was not clearly understood and described in interventions, and often anecdotaly and qualitatively measured (see Table 2). Outcomes of the interventions (the results or effects of a program and the changes that occur in attitudes, values, behaviors, or conditions of interventions) were measured rather than the social impacts (the economic, social, and environmental consequences, positive or negative, regardless of the purpose or perceived or real benefits of the activity) or theory used. Two interventions (4%) alluded to social impact being a justification for the intervention. Eight interventions (15%)}
| No. | Name                          | Authors                        | Theory                                                                 | Sample set                                                                 | Duration | Evaluation study, design, and method                                                                 | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|-------------------------------|--------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------|----------------|
| 1   | AU Play Zone in Primary Schools | Austin, Caperchione            | T: Not reported                                                         | Schools (n = 7) Students — not reported Age — not reported                   | 12 months| Case series with pre-test/post-test outcomes                                                            | Fidelity (adoption of preparation strategies, playground changes and games, peer-led training) | No                       | Yes           |
| 2   | AU Live Life Well @ School    | Bravo, Folley                  | T: Not reported                                                         | Schools (n = 929-1843) Students: NR Age: 5-11 years                       | 2012-2017| Case series with /post-test outcomes                                                                | June 2017: 80% of 10 desirable practices adopted. Curriculum had high adoption. Food and physical activity environment (3 out 4 had high adoption when supported by government programs). Professional development, monitoring and reporting had lowest adoption rates | No                       | No            |
| 3   | AU Go for your life           | de Silva-Sarigiaki, Prosser, Honnert, Woolcock | T: Theory-driven—socio-ecological framework          | Schools: 20G1 (≤ 12 months) 30G2 (≥ 12 month) 20G3 (member) Students: not reported Age: 5-12 years | Rolling adoption and varied uptake depending upon if in G1, G2, or G3 | A comparative study with concurrent controls | Yes—primary key organizational stakeholders (Consult) | Yes                       | Yes           |
| 4   | AU Kids Matter Primary        | Dix, Stee1, Gratz, Littlefield | T: Theory-driven—social and emotional learning                        | Schools (n = 90) Students: stratified sample of up to 76 students per school total (n not reported) Age: 10 years | 2 year implementation (2007/2008) | Comparative study without concurrent controls — interrupted time series | Significant + relationship between implementation and academic performance (↑ between 26 and 62 months) | Yes                       | Yes           |
| No. | Name                                      | Authors                                      | Theory                                                                 | Behavioral focus/ intervention approach                                                                 | Sample set                                                                 | Duration | Evaluation study, design, and method                                                                                                                                   | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|-------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|
| 5   | SunSmart Policy Intervention              | Dudley, Winslade\(^{16}\) Dudley, Cotton\(^{43}\) | T: Theory driven—social cognitive theory (SCT)                        | Wearingsuns protective headwear during breaks                                                   | Schools (n = 20) IG 5 and CG 15 Students: Grade 5 - 6 Age: G5 and G6 | 18 months | Cluster RCT                                                                                                               | Evaluation protocol design Follow-up cross-sectional design 60% of children wore a sun-safe hat during their breaks NS increase in sunscreen consumption or other SunSmart behaviors | Yes (Involve)         | No              |
| 6   | Fit-4-Fun                                 | Esther, Morgan\(^{46}\)                       | T: Theory driven—social cognitive theory (SCT), Heter’s competence motivation theory (CMT) | Wearing protective headwear during breaks, SunSmart behavior, SunSmart Education, SunSmart Policy | Schools (n = 4, 2 IG and 2 CG) Students (n = 226) IG 118 and CG 108 | 60 minutes × 8 weeks during HPE 8-week home (3 × 20 minutes per week) | **Group RCT**                                                                 | T1: Baseline NS difference between groups T2: Significant perception of school environment T3: Significant difference found between groups, except peers social support and parents Social support by teachers mediated effect of IG on PA | Yes (Involve)         | No              |
| 7   | Stephanie Alexander Kitchen Garden Program (SAKGNP) | Eckermann, Davyber\(^{47}\) Gibbs, Staiger\(^{48}\) | T: Theory driven—socio-ecological approach | Eating Habits                                                                                          | Schools (n = 42) IG 28 and CG 14 Students: IG 29, CG 23 Age: G3-G6 | 2 years (45 minutes × weekly lessons, 90 minutes kitchen) | **Comparative study with concurrent controls — case-control study**                                                                 | Short-term impacts: Significant difference in kitchen but not in garden behavior between IG and CG groups | No (Involve)          | Yes             |
| 8   | School-based intervention for increasing physical activity | Engelen, Bundy\(^{50}\) Grunstel, Hasl\(^{19}\) | T: Not reported                                                        | PA                                                                                                      | Schools (n = 12) IG 6 and CG 6 Students: (n = 221) IG 113 and GC 108 Q Age: 5-7 years | 13 weeks 2008/2009 | Cluster RCT                                                                                                               | T1: Baseline  T2: Follow-up — 3 months T3: Follow-up — 6 months | No (Involve)          | No              |
| No. | Name                          | Authors                      | Theory                                                                 | Sample set                                                                 | Duration | Evaluation study, design, and method                                      | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|-------------------------------|------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|----------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------|----------------|
| 9   | Crunch & Sip Free fruit pilot | Hector, Edwards              | T: Not reported                                                        | ↑ PA/Intake                                                                 | 10 weeks | Comparative study without a parallel control group                        | Significant participation rates in Crunch and Sip from baseline to week 9 [46.7% to 98%], with OR 17.5 increase in participation | Nb                      | Nb            |
|     |                               |                              | HPF: Not reported                                                      | Schools (n = 4)                                                               | Terms 3 and 4, 2014  |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Students: (n = not reported) Individual classes (n = 5)                       |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Age: K-G6                                                                   |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Every week for 12 weeks, 2007                                               |          |                                                                 |                                                                            |                         |                |
| 10  | Traditional Indigenous Games (TIG) | Kian and Knights           | T: Not reported                                                        | ↑ PA and ↑ cultural connectedness                                              |          | Cluster RCT                                                                 | NS, ↑ PA and ↑ cultural connectedness or between indigenous or non-indigenous students | Yes—indigenous reference group (Involve) | Nb            |
|     |                               |                              | HPF: Not reported                                                      | Schools (n = 4, 2 x 2)                                                       |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Students: (n = 167, IG 91, CG 76)                                           |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Age: G5-G6                                                                   |          |                                                                 |                                                                            |                         |                |
| 11  | Fresh kids                    | Laurence, Peterken          | T: Not reported                                                        | ↑ Fruit and Water Intake, ↓ Sweet Drink Intake                               |          | Comparative study without concurrent controls                              | Significant ↑ at all schools at T3: Fruit intake of 25-50%, ↑ water intake of 15-60%, ↓ sweet drink of 0-38% | Yes—school staff (Collaborate) | Nb            |
|     |                               |                              | HPF: HPS                                                                | Schools (n = 4)                                                               |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Students: (n = varied upon school, and timeframe)                           |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Age Not reported                                                             |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | 2 years (4 schools)                                                           |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | 3 years (2 schools)                                                           |          |                                                                 |                                                                            |                         |                |
| 12  | Supporting children's outcomes using rewards, exercise and skills (SCORES) | Lubans, Plotnikoff, Cohen, Morgan | T: Theory-driven—socio-ecological model (SEM)                          | ↑ PA and Fundamental movement skills (FMS)                                    | 12 months, 2012 | Evaluation protocol design                                               | Significant treatment effects for locomotor skills and overall FMS FMS competency not preserved competency mediated the effect on PA and cardio fitness | Nb                      | Nb            |
|     |                               |                              | Self-determination theory (SDT)                                        |                                                                                   |          |                                                                 |                                                                            |                         |                |
|     |                               |                              | Competence motivation theory (CMT)                                      |                                                                                   |          |                                                                 |                                                                            |                         |                |
|     |                               |                              | HPF: Not reported                                                      |                                                                                   |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Schools (n = 8, IG 4 and CG 4)                                                |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Students: (n = 460, IG 199 and CG 261)                                       |          |                                                                 |                                                                            |                         |                |
|     |                               |                              |                                                                        | Age: G3-G4                                                                   |          |                                                                 |                                                                            |                         |                |

*Social Impact* indicates the level of impact: Nb (Not reported).
| No. | Name                        | Authors                  | Theory                                                                 | Focus/ Intervention approach                                                                 | Sample set                                                                 | Duration       | Evaluation study, design, and method                                                                 | Outcome effect                                                                                   | Stakeholder consultation | Social Impact |
|-----|-----------------------------|--------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|
| 13  | Nutrition Education and Garden (NE&G) | Morgan, Warren            | T: Theory driven - Social Cognitive Theory                              | Behavioral focus/ intervention approach                                                                 | Schools (n = 2)                                                          | 10-week intervention | A comparative study with concurrent controls                                                                                      | No difference between groups for FAV intake                                                                                     | No                     | Nb           |
|     |                             |                          | HPP: HPS                                                               |                                                                                                   | Students (n = 27, 11 NE 3, 12 NE and G3, CG57)                                 |                | III-2 Vegetable intake—24-hour food recall (baseline and post), Vegetable preference (taste and rate method); Vegetable knowledge (6 vegetable observation and F&A questionnaire adapted from “Gimme 5”—8 questions) | Significant willingness for NE&G to taste and rate                                                                                       |                       |              |
|     |                             |                          |                                                                        |                                                                                                   | Quality of school life (QoSL)                                            |                | Knowledge increased—able to identify vegetables (knowledge is a construct of SCT)                                                                                                               | No effect on FAV intake                                                                                                          |                       |              |
| 14  | In-class vegetable promotion program | Myers, Wright            | T: Not reported                                                        | Peel intake                                                                                      | Schools (n = 21)                                                          | 10-week, terms 2-3 | Vegetable intake and knowledge                                                                                                    | Significant ↑ of vegetables (21% of 46%)                                                                                          | Yes—educational staff (Involve)                                      | Nb           |
|     |                             |                          | HPP: Not reported                                                      |                                                                                                   | Primary school teachers (n = 35); Students (n = 1818)                        |                | T2: Post-4 month                                                                                                                  | Teachers' attitudes and confidence ↑                                                                                               |                       |              |
| 15  | Physically Active Children in Education (PACE) | Nathan, Wiggers              | T: Theory driven - Behavior Change Wheel (BCW) and Theoretical Domains Framework (TDF) |                                                                                                   | Schools (n = 62, randomized IG or CG)                                      | 12 months      | Cluster RCT                                                                                                                      | Evaluation protocol design                                                                                                      | Multiple stakeholders (Involve)                                      | Nb           |
|     |                             |                          | HPP: Not reported                                                      |                                                                                                   | Students (n = unknown)                                                   |                | II Cost effectiveness analysis (CEA)                                                                                               |                                                                                                                                   |                       |              |
|     |                             |                          |                                                                        |                                                                                                   | T1: Baseline survey                                                        |                | T2: Post-12 months                                                                                                               |                                                                                                                                   |                       |              |
| 16  | Great Leaders Active Students (GLASS) | Nathan, Sutherland          | T: Theory driven - Transformational Leadership Theory                  |                                                                                                   | School: (n = 2)                                                          | 10-months, 2015 | A comparative study with concurrent controls—non-randomized control trial                                                       | No effect on ↑ PA                                                                                                               | No                     | Nb           |
|     |                             |                          | HPP: Not reported                                                      |                                                                                                   | Students: (n = 174, IG 88 and CG 89)                                      |                | III-2 Blinded-group measurement                                                                                                   |                                    |                       |              |
|     |                             |                          |                                                                        |                                                                                                   | Peer leaders delivered 2 × 30 min object control sessions (catch, underarm and overarm throws) |                | T1: Baseline and T3 post 3 months                                                                                                 |                                    |                       |              |
|     |                             |                          |                                                                        |                                                                                                   | PA measured by pedometer for 5 days; Object control skills were assessed during Test of Gross Motor Development (TGM-D 3); participants were videotaped demonstrating skills and rated correct or incorrect |                | Peer leadership skills assessed by Transformational Teaching Questionnaire (TTQ)                                                   |                                    |                       |              |
| No. | Name                | Authors                      | Theory                                                                 | Sample set                                                                 | Duration                                                                 | Evaluation study, design, and method                              | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|---------------------|------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------|----------------|
| 17  | AU                  | Radich, Thompson[60]         | T: Not reported Harris, Radich HPF: Not reported                       | Schools (n = 1): Students (n = 31) Age 11-12 years G5-G6                  | 5 classes × 60-minute sessions, weekly Term 4, 2017                     | Case series with post-test outcomes IV Observations Daily field diary Semi-structured student feedback to 4 responses | Observations and feedback not connected to social inclusion or mental health | No                      | No            |
| 18  | AU                  | Ritchie, OHara[61]           | T: Not reported HPF: HPS ↑ Mental health and ↑ social inclusion       | Schools (n = 1): Students (n = 118) Age Grade 1 and 5                     | 10 weeks, 2007                                                          | Case series with pre-post-test outcomes IV Impact Evaluation Questionnaire | Significant ↑ of identification and engagement with F&V NS change pre-post in knowledge, attitudinal and consumption statements Decrease in their skills for knife and fork use Cutting, grating and peeling skills increased No change in environmental supports | No                      | No            |
| 19  | AU                  | Roberts, Williams[62]        | T: Not reported HPF: Not reported ↓ T&A Use                             | Schools (n = 62, IG1 AOP + T20, IG2 AOP + T8C + IG2 AOP + T7 & IG2 AOP + T8C + 693, CG 94) Students (n = 523) IG1 AOP + T20, IG2 AOP + T8C + 693, CG 94 Age 10-13 years 6-7 grades | 10(SLS) × 60 minutes weekly and (OTS) IG1 and IG2 AOP + T&C 4 hours coaching per student years 1 and 2 over 2 years | Cluster RCT II AOP Questionnaire T1: Baseline at beginning of grade 6 Intervention contained Social skills, social problem solving, challenging unhelpful thoughts T2: post-test end of grade 7 T3: Follow-up end of Grade 8 Questionnaires for students and parents (T1-T3) | At T1 higher use of A than T At T3 C students were 1.8 times more likely to use AOP + T&C At T2 1.4 times more likely to use alcohol An intervention effect was found for teacher led AOP + coaching. IG students were less likely to smoke or consume alcohol than the CG who were 1.6 times more likely to smoke and 1.2 times more likely at follow-up (T3) | No                      | No            |
| 20  | AU                  | Somerset and Markwell[63]    | T: Not reported HPF: Not reported ↑ Ability to identify F&V ↑ positive attitudes toward F&V  | Schools (n = 1): Students (n = 152) IG1 120 and CG 138 Age 6-7 years | 11 hours/week for 12 months | Determinant questionnaire attitude, self-efficacy, liking, preferences, knowledge and perceived barriers, social environment HPV identification questionnaire T1: Year 1 pre-school garden T2: Year 2 post-school garden | ↑ Ability to identify individual F&V ↑ Confidence in preparing F&V Attitude there was. Interest in trying new foods NS difference between IG & CG groups | No                      | No            |
| 21  | CA                  | Bisset, Daniel[64]           | T: Theory driven—social innovation model HPF: WHO Ottawa Charter ↑ HE and nutritional education and experiences | Schools (n = 73): Students (IG209 and CG 170) Age G5 and G6 | 8 × 90 minutes workshops | A comparative study without concurrent controls—historical control study | ↑ Knowledge of nutritional knowledge and cooking NS difference found in food guide, food produce or international cuisine Family and or parental participation and gender (girls higher than boys) were significant covariates | Yes (community, professional and educational staff) (Collaborate) | No                      | No            |
## Table 1. Continued

| No. | Name                  | Authors                        | Theory                                                                 | Sample set                                                                 | Duration                                                                 | Evaluation study, design, and method                                                                 | Outcome effect                                                                 | Stakeholder consultation                                                                 | Social Impact |
|-----|-----------------------|--------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------|
| 22  | Healthy Buddies       | Campbell, Barnum, Randy Lee, Lee | T: Not reported
HPF: Whole-school health promotion program | Schools (n = 60)
Students: K-3 (n = 557, IG 304, C 193) 4-7 (n = 723, IG 509, C 214) Age K-3 and 4-7 grades | 21 x 30-minute sessions
6 x 30-minute fitness loops | Case series (pre/post-test outcomes)
IV: Questionnaire
T1: Baseline—beginning of school year
T2: Post-Questionnaire
Children’s Eating Attitudes Test (CEAT)—end of school year
Healthy living knowledge, behavior, habits and attitudes
Physical measures: included weight, height, waist size, BMI, BP and HR | K3 and 4-7 IG significant ↑ HL knowledge than CG
K3 IG significant ↑ HL and habit scores
4-7 IG ↑ in all 5 CEAT questions vs CG
Physical measures ↑ age | Yes
Indigenous communities
Peer-led (Involve) | Nb |
| 23  | Action Schools! BE—healthy eating A3 BC—HE | Day, Strange, Naylor, MacDonald | T: Theory driven - SEM
HPF: Whole school framework | Schools (n = 10, IG and CG 5)
Students: (IG 266 and CG 198)
Age: Gr JK-8 | 2 x HE activities per week (12 weeks) | Non-randomized experimental trial with control
III-2: Process Evaluation
Fruit intake
Vegetable intake
Students’ knowledge, attitudes and perceptions of FV,
† Willingness to try new FV intake,
Fidelity to Classroom, Food Frequency Questionnaire (FFQ), 24-hour Food Recall | ↑ in F, FV servings, FV variety and percentage of FV tried in the intervention schools
Teachers implemented activities across 80% of whole-school
No change in knowledge, attitudes and perceptions
No change in willingness to try new FV | Yes
Ministry of health, the MSA, the Ministry of Education, 2010 Legacies Now, Provincial Health Services Authority
Advisory committee (PAC), key public health, recreation, and sport stakeholders (Collaborate) | Yes |
| 24  | Northern Fruit and Vegetable Pilot Program (NFVPP) | He, Beynon | T: Not theory driven—Social Cognitive Theory (SCT)
HPF: not reported | Schools IG FFVS + ENE 9.G2
FFVS 9.G8
Students: (n = 1277, IG FFVS + ENE 400, FFVS-alone 470 CG 407)
Age G JK-8 | 21 weeks | Case series with Post-test
IV: Cluster RCT
II: Impact Evaluation
T1: Baseline
T2: End of intervention
24-hour FV recall questionnaire (servings/d)
Psychosocial & behavioral measures: Pro Children Questionnaire | IGI (0.49 serving/day) and IGI (0.42 serving/day), consumed more FV than CG, however, only IG1 was significant
↑ variety of FV reported in IG1 and IG2
No difference between groups for psychosocial and behavioral scales
63 interventions were delivered in school and community
Anthropometric data ↑ waist, ↓ fitness and ↑ television screen time for students ≥9 years | Yes
Indigenous Population Community consultation (Empower) | No |
| 25  | Kahnawake Schools Diabetes Prevention Project | Macaulay, Reeside, Adams, Receveur | T: Theory driven—Behavior change Theory, Native Learning Styles, Social Learning theory, Precede-Proceed
HPF: COHP Health promotion planning model | Schools (n = 2)
Students/n = 458
Age: G1-6 | 10 x 45-minute lessons per year for each grade | Case series with Post-test
IV: Mixed longitudinal and Cross-sectional design
Outcome, proximal impact, and process evaluation
Physical measures
Fitness vs Wall test
Body composition (weight, height, skinfold thickness, BMI)
Behaviors
Eating habits (7-day food frequency questionnaire)
Physical activity patterns (questionnaire) | IGI (0.49 serving/day) and IGI (0.42 serving/day), consumed more FV than CG, however, only IG1 was significant
↑ variety of FV reported in IG1 and IG2
No difference between groups for psychosocial and behavioral scales
63 interventions were delivered in school and community
Anthropometric data ↑ waist, ↓ fitness and ↑ television screen time for students ≥9 years | Yes
Indigenous Population Community consultation (Empower) | No |
| No. | Name                              | Authors                                | Theory                  | Behavioral focus/ intervention approach | Sample set | Duration | Evaluation study, design, and method | Outcome effect                                                                                   | Stakeholder consultation | Social Impact* |
|-----|-----------------------------------|----------------------------------------|-------------------------|------------------------------------------|------------|----------|--------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------|---------------|
| 26  | Passport Skills for Life (PSL)    | Mishara and Dufour                     | T: Not reported         | † Children’s coping skills               | Schools: (n = 20, IG 12, CG 8) Students: 9, n = 1492, IG 666 and CG 826 Age: G3-G6 | 1 Intro session and 17 x 55 minutes sessions | RCT  
T1: Pre-test  
T2: Post-test  
T3: Follow-up (12 months)  
Teacher’s questionnaire  
Observations of 89 sessions  
Focus groups after program  
Quantitative measures: Emotional awareness, LEAS-C  
Coping: Coping in hypothetical situations, draw and write, Kidscope, Children’s Coping Questionnaire (CCQ)  
Social and Academic skills: Social Skills Rating (SSRS)  
Draw and write | Small significant ↑ coping skills and strategies of IG cf. CG, maintained at post-test.  
NS difference between T1 and T2, but significant difference between T1 and T3 for CCQ measure of coping between IG and CG.  
NS difference between T1 and T2, but significant difference between T1 and T3 for social and academic skills between IG and CG.  
Focus groups increased appreciation (exceeded my expectations) | Yes — students and teachers in program development (Involve) | No |  

27  | Zippy’s Friends                    | Monleviciene, Mishara Dufour           | T: Theory driven — coping model | † Coping skills                          | School: not reported Students: (n = 246, IG 140 and CG 106) Age: G1 | 24 weekly sessions | Comparative Study with concurrent controls  
III-2 Questionnaires: The behavioral and Emotional Adaption to the Transition, the Problems Encountered, the reactions Observed in the New School Environment | IG had significant ↑ behavioral and emotional adaptions to school than CG.  
IG had significant ↑ positive reactions in new school and ↑ coping skills and strategies than CG.  
Evaluation found significant differences for  
IG: Height, Internalization; ↑ co246 operation, autonomy and perceived social support  
Comparative study with non-concurrent controls  
III-3 Quasi-experimental design  
T1: Pre-NPS policy survey 2001/2002  
T2: Post-NPS policy survey 2007  
The Eating Behavior Study (EBS), Food consumption food frequency questionnaire  
No measure of NPS changes or food environment | No |  

28  | Prince Edward Island—school nutrition policy (PB SNP) | Mullally, Taylor                       | T: Not reported         | † HE through nutrition school policies (NSP) and ↑ F&V intake; ↑ milk and alternative intake; ↓ LNDF | Schools: (n = 2, 1G (2007), CG (2001/2002) Students: IG 562, CG 917 Age: G5-G6 | 5-year period | Comparative study without concurrent control—historical control study  
III-3 Post-survey: Youth Health Survey (YHS) (students)  
Home survey (parents)  
Survey on Knowledge, Attitudes, Self-efficacy and diet  
Physical measures  
Physical activity (pedometer) over 9 consecutive days  
Weight and height  
BMI (kg/m²)  
Parent and student demographic  
Dietary intake: 24 hour dietary recall (WEB_Q24) | NS difference between APPLE and Comparison schools on outcomes  
NS difference between historical comparative and current study | Yes — parents, community and “other stakeholders” (Collaborate) | No |  

29  | APPLE Schools                      | Ofosu, Ekwaru                         | T: Not reported         | † HE  
† PA  
† Good mental health (MH) | Schools: (n = 26, IG 13, CG 13) Students: (n = 540) Age: M = 13.8 ± 1.4 of IG, 14.0 ± 1.3 CG | 2013/2016 | Comparative study without concurrent control—historical control study  
III-3 Post-survey: Youth Health Survey (YHS) (students)  
Home survey (parents)  
Survey on Knowledge, Attitudes, Self-efficacy and diet  
Physical measures  
Physical activity (pedometer) over 9 consecutive days  
Weight and height  
BMI (kg/m²)  
Parent and student demographic  
Dietary intake: 24 hour dietary recall (WEB_Q24) | NS difference between APPLE and Comparison schools on outcomes  
NS difference between historical comparative and current study | Yes — parents, community and “other stakeholders” (Collaborate) | No |  

© 2022 The Authors. Journal of School Health published by Wiley Periodicals LLC on behalf of American School Health Association.
| No. | Name | Authors | Theory | Sample set | Duration | Evaluation study, design, and method | Outcome effect | Stakeholder consultation | Social Impact |
|-----|------|---------|--------|------------|----------|-------------------------------------|----------------|-------------------------|---------------|
| 30  | CA   | Wackett and Evans[77] | Stakeholder consultation          | 30         | 3 years (1998-2001) | Case Series (pre-post-test outcomes) | Knowledge, motivation and personal insight maintained at T4 | Yes (parents/guardians input into program objectives — parent component added) | (Consult)     |
| 31  | NZ   | Ashfield-Watt, Stewart[78] | Social Impact*                  | 31         | 10 weeks Term 1 | Paired, Clustered Randomized Control (RCT) | ↑ Fruit intake (IG:0.4 pieces/week) ↓ 22% but decreased after T3 | Yes | Nb                      |
| 32  | NZ   | Rush, McDonald[79] | Randomized Control Trial (RCT)  | 32         | 2009-2011 | Randomized Control Trial (RCT) | HE not measured | No                      | Nb                      |
| 33  | UK   | Adab, Barret[77] | Qualitative Study               | 33         | 12-month program | Cluster RCT | Overall there was no difference between IG and CG | Yes (Involve) | Nb                      | (Consult)     |

**Table 1. Continued**
| No. | Name       | Authors | Theory                  | Sample set                                                                 | Duration                                                                 | Evaluation study, design, and method                                                                 | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|------------|---------|-------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------|---------------|
| 34  | MarathonKids | Chalkley, Routen | T: Not reported HPF: Not reported | Schools: (n = 6) Students: To be confirmed Age: 6-10 | 1-2 week over 2016 year during lunch breaks | Case series with pre-post-test outcomes                                                                 | Students found MK ↑ PAPeer influence on participation was important with both positive and negative influences on social cohesion and competitiveness Goal setting and rewards were seen as important Teacher influence was important on student engagement levels | Yes (Consult) | Yes—at process level (Collaborate) |
| 35  | Zippy's Friends | Clarke, Sixsmith | T: Theory driven—coping framework HPF: not reported | Schools: (n = 44) Students: 9 (n = 161, IG 84, CG 77) Age: not reported | 24 weeks Cluster RCT | Emotional literacy (T1 and T3) Brainstorming (T3) 4 themes conflict, rejection, loss and injury IG had a broader range of vocabulary and understanding in relation to emotions concerning problem situations Positive impact on problem-solving and support-seeking strategies | Distance = laps completed with lap bands All schools implemented with good fidelity, level of implementation varied Averaged distance per pupil per week ranging from 0.02 to 2.91 km and boys ↑ participants cf. girls Students found MK ↑ PA Peer influence on participation was important with both positive and negative influences on social cohesion and competitiveness Goal setting and rewards were seen as important Teacher influence was important on student engagement levels | Yes (Collaborate) | Nb  |
| No. | Name                          | Authors                          | Theory                                                                 | Sample set                                                                 | Duration | Evaluation study, design, and method                                                                 | Outcome effect                                                                 | Stakeholder consultation                                                                 | Social Impact* |
|-----|-------------------------------|----------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------|
| 36  | "Project Sprea"               | Coppinges, Lucy                  | T1: Theory driven — SEM of Health Behavior                             | Schools: (year 1, n = 6 IC4 and CG2, year 2 (additional), n = 10 IC3 and CG 1, year 3 (proposed), n = 15 IC3 and CG2) Students: Not reported Age: 6-10 years | 3 years  | RCT                                                                                                  | Tobe completed ↑ freeshop ↓ Effectiveness for 10 years ↓ waist size and heart rate Mixed results for Nutritional education between IG and CG for 6 and 10 years NS changes in BMI | Yes — community consultation and consideration (Consult)                                 | No             |
| 37  | Project Tomato                | Evans, Ransley                   | T: Theory driven — health maintenance behaviors                        | Schools: (n = 52, IC 26 and CG 24) Students: (n = 658) IG 311 and CG 347 Age: 7-8 years, G2 |           | Cluster RCT                                                                                         | T1: Baseline ↑ Light PA and ↑ risk awareness T2: Follow-up — 20 months after baseline Questionnaire on F & V consumption Food intake: 24-hour dietary assessment recall                                                                 | No                                | No             |
| 38  | Love Life                     | Fairbrother, Curtis              | T: Not theory driven — Health maintenance behaviors                    | Schools: (n = 2) Students: (n = 120) Age: 10-11 years                   | 8 weekly | Case series with post-test outcomes IV Qualitative focus group — thematic analysis                   | Health message (not measured) Knowledge awareness (not measured) Link between activities and health message ↓ recall                                                                 | No                                | No             |
| 39  | Children’s Health, Activity and Nutrition Get Educated! (CHANGE!) | Fairclough, Hackett              | T: Not theory driven — Social cognitive theory                          | Schools: (n = 11, IG 85 and CG 77) Students: (n = 318) IG 39 and CG 117 Age: 10-11 years | 20/2021  | Accident Prevention and ↑ risk awareness                                                                 | T1: Baseline T2: 20 weeks T3: Follow-up — 30 weeks Physical measures: waist size, BMI, Accelerometers for PA 7 days, playground area Food intake: 24-hour recall questionnaire                                                                 | Yes, parents, children and teachers (Involve)                                  | No             |
| 40  | Citizenship Safety Program (CSP) | Frederick and Barlow              | T: Not theory driven — Social Learning Theory, Diffusion of Innovation and Social Inoculation Theory | Schools: (n = 2, 1 primary and 1 secondary [peer]) Students: (n = 76, 54) Age: G1 (6-7 years) and 10 (14-15 years) | 30 minutes x 10 weekly sessions | Case series with pre-post-test outcomes IV Process and outcome evaluation T1: Baseline T2: End T3: post 2 months Measures: Draw and write on safety topic at T1-3, dates, interviews with teachers T2 Pictorial survey T2, year 10 Peer led tutoring for year 2 students on accident prevention and risk awareness | T1-2 had a reported ↑ accident prevention and risk awareness. T3 outcomes not reported | Yes — formatative design (Consult)                                                   | No             |
| No. | Name | Authors | Theory | Behavioral focus/ intervention approach | Sample set | Duration | Evaluation study, design, and method | Outcome effect | Stakeholder consultation | Social Impact* |
|-----|------|---------|--------|------------------------------------------|------------|----------|--------------------------------------|---------------|-------------------------|----------------|
| 41  | Nutrition Education at Primary School | Friel, Kelleher | T: Theory driven — social learning theory | Schools (n = 13, IG 10 and CG 3) Students (n = 82), IG 46 and CG 36 Age 8 – 10 years | 20 x 30 minutes sessions over 10 weeks | A comparative study with concurrent controls — non-randomized trial | NS ↑ in nutrition knowledge IG ↑ TV intakes and ↓ salty snacks at T2 | No | No |
| 42  | The Lifeskills Program | Gabhainn and Kelleher | HPS: HPS | Schools (n = 33, post primary) Students: post primary (PP) (n = 1620 with 795, Lifeskills — and 825, Lifeskills +), Young adults (YA) (n = 317, 129 Lifeskills — and 188 Lifeskills +), Age PP 12-17 years, YA 18-25 | Not reported | A comparative study with concurrent controls — interrupted time series with a control group | Main impact is a significant ↓ alcohol intake vs. Lift skills group. All other significant effect was found on health behaviors, for example, smoking | No | No |
| 43  | WAVES study | Griffin, Clarke | HPS: HPS | Obesity prevention program TPA, TPE skills | Students: Not reported Age 6 – 7 years G2 | Cluster RCT | Schools implementation fidelity: 8 had low, 8 had medium, and 8 had high. Lowest area of fidelity was PA | Yes — families in formative stage (Consult) | Nb |
| 44  | The Daily Mile | Harris, Milnes | T: Not theory driven — theory of change | Understand the implementation factors, impact and context which affect T PA in the Daily Mile at individual school and community level | Schools (n = 1) Students: (n = 75) Phase 1 (n = 75), Phase 2 (n = 18) stakeholders Age Phase 1:6-13 years | Case series with post-test outcomes IV | During 12-week teacher delivered implementation 98.6% of time. Approximately 95% students participated, completed recommended 15 minutes and engaged in MVPA 3 key emergent themes: embedding intervention, right physical environment and supportive relationships and climate | Yes (Involve) | Nb |
| 45  | Switch Off — Get Active! | Harrison, Burns | T: Not theory driven — theory of change | Schools (n = 91, IG and CG) Student: (n = 312, IG 182 and CG 130) Age 9-11 years | 10 x 30 minute lessons 10 weeks, February – June 2003 | A comparative study with concurrent controls — case-control study | ↑ Significant PA +0.84 30-minute block + and self-efficacy for IG NS difference between pre-post screen time, BMI and aerobic fitness for IG and CG individuals As school level significant ↑ PA in all IG and CG. Significant ↑ Screen time in 4/5IG and 2/5CG | No | Nb |
| No. | Name                                      | Authors                                | Theory                                                                 | Sample set                                                                 | Duration       | Evaluation study, design, and method                                                                 | Outcome effect                                                                 | Stakeholder consultation | Social Impact* |
|-----|-------------------------------------------|-----------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------|-----------------|
| 46  | HPS in Galway                             | John-Akinola and Gabhainn               | T: Theory driven—socio-ecological model                                | Schools: (n = 9, DES and non-DES) Students: 47, 139 and non-DES 65        | Not reported  | A comparative study with concurrent controls—case-control study                                    | No significant difference between HPS and non-HPS schools for health and wellbeing (data not reported) | No                      | Nb              |
| 47  | National Healthy Schools Program (NHSP)   | Keyte Harris                            | T: Not reported                                                        | Schools: (n = 10, 7 NHSP and 3 non-NHSP) Students: 131, NHSP 10 and non-NHSP 10| Not reported  | A comparative study with concurrent controls                                                       | F&B intake for Engaged NHSP was significantly more than non-engaged students (2 cf. 1 portion) | No                      | Nb              |
| 48  | Active for Life Year 5 (ARLY5)            | Kipping, Howe                          | T: Not theory driven—social cognitive theory (SCT)                     | Schools: 60, IG and CG Students: (n = 222, IG 1066 and CG 1127)           | 16 lessons over 6-7 months | Cluster RCT                                                                                                                                                  | No significant effect found on ↑ PA, ↑ sedentary behavior or ↑ F&B intake Increasing long-term follow-up Ns of 3 outcomes between groups IG and CG School-based interventions alone unlikely to have a major public health impact on children's diet PA | No                      | Nb              |
| 49  | Healthy Lifestyles Program (HeLP)         | Lloyd, Wyatt                           | T: Theory driven—behavior change theory, motivation and behavioral skills models | Schools: (n = 4, IG 2 and CG 2) Students: (n = 222, IG 1066 and CG 1127) | 3 terms: Spring and Summer term 5 and Autumn term 6 | Cluster RCT                                                                                                                                                  | Anthropometric measures ↓ in IG than CG at T3 and T4, except body fat % T3 6% increase in overweight and obesity CG, while G remained at T1 At T3 IG had ↓ sweetened fizzy drinks, ↓ healthy snacks and ↓ screen time cf. CG Follow-up: 26 months NS effect on ↓ obesity | Yes (children, parents, school staff) (Collaborate) | Nb              |
| 50  | Strathclyde Evaluation of Children’s Active Travel (SE—CAT) | McMinn, Rowe                           | T: Not theory driven—theory of planned behavior (TPB)                  | Schools: (n = 5, IG 2, and CG 4) Students: (n = 166, IG 79 and CG 87)     | 6 weeks active | A comparative study with concurrent controls                                                       | Pilot study of feasibility and measures—data analysis not completed in this study | No                      | Nb              |

Table 1. Continued
| No. | Name                       | Authors                                      | Theory                                                                 | Sample set                        | Duration            | Evaluation study, design, and method                                                                                                                                   | Outcome effect                                                                                      | Stakeholder consultation | Social Impact* |
|-----|----------------------------|----------------------------------------------|----------------------------------------------------------------------|-----------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------|---------------|
| 51  | Springfever                | Newby and Mathieu-Charron                   | ▲Theory driven—social behavior/lesson plan                             | Schools (n = 1)                   | 1 week to all school years | Case Series with post-test outcomes                                                                                                                                      | Reach—high Fidelity—high Dose—varied (high G1-G4, low G5-G6) satisfaction reported for teachers, parents but not students Context—sensitivity as delivery dependent upon teacher and student High level of acceptability and involvement of children and parents, 50% of parent participated Perceived impact on: ↑ pre-social communication within families, ↑ knowledge and awareness, changes in parental drinking behavior. Key criteria for effectiveness trial not met | Yes (Consult)            | No            |
| 52  | Kids, Adults Together (KAT) Program | Rothwell and Segrott                        | ▼Theory driven—social development model                              | Schools (n = 2)                   | 1 week with after-hours KAT event | Case Series with pre-/post-test outcomes                                                                                                                                     | ↑ Alcohol intake                                                                                   | Yes (Collaborate)         | Yes           |
| 53  | The CLASS PAL (Physical Activity Learning) Program | Routen, Biddle                             | ▼Theory driven—COM-B model of behavior change techniques               | Schools (n = 6)                   | Not reported         | A comparative study without concurrent controls—interrupted time series without a parallel control group                                                                 | Evaluation design protocol                                                                                                                                     | Yes—school stakeholders in development phase (Involve) | No            |
| 54  | Active Program             | Sahota, Rudolf                              | ▲Theory driven—social behavior/lesson plan                             | Schools (n = 10, IG 5 and CG) received the next year | 12 months           | Group RCT                                                                                                                                                              | Evaluation design protocol                                                                                                                                     | Yes—schools, teachers, parents, caterers, and pupils (Involve) | No            |
measured or attempted to measure aspects of social impact, although had not comprehensively measured the impact of the interventions. Of these 8, 4 mentioned that there was a positive impact on families or communities, individual’s knowledge or benefit beyond the program. However, it should be noted that measurement was not methodical (assessing against a framework, theory, or program logic) nor was it systematic (assessing all potential impacts—positive, negative intended or unintended) nor comprehensive (examining impacts in multiple domains such as individual, societal, economic, and policy levels). There were 8 studies (15%) which alluded to the broader social, environmental, or economic impacts of the intervention beyond the reportable outcomes of the intervention but made no mention of measuring this social impact. This review found only (14%) of interventions were implemented over 2 years (14%), with a wide variance in dosage, intensity, and delivery. Overall, interventions were not assessed systematically against a framework, theory, or program logic, nor were changes in the broader societal, economic, and policy determinants effectively considered.

Theory and Health Promoting Frameworks

Many interventions were not informed by theory (n = 27, 49%), with a further (n = 7, 13%) found to be not theory driven and were instead theory informed interventions (mentioning theory but failing to apply a theoretical framework in the study components or measures). Interventions were also found not to report any health promotion framework (n = 34, 62%). Theories and frameworks are needed to inform and describe what we do, and guide effective implementation of interventions. Theoretically informed and measured interventions show how the targeted behavior(s) were: (1) informed by theory, (2) had theory applied, (3) theory tested, or (4) built upon theory. Some interventions mentioned more than 1 theory or health promotion framework. Of those which referred to theory, the majority were social based theories (theories which examine the social influences on people, environments, and behaviors) (n = 17, 31%), the most common being the socio-ecological model (SEM) (the wider multilevel influences on individual behaviors such as the culture and environmental settings, policies, and engagement with the wider community) (n = 7, 13%), and social cognitive theory (SCT) (individual’s knowledge acquisition is associated and influence by the observation of others during social interactions and experiences and recognizes personal and socio-structural determinants of health) (n = 3, 5%). Behavioral-based theories (such as The Behavior Change Wheel and COM-B Framework) (n = 6, 11%) and psychological theories (such as Self-Determination Theory and
| No | Study | Study | Social Impact mentioned | Location and evidence |
|----|-------|-------|--------------------------|-----------------------|
| 1  | Play Zone in Primary Schools | Austin, Caperochio | Social | “Furthermore, 86% (6/7) of the implementing schools reported noticeable changes in children's behaviors other than PA, as a result of the intervention. These behaviors included reductions in fighting, reductions in boredom and disruptive behavior during school breaks, and increased incidence of cooperation, negotiation, and sharing” (p. 937)  
   | | | | “They're incidentally learning all the time, and the other thing is that you're taking kids away from being in the situation where they're going have antisocial behavior; they're having success and they're happy” (p. 937) |
| 3  | Go for your life! | de Silva-Sanigorski, Piossen, Horisett, Woock | Social | “Increased physical activity-related behaviors; increased healthy eating; increased knowledge, skills, beliefs, perceptions”  
   | | | Environment | “Improved community links and partnerships; Health promoting environments; Improved knowledge, skills, beliefs, perceptions”  
   | | | | Community and organization: |
| 4  | Kids Matter Primary | Dix, Slea | Social | “In brief, the questionnaires sought information on areas of school engagement and implementation of the initiative, impact on the school in general, impact on teachers and families, and impact on student social emotional competence and on their mental health” (p. 47)  
   | | | | “… to collaborate on Kids Matter with the aims of improving the mental health and well-being of students, reducing mental health problems…” (Graetz et al 2008, p. 15) |
| 7  | Stephanie Alexander Kitchen Garden Program (SAKGP) | Eolemann, Dawber | Social | Assessing multiplier impacts from investment on related community activity over time are suggested as key alongside evidence of program health effects on targeted groups of individuals in gauging community network engagement and ownership, dynamic impacts, and program long-term success and return on investment. “… impact on total community activity up to two years was 5.07 ($226,737/$44,758); 1.60 attributable to school, and 2.47 to wider community, activity” (p. 103) |
| 23 | Action Schools! | Day, Strange | Social | Figures 2  
   | | | Economic | “Long term health outcomes, … child and youth achievements, ↓ chronic disease, ↓ health cost, healthier kids” (p. 5)  
   | | | | “Impact at the systems level is measured by changes in public policies or organizational practices including legislation, funding, procedures, regulations, and incentives” (p. 5)  
   | | | | “… enhances the impact and sustainability of health promotion initiatives” (p. 6) |
| 25 | Kahnawake Schools Diabetes Prevention Project | Macaulay, Paradis | Social | “The Precede-Proceed model identifies predisposing, reinforcing, and enabling factors, as well as environmental and organisational factors, that impact on health behaviors. For HSDIP predisposing factors are children's knowledge and skills, reinforcing factors are the support of teachers and family, and enabling factors are the availability of healthy foods and opportunities for physical activity” (p. 8)  
   | | | Environment | “Community-based interventions improved children's lifestyles” (Adams et al 2005, p. 404) |
| 33 | WAVES | Adib, Barret | Economic | The aim was to estimate the cost-effectiveness of a obesity prevention intervention program in primary school-aged children” (p. 99)  
   | | | Social | “(Teacher) Questions 6: overall, what impact (if any) do you think the WAVES study intervention program had on your year 2 children? (Parent)  
   | | | | Question 5: what did you think of the cooking workshops? Do you think the workshops had any impact on your family?” (p. 35)  
   | | | | “… in terms of the perceived impact. Families from higher socioeconomic areas considered that they gained little additional knowledge and already practised healthy behaviours, whereas positive lifestyle changes were more likely to be reported by families from more disadvantaged communities” (p. 125)  
   | | | | “… although school is an important setting for influencing children's health behavior, wider impacts from the family and community, including socioeconomic circumstances, must also be considered” (p. 124)  
   | | | | “… perceived impacts of the programme were increased pro-social communication within families (including discussions about harmful parental alcohol consumption), heightened knowledge and awareness of the effects of alcohol consumption and its legal and health issues, and changes in parental drinking behaviours … through its impact on knowledge and communication processes within families” (p. 1)  
   | | | | “A range of health and social impacts of alcohol misuse by young people has been documented, including disorderly and violent behaviour, risky sexual behaviour [1], accidental injury, poor school attendance and achievement … The global costs of alcohol misuse related to such impacts are high” (p. 2) |

© 2022 The Authors. Journal of School Health published by Wiley Periodicals LLC on behalf of American School Health Association.
| Attempted measurement of social impact | Location and evidence |
|----------------------------------------|-----------------------|
| Mentions social impact                 | Social Economic       |
|                                        | Social Environment    |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Theory         |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
|                                        | Social Motivation     |
|                                        | Social Stakeholder     |
|                                        | Social Theory         |
|                                        | Social Competence     |
contribute to achieving intended impacts providing an explanation of how and why a program works. This guides intervention development and delivery and ensures that the critical components needed to achieve change are included. The low level of theory use and rare application of health promotion frameworks within these health promotion interventions was concerning. Health promotion aims to influence the broader benefits at the social, environmental, policy, or economic levels. Without theoretical guidance, important components can be omitted, and interventions may then fail to achieve the desired outcomes that create broader impact. Importantly, without theoretical explanation, it is not clear why interventions have succeeded or failed which prevents replication or duplication in other settings.

Health promotion in primary school settings often targets complex behavior, whether it is addressing a singular behavior such as not starting to smoke, or addressing multiple behaviors within a domain, such as healthy eating (increasing fruit and vegetable consumption, providing healthy eating skills) or physical activity (increasing steps taken per day, decreasing screen time). However, in this review, complex interventions conducted by Kipping, Howe, and Ofosu, Ekwaru,76 which targeted multiple behaviors, found no change in individual health determinants. Complex interventions need to measure social and economic health determinants, such as health equity, access to healthy foods or safe exercise environments to be able to capture social impact.

The interventions which most clearly applied and measured social impact in children’s primary school health promotion were more likely to have used a theoretical lens (social or behavioral based) and generally were informed by a health promotion framework. These lenses should encourage consideration of the broader effects of the intervention. Social impact is rarely measured as these broader effects are not being measured, even when SEM theories or HPS frameworks are reported. Whether it is a program logic such as Naylor, Macdonald69 or an alternative logic model, interventions need to provide a clear explanation of what the intended goal of the program is, outline the predicted outputs or outcomes and explain why a program is expected to work. Effective evaluation requires health promotion interventions to have stronger use of theory or health promotion frameworks to understand and map where and how change is occurring, or not occurring, rather than solely whether the input has created the desired outputs. This underpins effective intervention delivery and measurement, with an identification of the short- or long-term impacts and consideration of the intended and unintended consequences, both positive and negative, of programs socially, economically, and environmentally.

Evaluation of research and programs creates a map of how the research/program has worked in practice and provides key information about effective and ineffective practices and process, allocation of resources and sustainability. Brief interventions neither capture sustained behavior change nor target the structural issues which reinforce or drive complex wider issues such as obesity and mental health. If health promotion is to deliver lasting changes, evaluation of interventions requires more than measuring inputs, outputs, and outcomes of individual health determinants. Incorporation of broader social, community, and ecological measures in health promotion evaluation is required to measure and demonstrate what changed, and if it has changed differently for different individuals or groups, as competition for resources, funding, and time allocation within schools are rapidly increasing. Polonsky, Landreth Grau,129 and Nicholls130 highlight the need for more effective ways to utilize resources and address social issues to improve social outcomes. Health promotion needs to strive toward being more accountable in the way that delivery and demonstrated impact can be accurately estimated and clearly communicated.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The findings of this review should be considered in light of its strengths and limitations. This review included a large number of studies across multiple countries, providing a strong platform to assess social impact within health promotion in primary schools. The first important limitation is the generalizability of the findings as countries outside of the 4 Commonwealth countries, multiple countries, and systematic reviews were excluded from the analysis which may have yielded additional insights. A related limitation is the Anglo-centric focus, with non-English studies excluded, findings may not be representative of other cultures. Future research could replicate this examination in a broader group of countries. In addition, the search parameters used for this review, may have created a bias on which interventions were included and excluded from the analysis, meaning the studies are not an exhaustive list of health promotion interventions, programs, or initiatives conducted in primary school settings in Australia, Canada, New Zealand, or the United Kingdom. This review established a low level of social impact measurement within a large pool of studies, indicating a strong need for social impact measurement in school health promotion. To advance effective health promotion, future research needs to address the barriers to implementing interventions which measure social impact. If we are to understand the value of measuring what has changed beyond the individual, clear mapping of the
behavioral focus from input to outcome, stakeholder engagement, and the measurement against theoretical constructs, needs to occur before a social impact chain can be established. Currently, the paucity of social impact research within this context of health promotion interventions limits understanding of the broader social, economic, and health benefits of primary school health promotion, and social impact remains poorly defined, misunderstood, or not measured. A greater level of research in this area will contribute to better understanding and measurement.

CONCLUSION

Interventions should evidence how they create benefits by measuring the social impact, short or long term, whether societal, environmental, or economic benefits or a combination of these 3 benefits. Social impact measurement allows the return on investment for programs to be clearly communicated, supporting well-informed funding decisions to be made. There is a need for social impact to be incorporated and evaluated in primary school health promotion interventions to provide evidence of the benefits these interventions create and to demonstrate “value for money.” This review indicated social impact measurement is poorly understood and measured. Greater understanding is needed, and clear mapping of theory onto programs is required to explain why change occurs, and how this change leads to social impact. Only then can social impact measurement be embedded as a standard practice within health promotion interventions, programs and initiatives.

IMPLICATIONS FOR SCHOOL HEALTH

Health promotion efforts in primary schools need to be evaluated to measure whether they are effective in promoting behavioral changes in children, and whether they establish longer term safe and healthy life choices. This review sought to examine how social impact was measured within primary school health promotion interventions and found significant gaps in how social impact was understood, and how it was measured. In addition, theoretical and health promotion frameworks were often poorly implemented or considered in the evaluation of the intervention.

This review suggests to achieve more effective health promotion in primary schools, design, implementation, and evaluation needs to consider the following:

- Examination of the social impact of projects, programs or initiatives offers a means to understand the value of improved health behaviors and outcomes for school community stakeholders such as students, schools, and parental school communities.
- Evaluations should be grounded in theoretical determinants to understand whether determinants of change have altered as a result of intervention, and to measure the individual and the broader societal impact resulting from children’s health promotion. From a social impact estimation standpoint, theory delivers the understanding needed for clear attributions to be made. In the absence of causal links explaining the size of the effect, attributions are little more than a guessing game.
- Evaluation needs to involve greater stakeholder engagement, to establish and measure the social impacts of an intervention, to understand if health promotion is effective within schools. Interventions need to target what matters to key stakeholders and encourage active participation if effective behavioral change is to be achieved.
- Where possible, interventions need to plan for longer durations or frequent dosage. Stakeholder engagement and longer duration interventions are costly and resource intensive, and funding at this level not always available. However, to deliver broader social impact and evidence health promotion actions provide value for money, consideration of intervention length, dosage and the level of stakeholder engagement are important.

Moving forward, it is important that interventions in primary schools consider when measuring outcomes or social impact: What impact should they see; what impact has occurred and the mechanisms; what types of impact have occurred; who has been affected or impacted, and to how to evidence impact for impact measurement models. This ensures funding is directed to programs that deliver lasting change that benefits individuals and achieves improved health outcomes and cost savings for societies that fund health promotion efforts.

REFERENCES

1. World Health Organization. The Ottawa Charter: Principles for Health Promotion. Copenhagen: WHO Regional Office for Europe; 1986.
2. World Health Organization. Bangkok Charter for Health Promotion a Globalised World. Bangkok, Thailand; World Health Organisation; 2005.
3. Speller V, Learmonth A, Harrison D. The search for evidence of effective health promotion. Br Med J. 1997;315(7104):361-363.
4. Griebler U. Effects of student participation in school health promotion: a systematic review. Health Promot Int. 2017;32(2):195-206.
5. Dufour S, Denoncourt J, Mishara BL. Improving Children’s adaptation: new evidence regarding the effectiveness of Zippy’s friends, a school mental health promotion program. Adv Sch Ment Health Promot. 2011;4(3):18-28.
6. Neil AL, Christensen H. Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety. Clin Psychol Rev. 2009;29(3):208-215.
7. Adab P, Barrett T, Bhopal R, et al. The west midlands active lifestyle and healthy eating in school children (Waves) study: a cluster randomised controlled trial testing the clinical effectiveness and cost-effectiveness of a multifaceted obesity prevention intervention programme targeted at children aged 6-7 years. Health Technol Assess. 2018;22(8):1-644.
8. Morano M, Rutigliano I, Rago A, Pettolino-Mantovani M, Campanozzi A. A multicomponent, school-initiated obesity intervention to promote healthy lifestyles in children. Nutrition. 2016;32(10):1075-1080.
9. Dobbins M, Hussin H, DeCorby K, LaRocca RL. School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6 to 18. Cochrane Database Syst Rev. 2013;2:CD007651.
10. Kriemler S. Effect of school based physical activity programme (KISS) on fitness and adiposity in primary schoolchildren: cluster randomised controlled trial. Br Med J. 2010;340:c785.
11. Burke RM, Meyer A, Kay C, Allensworth D, Gazmararian JA. A holistic school-based intervention for improving health-related knowledge, body composition, and fitness in elementary school students: an evaluation of the HealthM-Powers program. Int J Behav Nutr Phys Act. 2014;11(1):1-12.
12. Amini M, Djazayery A, Majdzadeh R, Taghdisi MH, Jazayeri S. Effect of school-based interventions to control childhood obesity: a review of reviews. Int J Prev Med. 2015;6(1):68.
13. Pearson M, Chilton R, Wyatt K, et al. Implementing health promotion programmes in schools: a realist systematic review of research and experience in the United Kingdom. Implement Sci. 2015;10(149):1-20.
14. Katz DL. School-based interventions for health promotion and weight control: not just waiting on the world to change. Anna Rev Public Health. 2009;30(1):253-272.
15. Jaffery R, Breslin G, Brennan D, Hassan D. A systematic review of school-based physical activity interventions on children’s wellbeing. Int Rev Sport Exerc Psychol. 2016;9(1):215-230.
16. Dudley DA, Winslade J, Wright BJ, Cotton WG, Melver J, Jackson KS. Rationale and study protocol to evaluate the SunSmart Poicy intervention: a cluster randomised controlled trial of a primary school-based health promotion program. BMC Public Health. 2015;15(42):1-7.
17. Weist MD, Bruns EJ, Whitaker K, et al. School mental health promotion and prevention: experiences from four nations. School Psychol Int. 2017;38(4):343-362.
18. Branscum P, Sharma M. After-school based obesity prevention interventions: a comprehensive review of the literature. Int J Environ Res Public Health. 2012;9(4):1438-1457.
19. Maas K, Likert K. Environmental Management Accounting and Supply Chain Management Eco-Efficiency in Industry and Science. Dordrecht: Springer; 2011.
20. Florman M, Klinger-Vidra F, Facada MJ. A critical evaluation of Social Impact Assessment methodologies and a call to measure economic and social impact holistically through the External Rate of Return platform 2016:1-30. http://www.lse.ac.uk/businessAndConsultancy/LSEConsulting/pdf/Assessing-social-impacts-assessment-methods-report.pdf
21. Fischer RL, Richter FG-C. SROI in the pay for success context: are they at odds? Eval Program Plann. 2017;64:105-109.
22. Molecke G, Pinke J. Accountability for social impact: a bricolage perspective on impact measurement in social enterprises. J Business Vent. 2017;32(5):550-568.
23. Moore GF, Evans RE, Hawkins J, et al. From complex social interventions to interventions in complex social systems: future directions and unresolved questions for intervention development and evaluation. Evaluation. 2018;25(1):23-45.
24. Greico C. Measuring value creation in social enterprises: a cluster analysis of social impact assessment models. Nonprofit Voluntary Sect Quart. 2015;44(6):1173-1193.
25. Hurley E, Dietrich T, Rundle-Thiele S. A systematic review of parent based programs to prevent or reduce alcohol consumption in adolescents. BMC Public Health. 2019;19(1):1-14.
26. Pollock A, Campbell P, Struthers C, et al Stakeholder involvement in systematic reviews: a protocol for a systematic review of methods, outcomes and effects. Res Involv Engage. 2017;3(9):3-13.
27. Hrubá D, Zaloudíková I, Hrubá D. Zaloudíková I. What limits the effectiveness of school-based anti-smoking programmes? Cent Eur J Public Health. 2012;20(1):18-23.
28. Van Cauwenberghhe E, Mae S, Spitaels H, et al. Effectiveness of school-based interventions in Europe to promote healthy nutrition in children and adolescents: systematic review of published and ‘grey’ literature. Br J Nutr. 2010;103(6):781-797.
29. Jurak G, Cooper A, Leskosek B, Kovac M. Long-term effects of a 4-year longitudinal school-based physical activity intervention on the physical fitness of children and youth during 7-year follow-up assessment. Cent Eur J Public Health. 2013;21(4):190-195.
30. Ahrens W, Moreno LA, Märdil S, et al. Metabolic syndrome in young children: definitions and results of the IDF/ECS study. Int J Obes (Lond). 2014;38(2):54-514.
31. Love R, Adams J, van Sluijs EMF. Are school-based physical activity interventions effective and equitable? A meta-analysis of cluster randomized controlled trials with accelerometer-assessed activity. Obes Rev. 2019;20(6):859-870.
32. Robinson D, Berg S, Gleddie D. A scoping review of school-based physical activity and health eating/nutrition interventions. PHEnEx J. 2018;9(2):1-29.
33. Yulkos H, Sahin FN, Maksimovic N, Drid P, Bianco A. School-based intervention programs for preventing obesity and promoting physical activity and fitness: a systematic review. Int J Environ Res Public Health. 2020;17(1):347.
34. Darabovskaj J, Montemurro G, Ekwari JP, et al. Effectiveness of school-based health promotion interventions prioritized by stakeholders from health and education sectors: a systematic review and meta-analysis. Prev Med. 2020;19:1-18.
35. Rethlefsen ML, Kirtley S, Waffenschmidt S, et al. PRISMA-S: an extension to the PRISMA statement for reporting literature searches in systematic reviews. Syst Rev. 2021;10:1-19.
36. National Health and Medical Research Council. NHMRC Levels of Evidence and Grades for Recommendations for Guideline Developers. Canberra: National Health and Medical Research Council; 2009.
37. Austin G, Caperchione C, Mummery W. Translating research to practice: Using the RE-AIM framework to examine an evidence-based physical activity intervention in primary school settings. Health Promot Pract. 2011;12(6):932-941.
38. Bravo A, Foley BC, Innes-Hughes C, Rissel C. The equitable reach of a universal, multisector childhood obesity prevention program (LiveLifeWell®School) in Australian primary schools. Public Health Research & Practice. 2020;30(1):e3012003.
39. de Silva-Sanigorski A, Prosser L, Carpenter L, et al. Evaluation of the childhood obesity prevention program kids—“Go for your life”. BMC Public Health. 2010;10:1-8.
40. Honisett S, Woolcock S, Porter C, Hughes I. Developing an award program for children’s settings to support healthy eating and physical activity and reduce the risk of overweight and obesity. *BMC Public Health*. 2009;9(1):345.

41. Dix KL, Slee PT, Lawson MJ, Keeves JP. Implementation quality of whole-school mental health promotion and students’ academic performance. *Child and Adolescent Mental Health*. 2012;17(1):45-51.

42. Graetz B, Littlefield L, Trinder M. KidsMatter: A population health model to support student mental health and wellbeing in primary schools. *International Journal of Mental Health Promotion*. 2008;10(4):13-20.

43. Dudley DA, Cotton WG, Peralta LR. Teaching approaches and strategies that promote healthy eating in primary school children: A systematic review and meta-analysis. *International Journal of Behavioural Nutrition and Physical Activity*. 2015;12(28):1-26.

44. Ether N, Morgan P, Lubans D. Social support from teachers mediates physical activity behaviour change in children participating in the Fit-4-Fun intervention. *International Journal of Behavioral Nutrition and Physical Activity*. 2013;10(68):1-15.

45. Ether N, Morgan P, Lubans D. Feasibility and preliminary efficacy of the Fit-4-Fun intervention for improving physical fitness in a sample of primary school children: A pilot study. *Physical Education & Sport Pedagogy*. 2013;18(4):389-411.

46. Ether N, Morgan P, Lubans D. Improving health-related fitness in children: The Fit-4-Fun randomized controlled trial study protocol. *BMC Public Health*. 2011;11(902):1-12.

47. Eckermann S, Dawber J, Yeatman H, Quinsey K, Morris D. Evaluating return on investment in a school based health promotion and prevention program: The investment multiplier for the Stephanie Alexander Kitchen Garden National Program. *Social Science and Medicine*. 2014;114C:103-112.

48. Gibbs L, Staiger PK, Townsend N. Methodology for the evaluation of the Stephanie Alexander Kitchen Garden Program. *Health Promotion Journal of Australia*. 2013;24(1):32-43.

49. Engelen L, Bundy AC, Simpson JM, et al. Increasing physical activity in your primary school children - it’s child’s play: A cluster randomised controlled trial. *Preventive Medicine*. 2013;56(5):319-325.

50. Grunseit AC, Hara BJ, Drayton B. Ecological study of playground space and physical activity among primary school children. *BMC Open*. 2020;10(6):e34586.

51. Hector D, Edwards S, Gale J, Ryan H. Achieving equity in playground space and physical activity among primary school children: A non-randomised trial. *Preventive Medicine*. 2015;33(18):1908-1918.

52. Myers G, Wright S, Blane S, Pratt IS, Pettigrew S. A process and outcome evaluation of an in-class vegetable promotion program. *Appetite*. 2018;125:182-189.

53. Nathan N, Wiggers J, Bauman AE. A cluster randomised controlled trial of an intervention to increase the implementation of school physical activity policies and guideline: Study protocol for the physically active children in education (PACE) study. *BMC Public Health*. 2019;19(170):1-12.

54. Nathan N, Sutherland R, Beauchamp MR. Feasibility and efficacy of the Great Leaders Active StudentS (GLASS) program on children’s physical activity and object control skill competency: A non-randomised trial. *Journal of Science and Medicine in Sport*. 2017;20(12):1081-1086.

55. Radicchi MR, Thompson S, Papertalk L. “It made me feel Brazilian!”: Addressing prejudice through Capoeira classes in a school in Western Australia. *Health Promotion Journal of Australia*. 2019;30(3):299-302.

56. Ritchie B, O’Hara L, Taylor J. ‘Kids in the Kitchen’ impact evaluation: Engaging primary school students in preparing fruit and vegetables for their own consumption. *Health Promotion Journal of Australia*. 2015;26(2):146-149.

57. Roberts C, Williams R, Kane R, et al. Impact of mental health promotion program on substance use in young adolescents. *Advances in Mental Health*. 2011;10(1):72-82.

58. Somerset S, Markwell K. Impact of a school-based food garden on attitudes and identification skills regarding vegetables and fruit: A 12-month intervention trial. *Public Health Nutrition*. 2009;12(2):214-221.

59. Bisset S, Daniel M, Potvin L, Paquette M. Assessing the impact of the primary school-based nutrition intervention Petits cuisinots-parents en reseaux. *Canadian Journal of Public Health - Revue Canadienne De Sante Publique*. 2008;99(2):107-113.

60. Bisset S, Potvin L. Expanding our conceptualization of program implementation: Lessons from the genealogy of a school-based nutrition program. *Health Education Research*. 2007;22(5):737-746.

61. Campbell AC, Barnum D, Ryden V, Ishkanian S, Stock S, Chanoine JP. The effectiveness of the implementation of Healthy Buddies (TM), a school-based, peer-led health promotion program in elementary schools. *Canadian Journal of Diabetes*. 2012;36(4):181.

62. Ronsley R, Lee AS, Kuzeljevic B, Panagiotopoulos C. Health Buddies (TM) reduces Body Mass Index Z-score and waist circumference in Aboriginal children living in remote coastal communities. *Journal of School Health*. 2013;83(9):605-613.

63. Day ME, Strange KS, McKay HA, Naylor PJ. Action Schools! BC - Healthy Eating - Effects of a whole-school model to modifying eating behaviours of elementary school children. *Canadian Journal of Public Health - Revue Canadienne De Sante Publique*. 2008;99(4):328-331.

64. Naylor P-J, Macdonald HM, Reed KE, McKay HA. Action schools! BC: a socioeconomic approach to modifying chronic disease risk factors in elementary school children. *Prev Chronic Dis*. 2006;3(2):A60.

65. He M, Beynon C, Sangster Bouch M. Impact evaluation of the Northern Fruit and Vegetable Pilot Programme - A cluster-randomised controlled trial. *Public Health Nutrition*. 2009;12(11):2199-2208.

66. Macaulay AC, Paradis G, Potvin L, et al. The Kahnawake schools diabetes prevention project: Intervention, evaluation, and baseline results of a diabetes primary prevention program with a native community in Canada. *Preventive Medicine*. 1997;26(6):779-790.

67. Adams A, Receveur O, Mundt M, Paradis G, Macaulay A. Healthy lifestyle indicators in children (Grades 4 to 5) from the Kahnawake Schools Diabetes Prevention Project. *Can J Diabetes*. 2005;29(4):403-409.

68. Mishara BL, Dufour S. Randomized control study of the implementation and effects of a new mental health promotion program...
program to improve coping skills in 9 to 11 year old children: Passport: Skills for Life. *Frontiers in Psychology*. 2020;11:1-16.

69. Monkeviciene O, Mishara BL, Dufour S. Effects of the Zippy’s Friends Programme on children’s coping abilities during the transition from kindergarten to elementary school. *Early Child Educ J*. 2006;34(1):63-60.

70. Mullally MLM, Taylor JPP, Kuhle SMDMPH. A province-wide school nutrition policy and food consumption in elementary school children in Prince Edward Island. *Canadian Journal of Public Health*. 2010;101(1):40-43.

71. Ofosu NN, Ekwuru JP, Bastian KA, et al. Long-term effects of comprehensive school health on health-related knowledge, attitudes, self-efficacy, health behaviours and weight status of adolescents. *BMC Public Health*. 2018;18:1-9.

72. Wackett J, Evans L. An evaluation of the Choices and Changes student program: A grade four to seven sexual health education program based on the Canadian Guidelines for Sexual Health Education. *The Canadian Journal of Human Sexuality*. 2009;14(4):265-273.

73. Ashfield-Watt PAL, Stewart EA, Scheffer JA. A pilot study of the effect of providing daily free fruit to primary-school children in Auckland, New Zealand. *Public Health Nutrition*. 2009;12(5):693-701.

74. Rush E, McMennan S, Obolonkin V, et al. Project Energize: Whole-region primary school nutrition and physical activity programme: Evaluation of body size and fitness 5 years after the randomised controlled trial. *British Journal of Nutrition*. 2014;111(2):363-371.

75. Rush E, Cairncross C, Williams MH, et al. Project Energize: Intervention development and 10 years of progress in prevention childhood obesity. *BMC Research Notes*. 2016;9(44):1-7.

76. Clarke J, Griffin TL, Lancashire ER, Adap P, Parry JM, Pallan MJ. Parent and child perceptions of school-based obesity prevention in England: A qualitative study. *BMC Public Health*. 2015;15(1224):1-9.

77. Chalkley AE, Routen AC, Harris JP, Cale LA, Sherar LB. Marathon Kids UK: Study design and protocol for a mixed methods evaluation of a school-based running programme. *BMJ Open*. 2018;8(5):e022176.

78. Chalkley AE, Routen AC, Harris JP, Cale LA, Sherar LB. An evaluation of the implementation of a UK school-based running program. *Children (Basel)*. 2020;7(10):151.

79. Chalkley AE, Routen AC, Harris JP, Cale LA, Sherar LB. “I just like the feeling of it, outside being active”: Pupils’ experiences of a school-based running programme, a Qualitative study. *Journal of Sport & Exercise Psychology*. 2020;42(1):48-58.

80. Clarke AM, Sixedmth J, Barry MM. Evaluating the implementation of an emotional wellbeing programme for primary school children using participatory approaches. *Health Education Journal*. 2015;74(5):578-593.

81. Coppenber T, Lacey S, O’Neill C, Burns C. ‘Project Spraio’: A randomized control trial to improve nutrition and physical activity in school children. *Contemporary Clinical Trials Communications*. 2016;3:94-101.

82. O’Leary M, Rush E, Lacey S, Burns C, Coppenber T. Project Spraio: Two year outcomes of a whole school physical activity and nutrition intervention using the RE-AIM framework. *Irish Educational Studies*. 2019;38(2):219-243.

83. Evans CEL, Ransley JK, Christian MS, Greenwood DC, Thomas JD, Cade JE. A cluster-randomised controlled trial of a school-based fruit and vegetable intervention: Project Tomato. *Public Health Nutrition*. 2013;16(6):1073-1081.

84. Fairbrother H, Curtis P, Kirkcaldy A. Children’s learning from a Smokefree Sports programme: Implications for health education. *Health Education Journal*. 2020;79(6):686-699.

85. Routen AC, Biddle SJH, Cale L, et al. Study design and protocol for a mixed methods evaluation of an intervention to reduce
and break up sitting time in primary school classrooms in the UK: The CLASS PAL (Physically Active Learning) Programme. *BMJ Open*. 2017;7:e019428.

109. Sahota P, Rudolf M, Dixey R, Hill A, Barth A, Cade J. Evaluation of implementation and effect of primary school based intervention to reduce risk factors for obesity. *BMJ*. 2001;323:1-4.

110. Willmott T, Pang B, Rundle-Thiele S, Badejo A, Bolade S, Sindakis S. Micro-foundation of Knowledge Creation Theory: development of a conceptual framework theory. *J Knowl Econ*. 2020;11(4):1556-1572.

111. Starkey F, Orme J. Evaluation of a primary school drug education project: Methodological issues and key findings. *Health Education Research*. 2001;16(5):609-622.

112. Willmott T, Pang B, Rundle-Thiele S, Badejo A. Reported theory use in electronic health weight management interventions targeting young adults: a systematic review. *Health Psychol Rev*. 2019;13(3):295-317.

113. Bolade S, Sindakis S. Micro-foundation of Knowledge Creation Theory: development of a conceptual framework theory. *J Knowl Econ*. 2020;11(4):1556-1572.

114. Funnell SC, Rogers PJ. Purposeful Program Theory: Effective Use of Digital Health: An Integrated Approach. *Health Promot Int*. 2017;32(2):177-184.

115. Rubinelli S, Diviani N. The bases of targeting behavior in health promotion and disease prevention. *Patient Educ Couns*. 2020;103(12):2395-2399.

116. Bandura A. Health promotion from the perspective of Social Cognitive Theory. *Psy chol Health*. 1998;13(4):623-649.

117. Barker F, Atkins L, de Lusignan S. Applying the COM-B behaviour model and behaviour change wheel to develop an intervention to improve hearing-aid use in adult auditory rehabilitation. *Int J Audiol*. 2016;55(supp 3):S90-S98.

118. Howarth A, Quesada J, Silva J, Judycki S, Mills PR. The impact of digital health interventions on health-related outcomes in the workplace: a systematic review. *Digital Health*. 2018;4:1-18.

119. Rawhouser H, Cummings M, Newbert SL. Social impact measurement: current approaches and future directions for social entrepreneurship research. *Entrep Theory Pract*. 2019;43(1):82-115.

120. Breuer E, Lee I, De Silva M, Lund C. Using theory of change to design and evaluate public health interventions: a systematic review. *Implement Sci*. 2016;11(63):1-17.

121. Funnell SC, Rogers PJ. Purposeful Program Theory: Effective Use of Theories of Change and Logic Models. 1st ed. San Francisco, CA: John Wiley and Sons; 2011.

122. Turunen H, Sormunen M, Jourdan D, von Seelen J, Buijs G. Health promoting schools—a complex approach and a major means to health improvement. *Health Promot Int*. 2017;32(2):177-184.

123. Kipping RR, Howe LD, Jago R, et al. Effect of intervention aimed at increasing physical activity, reducing sedentary behaviour, and increasing fruit and vegetable consumption in children: Active for Life Year 5 (AFLY5) school based cluster randomised controlled trial. *Br Med J*. 2014;348:1-13.

124. Lucyk K, McLaren L. Taking stock of the social determinants of health: a scoping review. *PLoS One*. 2017;12(5):1-24.

125. Gold R, Bunce A, Cottrell E, et al. Study protocol: a pragmatic, stepped-wedge trial of tailored support for implementing social determinants of health documentation/action in community health centers, with realist evaluation. *Implement Sci*. 2019;14:1-17.

126. De Buck E, Hannes K, Cargo M, et al. Engagement of stakeholders in the development of a Theory of Change for handwashing and sanitation behaviour change. *Int J Environ Health Res*. 2018;28(1):8-22.

127. Kozica SL. Developing comprehensive health promotion evaluations: a methodological review. *MOJ Public Health*. 2014;2(1):1-19.

128. Joyce A, Dabrowski A, Aston R, Carey G. Evaluating for impact: what type of data can assist a health promoting school approach? *Health Promot Int*. 2017;32(2):403-410.

129. Polonsky MJ, Landreth Grau S, McDonald S. Perspectives on social impact measurement and non-profit organisations. *Market Intell Plan*. 2016;34(1):80-98.

130. Nicholls J. Social return on investment—development and convergence. *Eval Program Plann*. 2017;64:127-135.

131. Davey M, McHugh P, Devaney M, et al. Systems-thinking social marketing: conceptual extensions and empirical investigations. *J Mark Manag*. 2016;32(11-12):1123-1144.

132. Arce-Gomez A, Donovan JD, Bedggood RE. Social impact assessments: developing a conceptual framework. *Environ Impact Assess Rev*. 2015;50:85-94.

133. Vanclay F. Reflections on social impact assessment in the 21st century. *Impact Assess Project Appraisal*. 2020;38(2):126-131.

134. Banke-Thomas AO, Madaj B, Charles A, van den Broek N. Social Return on Investment (SROI) methodology to account for value for money of public health interventions: a systematic review. *BM C Public Health*. 2015;15(1):582.

135. Vanclay F. Reflections on social impact assessment in the 21st century. *Impact Assess Project Appraisal*. 2020;38(2):126-131.

136. Arce-Gomez A, Donovan JD, Bedggood RE. Social impact assessments: developing a conceptual framework. *Environ Impact Assess Rev*. 2015;50:85-94.

137. Banke-Thomas AO, Madaj B, Charles A, van den Broek N. Social Return on Investment (SROI) methodology to account for value for money of public health interventions: a systematic review. *BM C Public Health*. 2015;15(1):582.

138. Vanclay F. Reflections on social impact assessment in the 21st century. *Impact Assess Project Appraisal*. 2020;38(2):126-131.

139. Banke-Thomas AO, Madaj B, Charles A, van den Broek N. Social Return on Investment (SROI) methodology to account for value for money of public health interventions: a systematic review. *BM C Public Health*. 2015;15(1):582.

140. Vanclay F. Reflections on social impact assessment in the 21st century. *Impact Assess Project Appraisal*. 2020;38(2):126-131.

SUPPORTING INFORMATION

The following Supporting Information is available for this article:

**Appendix S1:** Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.