



National Collaborating Centre  
for Determinants of Health

Centre de collaboration nationale  
des déterminants de la santé

**EXPEDITED  
SYSTEMATIC  
REVIEW**



**ASSESSING THE IMPACT AND EFFECTIVENESS OF INTERSECTORAL ACTION  
ON THE SOCIAL DETERMINANTS OF HEALTH AND HEALTH EQUITY:  
AN EXPEDITED SYSTEMATIC REVIEW**

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## ABOUT THE NATIONAL COLLABORATING CENTRE FOR DETERMINANTS OF HEALTH

The National Collaborating Centre for Determinants of Health is one of six National Collaborating Centres (NCCs) for Public Health in Canada. Established in 2005 and funded by the Public Health Agency of Canada, the NCCs produce information to help public health professionals improve their response to public health threats, chronic disease and injury, infectious diseases, and health inequities.

The National Collaborating Centre for Determinants of Health focuses on the social and economic factors that influence the health of Canadians. The Centre translates and shares information and evidence with public health organizations and practitioners to influence interrelated determinants and advance health equity.

## PREFACE

The National Collaborating Centre for Determinants of Health (NCCDH) focuses on the social and economic factors that influence the health of Canadians.

This expedited systematic review is part of ongoing work at the NCCDH that explores “what works” to improve health equity through action on the social determinants of health.

The focus of this review is the effectiveness of intersectoral action as a public health practice to advance health equity. The review summarizes the best available research evidence to support evidence-informed public health. Research evidence is one component of information needed to inform decision-making in public

health.<sup>1</sup> Other important forms of information include practice-based experience and program evaluation, as well as factors about the local environment, priorities, and available resources.<sup>1</sup>

Strengthening our understanding of the impact of intersectoral action on health equity will help to clarify how public health works with other sectors and to identify the tools and strategies that support this work.

To our knowledge, this is the first attempt to systematically assess the impact of intersectoral action in public health on the social determinants of health and health equity using literature from a number of different countries.

A summary statement of the report findings is available at [www.nccdh.ca](http://www.nccdh.ca)

# CONTENTS

- BACKGROUND ..... 2
- RESEARCH QUESTION..... 3
- METHODS ..... 3
  - Literature Search ..... 3
  - Relevance ..... 4
  - Quality Assessment ..... 5
  - Data Extraction and Analysis ..... 6
- FINDINGS ..... 7
  - Quality of Included Studies ..... 7
  - Systematic Review ..... 8
  - Primary Studies ..... 8
    - Population Health Approach to Reducing Health Inequities*..... 8
    - Populations* ..... 8
    - Intervention Settings* ..... 9
    - How the Social Determinants of Health Are Addressed* ..... 9
    - Relationships and Roles*..... 17
    - Tools, Mechanisms, and Strategies for Initiation and Implementation* ..... 17
- DISCUSSION ..... 18
- LIMITATIONS ..... 21
- CONCLUSIONS ..... 22
- IMPLICATIONS ..... 23
  - For Practice and Policy..... 23
  - For Research..... 23
- REFERENCES ..... 24
- TABLES, FIGURE AND APPENDICES ..... 27
  - TABLE 1 Quality Assessment Results ..... 28
  - TABLE 2 Characteristics of Included Studies ..... 31
  - FIGURE 1 Search Results ..... 50
  - APPENDIX 1 Search Strategy ..... 51
  - APPENDIX 2 Grey Literature Search ..... 56

## BACKGROUND

This expedited systematic review is part of ongoing work at the National Collaborating Centre for Determinants of Health (NCCDH) that explores “what works” to improve health equity through action on the social determinants of health.

Numerous previous reports have noted the importance of intersectoral action in improving health equity;<sup>2-7</sup> and intersectoral action has been identified as a public health practice with potential to allow local public health units to address the social determinants of health and reduce health inequities.<sup>6</sup>

Intersectoral action for health refers to ‘actions undertaken by sectors outside the health sector, possibly, but not necessarily, in collaboration with the health sector, on health or health equity outcomes or on the determinants of health or health equity’.<sup>4(p.2)</sup> Intersectoral action recognizes that the social and economic factors influencing the health of the population, described as the social determinants of health,<sup>8,9</sup> lie outside the sphere of the health sector, falling within the purview of other sectors. As such, action within and between sectors, at the local, regional, provincial, national, and global levels, is needed to influence the social and economic landscape that enables the health and well-being of the population.<sup>10</sup>

For the purposes of this review, we considered intersectoral interventions, policies and programs, undertaken by the public health sector in collaboration with governmental and non-governmental sectors outside of health. We define the public health sector as organizations and individuals that deliver activities intended to reduce the amount of disease, premature death, and disease-related discomfort and disability in the population. In Canada, formal public health organizations include health departments, regional health authorities, and units at the local, regional, provincial, territorial and national levels. We focus on intersectoral interventions that aim to improve health equity through action on the social determinants of health. The social determinants of health are social and economic factors that influence health. They are “the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics”.<sup>11</sup> Examples of the social determinants of health include income and income distribution, education, social safety networks, employment and working conditions, unemployment and job security, early childhood development, gender, race, food insecurity, housing, social exclusion, access to health services, Aboriginal status, and disability.<sup>8</sup>

Health equity is defined as the “the absence of unfair and avoidable or remediable differences in health among population groups defined socially, economically, demographically or geographically”.<sup>11</sup> Health inequities refer to health differences that are socially produced, systematic across the population, and unfair.<sup>12</sup>

Although examples and case studies from Canadian and international settings describing intersectoral action for health equity are available,<sup>2-4,13-15</sup> there is limited information about the impact of intersectoral action on the social determinants of health and health equity.<sup>4,14,16</sup>

This review focuses on the impact and effectiveness of intersectoral action in public health practice on the social determinants of health and health equity. Additionally, the review identifies gaps in current research on and documentation of effective public health practice. A recent systematic review on the impact on health of collaboration between local health service organizations and local governments did not assess the impact on health equity.<sup>17</sup> To our knowledge, the current report represents the first attempt to systematically assess the impact of intersectoral action in public health on the social determinants of health and health equity using literature from a number of countries.

## RESEARCH QUESTION

This review examines the question, “What is the impact and effectiveness of intersectoral action as a public health practice for health equity through action on the social determinants of health?” The review also explores two additional questions: What is the role of the public health sector in intersectoral action on the social determinants of health for health equity? What tools, mechanisms, and strategies support the initiation and implementation of intersectoral action to improve health equity?

## METHODS

Rapid reviews use streamlined traditional systematic review methods to help synthesize and communicate evidence within a shortened time frame.<sup>18</sup> This rapid review followed many of the steps for a full systematic review. A number of decisions were made a priori and during the course of the review, specifically:

- to not review the full text of articles that we could not retrieve during the specified time frame;
- to not search the reference lists of included studies; and
- to not contact authors for missing information.

**The following methods were used to collect the literature for this paper:**

- a comprehensive search of published literature from January 2001 to January 2012;
- a search for and retrieval of potentially relevant grey literature; and
- retrieval and review of relevant studies from any systematic reviews that were assessed for methodological quality.

### Literature Search

The Population, Intervention, Control or Comparison group and Outcome (PICO) for this study was developed by staff at the NCCDH during an internal workshop and was provided to a skilled research librarian. The librarian, using the PICO as a guide, developed a search strategy. General and synonymous terms were identified to capture any relevant literature on the specific and individual topics in the PICO. The librarian used the search terms (listed in Appendix 1) to conduct searches in several databases: Embase MEDLINE, CINAHL, Social Sciences Abstracts, and the Cochrane and Campbell libraries. The librarian used the PICO to search the grey literature (specifically, the websites listed in Appendix 2).

We asked members of the Project Advisory Group to identify relevant published and unpublished literature. We also contacted selected experts identified by the Project Advisory Group.

The initial search located 10,235 potentially relevant articles, including primary studies and systematic reviews.

## Relevance

Two reviewers independently screened the titles and abstracts of all articles identified in the initial search. A total of 886 articles were deemed potentially relevant and underwent full-text screening for relevance testing (Figure 1).

### An article was included for full relevance testing if it had the following characteristics:

- The study involved any population group.
- The study had any design.
- The intervention was any population health intervention related to the social determinants of health and health equity.
- The article explicitly mentioned an intersectoral relationship involving a public health organization or professional and at least one other sector.
- The outcomes were health, the social determinants of health, or policy to improve the social determinants of health and health equity, as defined below:
  - *Health-related outcomes are any measure of mortality and morbidity, healthcare utilization, adherence to healthcare, or quality of life.*
  - *The social determinants of health are social and economic factors that influence health. More specifically, as described in the Background, they are “the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics”.<sup>11</sup> Examples of the social determinants of health include income and income distribution, education, social safety networks, employment and working conditions, unemployment and job security, early childhood development, gender, race, food insecurity, housing, social exclusion, access to health services, Aboriginal status, and disability;<sup>8</sup>*
  - *Policy outcomes include societal-level legislative changes (e.g., laws, bills), as well as organizational-level policies, programs, and strategies to improve the social determinants of health and health equity.*
- The article was published between January 2001 and January 2012.
- The study was set in one of the following countries: Norway, Finland, Denmark, Sweden, Australia, New Zealand (NZ), Canada, the United States (US), or the United Kingdom (UK).
- The article was published in English or French.



**Any study with the following characteristics was excluded:**

- It was a theoretical paper or commentary, not based on empirical data.
- It examined only process outcomes (e.g., how well sectors worked together).
- It involved only academia and community partners.
- It focused on primary health care.

For 60 articles (0.6% of the total identified), we were unable to retrieve the full text; these articles were also excluded at the full-text screening stage.

A total of 17 articles (1 systematic review, 14 quantitative studies, and 2 qualitative studies) were found to be relevant and underwent quality assessment, as described below. See Figure 1 for a flow chart detailing the search results. Key relevant findings from these studies have been included in this paper.

### Quality Assessment

Two reviewers independently assessed the quality of included studies. The systematic review was assessed using AMSTAR,<sup>19</sup> a valid and reliable tool for assessing the methodological quality of systematic reviews.<sup>20,21</sup> See Table 1 for the results of quality assessment of the systematic review.

Quantitative studies were assessed using a tool developed by the Effective Public Health Practice Project.<sup>22</sup> This tool has been tested for assessing the methodological quality of primary studies in public health. It is based on previously established guidelines,<sup>23,24</sup> and has been examined by experts in the field, who gave it excellent ratings.<sup>25</sup> The tool and accompanying dictionary are available from [www.ehpp.ca](http://www.ehpp.ca). The tool consists of six criteria: selection bias, study design, confounders, blinding, data collection methods, and withdrawals and dropouts.

Two reviewers independently reviewed each quantitative study on the basis of the six criteria listed above and independently rated the studies as “strong,” “moderate,” or “weak.” The reviewers met to analyze their ratings, discuss differences, define terms, and reach consensus for conflicting ratings. Once the ratings of individual study characteristics were summed, each study was then given an overall assessment of strong, moderate, or weak quality. For a study to be rated as “strong,” four of the six quality assessment criteria had to be rated as strong, with no weak ratings. A strong rating could also be assigned if an article had more than four strong plus one moderate and one weak rating. A rating of “moderate” was assigned if fewer than four criteria were rated as strong or moderate and one criterion was rated as weak. A rating of weak was assigned if two or more criteria were rated as weak. See Table 1 for the results of quality assessment of the quantitative studies.

Two papers reported qualitative studies and were assessed according to criteria developed by Letts, Wilkins, Law, Stewart, Bosch, & Westmorland.<sup>26</sup> These criteria include clarity of purpose, description of the background literature reviewed, statement of the study design and its appropriateness, description of the methods used for sampling and data collection, analytic rigour, auditability, credibility, transferability, dependability, confirmability, and soundness of the conclusions. Two reviewers independently examined each paper; discrepancies in quality ratings were discussed until consensus was reached. See Table 1 for the results of quality assessment of the qualitative studies.

## Data Extraction and Analysis

Data were extracted from all included studies, regardless of methodological quality (see Table 2 for characteristics of the included studies). Data extraction was conducted by one reviewer and was checked by another for completeness and accuracy. The data are reported in a narrative format that includes information on the study design, the intervention, and the outcomes. All statistically significant and non-significant outcomes that were considered relevant to the review question are reported. The following additional data were extracted:

- Location (i.e., country)
- Setting (e.g., rural, urban, organizational, local, regional, national)
- Population
- Population health approach to addressing health equity: Interventions may be defined by their approach to reducing health inequities, with universal interventions addressing the entire population (a horizontal approach),<sup>5,16,27</sup> targeted interventions selectively providing interventions to disadvantaged groups (a vertical approach),<sup>5,16,27</sup> and mixed approaches (“targeting within universalism”) directing extra benefits to disadvantaged groups within the context of a universal policy design.<sup>28</sup>
- Level of intervention on the social determinants of health: Interventions to advance health equity may be categorized by their approach to addressing the “upstream,” “midstream,” or “downstream” determinants of health.<sup>16,29,30</sup>
  - *Interventions are classified as upstream interventions if they include reform of fundamental social and economic structures and involve mechanisms for the redistribution of wealth, power, opportunities, and decision-making capacities. Upstream interventions typically involve structural and system-level changes.*
  - *Midstream interventions seek to reduce risky behaviours or exposures to hazards by influencing health behaviours or psychosocial factors and/or by improving material working and living conditions. Midstream interventions generally occur at the community or organizational level.*
  - *Downstream interventions occur at the micro and/or individual level and mitigate the inequitable impacts of upstream and midstream determinants through efforts to increase equitable access to health care services.*
- Sectors involved
- Relationship between sectors:<sup>5</sup> characterize four patterns of relationships in intersectoral action: information-sharing, cooperation, coordination, and integration. An informative relationship is based on information sharing and exchange between sectors; cooperation refers to the achievement of greater efficiency through optimization of resources for the enforcement or implementation of policies or programs; coordination involves joint work among sectors for greater efficiency and effectiveness, generally the creation and integration

of synergistic relationships and shared financing; and integration refers to approaching a new policy or program in conjunction with multiple sectors and requires the synthesis of objectives, administrative processes, resources, responsibilities, and actions.

- Role of public health: Four roles for public health action on the social determinants of health to advance health equity include:<sup>31,32</sup>
  - *Reporting/ assessing on the health of populations and describing health inequalities and inequities and effective strategies to address those inequalities and inequities.*
  - *Modifying and orienting interventions to reduce health inequities including the unique needs and capacities of priority populations.*
  - *Engaging in community and multi-sectoral collaboration to address the health needs of priority populations through services and programs.*
  - *Leading/participating and supporting other stakeholders in policy analysis, development and advocacy for improvements in the health determinants/inequities”*
- Tools, strategies, and mechanisms: Tools may be described as catalysts that facilitate intersectoral action; mechanisms as institutional structures and arrangements; and strategies as a broader combination of planned actions or initiatives.<sup>14</sup>
- Social determinant of health addressed

Given the heterogeneity of the included studies, a meta-analysis would not have been appropriate, because outcome measures were not measured consistently across the included studies, and most studies did not include statistical analyses that would lend them to meta-analysis.

## FINDINGS

In this section, we discuss the quality of the studies that met the prespecified review criteria, as well as the outcomes reported. The systematic review that met our criteria is presented first. The population health approach to reducing health inequities, populations, and intervention settings of the primary quantitative and qualitative studies are presented next. The outcomes of the primary studies are then organized by how they intervened on social determinants of health. We then summarize the relationships among sectors, the role of the public health sector in the interventions, and the tools, mechanisms, and strategies for initiation and implementation reported.

### Quality of Included Studies

Seventeen studies met the prespecified review criteria. We identified one strong systematic review.<sup>33</sup> Fourteen of the primary studies were quantitative. Of these, one was methodologically strong,<sup>34</sup> five were of moderate quality,<sup>35-39</sup> and eight were weak.<sup>40-47</sup> The quality assessment of the two qualitative studies<sup>48,49</sup> is summarized in Table 1.

## Systematic Review

One systematic review met our inclusion criteria.<sup>33</sup> The systematic review assessed the impact of organizational partnerships on public health outcomes and health inequalities in England and included 15 studies related to six interventions: Health Action Zones, Health Improvement Programmes, New Deal for Communities, Health Education Authority Integrated Purchasing Programme, Healthy Living Centres, and National Healthy School Standard. All interventions were multi-sectoral, and each was designed to address a range of social determinants of health (e.g., employment, poverty, social exclusion, housing, education). One intervention (National Healthy School Standards) focused on children in school settings, and all other interventions occurred at the local, neighbourhood, or community level. Interventions took a range of approaches to addressing health equity (see Table 2). Included studies were of mixed methodological quality, and the majority were not designed specifically to assess the impact of partnerships on public health outcomes, including health equity. Four of the studies included a quantitative component and produced a mixed and inconclusive picture in terms of the impacts of partnerships on health outcomes and health equity. Qualitative studies included in the systematic review suggested that some partnerships increased the profile of health inequalities on local policy agendas. These interventions were typically short-term. Smith and colleagues,<sup>33</sup> found that the design of partnership interventions and of the studies evaluating them meant it was difficult to assess the extent to which identifiable successes and failures were attributable to the partnerships.

## Primary Studies

### *Population Health Approach to Reducing Health Inequities*

None of the primary studies included in this review evaluated a strictly universal intervention. Two interventions took a mixed approach by offering universal programming to all involved in the intervention and additional programming for specific groups.<sup>36,44</sup> Other studies investigated targeted interventions.<sup>34,35,37-39,41-43,45-49</sup> One study investigated a multi-component intervention that offered both universal and targeted programs and policies.<sup>40</sup>

### *Populations*

The primary studies included in this review described health equity interventions focusing on specific populations. Many of the interventions involved individuals and communities that were experiencing multiple social and/or economic disadvantages. Ten of the interventions involved children.<sup>34-36,38,39,43-47</sup> Ten of the interventions involved socio-economically disadvantaged populations.<sup>34-36,38-40,42,44,45,48</sup> Five of the interventions involved racialized communities,<sup>36,38-40,48</sup> and three involved refugee and/or immigrant populations.<sup>42-44</sup> Two of the interventions involved Aboriginal communities.<sup>46,47</sup> Two of the interventions focused on people with disabilities.<sup>41,49</sup>

### ***Intervention Settings***

The majority of the interventions were implemented at the local community level, and in school, or workplace settings. Six interventions occurred within school settings.<sup>34,36,39,43,44,47</sup> One intervention was implemented within a workplace.<sup>42</sup> Six interventions were community-based.<sup>35,38,40,45,46,48</sup> Three of these community-based interventions occurred within urban settings,<sup>38,40,48</sup> and two occurred in remote and/or rural settings<sup>35,46</sup> and one<sup>45</sup> did not specify if it was a rural or urban setting. Three interventions occurred at the regional, district or state level.<sup>37,41,49</sup>

### ***How the Social Determinants of Health Are Addressed***

In this section, the findings of the primary studies are presented on the basis of how they intervened on the social determinants of health (i.e., upstream, midstream, or downstream interventions).

## **Upstream Interventions**

Two studies examined upstream interventions, one focusing on improving housing conditions<sup>46</sup> and the other on employment.<sup>49</sup>

### ***Housing***

An evaluation of an Australian indigenous housing program assessed the impact of a building program on housing conditions for young children.<sup>46</sup> More specifically, the study examined the impact of the construction of housing for remote communities using standards set by the Environmental Health Program of the Australian Government's National Aboriginal Health Strategy. This intervention was based on national legislation and sought to redistribute wealth by improving housing conditions. The intervention involved numerous partners, such as Aboriginal communities, regional government departments (including public health), academic partners and research partners. This year-long pre/post study measured the change in housing conditions for a cohort of 418 children living in 208 houses. The study used multiple tools, which measured overcrowding (number of people per bedroom sleeping in the house), housing infrastructure (Failed Healthy Living Practice Score and Surveyor Function Score), and hygiene (Surveyor Condition Score). The mean number of people per bedroom sleeping in the house changed from 3.4, confidence interval (CI) [3.1, 3.6] before the intervention to 3.2, CI [2.9, 3.4] at follow-up (average of 10 months) ( $p = .102$ ). The mean Failed Healthy Living Practice score dropped from 5.6, CI [5.3, 6.0] to 4.4, CI [4.1, 4.8] ( $p < .0001$ ), where a score of 7 means that 7 of the 8 infrastructure components scored by this method were scored as "failed" and a score of 0 means there were no failed infrastructure components. The mean Surveyor Function Score increased from 3.8, CI [3.5, 4.0] at baseline to 3.4, CI [3.1, 3.6] at follow-up ( $p = .047$ ). The hygienic conditions of homes (based on the Surveyor Condition Score) were similar at baseline and follow-up (overall mean 4.1, CI [3.9, 4.4];  $p = .605$ ).

### ***Employment***

Metzel et al.<sup>49</sup> qualitatively examined the development and implementation of six interagency agreements between vocational rehabilitation and mental health organizations to support employment for people living with disabilities in six states in the US. The intervention aimed to alter the social and economic structure of employment for people with disabilities. Using document review and interviews (n = 20), the authors sought to better understand the context for the development of interagency agreements and the elements that contribute to effective implementation resulting in increased numbers of people being supported in employment. Five of the six states reported an increase in supported employment for people with disabilities. Estimates from the various programs indicated a 25% yearly increase in employment from 1994 to 1999. More specifically, in 1997 there was an increase of 30%, with 200–300 young people benefiting from vocational assessment and employment opportunities, and between 1995 and 1996 there was an increase of 14%. Representatives from three of the states described an increase in coordination and cooperation (e.g., alteration of processes, systems change, coordination of budgets).

### **Midstream Interventions**

Eight studies reported on midstream interventions that addressed a range of social determinants of health: employment and working conditions,<sup>41,42</sup> early childhood development,<sup>45</sup> housing,<sup>37</sup> physical and social environments,<sup>34,36,40,48</sup> and food security.<sup>36</sup>

#### ***Employment and Working Conditions***

Two studies addressed employment and working conditions.<sup>41,42</sup>

Sherring et al.<sup>41</sup> conducted a longitudinal cohort study to assess the impact of a supported employment intervention providing competitive employment for people with mental illness in Australia (n = 43). The program created formal links between a community mental health team and three employment services. Occupational therapists and an employment specialist assessed the vocational needs of participants and provided assistance in accessing employment services and clinical support for those in the program. This intervention aimed to improve working conditions at the community level. Employment was deemed to have been achieved if it was maintained for a minimum of 4 weeks, unless the position was specifically a short-term contract. Overall, 76.7% (n = 33) of the participants obtained competitive employment at some point during the study, and after 24 months, 46.5% (n = 20) were still employed. The mean duration of employment was 24.7 weeks [standard deviation (SD) = 27.1, range 2.5–99.6], participants averaged 24.7 hours of work per week (SD = 12.8, range 3–40), and they earned AU\$17.5/hour (SD = 4.9, range 7.6–30.4). Minimum wage was AU\$13.74/hour at the time. Sherring et al. reported that employment outcomes were not significantly related to gender, age, or level of education (data not provided in the study).<sup>41</sup>

Pechter et al.<sup>42</sup> described how the Massachusetts Coalition for Occupational Safety and Health worked with a union of predominantly low-income, Spanish-speaking immigrant workers to assess workplace symptoms, hazards and equipment and to improve working conditions by reducing exposure to hazards. Using the results of an assessment survey (n = 49; 35% of potential respondents), the union and the coalition advocated for a change in organizational policies in one workplace. Upon invitation from the coalition, the Occupation Health Surveillance Program of the Massachusetts Department of Public Health translated the surveillance data into practical recommendations for workplace safety. Five priority changes to the work environment were made: (a) limitation on the total number of cleaning products used, (b) stipulation that cleaning products should not be mixed but could be diluted, (c) stipulation that no changes could be made in products without notice to the workers, (d) preparation of a demonstration shelf (wired in place) with the correct products so that any product in use could be compared and verified, and (e) standardization of operations for worker protection so that health and safety training focused on implementing clear work practices.

### ***Early Childhood Development: Literacy***

Peifer and Perez<sup>45</sup> sought to identify the impact of four coordinated, community-based early childhood literacy initiatives on parental behaviour among primarily low-income women in the US. Sectors involved in the initiatives were public health agencies, libraries, primary health care providers, community organizations, and child care centres. Interventions included prenatal home visits by public health nurses and community health workers during which families received card books, as well as book distribution projects (as part of home visitation and through a pediatric clinic) and early literacy programs funded through California's FIRST 5 Commission (funded by tobacco tax revenue). All programs incorporated the following components: distributing high-quality, culturally appropriate books for infants; modelling reading behaviour with the parents; educating caregivers about the importance of a regular reading routine at home; promoting the use of public library services and literacy programs; and informing parents about the important role they play in their children's school readiness. The primary outcome measures for this study were the frequency in of parents having shown books to their children, read to their child, interacted and played with their child, and drew pictures with their child in the past week. Additional outcome variables included whether the parents took their child to the library, attended an event at the library, or participated in the Raising a Reader program. Two samples were compared: 2001 (n = 300) and 2003 (n = 216). The comparison between the two time periods showed an increase in all early literacy behaviours (p values not provided). There was a 77% increase in the ratio of parents reporting that they showed books to their infants on a daily basis (53.67% in 2001, 69.44% in 2003). There was a 61.44% increase in the ratio of parents reading books aloud to their children on a daily basis (33% in 2001, 53.70% in 2003). The percentage of mothers who reported engaging in the Raising a Reader program was 4.3% in 2001 and 16.7% in 2003.

### ***Housing***

The Healthy Housing Programme, a joint initiative of the government-funded housing corporation and county health boards, aimed to improve housing conditions in NZ.<sup>37</sup> Using an interrupted time series design, the study involved 9,736 residents in 3,410 households with a median of 2.3 years post-intervention data. The intervention focused on improving living conditions and influencing health behaviours by reducing exposure to hazards. The intervention included educating families about health risks; making referrals to local health providers; making houses dryer and warmer by installing insulation; modifying houses to address health and disability needs; and transferring families to other houses to address overcrowding or, in some instances, increasing the number of bedrooms in the house. All participating households received health and social service interventions; 97% had insulation, heating, or ventilation modifications; and 13% received interventions to reduce overcrowding (transfers or building extensions). Post-intervention hospital admissions for children up to 4 years old declined by 11% (hazard ratio [HR] = 0.89, CI [0.79, 0.99]); admissions among those 5–34 years old declined by 23% (HR = 0.77, CI [0.70, 0.85]); and there was no observed change in admissions among adults aged 35 years or older (HR = 1.04, CI [0.95, 1.15]). After the intervention, housing-related avoidable hospital admissions were 12% less for children up to 4 years old (HR = 0.88, CI [0.74, 1.05]), were reduced by 27% for those 5–34 years old (HR = 0.73, CI [0.58, 0.91]), and increased by 31% for those 35 years of age or older (HR = 1.31, CI [1.09, 1.56]).

### ***Social and Physical Environments***

Using a pre/post cohort study design, Cheadle et al.<sup>40</sup> evaluated Steps to Health King County, a multi-project initiative conducted in an area of King County in Washington State in the US with a population of 352,836, of whom 14.4% were African American, 8.9% Hispanic or Latino, and 3.9% Vietnamese. More than 30% of residents lived below 200% of the Federal Poverty Line. The collaborative included 75 representatives from public health agencies, community-based organizations, hospitals, health plans, clinics, local government agencies, universities, government agencies, and school districts. The study reported outcomes from eight projects, which consisted of both midstream and downstream interventions (the downstream interventions are described in the next section). Projects received funding for midstream interventions for service integration and systems and policy change at the organizational, legislative, and regulatory levels. Although a few organizations engaged in policy and integration at the program level, most did not (numbers not specified). Program key informants noted that staff members were too busy managing day-to-day operations and that policy issues seemed too remote from their core mission of serving clients. Cross-program integration was described as modest and unsustainable. Twenty-five organizational changes in schools and the community were attributed in full or in part to the efforts of the collaborative. The collaborative also engaged in 20 advocacy campaigns on local, state, and national issues, with mixed success.

Freeman et al.<sup>34</sup> assessed the effectiveness of a school-based break-time snacking initiative on the oral health of children attending schools in areas with low socio-economic status (SES) in Northern Ireland. This intervention was intended to change health behaviours and improve health outcomes by altering the school environment. School representatives, public health professionals (health promoters and



dietitians), academics, and dairy farmers developed a break-time policy called Boost Better Breaks, which addressed unhealthy break-time snacks and drinks at the intervention schools. The study matched intervention and control schools by location, coeducation, and SES. The sample consisted of three hundred and sixty-four 9-year-olds, 189 in the intervention schools and 175 in the control schools. The outcome of interest, childhood dental disease, was determined in terms of the percentage of children who were free of tooth decay and fillings and had no evidence of extracted teeth due to decay (i.e., caries-free), based on the clinical index known as DMFT (total number of decayed, missing due to caries, and filled teeth). At the end of the study, the intervention group (low SES) had a mean DMFT score of 1.58, CI [1.28, 1.89]), whereas the control group (high SES) had a mean DMFT score of 0.065, CI [0.38, 0.93]. In addition, the DMFT in the intervention group (n = 99) changed from 1.13, CI [0.85, 1.40] in year 1 to 1.58, CI [1.28, 1.89] in year 2. There was also an increase in the number of filled permanent teeth among students from lower SES schools over time: mean 0.49, CI [0.20, 0.77] in year 1 and 1.05, CI [0.69, 1.14] in year 2.

Collie-Akers and colleagues<sup>48</sup> evaluated the impact of the Kansas City - Chronic Disease Coalition in the US, the goal of which was to reduce the risk of cardiovascular diseases and diabetes among African Americans and Hispanics. The study used a case study design to document changes in the community attributable to the work of the coalition. The coalition was led by the Missouri Primary Care Association and also included five health centres, the United Auto Workers Ford Community Health Care Initiative, neighbourhood organizations, and the local health department. Activities included supporting members through education and information, employing community mobilizers and subcontractors to help partners and the coalition make plans and implement changes, and documenting the coalition's accomplishments. The coalition established clear vision and mission statements and a framework for action. An action plan was developed that allowed prospective partner organizations to see their role in the work of the coalition. The coalition also promoted the sharing of resources among partners. Of 729 events or activities facilitated by the Coalition, 321 instances of community change (new programs, policies, or practices) were reported. Of these, 75% were designed to reduce residents' risk of both cardiovascular disease and diabetes, 13% to reduce the risk of diabetes, 6% to reduce the risk of cardiovascular disease, and 5% to address health care access or disparities. Providing information and enhancing skills constituted the most frequent strategy used (by 38% of the activities), followed by modifying access, barriers, and opportunities (27%); changing the consequences (14%); enhancing services and support (10%); and modifying policy (9%). Although no health outcomes were reported, given the early nature of the coalition's activities at the time of publication, the authors noted that tracking community changes over time will help to link these changes to population health changes over the long term.

### ***Social and Physical Environments and Food Security***

Hollar et al.<sup>36</sup> conducted a controlled clinical trial of an elementary school-based obesity prevention program in Florida. Study partners included academia, the educational sector (school administration and cafeteria), district food services, district wellness committee members, the US Department of Agriculture Food and Nutrition Service, and a magazine. The study involved a sample of 3,769 students (50.2% Hispanic, 33.4% white, 8.0% Black, and 8.4% other), 3,032 students in four intervention schools

and 737 in one control school, with an average age of 8 years (range 4 to 13). The intervention consisted of (a) modification of dietary offerings to include nutritious ingredients and whole foods in school-provided meals, (b) nutrition and lifestyle educational curricula, (c) a physical activity component, and (d) wellness projects. Data were reported at two points in time; the longest follow-up is reported here. In year 2, mean body mass index (BMI) declined by 1.73 (SD = 13.6) in the intervention schools and by 0.47 (SD = 12.1) in the control school ( $p = .007$ ). Girls in the control group had an increase in mean systolic blood pressure, from 98.37 to 101.44 mm Hg ( $p < .001$ ), and boys in both groups had an increase in systolic blood pressure (100.83 to 101.94 mm Hg in the intervention group and 99.28 to 101.93 mm Hg in the control group) ( $p < .0001$ ). Diastolic blood pressure increased in both boys and girls in the intervention and control groups ( $p < .0001$ ). A sub-sample of low-income students

( $n = 1,197$ ; 68 % Hispanic, 15% white, 9% Black, and 8% other) received free or reduced-cost school lunches. In this sub-sample, children in the intervention schools were more likely to reduce their BMI ( $p = .0013$ ) and their weight ( $p < .011$ ) than children in the control school over the 2-year intervention period. Math scores of students in the intervention group improved ( $p < .0005$ ), and Hispanic and white children in intervention schools were more likely to have higher math scores ( $p < .001$ ) than their counterparts in the control school. There was no observed change in math scores among Black students. Children in the intervention schools had higher reading scores than those in the control school in both years of the intervention ( $p < .08$ ).

## Downstream Interventions

All seven downstream interventions focused on access to health services or care.<sup>35,38-40,43,44,47</sup>

### *Case Coordination*

The downstream interventions evaluated by Cheadle et al.<sup>40</sup> included case coordination and case management, multi-session physical activity programs and health education for youth, training and education sessions for child care providers and community members, and bicycle safety promotion. Of case-managed patients, 45% established care with a primary care provider; in addition, there were 40% fewer emergency department visits among patients in the case management program after they were connected to a primary care provider, compared to the average for three comparison groups (0.79 vs. 1.31 visits/year,  $p < .05$ ), and the proportion of patients with poor diabetic control (hemoglobin A1c > 9) decreased from 78% before entering case management to 48% after ( $p < .05$ ).

### *School Readiness*

A school readiness program, Before School Check, aimed to identify and address health, behavioural, social, or developmental concerns that might impact school performance and readiness in Hawke's Bay, a largely rural community on the east coast of NZ. Wills et al.<sup>35</sup> measured the rate of referrals following training of pediatricians, nurses, public health staff, and academics to conduct the Before School Check and referrals for 4-year-old children. The preschool population of Hawke's Bay is more deprived than that of NZ as a whole, with 56% of babies born in 2006 being in NZ Deprivation Index deciles 8-10,

compared to the national average of 39%. A range of tools were used to assess school readiness and to refer children to services as required. A total of 1,848 checks (84% of the cohort) were completed over a 10-month period, and the program maintained a 50% referral rate. Screening rates by income quintiles 1 to 5 (high to low) were Q1, 110%; Q 2 and Q3, 90% each; Q4, 80%, and Q5, 75% (no statistical analysis provided). The authors noted difficulties in recruiting children from low-income families, compared to children from higher SES families.

### ***Mental Health***

One study described the establishment of a school-based mental health service for refugee children in the UK.<sup>43</sup> Using a pre/post survey design, Fazel et al. assessed the impact of the service on students' mental health using a 25-item Strengths and Difficulties Questionnaire (SDQ). The core activity of the service was a weekly consultation at each school with the key mental health worker and the link teacher. This teacher was usually a language support or special needs teacher who typically had good existing knowledge of the refugee children. The link teacher liaised with other teachers and generally acted as a conduit between the school and the mental health service. The intervention group (n = 47) was made up of refugee students. Students in each of the control groups (ethnic, n = 47; white, n = 47) received no intervention. There were overall differences between the three groups (with refugee children scoring higher, but no significant difference between the two control groups) in SDQ total score (F [2, 138] = 6.6, p = .002) and in the scales for emotional symptoms (F [2, 138] = 11.5, p < .001) and peer problems (F [2, 138] = 4.2, p = .017). Over the study period (pre- vs. post-treatment), the total SDQ score in all groups decreased (F [1, 138] = 5.9, p = .016), with the greatest changes evident in the peer problems scale (F [1, 138] = 8.1, p = .005) and the hyperactivity scale (F [1, 138] = 3.9, p = .05). Hyperactivity scores decreased more in the refugee group than in the control groups (mean change -0.96 [SD = 2.40] vs. -0.10 [SD = 1.98]; t = 2.12, p = .037), with a suggestion of an effect in the emotional symptoms score (mean change -0.72 [SD = 2.63] vs. 0.03 [SD = 2.02]; t = 1.73, p = .088). At the end of the 1-year study period, refugee children continued to have significantly higher SDQ total scores (F [2, 138] = 4.7, p = .011), emotional symptom scores (F [2, 138] = 8.6, p < .001), and peer problem scores (F [2, 138] = 6.3, p = .002) than those in the control groups.<sup>43</sup>

### ***Oral Health***

Two studies focused on the provision of dental or oral health services.<sup>44,47</sup>

A study of a school-based oral health program examined the impact of providing dental services to refugee students in the US.<sup>44</sup> As part of the intervention, a dental hygienist examined health records at school, conducted a visual dental screen, and arranged for students to see a community dentist. Transportation and translation were provided as needed. Melvin assessed the provision of preventive, restorative, and emergency care over 2 years of the program. In year 1, the program served 1,144 students and in year 2 it served 353 children. The percentage of children receiving preventive care increased from 52% in year 1 to 60% in year 2. In year 2, 212 children (60%) received preventive care, and 39 children (11%) received restorative care. The number of children receiving restorative care decreased by 11% in year 2 (no p values provided).<sup>44</sup>

Macnab et al.<sup>47</sup> conducted a cross-sectional study of a school-based dental health program in a rural, remote Aboriginal community in Canada (population 300). All children attending the community school (n = 26 at baseline and n = 40 at follow-up) participated in an oral health program that consisted of daily school-based brush-ins after lunch supervised by teachers and/or the community health director; a weekly fluoride rinse; fluoride varnish application for those under 9 years of age; and classroom presentations by pediatric residents about a variety of health topics, including oral health. At the start of the program, the mean DMFT score was 5.5 (SD = 6.2) and at 3-year follow-up the mean score was 6.1 (SD = 8.5) (p < .05). Children assessed both before and after the intervention, (n = 13) had improvements in dmfs/DMFS (total number of decayed, missing due to caries, and filled surfaces : primary/permanent) (p < .005) and dmft/DMFT (p < .05) scores.

### ***Immunization***

Findley et al.<sup>38</sup> assessed the impact of Start Right, a community-based immunization promotion program of outreach and tracking for children under 5 years of age in Northern Manhattan, in New York City in the US. The Start Right coalition, aiming to increase immunization rates, comprised 23 organizations, including an academic institution (program leads), Women, Infants, and Children programs, primary care networks, housing advocacy organizations, community social service organizations, and faith-based organizations. The intervention integrated immunization promotion into ongoing programs. Specific activities included one-on-one contact, intensive reminders, follow-up, and group education sessions. Intervention participants were children 19 to 35 months of age as of April 16, 2004 (n = 1,502), and rates were compared with the National Immunization Survey of 2003. Over a 2-year period, immunization rates improved, and there was no significant difference in immunization rates between Start Right participants (80.5%) and the national population (79.4%) (t = 0.87). The immunization rate among African Americans in the study (n = 281) was 78.4% (SD = 4.7), compared to the US immunization rate for African Americans of 73.3% (SD = 3.3) (t = 2.90). Among Latino participants (n = 1,122), the immunization rate was 83.7% (SD = 4.9), compared to the national rate (77.0% [SD = 2.1], t = 2.32) and the local rate (73.7% [SD = 9.5 %], t = 3.75) for Latino populations. Latino children were more likely to be up-to date than were African American children (OR = 9.81, [CI=1.1, 2.1]). The overall immunization rate among Start Right participants increased from 46% in 2003 to 80.5% in 2004.

### ***Asthma Management***

A controlled clinical trial measured the impact of a school-based asthma intervention for low- income ethnic minority families in New York City.<sup>39</sup> Schools were randomly assigned in pairs to either the intervention or control groups; control schools received the intervention after the evaluation. School nurses and physicians worked with families and primary care providers to encourage the development of asthma management plans. Nurses (a) called families to confirm case-detection information, to further assess children's asthma severity and health care needs, and to provide caregivers with asthma education as needed; (b) sent sample treatment plans to primary care providers on the basis of students' asthma severity, consistent with National Heart, Lung and Blood Institute guidelines, and blank treatment plans; (c) encouraged caregivers and primary care providers to complete required forms when medication was needed at school; and (d) referred families for medical care as needed. At 2 years post-intervention, control students had had fewer admissions to hospital in the previous 12 months (control 0.1 [SD = 0.3] vs. intervention 0.2 [SD = 0.6], p < .05).<sup>39</sup>

### ***Relationships and Roles***

Intersectoral action can be thought of as both a strategy and a process to promote shared goals in a range of areas, including policy, research, planning, practice, and funding. The interventions described in this review involved a number of different sectors, roles, and relationships. Although we attempted to categorize the nature of the relationships between sectors involved in an intervention, these relationships were not always clearly defined (see Table 2).

Public health organizations and staff played numerous roles in the interventions described above. The nature of public health roles and responsibilities in an intervention were not always clearly described. Given our inclusion criteria, all public health organizations involved in the interventions described in this review engaged in multi-sectoral collaboration. Numerous sectors played a variety of leading, supporting, and participating roles in policy analysis, development, and advocacy. For example, public health agencies and professionals played roles in providing technical information about health effects and preventive measures<sup>42</sup> and in the development and implementation of policy,<sup>34</sup> as well as in initial meetings with program leads to identify appropriate interventions.<sup>47</sup> Further, all interventions that improved access to care were intended to modify and reorient existing services to reach priority populations.<sup>35,38-40,43,44,47</sup> The role of public health in each intervention is presented in Table 2.

### ***Tools, Mechanisms, and Strategies for Initiation and Implementation***

The initiation and implementation of the intersectoral interventions were supported by a number of tools, mechanisms, and strategies (see Table 2), but these supporting elements were not always described in the included studies. Where they were described, the tools, mechanisms, and strategies tended to not be exclusive to intersectoral activities but could be generally applicable to population health activities.

One qualitative study explicitly described and evaluated written agreements as a tool for initiation and implementation of interagency partnerships. The characteristics of written agreements that led to increased employment among people with disabilities (the outcome measure) included identification of a specific population, clear roles and responsibilities for partners, resource commitment, and the expected outcome of more people using supported employment. The implementation of agreements was supported by champions, working relationships, and communication between partners.<sup>49</sup>

Meetings with partners, community members, and stakeholders were described as mechanisms for the initiation of intersectoral activities.<sup>40,47</sup> Two studies described how intersectoral interventions were initiated or guided by the results of studies illustrating health disparities.<sup>38,48</sup> In one instance, a champion was clearly the initiator, or catalyst, of the intersectoral program.<sup>44</sup> Legislation and policy that directed intersectoral activities were described as the initial drivers of two of the interventions.<sup>46,49</sup>

A number of studies described the creation of multi-sectoral partnership committees for the initiation and implementation of intersectoral interventions.<sup>34,35,38,44,48</sup> Committees or coalitions generally played an advisory role in the overall strategies and activities of the intersectoral initiatives. Some studies also specifically described the creation of teams for the implementation and coordination of

activities.<sup>34,37,39-41,43</sup> Three interventions involved specific staff who were hired to carry out assigned roles.<sup>40,41,48</sup> Committees, teams, and other similar entities usually served as a forum for formal communication. Formal communication processes (e.g., monthly meetings and regular appointments) were described in one study as important for the initiation and implementation of intersectoral activities.<sup>41</sup> Clear definition of the roles and responsibilities of partner organizations was described as beneficial in three of the studies.<sup>40,41,49</sup>

Building intersectoral initiatives and partnerships into existing programs was described as a strategy for both the initiation and implementation of intersectoral initiatives.<sup>35,38,40,45</sup> Additionally, two initiatives described more widely implementing previously piloted initiatives,<sup>35,38</sup> and another described purposefully funding pilot initiatives.<sup>40</sup> Two studies described the use of logic models and planning tools for initiation and implementation of programs and evaluation of activities.<sup>40,48</sup>

Partnerships with academia and research sectors supported the evaluation of intersectoral interventions.<sup>34,40,48,50</sup> Funding sources for the initiation, implementation, and evaluation of activities were described in numerous cases.<sup>40,41,44,45,48,49</sup> Only two of the included studies<sup>40,44</sup> indicated intervention costs.

## DISCUSSION

Many of the primary studies included in this review had several limitations that compromised their methodological quality and that should be addressed in future work. First, most studies did not have adequate sample sizes or a sample size calculation, so it is difficult to know if the lack of between-group differences was a product of the intervention not being effective or of insufficient power because of low sample size. Second, blinding of outcome assessors was rarely addressed. Furthermore, a number of studies had the potential for high selection bias.

The follow-up time was typically short, and only one study had follow-up extending to 10 years. As a result of these limitations, only one primary study met the criteria for being methodologically strong.<sup>34</sup> This is perhaps not surprising, given the challenges in documenting evidence for complex relational processes such as intersectoral action.<sup>50</sup> We included in our review studies of all methodological quality, as the studies we identified provide the best available evidence on the impact of intersectoral action on the social determinants of health and health equity.

The included systematic review indicated that the impacts of intersectoral action on health equity are mixed and limited. Smith and colleagues,<sup>33</sup> found that the design of partnership interventions and of the studies evaluating them meant it was difficult to assess the extent to which identifiable successes and failures were attributable to the partnerships.

Only two out of the 16 included primary studies addressed upstream determinants of health, eight addressed midstream determinants, and seven addressed downstream determinants. Upstream or structural interventions are likely to have the greatest impact in terms of reducing health inequities because they change the underlying conditions in which people live, work, and play.<sup>51,52</sup> Both of the studies dealing with upstream interventions focused on specific segments of the population who

were experiencing health inequities. These interventions had mixed effects, ranging from moderate to none, on the social determinants of health. More specifically, provision of housing for disadvantaged populations had a moderate impact in terms of improved housing infrastructure and no demonstrated effect on overcrowding and hygienic conditions.<sup>46</sup> Qualitative data suggested that identification of a specific population, definition of clear roles and responsibilities for partners, commitment of resources, and setting of expectations for improvement in outcomes were characteristics of successful partnerships to improve employment.<sup>49</sup>

The eight midstream interventions painted a mixed picture of the impact of intersectoral action on the social determinants of health to improve health equity. Follow-up in all of these studies was 2 years or less. These interventions focused on employment and working conditions, early childhood development, and healthier social and physical environments.

Two of the midstream interventions had a positive impact on employment and working conditions.<sup>42,54</sup> Supported employment, which integrates mental health support and employment services, yielded positive outcomes for people with mental illness. Dedicated staff focused solely on employment, the identification of shared principles, and a formal communication process between sectors were core components of the intervention.<sup>41</sup> When coupled with policy advocacy, intersectoral partnerships between unions, non-governmental organizations, and public health agencies can help to improve physical conditions at work by giving voice to workers and providing access to public health expertise to support evidence-informed organizational policy change.<sup>42</sup>

Intervening in the early years of life had a positive effect for children. Early interventions were also effective in promoting early literacy among the children of low-income women.<sup>45</sup>

When offered in conjunction with health and social service support, housing improved population health outcomes for marginalized populations under the age of 35.<sup>37</sup>

Intersectoral partnerships can support the creation of healthy policies that alter social and physical environments.<sup>36,40,44,48</sup> Such policies are beneficial for low-income and racialized populations. Supportive environments that promote access to healthy foods for low-income students had a positive effect on oral health.<sup>44</sup>

School-based obesity prevention, which included the provision of lunch at reduced or no cost, had a positive effect on weight reduction for low-income children across all ethnicities; however, the impact on academic performance was mixed, with improvement in math scores observed for Hispanic and white children only.<sup>36</sup>

Downstream interventions, which focus on access to services, are generally moderately effective in increasing the availability and use of services by marginalized communities. In the studies reviewed here, such targeted interventions increased access to care, reduced the number of emergency visits, improved the management of existing conditions (such as asthma and diabetes), improved immunization rates, and improved mental health. For these interventions, the public health sector was involved in

various capacities, including service delivery, provision of training and education for other sectors, and participation on project committees. The primary health care sector was often involved in the initiation and/or delivery of services. Other sectors, such as education, academics, and non-governmental organizations, were also actively involved.

To determine if an intervention has an effect on the health of the target population and on health equity, a number of measures are required. Impact is measured by whether the intervention has a positive, null, or negative effect on health, the social determinants of health, and health equity. The size of the observed effect indicates whether the observed outcomes are due to the intervention. The majority of quantitative studies included in this review had small sample sizes and short follow-up periods. The included studies showed mixed impacts on population health outcomes and the social determinants of health, and any positive impacts were usually moderate. As such, confidence in the impact of most interventions is low.

The ultimate goal of intersectoral action for the social determinants of health is to improve health equity.<sup>50</sup> All of the included studies focused their interventions on populations experiencing social and/or economic disadvantage. Few of these studies specifically described assessing and comparing the impacts of interventions in marginalized groups with the impacts of such interventions in other groups within the population. The majority of studies did not specifically analyze the health equity implications of the interventions in terms of multiple factors of disadvantage. It is possible that some initiatives would improve the health of marginalized populations without changing the gap between marginalized and privileged groups. While the interventions reviewed here focused on marginalized communities, the majority were downstream and midstream interventions. For example, none of the included studies that focused on racialized communities addressed the issue of institutionalized racism. Previous work has noted the challenge of addressing upstream determinants of health.<sup>53</sup>

To understand the impact of intersectoral initiatives on various populations, the equity analysis in interventions should be strengthened.<sup>53</sup> Such analysis includes incorporating approaches that assess the change in health for the targeted group and reference to how any observed improvement affects the divide between the marginalized group and more privileged groups. One approach to narrowing the health divide considers the gap between those who are worst off in society and those who are best off and strives to reduce the disparity in health status between these extremes of the social scale. Additionally, interventions can focus on reducing social inequities throughout the whole population and creating better opportunities for health across the socio-economic continuum.<sup>12</sup>

The majority of included studies evaluated setting-specific (e.g., schools and workplaces), local, and district-level interventions. Few studies examined regional-level interventions, and none explored large-scale policy interventions. This may be the result of limited funding for the evaluation for complex and large-scale interventions.



Given that the relationships between sectors and how these relationships contributed to outcomes was not clearly articulated in the description of interventions, it is difficult to attribute the effectiveness of initiatives or lack thereof to intersectoral action. Successes and failures of the programs and policies may have been the result not of partnership, but of other contextual factors. The included studies generally provided few details about the process, context, successes, and challenges of the intersectoral interventions and how these were related to the observed outcomes. The role of public health was not always clearly articulated and is likely to vary based on the context and issue. For most interventions, it is unclear whether the same outcome would have been observed if only one sector had been responsible for development and implementation. A few studies noted the importance of some tools, mechanisms, and strategies supporting intersectoral activities and interventions; however, limited or no empirical evidence was provided to support these assertions.

Context-specific, complex, and process-oriented approaches such as intersectoral action require similarly appropriate mechanisms for assessing impact.<sup>50,54</sup> The complexity of evaluating the impact of intersectoral action on the social determinants of health to improve health equity calls for more rigorous approaches to evaluate intersectoral action along a continuum, taking into account intersectoral processes, tools and strategies used to support such processes, and the implementation and health equity impacts of interventions. Long-term, large, controlled quantitative studies, as well as mixed-methods studies (which would take into account contextual factors) and well-designed qualitative studies involving the intended beneficiaries, are required to better understand the impact of intersectoral action on health equity.

## LIMITATIONS

As stated in Methods, this expedited review had several limitations related to the primary studies and the review methodology. In particular, many of the primary studies had the potential for selection bias. Blinding was not often used in the studies, which may reflect the type of interventions being investigated. The methodological quality of the included primary studies limits the ability to draw concrete conclusions.

The sectors involved in an intervention were not always explicitly described in the published studies considered for inclusion. Studies were included only if an intersectoral relationship was explicitly mentioned. Therefore, potentially relevant studies, including studies of interventions by the public health sector in partnership with other sectors, may have been missed or excluded where such descriptions were not explicit.

Identifying the involvement of public health organizations and/or professionals was sometimes difficult. There are many models of public health organization in Canada and internationally. For example, a public health organization may be a stand-alone unit or may be included within a broader health sector organization.

Another limitation was the available time frame for completing this review. A full systematic review may require between 12 and 24 months to complete, whereas this expedited review was completed in less than 3 months. The shortened time frame meant that the time available to retrieve articles was reduced. Further, the limited time period prevented hand-searching relevant journals. Again, potentially relevant studies may have been missed.

For all of the retrieved articles, the methodological rigour used to assess relevance and quality was high. Relevance testing and quality assessment for all articles was conducted by two reviewers. Data extraction was conducted by one reviewer and checked by another. A meta-analysis was not considered because of the methodological quality and heterogeneity of the included studies. This type of analysis could be considered for a future systematic review on this topic. The results of this expedited review should be considered as interim guidance until a full systematic review is conducted.

## CONCLUSIONS

The purpose of this expedited review was to examine the state of the published evidence regarding the impact of intersectoral action as a public health practice on health equity through action on the social determinants of health. The body of literature on intersectoral action as a promising practice is mixed, revealing moderate to no effect on the social determinants of health. The evidence on the impact of intersectoral action on health equity is even more limited. We found that much of the available literature is descriptive and that programs are not rigorously evaluated. Furthermore, there is a major gap in the literature, with mechanisms linking intersectoral processes to observed outcomes being mostly absent.

The strongest effects were observed with more downstream interventions for population health outcomes such as intersectoral collaborations to improve immunization rates and oral health among vulnerable populations. Midstream intersectoral interventions have shown moderate to no impact on the social determinants of health and health equity. The association between upstream interventions and health outcomes is less conclusive. This is likely because the impact of upstream interventions on health equity and social determinants of health is more difficult to measure, assess, and evaluate.

Overall, the literature is mixed regarding the magnitude and long-term impact of intersectoral action on the social determinants of health and health equity.

The majority of outcome evaluations described within this review were not methodologically strong, a limitation that should temper any conclusions drawn from the review.

## IMPLICATIONS

### For Practice and Policy

- Collaborations between public health and other sectors show promise in creating supportive environments, as well as in enhancing access to services for marginalized populations. There is a need for more multi-level interventions that address structural determinants of health across the whole population.
- Existing policies support the initiation and implementation of intersectoral initiatives. There is a need to further integrate policy advocacy into the core functions of intersectoral initiatives and to adequately understand the relationships between sectors and the contribution of the public health sector to this work.
- On their own, intersectoral initiatives that focus on downstream determinants are unlikely to eliminate disparities. There is a need for multi-level intersectoral interventions that take universal, mixed, and targeted approaches to reducing health inequities.
- Intersectoral initiatives should include a comprehensive equity analysis to identify any populations that are positively or negatively affected and the contexts under which such effects occur. This is important to ensure that interventions do not increase population health inequities.
- Publishing findings from program and policy interventions contributes to the evidence base about intersectoral action for health equity. Adequate funding is required to ensure organizational capacity and systems to collect data for rigorous evaluation.
- Funding for initiatives was reported as an important mechanism supporting the initiation, implementation, and evaluation of initiatives.

### For Research

- Methodological issues such as selection bias, blinding, and sample size should be addressed in future studies on intersectoral action.
- Rigorous evaluation of intersectoral action is needed, particularly for upstream interventions. Evaluations of the health equity impacts of intersectoral action should include prospective and, where possible, controlled designs with sufficiently long follow-up to identify trends. Evaluations of program and policy interventions must include both empirical outcome measures and descriptions of intersectoral activities, roles, and responsibilities. Creating an interdisciplinary body of knowledge about how to evaluate intersectoral action, along with supporting tools, will help strengthen the evidence base for intersectoral action on health equity and the social determinants of health.
- Academic and practitioner partnerships are beneficial for evaluating interventions.
- Further research and exploration of funding mechanisms and the cost-effectiveness of intersectoral action are required.

## REFERENCES

1. Dicenso A, Ciliska D, and Gyuatt G. Introduction to evidence-based nursing. In: Dicenso A, Ciliska D, Guyatt G, editors, *Evidence-based nursing: A guide to clinical practice*. St. Louis, MO: Elsevier Mosby; 2005. Chapter 1, p. 3-19.
2. Public Health Agency of Canada. *Lessons learned from Canadian experiences with intersectoral action to address the social determinants of health*. Chomik Consulting & Research; 2007. Available at: [http://www.who.int/social\\_determinants/resources/isa\\_lessons\\_from\\_experience\\_can.pdf](http://www.who.int/social_determinants/resources/isa_lessons_from_experience_can.pdf)
3. Public Health Agency of Canada. *Canadian Reference Group on social determinants of health*. World Health Organization; 2011. Available at: [http://www.who.int/sdhconference/resources/BackgroundCanada\\_PHAC.pdf](http://www.who.int/sdhconference/resources/BackgroundCanada_PHAC.pdf).
4. Public Health Agency of Canada and World Health Organization. *Health equity through intersectoral action: an analysis of 18 country case studies*. 2008. HP5-67/2008E. Available at: <http://www.phac-aspc.gc.ca/publicat/2008/hetia18-esgai18/index-eng.php>.
5. Solar O and Irwin A. *A conceptual framework for action on the social determinants of health*. Geneva: World Health Organization; 2010. Available at: [http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH\\_eng.pdf](http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf).
6. Sudbury & District Health Unit. *10 promising practices to guide local public health practice to reduce social inequities in health: technical briefing*. Sudbury, ON; 2011. Available at: [http://www.sdhu.com/uploads/content/listings/Briefing\\_10PromisingPractices.pdf](http://www.sdhu.com/uploads/content/listings/Briefing_10PromisingPractices.pdf).
7. Sutcliffe P, Snelling S, and Laclé S. *Research-oriented decision-making to guide local public health practice to reduce social inequities in health*. Sudbury, ON: Sudbur & District Health Unit; 2009. Available at: [http://www.sdhu.com/uploads/content/listings/EXTRAProgressReport2SDHUJuly2009\\_External.pdf](http://www.sdhu.com/uploads/content/listings/EXTRAProgressReport2SDHUJuly2009_External.pdf).
8. Mikkonen J and Raphael D. *Social determinants of health: the Canadian facts*. Toronto, ON: York University School of Health Policy and Management; 2010. Available at: [http://www.thecanadianfacts.org/The\\_Canadian\\_Facts.pdf](http://www.thecanadianfacts.org/The_Canadian_Facts.pdf).
9. *What determines health?* 2011. Available at: <http://www.phac-aspc.gc.ca/ph-sp/determinants/index-eng.php#What>.
10. Federal Provincial and Territorial Advisory Committee on Population Health (ACPH). *Intersectoral action... towards population health*. Ottawa, ON: Health Canada Communications Directorate; 1999. Cat. No. H39-507/1999. Available at: <http://www.phac-aspc.gc.ca/ph-sp/pdf/inters-eng.pdf>.
11. World Health Organization. "Equity Team" definition. Health and Human Rights and Equity Working Group Draft Glossary Unpublished 2005. 2005. Unpublished Work
12. Whitehead M and Dahlgren G. *Concepts and Principles for tackling social inequities in health: levelling up part 1*. Geneva: World Health Organization; 2006. WHOLIS E89383. Available at: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/74737/E89383.pdf](http://www.euro.who.int/__data/assets/pdf_file/0010/74737/E89383.pdf).
13. *Population health intervention research casebook*. 2011. Available at: <http://www.cihr-irsc.gc.ca/e/43472.html>.
14. Public Health Agency of Canada. *Crossing sectors - experiences in intersectoral action, public policy and health*. 2007. HP5-45/2007E-PDF. Available at: [http://www.phac-aspc.gc.ca/publicat/2007/cro-sec/pdf/cro-sec\\_e.pdf](http://www.phac-aspc.gc.ca/publicat/2007/cro-sec/pdf/cro-sec_e.pdf).
15. World Health Organization and Canadian Public Health Association. *Intersectoral action for health: a cornerstone for health for all in the 21st century*. World Health Organization; 1997. WHO/PPE/PAC/97.6. Available at: <http://www.cpha.ca/uploads/progs/infra/intersectoral.pdf>.
16. Shankardass K, Solar O, Murphy K, Greaves L, and O'Campo P. *A scoping review of intersectoral action for health equity involving governments*. *Int J Public Health*. 2012;57(1):25-33.
17. Hayes SL, Mann MK, Morgan FM, Kitcher H, Kelly MJ, and Weightman AL. *Collaboration between local health and local government agencies for health improvement*. *Cochrane Database Syst Rev*. 2011;(6):CD007825.
18. Ganann R, Ciliska D, and Thomas H. *Expediting systematic reviews: methods and implications of rapid reviews*. *Implement Sci*. 2010;5:56.
19. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, Porter AC, Tugwell P, Moher D, and Bouter LM. *Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews*. *BMC Med Res Methodol*. 2007;7:10.

20. Shea BJ, Bouter LM, Peterson J, Boers M, Andersson N, Ortiz Z, Ramsay T, Bai A, Shukla VK, and Grimshaw JM. External validation of a measurement tool to assess systematic reviews [AMSTAR]. *PLoS One*. 2007;2(12):e1350.
21. Shea BJ, Hamel C, Wells GA, Bouter LM, Kristjansson E, Grimshaw J, Henry DA, and Boers M. AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *J Clin Epidemiol*. 2009;62(10):1013-20.
22. Thomas BH, Ciliska D, Dobbins M, and Micucci S. A process for systematically reviewing the literature: providing the research evidence for public health nursing interventions. *Worldviews Evid Based Nurs*. 2004;1(3):176-84.
23. Mulrow CD, Cook DJ, and Davidoff F. Systematic reviews: critical links in the great chain of evidence. *Ann Intern Med*. 1997;126(5):389-91.
24. Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ, and McQuay HJ. Assessing the quality of reports of randomized clinical trials: is blinding necessary? *Control Clin Trials*. 1996;17(1):1-12.
25. Deeks JJ, Higgins JP, and Altman DG. Analysing and presenting results. In: Higgins JP and Green S, editors. *Cochrane Handbook for Systematic Reviews of Interventions* 4.2.6. Chichester, UK: John Wiley & Sons, Ltd.; 2006.
26. Critical review form - qualitative Studies [Version 2.0]. 2007. Available at: [http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/qualreview\\_version2.0.pdf](http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/qualreview_version2.0.pdf).
27. Mkandawire T. Targeting and universalism in property reduction. Geneva, Switzerland: United Nations Research Institute for Social Development; 2005. Social Policy and Development Program Number 23. Available at: [http://www.unrisd.org/80256B3C005BCCF9/\(httpAuxPages\)/955FB8A594EEA0B0C12570FF00493EAA/\\$file/mkandatarget.pdf](http://www.unrisd.org/80256B3C005BCCF9/(httpAuxPages)/955FB8A594EEA0B0C12570FF00493EAA/$file/mkandatarget.pdf).
28. Skocpol T. Targeting within universalism: politically viable policies to combat poverty in the United States. In: Jencks C, Peterson PE, editors, *The Urban Underclass*. Washington, DC: Brookings Institution Press; 1991. p. 411-36.
29. Brownson RC, Seiler R, and Eyler AA. Measuring the impact of public health policy. *Prev Chronic Dis*. 2010;7(4):A77.
30. Torgersen TP, Giaever O, and Trygve Stigen O. Developing an intersectoral national strategy to reduce social inequalities in health - The Norwegian Case. Oslo; 2007. Available at: [http://www.who.int/social\\_determinants/resources/isa\\_national\\_strategy\\_nor.pdf](http://www.who.int/social_determinants/resources/isa_national_strategy_nor.pdf).
31. National Collaborating Centre for Determinants of Health. Integrating Social Determinants of Health and Health equity into Canadian public health practice: environmental scan 2010. Antigonish, NS: National Collaborating Centre for Determinants of Health, St. Francis Xavier University; 2011. Available at: <http://nccdh.ca/resources/entry/integrating-sdoh-health-equity-into-canadian-public-health-practice-scan>.
32. Seskar-Hencic S. Bringing health inequities from the fringes into the mainstream public health agenda. 2010. 7-15-2010.
33. Smith KE, Bamba C, Joyce KE, Perkins N, Hunter DJ, and Blenkinsopp EA. Partners in health? A systematic review of the impact of organizational partnerships on public health outcomes in England between 1997 and 2008. *J Public Health (Oxf)*. 2009;31(2):210-21.
34. Freeman R, Oliver M, Bunting G, Kirk J, and Saunderson W. Addressing children's oral health inequalities in Northern Ireland: a research-practice-community partnership initiative. *Public Health Rep*. 2001;116(6):617-25.
35. Wills R, Morris MK, Hedley C, Freer T, and Morris H. Improving school readiness with the Before School Check: early experience in Hawke's Bay. *N Z Med J*. 2010;123(1326):47-58.
36. Hollar D, Lombardo M, Lopez-Mitnik G, Hollar TL, Almon M, Agatston AS, and Messiah SE. Effective multi-level, multi-sector, school-based obesity prevention programming improves weight, blood pressure, and academic performance, especially among low-income, minority children. *J Health Care Poor Underserv*. 2010;21(2:Suppl):S93-108.
37. Jackson G, Thornley S, Woolston J, Papa D, Bernacchi A, and Moore T. Reduced acute hospitalisation with the healthy housing programme. *J Epidemiol Community Health*. 2011;65(7):588-93.
38. Findley SE, Irigoyen M, Sanchez M, Guzman L, Mejia M, Sajous M, Levine DA, Chen S, and Chimkin F. Community-based strategies to reduce childhood immunization disparities. *Health Promot Pract*. 2006;7(3):191S-200s.

39. Bruzzese JM, Evans D, Wiesemann S, Pinkett-Heller M, Levison MJ, Du Y, Fitzpatrick C, Kringsman G, Ramos-Bonoan C, Turner L, and Mellins RB. Using school staff to establish a preventive network of care to improve elementary school students' control of asthma. *J Sch Health*. 2006;76(6):307-12.
40. Cheadle A, Bourcier E, Krieger J, Beery W, Smyser M, Vinh DV, Lessler D, and Alfonsi L. The impact of a community-based chronic disease prevention initiative: evaluation findings from Steps to Health King County. *Health Educ Behav*. 2011;38(3):222-30.
41. Sherring J, Robson E, Morris A, Frost B, and Tirupati S. A working reality: evaluating enhanced intersectoral links in supported employment for people with psychiatric disabilities. *Aust Occup Ther J*. 2010;57(4):261-7.
42. Pechter E, Azaroff LS, Lopez I, and Goldstein-Gelb M. Reducing hazardous cleaning product use: a collaborative effort. *Public Health Rep*. 2009;124(Suppl 2):49-52.
43. Fazel M, Doll H, and Stein A. A school-based mental health intervention for refugee children: an exploratory study. *Clin Child Psychol Psychiatry*. 2009;14(2):297-309.
44. Melvin CS. A collaborative community-based oral care program for school-age children. *Clin Nurse Spec*. 2006;20(1):18-22.
45. Peifer K and Perez L. Effectiveness of a coordinated community effort to promote early literacy behaviors. *Matern Child Health J*. 2011;15(6):765-71.
46. Bailie R, McDonald E, Stevens M, Guthridge S, and Brewster D. Evaluation of an Australian indigenous housing programme: community level impact on crowding, infrastructure function and hygiene. *J Epidemiol Community Health*. 2011;65(5):432-7.
47. MacNab AJ, Rozmus J, Benton D, and Gagnon FA. 3-year results of a collaborative school-based oral health program in a remote First Nations community. *Rural Remote Health*. 2008;8(2):-7p.
48. Collie-Akers VL, Fawcett SB, Schultz JA, Carson V, Cyprus J, and Pierle JE. Analyzing a community-based coalition's efforts to reduce health disparities and the risk for chronic disease in Kansas City, Missouri. *Prev Chronic Dis*. 2007;4(3):A66.
49. Metzel DS, Foley SM, and Butterworth J. State-level interagency agreements for supported employment of people with disabilities. *Journal of Disability Policy Studies*. 2005;16(2):102-14.
50. CSDH. Closing the gap in a generation: health equity through action on the social determinants of health. Geneva: World Health Organization; 2008. Available at: [http://www.who.int/social\\_determinants/thecommission/finalreport/en/index.html](http://www.who.int/social_determinants/thecommission/finalreport/en/index.html).
51. World Health Organization. Intersectoral action to tackle the social determinants of health and the role of evaluation. Geneva: World Health Organization; 2010. Available at: [http://whqlibdoc.who.int/hq/2010/WHO\\_ETH\\_10.1\\_eng.pdf](http://whqlibdoc.who.int/hq/2010/WHO_ETH_10.1_eng.pdf).
52. Marmot M, Friel S, Bell R, Houweling TA, and Taylor S. Closing the gap in a generation: health equity through action on the social determinants of health. *Lancet*. 2008;372(9650):1661-9.
53. Bambra C, Gibson M, Sowden A, Wright K, Whitehead M, and Petticrew M. Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews. *J Epidemiol Community Health*. 2010;64(4):284-91.
54. Barten F, Mitlin D, Mulholland C, Hardoy A, and Stern R. Integrated approaches to address the social determinants of health for reducing health inequity. *J Urban Health*. 2007;84(3 Suppl):i164-i173.

## **TABLES, FIGURE AND APPENDICES**

### **TABLES**

TABLE 1: Quality Assessment Results

TABLE 2: Characteristics of Included Studies

### **FIGURE**

FIGURE 1: Search Results

### **APPENDICES**

APPENDIX 1: Search Strategy

APPENDIX 2: Grey Literature Search

APPENDIX 3: Project Advisory Group

APPENDIX 4: Quality Assessment Tool for Quantitative Studies

APPENDIX 5: Quality Assessment Tool for Qualitative Studies

## Table 1: Quality Assessment Results

*Systematic Review (Shea et al. 2007)<sup>19</sup>*

STUDY	SMITH <sup>33</sup>
<p><b>Q1. Was an a priori design provided?</b> The research question and inclusion criteria should be established before the conduct of the review.</p>	Yes
<p><b>Q2. Was there duplicate study selection and data extraction?</b> There should be at least two independent data extractors, and a consensus procedure for disagreements should be in place.</p>	Yes
<p><b>Q3. Was a comprehensive literature search performed?</b> At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated, and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.</p>	Yes
<p><b>Q4. Was the status of publication (i.e., grey literature) used as an inclusion criterion?</b> The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language, etc.</p>	Yes
<p><b>Q5. Was a list of studies (included and excluded) provided?</b> A list of included and excluded studies should be provided.</p>	Yes
<p><b>Q6. Were the characteristics of the included studies provided?</b> In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed (e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.</p>	Yes
<p><b>Q7. Was the scientific quality of the included studies assessed and documented?</b> 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.</p>	Yes
<p><b>Q8. Was the scientific quality of the included studies used appropriately in formulating conclusions?</b> The results of the methodological rigour and scientific quality should be considered in the analysis and the conclusions of the review and explicitly stated in formulating recommendations.</p>	Yes
<p><b>Q9. Were the methods used to combine the findings of studies appropriate?</b> For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., chi-squared test for homogeneity). If heterogeneity exists, a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?).</p>	Yes
<p><b>Q10. Was the likelihood of publication bias assessed?</b> An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test).</p>	No
<p><b>Q11. Was the conflict of interest stated?</b> Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.</p>	No



Table 1 Con't : Quantitative Studies

AUTHOR	SELECTION BIAS	STUDY DESIGN	CONFOUNDERS	BLINDING	DATA COLLECTION METHODS	WITHDRAWALS/ DROPOUTS	GLOBAL RATING
Bruzzese <sup>39</sup>	Weak	Strong	Strong	Moderate	Strong	Moderate	MODERATE
Wills <sup>35</sup>	Strong	Moderate	Moderate	Moderate	Strong	Not applicable	MODERATE
Findley <sup>38</sup>	Strong	Moderate	Strong	Moderate	Weak	Strong	MODERATE
Jackson <sup>37</sup>	Strong	Moderate	Strong	Weak	Strong	Strong	MODERATE
Hollar <sup>36</sup>	Moderate	Strong	Strong	Weak	Strong	Strong	MODERATE
Freeman <sup>34</sup>	Moderate	Strong	Strong	Strong	Strong	Strong	STRONG
Metvin <sup>44</sup>	Moderate	Moderate	Weak	Weak	Moderate	Not applicable	WEAK
Sherring <sup>41</sup>	Moderate	Moderate	Weak	Weak	Strong	Moderate	WEAK
Cheadle <sup>40</sup>	Weak	Moderate	Weak	Weak	Weak	Not applicable	WEAK
Pechter <sup>42</sup>	Weak	Weak	Weak	Weak	Weak	Not applicable	WEAK
Macnab <sup>47</sup>	Weak	Moderate	Strong	Moderate	Strong	Weak	WEAK
Fazel <sup>43</sup>	Moderate	Moderate	Strong	Weak	Strong	Weak	WEAK
Bailie <sup>46</sup>	Strong	Moderate	Strong	Weak	Weak	Moderate	WEAK
Peifer <sup>45</sup>	Weak	Moderate	Weak	Weak	Weak	Not applicable	WEAK

**Table 1 Con't: Studies**

*(Letts et al. 2007)<sup>26</sup>*

STUDY		COLLIE-AKERS <sup>48</sup>	METZEL <sup>49</sup>
Study purpose: Was the purpose and/or research question stated clearly?		Yes	Yes
Literature: Was relevant background literature reviewed?		Yes	Yes
Study design:	What was the design?	Case study	Qualitative description
	Was a theoretical perspective identified?	Yes	Yes
Method(s) used		Document review and interviews	Interviews
Sampling:	Was the process of purposeful selection described?	No	Yes
	Was sampling done until redundancy?	Not addressed	Not addressed
Was informed consent obtained?		Not addressed	Yes
Data Collection			
Descriptive clarity	Clear and complete description of site	Yes	Yes
	Clear and complete description of participants	Yes	Yes
	Role of researcher and relationship with participants	Yes	No
	Identification of assumptions and biases of researcher	No	No
Procedure rigour	Procedural rigour was used in data collection strategies?	Yes	Yes
Data Analyses			
Analytical rigour	Data analyses were inductive	Yes	Yes
	Findings were consistent with and reflective of data	Yes	Yes
Auditability	Decision trial developed?	Yes	Yes
	Process of analyzing the data was described adequately	No	Yes
Theoretical Connections:	Did a meaningful picture of the phenomenon under study emerge?	Yes	Yes
Overall Rigour			
Was there evidence of the four components of trustworthiness?	Credibility	Yes	Yes
	Transferability	Yes	Yes
	Dependability	Yes	Yes
	Confirmability	No	Yes
Conclusions and Implications			
Conclusions were appropriate given the study findings?		Yes	Yes
The findings contributed to theory development and future practice/research?		Yes	Yes

**Table 2: Characteristics of Included Studies**

Author	Bailie et al. 2011 <sup>46</sup>
Title	Evaluation of an Australian indigenous housing programme: community level impact on crowding, infrastructure function and hygiene
Methods	<b>Design:</b> Cohort <b>Follow up:</b> On average 10 months after occupation of new houses <b>Years of data collected:</b> 2 years
Location	<b>Country:</b> Australia <b>Setting:</b> Community
Participants	<b>Sample:</b> 418 children living in 185 houses <b>Characteristics:</b> Households with children Race/ethnicity: Indigenous Geographic setting: Rural or remote communities
Intersectoral action	<b>Time frame:</b> 2003 to 2007 <b>Sectors:</b> Public health, primary health care, academia, housing agencies, Aboriginal councils <b>Pattern of relationships between sectors:</b> Integration <b>Activities and relationships:</b> Not specified <b>Role of public health:</b> Not specified <b>Public health individuals involved:</b> Not specified
Interventions	Housing Improvement and Child Health Study: conducted in the 10 Northern Territory communities where there was the greatest construction of new houses by the Environmental Health Program of the Australian Government's National Aboriginal Health Strategy and other large infrastructure programs over the period 2004–2005.  Additional housing was constructed to meet specific housing standards that were significantly more rigorous than standards applied in these communities over previous decades.  The average number of new houses to be constructed in each of the 10 communities was 11 (range 7–15). A small number of uninhabitable houses were earmarked for demolition. No concurrent renovation programs or hygiene promotion activities were conducted over the study period, so the housing intervention essentially consisted of the construction of a defined number of new houses.  The program's impact was assessed using house infrastructure surveys and structured interviews with the main householder in all homes with young children in the 10 remote Australian indigenous communities.
Outcomes	At follow-up, there was a small (non-significant) decrease in the mean number of people per bedroom sleeping in the house on the night before the survey, from 3.4, confidence interval [CI] [3.1, 3.6] at baseline to 3.2, CI [2.9, 3.4] at follow-up (natural logarithm transformed t test, t = 13, p = .102).  From baseline to follow-up, there was no significant change in the composition of households in terms of the numbers of younger and older children and adults.  The Kruskal–Wallis test showed a significant difference in Failed Healthy Living Practice score (housing infrastructure) between baseline (mean 5.6, CI [5.3, 6.0]) and follow-up (mean 4.4, CI [4.1, 4.8]) ( $\chi^2 = 22.8$ , p < .001).  The Kruskal–Wallis test showed a marginally statistically significant difference in the Surveyor Function Score (housing infrastructure) between baseline (mean 3.8, CI [3.5, 4.0]) and follow-up (mean 3.4, CI [3.1, 3.6]) ( $\chi^2 = 3.9$ , p = .047).  The Kruskal–Wallis test confirmed that there was no evidence of improvement in overall Surveyor Condition Score (hygienic conditions) (baseline mean 4.1, CI [3.9, 4.4]; follow-up mean 4.1, CI [3.9, 4.4]; $\chi^2 = 0.3$ , p = .605).
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Policy: National Aboriginal Health Strategy <b>Implementation:</b> Housing standards
Social determinants of health	Housing
Level of intervention	Upstream
Population health approach to health equity	Targeted
Cost	Not specified

Table 2: Characteristics of Included Studies con't

Author	Bruzzese et al. 2006 <sup>39</sup>
Title	Using school staff to establish a preventive network of care to improve elementary school students' control of asthma
Methods	<b>Design:</b> Controlled clinical trial <b>Length of follow-up:</b> 1 year, 2 years <b>Years of data collected:</b> Two waves of 2 years each
Location	<b>Country:</b> United States <b>Setting:</b> School
Participants	<b>Sample:</b> n = 591 students with prior asthma diagnosis (kindergarten to grade 5) and their caregivers (intervention: n = 307; control: n = 284) <b>Characteristics:</b> Age: mean 7.8 years (SD = 1.4) Income and race/ethnicity: eligibility criteria for schools specified that more than 50% of students had to be receiving free lunch and more than 67% had to be from ethnic minorities
Intersectoral action	<b>Time frame:</b> 1998–2001 <b>Sectors:</b> Public health, primary health care, education, academia <b>Pattern of relationships between sectors:</b> Coordination <b>Activities and relationships:</b> Creation of school health team, including full-time school nurse, school physician, and public health assistant; school teacher or administrator; and a parent. Academic partner provided training for school health team. Prevention activities were implemented by school health team with support from academic partner. <b>Role of public health:</b> Training school staff and primary care providers. <b>Public health individuals involved:</b> Public health nurse
Interventions	The school health team participated in a 3-day workshop led by Columbia University staff during the summer. During the early fall, the school health team and Columbia University staff trained teachers in a single 45-minute session about asthma and their role in helping children manage asthma at school. Columbia University staff and New York City Department of Health and Mental Hygiene physicians also trained students' primary care providers during the fall and early winter in state-of-the-art preventive therapy, communication, and patient education strategies, and procedures for establishing medication plans in schools using the Physician Asthma Care Education program.  Nurses (a) called families to confirm case-detection information, further assess children's asthma severity and health care needs, and provide caregivers with asthma education as needed; (b) sent sample treatment plans to primary care providers on the basis of students' asthma severity, consistent with National Heart, Lung and Blood Institute guidelines, and blank treatment plans; (c) encouraged caregivers and primary care providers to complete required forms when medication was needed at school; and (d) referred families for medical care if needed. Additionally, nurses conveyed instructions from the management plans to teachers.
Outcomes	While case detection helped nurses to identify additional students with asthma and nurses increased the amount of time spent on asthma-related tasks, primary care providers did not change their medical management of asthma. Few improvements in health outcomes were achieved. Relative to controls, at 12 months after the intervention, students in the intervention group had a reduction in activity limitations due to asthma (–35% vs. –9%, $p < .05$ ) and more days without symptoms (26% vs. 39%, $p = .06$ ).  The intervention had no impact on use of urgent health care services, school attendance, or caregiver's quality of life, and there were no improvements at 24 months after the intervention.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Not specified <b>Implementation:</b> Creation of a school health team
Social determinant of health	Health services
Level of intervention	Downstream
Population health approach to health equity	Targeted
Costs	Not specified

**Table 2: Characteristics of Included Studies con't**

Author	Cheadle et al. 2011 <sup>40</sup>
Title	The impact of a community-based chronic disease prevention initiative: evaluation findings from Steps to Health King County
Methods	<b>Design:</b> Cohort <b>Follow up:</b> Post intervention, 1 to 2 years <b>Years of data collected:</b> Not specified
Location	<b>Country:</b> United States <b>Setting:</b> Community-based; mixed urban and suburban
Participants	<b>Sample:</b> n = 63,780 area residents (for all interventions) <b>Characteristics:</b> Race/ethnicity of area residents: 14.4% African American, 8.9% Hispanic or Latino, 3.9% Vietnamese Income of area residents: More than 30% of residents below 200% of the Federal Poverty Line Interventions focused on people with household income less than 200% of the federal poverty level who spoke English, Spanish, and/or Vietnamese
Intersectoral action	<b>Time frame:</b> 2003–2009 <b>Sectors:</b> Public health, primary health care, academic, education, non-governmental organizations <b>Patterns of relationships between sectors:</b> Cooperation, coordination, integration <b>Activities and relationships:</b> Leadership team: Public Health – Seattle & King County and 75 representatives of community-based organizations, hospitals, local government agencies, universities, school districts, etc.; implementation by all participating organizations, with financial and technical support from Public Health – Seattle & King County; evaluation team: Centre for Community Health and Evaluation, Public Health – Seattle & King County staff, University of Washington <b>Role of public health:</b> Leadership (convened large community gathering, etc.), program implementation, financial and technical support <b>Public health individuals involved:</b> Program manager
Interventions	Steps to Health King County was 1 of 40 community-level initiatives funded in 2003 as part of the Steps to a Healthier US initiative.  Multiple interventions within eight projects were reported by level of intensity: <b>High intensity:</b> one-on-one case management programs, including care coordination, community-based health education, physical activity for youth and seniors <b>Medium intensity:</b> multi-session programs or intensive one-time training or education, for community members, parents, and child care providers <b>Low intensity:</b> single-session or group education programs, school system and policy change, bicycle safety and promotion, youth health education
Outcomes	Program outcomes related to primary care provision, emergency department utilization, diabetes control, asthma management, health knowledge, and behaviour change were all statistically significant (p < .05).  Participation in policy advocacy was limited, and staff reported being too busy with operational priorities to focus on advocacy.  Organizational level and policy changes were also reported.  Primary reasons for lack of program integration and policy change included lack of time, focus on individual program activities, and perception of low payoff from collaborative activities.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> None <b>Implementation:</b> Developed place-based strategic plan; held senior leadership forum to implement system changes; created sector-specific health promotion strategies; created leadership and evaluation teams; hired staff members to increase coordination among organizations
Social determinants of health	Health services, physical and social environments
Levels of intervention	Midstream and downstream
Population health approach to health equity	Mixed
Costs	<b>High intensity:</b> US \$900/person <b>Medium intensity:</b> US\$115–\$175/person <b>Low intensity:</b> \$7/person

Table 2: Characteristics of Included Studies con't

Author	Collie-Akers et al. 2007 <sup>48</sup>
Title	Analyzing a community-based coalition's efforts to reduce health disparities and the risk for chronic disease in Kansas City, Missouri
Methods	<b>Design:</b> Empirical case study <b>Follow up:</b> Participatory research during intervention <b>Years of data collected:</b> 5
Location	<b>Country:</b> United States <b>Setting:</b> Urban
Participants	<b>Sample:</b> Online documentation of instances of community or system change <b>Key informant interviews: n = 12</b>  <b>Area characteristics:</b> Income: 24% households below poverty line Race/ethnicity: 57% African Americans, 8.5% Hispanics
Intersectoral action	<b>Time frame:</b> 2000 to 2004 <b>Sectors:</b> Public health, primary health care (community health centres), non-governmental organizations (neighbourhood associations, faith organizations, other public and private organizations) <b>Patterns of relationship between sectors:</b> Coordination <b>Activities and relationships:</b> Coalition of multiple partners formed by Missouri Primary Care Association, including University of Kansas Work Group for Community Health and Development as scientific partner. Strengths included engagement of diverse parts of the community. <b>Role of public health:</b> Coalition focused on two minority populations in accordance with findings from a Kansas City Health Department report. <b>Public health individuals involved:</b> Not specified
Intervention	Kansas City - Chronic Disease Coalition: The coalition initiated a program called Pick Six, in which coalition partners were asked to identify six community changes that they could implement. From October 2001 through December 2004, coalition partners were given sub-contracts to implement the community changes that they had identified in the action plan. The partners consisted of 5 community health centres, 24 neighbourhood associations, 24 faith organizations, and several other public and private organizations. The coalition focused on two minority populations at high risk for cardiovascular disease and diabetes mellitus: African Americans and Hispanics.
Outcomes	The coalition facilitated 321 community changes from October 2001 through December 2004. Of these changes, 75% were designed to reduce residents' risk for both cardiovascular disease and diabetes. The most common strategy was to provide health-related information to or enhance the health-related skills of residents (38%).
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Two separate health assessments identified health disparities; contract and funding from national organization (Centres for Disease Control and Prevention). <b>Implementation:</b> Logic model for planning five interrelated phases; development of a plan for reducing disparities; hiring of a project manager; hiring (and later departure) of a community mobilizer to help implement the action plan; use of annual sub-contracts; and availability of targeted resources to neighbourhood and faith organizations.
Social determinant of health	Social and physical environments
Level of intervention	Midstream
Population health approach to health equity	Targeted
Costs	Not specified

**Table 2: Characteristics of Included Studies con't**

Author	Fazel et al. 2009 <sup>43</sup>
Title	A school-based mental health intervention for refugee children: an exploratory study
Methods	<b>Design:</b> Cohort analytic <b>Length of follow-up:</b> Immediately after intervention <b>Years of data collected:</b> 1
Location	<b>Country:</b> United Kingdom <b>Setting:</b> School
Participants	<b>Sample:</b> n = 141 school-age children (intervention: n = 47; comparison: n = 94). Two age- and sex-matched controls (one from a group of non-refugee ethnic minority children and one from a group of white children) were selected for each of the 47 children in the intervention group. <b>Characteristics:</b> Age: School-age (first school: 4–8 years; middle school: 9–12 years; secondary school: 13–19 years) Race/ethnicity: India, Pakistan, Asia, Bangladesh, Balkans, other Intervention and comparison groups: Refugee, non-refugee ethnic minority and white children
Intersectoral action	<b>Time frame:</b> Not specified <b>Sectors:</b> Public health, education <b>Patterns of relationship between sectors:</b> Coordination <b>Activities and relationships:</b> Not specified <b>Role of public health:</b> Provision of mental health services <b>Public health individuals involved:</b> Mental health professionals
Interventions	School-based mental health service to address psychological needs of refugee children. Refugee children were discussed by mental health team, and children at greatest risk were seen.  Weekly individual counselling, with number of sessions per child varying according to need (2 to 5 weekly counseling sessions for most of the school year).
Outcomes	At the end of the study period, refugee children continued to have significantly higher Strengths and Difficulties Questionnaire (SDQ) total scores (F [2, 138] = 4.7, p = .011), emotional symptom scores (F [2, 138] = 8.6, p < .001), and peer problem scores (F [2, 138] = 6.3, p = .002) than those in the control groups.  Over the study period (pre- vs. post-treatment), the total SDQ score in all groups decreased significantly (F [1, 138] = 5.9, p = .016), with the greatest changes evident in the peer problems scale (F [1, 138] = 8.1, p = .005) and the hyperactivity scale (F [1, 138] = 3.9, p = .05).  Hyperactivity scores decreased significantly more in the refugee group than in the control groups (mean change -0.96 [SD = 2.40] vs. -0.10 [SD = 1.98]; t = 2.12, p = .037), with a suggestion of an effect in the emotional symptoms score (mean change -0.72 [SD = 2.63] vs. 0.03 [SD = 2.02]; t = 1.73, p = .088).

Table 2: Characteristics of Included Studies con't

Subgroup analyses	<p>Re-examination of the data comparing the outcomes of the 11 refugee children “directly seen” by the service and the 36 refugee children in the “consultation only” group revealed an interaction between time and group in the SDQ total score (<math>F [1, 45] = 5.3, p = .026</math>) and in the peer problems scale (<math>F [1, 45] = 10.9, p = .002</math>), with those who had been directly seen having significantly higher scores on the peer problems scale at baseline (<math>F [1, 45] = 5.3, p = .026</math>) and showing relatively greater improvement over the study period.</p> <p>There was a non-significant improvement over time in scores on the emotional symptoms scale for refugee children directly seen by the service.</p> <p>At baseline, “caseness” criteria were met by 15 (32%) of the refugee children, 4 (9%) of the ethnic minority children, and 9 (19%) of the white children. At follow-up, caseness criteria were met by 11 (23%) of the refugee children, 2 (4%) of the ethnic minority children, and 10 (21%) of the white children, with the difference in caseness between the refugee and other children being significant at baseline but not at follow-up. (“Caseness” was defined as the combination of raised symptoms [SDQ score <math>\geq 14</math>] and high impact scores [<math>\geq 2</math>]).</p>
Tools, mechanisms, and strategies for intersectoral action	<p><b>Initiation:</b> Not specified</p> <p><b>Implementation:</b> Creation of team of mental health professionals</p>
Social determinant of health	Health services
Level of intervention	Downstream
Population health approach to health equity	Targeted
Costs	Not specified



**Table 2: Characteristics of Included Studies con't**

Author	Findley et al. 2006 <sup>38</sup>
Title	Community-based strategies to reduce childhood immunization disparities
Methods	<b>Design:</b> Cohort <b>Follow up:</b> 1 year <b>Years of data collected:</b> 3
Location	<b>Country:</b> United States <b>Setting:</b> Community
Participants	<b>Sample:</b> n = 1,502 children aged 19 to 35 months  <b>Characteristics:</b> Income: Low income (study site, Northern Manhattan, includes the communities of Harlem and Washington Heights, which are among the most disadvantaged in the city of New York and the nation, with almost two thirds of families having incomes 200% below the poverty level, and a third receiving an income supplement)  Race/ethnicity: African American (n = 281), Latino (n = 1,221). Two out of every five residents (40%) in these communities were foreign-born, the majority from the Dominican Republic but also from West Africa and other Latin American countries
Intersectoral action	<b>Time frame:</b> 1999–2004 <b>Sectors:</b> Public health, primary health care, academia, non-governmental organizations (social services, housing advocacy organizations) <b>Pattern of relationships between sectors:</b> Integration <b>Activities and relationships:</b> The program was designed, implemented, and directed by a large coalition. Activities were integrated into ongoing programs of community organizations. Staff were trained to provide immunization education and support. <b>Role of public health:</b> Part of coalition that designed, implemented, and directed the intervention <b>Public health individuals involved:</b> Academic public health
Intervention	Start Right was a community-based immunization promotion program of outreach and tracking for children younger than 5 years in Northern Manhattan, which was designed, implemented, and directed by a coalition of 23 community organizations. The program consisted of health education, reminders, follow-up, and incentives, all delivered in the context of programs routinely offered by coalition members.
Outcomes	Disparity reduction was assessed by comparing coalition immunization coverage rates for the 4:3:1:3:3 series (4 diphtheria-tetanus, 3-polio, 1 measles-mumps, rubella, 3 Haemophilus influenza b, and 3 Hepatitis B) with 2003 rates as determined by the National Immunization Survey. Coverage increased from 46.0% at enrollment to 80.5% at follow-up, matching nationwide rates for all children (t = 0.87) and for white children (t = 1.99). Immunization coverage for African American children in the study was greater than for African American children nationwide (78% [SD=4.7] v. 73.3% [SD=3.2]) (t = 2.90). Similarly, coverage for Latino children in the study was higher than for Latino children city and nationwide (83.7% [SD=4.9] v. 73.7% [SD=9.5] and 77.0% [SD=2.1]) (t = 2.32).  Embedding immunization promotion into existing community immunization programs was successful in eliminating disparities in immunization rates. The most effective programs were those with direct linkages to health care systems targeting young children.
Subgroup analyses	Age at enrollment and gender did not have a significant influence on immunization status Age at enrollment (days): Adjusted Odds Ratio (AOR) = 1.10, CI [1,1] Gender: (male, female) AOR = 1.10, CI [.87, 1.39] Ethnicity: (Latino, other) AOR = 1.56, CI [1.14, 2.13]
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Followed an epidemic, at which time reports described low vaccination rates and inequities; 2 years of planning and piloting; built on existing programs and structures; coalition created <b>Implementation:</b> Shared accountability among partners; community ownership of program
Social determinant of health	Health services
Level of intervention	Downstream
Population health approach to health equity	Targeted
Cost	No information

Table 2: Characteristics of Included Studies con't

Author	Freeman et al. 2001 <sup>34</sup>
Title	Addressing children's oral health inequalities in Northern Ireland: a research-practice-community partnership initiative
Methods	<b>Design:</b> Controlled clinical trial <b>Follow-up:</b> 1 year <b>Years of data collected:</b> 2
Location	<b>Country:</b> United Kingdom (Northern Ireland) <b>Setting:</b> School
Participants	<b>Sample:</b> n = 364 students in 16 schools (8 rural and 8 urban) eligible Year 1: (intervention: n = 118 students; control: n = 120 students) Year 2: (intervention: n = 99 students; control: n = 102 students)  <b>Characteristics:</b> Age: 9 years old at baseline Other: Socioeconomically disadvantaged region
Intersectoral action	<b>Time frame:</b> Not specified <b>Sectors:</b> Public health, education, primary health care (specialized care: visiting ophthalmology service) <b>Patterns of relationships between sectors:</b> Coordination <b>Activities and relationships:</b> Policy developed by a team (dietitians, school meal advisors, teachers, health promotion officers, and local suppliers of school milk). Community-based practitioners negotiated and developed strategy with parents, teachers, and school governors. Research and Development Office of the UK Department of Health financed the evaluation. <b>Role of public health:</b> Members of policy team <b>Public health individuals involved:</b> Health promotion officer, dietitians, community-based practitioners
Interventions	Boost Better Breaks: Each participating school or pre-school group had to have a written policy, approved by its board of governors, permitting the consumption of only milk and/or fruit at break time. Schools had to agree not to sell snacks high in fat or sugar in the school setting, and teachers had to agree not to reward students with candy. Control: No written policy
Outcomes	Intervention group (low SES) had a mean DMFT (total number of decayed, missing due to caries and filled teeth) score of 1.58, CI [1.28, 1.89] compared to control group (high SES) mean score of 0.065, CI [0.38, 0.93].  The DMFT of intervention group (n = 99) year 1 was 1.13, CI [0.85, 1.40], compared to 1.58, CI [1.28, 1.89] in year 2.  Number of filled permanent teeth among intervention group changed from 0.49, CI [0.20, 0.77] in year 1 to 1.05, CI [0.69, 1.14] in year 2.  Program had a positive effect in terms of increasing the mean number of sound teeth among children attending schools in areas where socio-economic conditions were poor.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> The Boost Better Breaks break-time policy was based on the belief that using community development to negotiate and develop a break-time snacking policy within the school environment would help empower children to make the "healthy choice the easy choice." The policy was developed by a team of dietitians, school meal advisors, teachers, health promotion officers, and local suppliers of school milk. <b>Implementation:</b> Multi-sectoral policy committee
Social determinants of health	Social and physical environments
Level of intervention	Midstream
Population health approach to health equity	Targeted
Costs	Not specified

**Table 2: Characteristics of Included Studies con't**

Author	Hollar et al. 2010 <sup>36</sup>
Title	Effective multi-level, multi-sector, school-based obesity prevention programming improves weight, blood pressure, and academic performance, especially among low-income, minority children
Methods	<b>Design:</b> Controlled clinical trial <b>Length of follow-up:</b> Fall 2004, Spring 2005, Fall 2005, Spring 2006 <b>Years of data collected:</b> 2
Location	<b>Country:</b> United States <b>Setting:</b> School
Participants	<b>Sample:</b> 4 intervention schools (n = 3,032 students), 1 control school (n = 737 students) <b>Subgroup in free or reduced-cost lunch program:</b> n = 1,197 <b>Characteristics:</b> Age: mean 8 years, range 4–13 Sex ratio: 51% female, 49% male Race/ethnicity: 50.2% Hispanic, 33.4% White, 8.0% Black, 8.4% other (multi-ethnic, Asian, American Indian)
Intersectoral action	<b>Time frame:</b> 2004 to 2006 <b>Sectors:</b> Academia, education (school administration and cafeteria), district food services, district wellness committee, Department of Agriculture Food and Nutrition Service, and media (i.e., magazine) <b>Patterns of relationships between sectors:</b> Cooperation, coordination <b>Activities and relationships:</b> Not specified <b>Role of public health:</b> Not specified <b>Public health individuals involved:</b> Dietitian, district wellness committee members
Interventions	Healthier Options for Public Schoolchildren (HOPS)/OrganWise Guys (OWG): an elementary school-based obesity prevention intervention designed to keep children at a normal healthy weight and to improve health status and academic achievement. Components included dietary intervention, curriculum, and physical activity.  Free or reduced-cost lunch program provided to children from low-income families.
Outcomes	Children in intervention group experienced greater decrease in body mass index (BMI) percentile than children in control group in year 1; difference between improvements in BMI percentiles reached statistical significance in year 2 (p = .007).  Females in the control group school experienced significant increase in mean systolic blood pressure (from 98.37 to 101.44 mm Hg) (p < .001); males in both groups had significant increases in systolic blood pressure during summer (from 100.83 to 101.94 mm Hg in intervention group, from 99.28 to 101.93 mm Hg in control group) (p < .0001).  Increases in diastolic blood pressure were seen during summer in both sexes and in both the intervention and control groups (p < .0001).
Subgroup analyses	In the sub-sample of children receiving free or reduced-cost lunches, mean BMI (in terms of z score) changed from 0.61 (standard deviation [SD] = 1.19) at baseline to 0.71 (SD = 1.09) at final measurement in the intervention group and from 0.98 (SD = 0.88) at baseline to 1.05 (SD = 0.85) at final measurement in the control group (p = .0013).  Also in the sub-sample of children receiving free or reduced-cost lunches, mean weight (in terms of z score) changed from 0.61 (SD = 1.14) at baseline to 0.65 (SD = 1.12) at final measurement in the intervention group and from 0.90 (SD = 0.98) at baseline to 0.95 (SD = 1.00) at final measurement in the control group (p = .011).  Hispanic and white children in the intervention schools were significantly more likely to have higher Florida Comprehensive Achievement Test math scores than their counterparts in the control school (p < .001).
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> None described <b>Implementation:</b> None described
Social determinants of health	Physical and social environments, food security
Level of intervention	Midstream
Population health approach to health equity	Mixed
Costs	Not specified

Table 2: Characteristics of Included Studies con't

Author	Macnab et al. 2008 <sup>47</sup>
Title	3-year results of a collaborative school-based oral health program in a remote First Nations community
Methods	<b>Design:</b> Cohort <b>Follow-up:</b> 3 years <b>Years of data collected:</b> 3
Location	<b>Country:</b> Canada <b>Setting:</b> School
Participants	<b>Sample:</b> n = 58 children enrolled, with 26 children receiving the complete intervention <b>Characteristics:</b> Age: Kindergarten to grade 10 at the outset, subsequently to grade 12 Race/ethnicity: Aboriginal
Intersectoral action	<b>Time frame:</b> Not specified <b>Sectors:</b> Public health, primary health care, academia, education, non-governmental organization <b>Pattern of relationships between sectors:</b> Coordination <b>Activities and relationships:</b> Initiated by University of British Columbia (UBC) Pediatric Residency Program. Meeting with community elders and community health staff identified health problem. Option of school-based intervention was selected, and school principal and teachers were involved in design of program. UBC team implemented the intervention, working with nurses, the school, and band council to maintain the program. <b>Role of public health:</b> Involved in meeting that identified health problem <b>Public health individuals involved:</b> Public health nurse
Intervention	School-based program to improve knowledge and practices related to oral health, using brush-ins and application of topical fluoride varnish and/or rinses, dental health anticipatory guidance by the pediatric residents during well-baby and well-child visits, and classroom presentations by the pediatric residents about a variety of health topics, including oral health.
Outcomes	Before the intervention, 8% of the children were cavity-free (based on assessment of 45% of the 58 children). Following 3-year intervention, 32% were cavity-free. Among the 13 children assessed both pre- and post-intervention, dmfs/DMFS improved significantly (p < .005). The visiting hygienist noted increased knowledge about oral health.  The community was able to see a marked improvement and remained very positive about the program.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Meetings to identify health problem, appropriate response, and program design. <b>Implementation:</b> Not specified
Social determinants of health	Health services
Level of intervention	Downstream
Population health approach to health equity	Targeted
Costs	Not specified

Table 2: Characteristics of Included Studies con't

Author	Jackson et al. 2011 <sup>37</sup>
Title	Reduced acute hospitalization with the healthy housing programme
Methods	<b>Design:</b> Interrupted time series <b>Follow-up:</b> 2.3 years <b>Years of data collected:</b> 10
Location	<b>Country:</b> New Zealand <b>Setting:</b> Community-based, district level
Participants	<b>Sample:</b> n = 9,736 residents of 3,410 homes <b>Characteristics:</b> Age: 0–4 years of age, 24.75%; 5–34 years of age, 50.6%; 35 years or older, 24.5%
Intersectoral action	<b>Time frame:</b> July 1999 to January 2009 <b>Sectors:</b> Public health, housing <b>Patterns of relationship between sectors:</b> Integration <b>Activities and relationships:</b> Joint initiative between housing and health boards. Assessment undertaken by housing area coordinator and public health nurse. <b>Role of public health:</b> Co-lead in the joint housing initiative, part of the assessment team <b>Public health individuals involved:</b> Public health nurse
Intervention	Healthy Housing Programme, a joint initiative between Housing New Zealand Corporation and Counties Manukau, Auckland, Hutt Valley, and Northland District Health Boards with three related dimensions: health, housing, and social. The study investigated the impact of housing modifications to reduce overcrowding; insulation and ventilation improvements; and health and social service assessments, referrals, and linkages for acute admission to hospital.
Outcomes	People aged 5–34 years had fewer acute admissions to hospital after the intervention than before (hazard ratio [HR] 0.77, confidence interval [CI] [0.70, 0.85]). For children aged 0–4 years, the HR was 0.89, CI [0.79, 0.99]. Among adults 35 years of age or older, there was a non-significant increase. When the causes of hospital admission were restricted to those related to housing, a further decline in HR was seen: 0.88, CI [0.74, 1.05], for those 0–4 years old, 0.73, CI [0.58, 0.91] for those 5–34 years of age and 1.31, CI [1.09, 1.56] for those 35 years of age or older.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Not specified <b>Implementation:</b> Not specified
Social determinant of health	Housing
Level of intervention	Midstream
Population health approach to health equity	Targeted
Costs	Not specified

Table 2: Characteristics of Included Studies con't

Author	Melvin 2006 <sup>44</sup>
Title	A collaborative community-based oral care program for school-age children
Methods	<b>Design:</b> Cohort <b>Follow-up:</b> Immediately after intervention <b>Years of data collected:</b> 4
Location	<b>Country:</b> United States <b>Setting:</b> School
Participants	<b>Sample:</b> Children in three district schools, year 1 (n = 1, 144), year 2 (n = 353), year 3 (n = 635) <b>Characteristics:</b> Age: School-age (grades 1 to 6) <b>Other criteria:</b> Low income, refugees
Intersectoral action	<b>Time frame:</b> 2001 to 2005 <b>Sectors:</b> Public health, primary health care, education, academia (nursing faculty) <b>Patterns of relationships between sectors:</b> Coordination, integration <b>Activities and relationships:</b> A community nurse specialist brought issue to university nursing faculty and Vermont Department of Health. A Dental Access Committee was created, with program delivery funded by health department and local hospital. Dental hygienist performed visual examination and provided referrals to a dentist. <b>Role of public health:</b> Members of Dental Access Committee <b>Public health individuals involved:</b> Public health nurse, executive and senior management
Interventions	Tooth Tutor Program, aimed at children in grades 1-6, placed most of its emphasis on identifying children without a "dental home" and on increasing the number of children receiving oral preventive services and routine care in a dental office. Dental hygienists within schools identified children in need of services (by visual screening) and set up appointments with community dentists for the provision of preventive, restorative, and emergency dental care. The classroom component included yearly presentations.
Outcomes	<b>Phase 1 (years 1 and 2):</b> In September 2001 (year 1), 59% of children in the three schools had a dental home, and by June 2002, 78% of children had a dental home.  In September 2002 (year 2), 51% of children had a dental home, and by June 2003, 87% of children had a dental home.  The program served 1, 144 children in year 1 and 353 children in year 2. In year 1, 75 children (52% of the target group) received preventive care and 32 (22%) received restorative care. In year 2, 212 children (60%) received preventive care, and 39 (11%) received restorative care.  <b>Phase 2 (years 3 and 4):</b> As of June 2004, a total of 635 children had been seen by community dentists. Services provided included cleaning, application of sealants, fluoride treatments, radiography, placement of crowns, extractions, and oral surgery.  In fall 2004, a school-based dental clinic was opened in one of the original three schools, so that dental care could be provided on site. During that year, 212 students were seen on site.  The breakdown of care provided in phase 2 was 54% diagnostic or preventive services and 46% restorative services. The increase in the need for restorative services in years 3 and 4 was attributable to continued immigration of refugee children requiring extensive dental care. Another contributing factor may have been that new children continued to move into the school district.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Champion, multi-sectoral committee <b>Implementation:</b> Multi-sectoral committee, funding
Social determinants of health	Health services, social and physical environments
Level of intervention	Downstream
Population health approach to health equity	Mixed
Costs	\$70 per child served

**Table 2: Characteristics of Included Studies con't**

Author	Metzel et al. 2005 <sup>49</sup>
Title	State-level interagency agreements for supported employment of people with disabilities
Methods	<b>Design:</b> Qualitative descriptive <b>Data collection:</b> May 1999 to January 2000
Location	<b>Country:</b> United States <b>Setting:</b> State level
Participants	<b>Sample:</b> Document review: Agreements from six states, focusing on mental illness [n = 2], most severe disabilities [n = 2], developmental disabilities [n = 1], and transitioning studies [n = 1]. Number of partner agencies: two [n = 4], four + two guests [n = 1], or seven [n = 1]. Key information interviews: n = 20
Intersectoral action	<b>Time frame:</b> Not specified <b>Sectors:</b> Public health (Department of Mental Health), education, employment and labour <b>Patterns of relationships between sectors:</b> Cooperation, coordination <b>Activities and relationships:</b> written interagency agreements using language that promoted cooperation and outlined roles and responsibilities of partners. <b>Role of public health:</b> Not specified <b>Public health individuals involved:</b> Middle managers
Interventions	The study investigated six interagency agreements for supported employment to identify the conditions and qualities necessary to increase the number of people in supported employment. To determine the effect of written interagency agreements outlining planned coordination for supported employment, researchers asked the following questions: 1. What is necessary for the development of a potentially good interagency agreement for supported employment? 2. What is necessary for the implementation of a potentially good interagency agreement? 3. What are the positive outcomes of the interagency agreements for supported employment?
Outcomes	Increase in supported employment: Five states succeeded in supporting more people with disabilities in employment. Estimates indicated a 25% yearly increase in employment from 1994 to 1999. In 1997 there was an increase of 30%, with 200–300 young people benefiting from vocational assessment and employment opportunities, and between 1995 and 1996 there was an increase of 14%. Representatives from three states also mentioned increased visibility of supported employment. Increase in coordination and collaboration: Representatives from three states described increased coordination and cooperation (e.g., by altering processes, changing systems, coordinating budgets).
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Legislation requiring inter-agency cooperation and coordination at the state level. Funding, fulfillment of legal mandates, formal endorsement of supported employment, mission or vision statements. <b>Implementation:</b> Written interagency agreements, which included population-specific agreements, resource commitments, partners' roles and responsibilities, and expected outcomes. Themes of good collaboration included champions, strong working relationship across agencies and team members, common language, regular and frequent meetings.
Social determinant of health	Employment
Level of intervention	Upstream
Population health approach to health equity	Targeted
Costs	Not specified

Table 2: Characteristics of Included Studies con't

Author	Pechter et al. 2009 <sup>42</sup>
Title	Reducing hazardous cleaning product use: a collaborative effort
Methods	<b>Design:</b> Case study <b>Length of follow-up:</b> Not specified <b>Years of data collected:</b> 1
Location	<b>Country:</b> United States <b>Setting:</b> Workplace
Participants	<b>Sample:</b> n = 140 workers <b>Characteristics:</b> Low-income workers, immigrant workers
Intersectoral action	<b>Timeframe:</b> 2005 <b>Sectors:</b> public health, employment and labour (union), non-governmental organization (NGO) (Massachusetts Coalition for Occupation Safety and Health) <b>Pattern of relationships between sectors:</b> Coordination <b>Activities and relationships:</b> Union responded to worker concerns. NGO developed survey and supported surveillance of cleaning products used. By invitation, Occupational Health Surveillance Program of the Massachusetts Department of Public Health provided technical information about health effects and preventive measures. <b>Role of public health:</b> Translation of surveillance data into practical recommendations for immediate change. <b>Public health individuals involved:</b> Not specified
Intervention	Multi-year project led by immigrant cleaning workers with their union, Service Employees International Union, Local 615, and support from Massachusetts Coalition for Occupational Safety and Health to address exposure to hazardous chemicals.
Outcomes	Development of a workplace policy calling for elimination of the most hazardous chemicals, reduction in the number of products used, ban on mixing products, and improvements in safety training.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Union leadership, participatory approach <b>Implementation:</b> Staff, survey, reports
Social determinant of health	Employment and working conditions
Level of intervention	Midstream
Population health approach to health equity	Targeted
Costs	Not specified



Table 2: Characteristics of Included Studies con't

Author	Peifer & Perez 2011 <sup>45</sup>
Title	Effectiveness of a coordinated community effort to promote early literacy behaviors
Methods	<b>Design:</b> Interrupted time series <b>Follow-up:</b> 2 years <b>Years of data collected:</b> 2
Location	<b>Country:</b> United States <b>Setting:</b> Community
Participants	<b>Sample:</b> Intervention delivered to approximately 1,500 families, surveys of two independent samples collected in 2001 (n = 300 parents) and 2003 (n = 216 parents) <b>Characteristics:</b> Annual income: Survey I, 47.7% with less than \$15,000, 48.1% with greater than \$15,000 but less than \$30,000, 4.1% with greater than \$30,000 but less than \$50,000; survey II (post-intervention), 25.5% with less than \$15,000, 43.0% with greater than \$15,000 but less than \$30,000, 31.5% with greater than \$30,000 but less than \$50,000 Race/ethnicity: Survey I, 82.6% Hispanic; survey II, 69.4% Hispanic Education level less than high school: Survey I, 83 (32.2%), survey II, 84 (38.9%)
Intersectoral action	<b>Time frame:</b> Interventions began in 1998; data were collected in 2001 and 2003 <b>Sectors:</b> Public health, primary health care, non-governmental organizations, public library <b>Pattern of relationships between sectors:</b> Cooperation <b>Activities and relationships:</b> Four separate community programs; coordination to deliver and evaluate the intervention (providing access to books to target population). Interventions built on existing programs (home visits, clinic visits, child care centres) and involved partnering with public library system. <b>Role of public health:</b> Part of intervention delivery team <b>Public health individuals involved:</b> Public health nurse
Intervention	Four coordinated programs: Prenatal to Three initiative, "Raising a Reader," Reach Out and Read, California's FIRST 5 Commission. The four programs had common elements, specifically book distribution programs based in clinical settings, child care centres, and home visitation programs. The intent of the programs was to communicate the message that reading to infants and young children and accessing services at the public library are beneficial.
Outcomes	Data comparison between the two time periods showed the following changes (data reported as ratio between proportions [%], 2003/2001): 77% increase in parents reporting that they showed books to their infants on a daily basis 61.44% increase in parents reading aloud to their infants on a daily basis 89.29% increase in parents playing with child 52.96% increase in parents drawing pictures with child
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Building on existing programs and relationships; funding <b>Implementation:</b> Not specified
Social determinant of health	Early childhood development
Level of intervention	Midstream
Population health approach to health equity	Targeted
Costs	Not specified

Table 2: Characteristics of Included Studies con't

Author	Sherring et al. 2010 <sup>41</sup>
Title	A working reality: evaluating enhanced intersectoral links in supported employment for people with psychiatric disabilities
Methods	<b>Design:</b> Cohort <b>Follow-up:</b> 2 years <b>Years of data collected:</b> 2
Location	<b>Country:</b> Australia <b>Setting:</b> Regional level, metropolitan, regional, rural, and remote communities
Participants	<b>Sample:</b> n = 43 people with mental illness <b>Characteristics:</b> Age: mean 27.8 years, standard deviation [SD] = 5.9, range 19–39 Sex ratio: 79% male (n = 34), 21% female (n = 9) Education: 46.5% high school (n = 20), 7% bachelor's degree (n = 3) Other criteria: Program targeted young people in the first 5 years of illness.
Intersectoral action	<b>Time frame:</b> September 2006 to September 2008 <b>Sectors:</b> Public health, primary health care, employment and labour <b>Patterns of relationships between sectors:</b> Information sharing, integration <b>Activities and relationships:</b> Program staffed by occupational therapists and an employment consultant. Intersectoral approach consisted of integration of occupational therapists with community mental health and employment services. Participating staff agreed to principles and established formal communication process. Funded by Department of Education, Employment and Workplace Relations. Implementation by occupational therapist, who assessed personal needs, assisted with access to employment services, and provided clinical support. Employment consultant responsible for all job search activities. <b>Role of public health:</b> Providing mental health services, performing evaluation of program <b>Public health individuals involved:</b> Health promoter
Intervention	Vocational Education, Training and Employment (VETE) demonstration project: supported employment program in which formal links were created between a community mental health team and three employment services to evaluate the application of evidence-based employment programs in the Australian context.
Outcomes	Participants who held a job in the year preceding entry into the VETE program were employed for a greater proportion of the total participation period (mean 64.4%, SD 28.3) than those who had not held a job before entry into the program (mean 36.6%, SD = 27.6) (df = 31, t = 2.858, p < .01).  The duration of employment was positively correlated with the average hourly pay (r = 0.499, p < .01), but not with age, baseline score on Brief Psychiatric Rating Scale (BPRS), duration of illness, or mean number of hours per week of employment.  Total BPRS at baseline was significantly lower among participants who got a job (mean 34.2, SD = 6.9) than among those who did not get a job (mean 39.8, SD = 6.6) (df = 41, t = 2.28, p < .05).  Total score on Work-related Self-efficacy Scale was significantly higher among those who obtained employment (mean 80.5, SD = 12.3) than among those who did not get a job (mean 68.7, SD = 11.46) (df = 39, t = 2.68, p < .01).  No significant differences for any other predictors.
Subgroup analyses	None
Tools, mechanisms, and strategies for intersectoral action	<b>Initiation:</b> Both formal (monthly case reviews, regular joint appointments) and informal (phone and email) communication processes established. Clearly defined roles established during early stages of the partnership. <b>Implementation:</b> Staff, funding, education, communication between sectors, culture change
Social determinant of health	Employment and working conditions
Level of intervention	Midstream

**Table 2: Characteristics of Included Studies con't**

Population health approach to health equity	Targeted
Costs	Not specified
Author	Smith et al. 2009 <sup>33</sup>
Title	Partners in health? A systematic review of the impact of organizational partnerships on public health outcomes in England between 1997 and 2008
Methods	<b>Design:</b> Systematic review <b>Data sources:</b> 18 electronic databases covering academic research, local and central government studies, and grey literature in the medical, social sciences, and economic literatures (January 1997 to June 2008); bibliographies of identified articles were also searched
Location	<b>Country:</b> England
Sample	15 studies, relating to six different interventions, met review criteria: specifically, provided data on impact of partnerships on public health outcomes (improvement in health and/or reduction in health inequalities), either directly (e.g., effects of partnerships or of partnership-implemented interventions on self-reported health) or indirectly (e.g., by raising the policy profile of health inequalities).
Interventions	<ul style="list-style-type: none"> <li>» Health Action Zones (HAZs): area-based initiatives intended to develop partnerships involving the National Health Service (NHS), local government, and other sectors, with the aim of tackling ill health and persistent inequalities in the most disadvantaged communities across the UK. The initiatives aimed to address social and economic determinants (e.g., services providing advice on benefit support), promote healthy lifestyles (e.g., smoking cessation services), empower individuals and communities (e.g., "Stepping Out," a program of leisure and sports activities for people with physical and sensory disabilities), and improve health and social care services (e.g., Integrated Substance Misuse Service). HAZs were launched in 1998 and received a total of £320 million over a 3-year period.</li> <li>» Health Improvement Programmes (HIMPs): action plans developed by NHS and local government bodies and introduced in 1999; renamed Health Improvement and Modernisation Plans in 2001. The plans set out how these organizations (with volunteer and private sector input where deemed appropriate) intended to improve the health of local populations and reduce health inequalities. The programs offered a 3-year plan for identifying local health needs and developing relevant strategies to improve health and health care services at the local level. HIMPs were founded on the basis of multi-agency partnerships between local government and strategic health authorities.</li> <li>» New Deal for Communities (NDC): part of the Neighbourhood Renewal Strategy, developed to tackle health and social inequalities experienced by the 39 most deprived communities in the UK. In partnership with local communities, the NDC sought to address embedded issues of deprivation and long-term poverty by improving outcomes in terms of housing, education, employment, and health. Interventions focused mainly on promoting healthy lifestyles, enhancing service provision, developing the health workforce, and working with young people.</li> </ul>

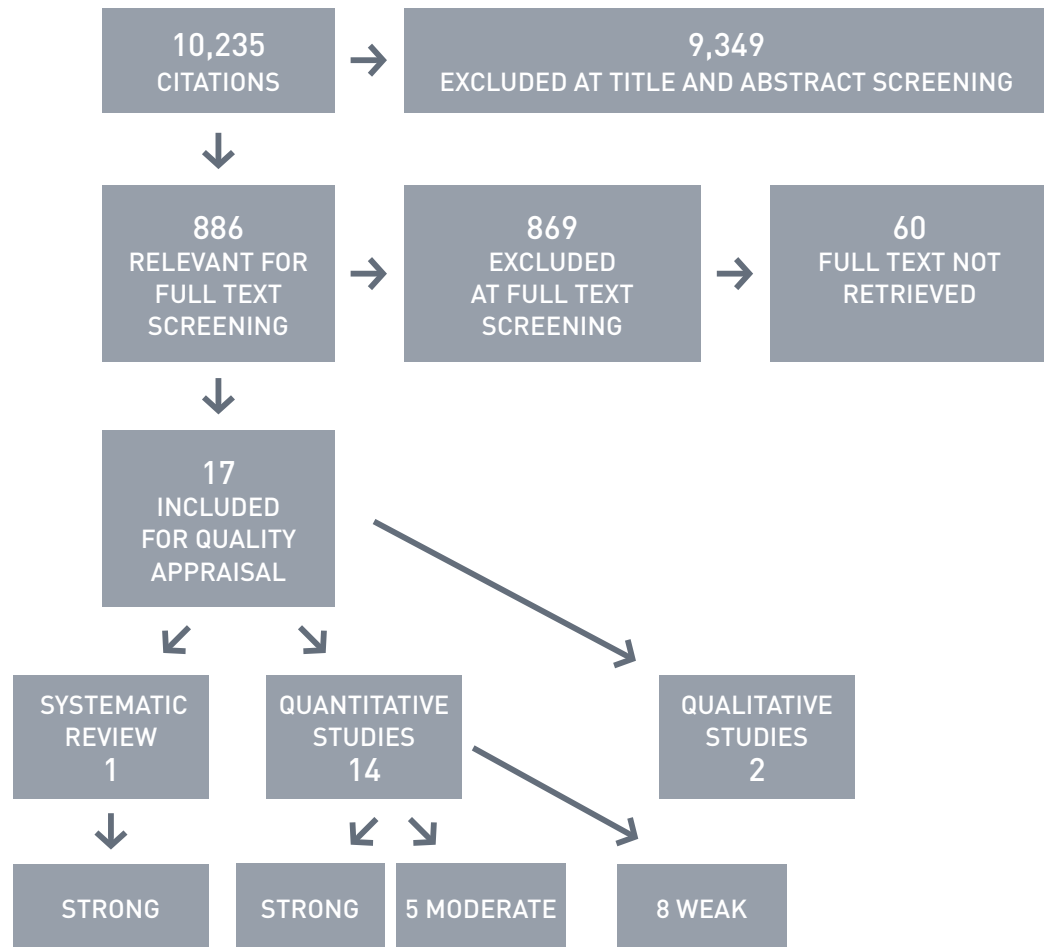
**Table 2: Characteristics of Included Studies con't**

Interventions	<ul style="list-style-type: none"> <li>» Health Education Authority Integrated Purchasing Programme: developed by the Health Education Authority and operational between 1996 and 1999. The overall aim was to support partnerships between local authorities, primary care groups, and health authorities in improving health. Five demonstration projects were launched, each involving a local partnership to tackle health inequalities. Other elements of the program included a national Practice Exchange Network, a learning and dissemination program, and a knowledge resource base.</li> <li>» Healthy Living Centres (HLCs): introduced in 1998 to tackle the broader determinants of health inequalities and to improve health and well-being at the local level. Funding was awarded for 352 community projects, which varied in terms of their focus, ranging from service-related issues to activities addressing unemployment, poverty, and social exclusion. Working in partnership was presented as an underpinning concept of HLCs. The interventions included health-focused projects such as a physical activity outreach program in rural communities; support programs such as the Community Health Information Project, which trained members of the local community to act as ambassadors for the HLCs; and services such as "bumps to babies," which provided midwifery and health visiting services for young families. Although some HLCs were still in existence at the time the systematic review was performed, a lack of clarity about funding meant that the future of many HLCs was unclear.</li> <li>» National Healthy School Standard: led by a partnership between the Department of Health, the Department for Education and Skills, and the Health Development Agency. Its three key objectives were to raise pupil achievement, to promote social inclusion, and to contribute to reducing health inequalities.</li> </ul>
Outcomes	<p>Four of the 15 studies included a quantitative element and produced a mixed picture of the impacts of partnerships.</p> <p>Qualitative studies suggested that some partnerships increased the profile of health inequalities on local policy agendas.</p> <p>The variation in design of the partnership interventions and of their evaluations made it difficult to assess whether the observed impacts resulted from the partnerships.</p>
Social determinants of health	Interventions addressed a range of determinants of health such as social exclusion, income, employment, housing, and poverty.
Population health approach to health equity	Targeted

Table 2: Characteristics of Included Studies con't

<b>Authors</b>	Wills et al. 2010 <sup>35</sup>
<b>Title</b>	Improving school readiness with the Before School Check: early experience in Hawke's Bay
<b>Methods</b>	<b>Design:</b> Cohort <b>Follow-up:</b> 1 month after intervention and each month thereafter for 10 months <b>Years of data collected:</b> 1
<b>Location</b>	<b>Country:</b> New Zealand <b>Setting:</b> Health district (largely rural population)
<b>Participants</b>	<b>Sample:</b> All preschool children in Hawke's Bay. In 2006, there were 34,101 children and approximately 2,200 deliveries in the region, with 56% of babies born being categorized in New Zealand Deprivation Index deciles 8-10.
<b>Intersectoral action</b>	<b>Time frame:</b> 2009 <b>Sectors:</b> Public health; primary health and non-governmental organizations (social services) <b>Pattern of relationships between sectors:</b> Cooperation <b>Activities and relationships:</b> Hawke's Bay District Health Board used a formal tendering process to select the program provider (Hawke's Bay Primary Health Organization). Clinical advisory groups (with numerous representatives from health, education, and social services) were formed and were described as critical to success of the program (through engagement and commitment of stakeholders). Training was delivered by public health personal, primary health care providers, academia, and consultants. Program was promoted by public health and health staff within existing service delivery. Data collection and evaluation were performed by Hawke's Bay Primary Health Organization. <b>Role of public health:</b> Leadership for other stakeholders, training of nurses to perform screening, active promotion of the program within existing service delivery, creation of clinical advisory group <b>Public health individuals involved:</b> Public health nurse, program manager
<b>Interventions</b>	Before-School Check: screening program for school readiness, including child health questionnaire, vision, hearing, and oral health screening, measurement of height and weight, assessments of behaviour (with the Strength and Difficulties Questionnaire) and of development (with the Parent Evaluation of Developmental Status), health promotion and education, and referrals as indicated.
<b>Outcomes</b>	At baseline: Data reported in graph format; checks and referrals appear to be below 10%. Estimated effect of program: 1,848 checks (84% of cohort) completed over the 10-month intervention period; 50% referral rate maintained.
<b>Subgroup analyses</b>	Income quintile 1: 110% screened Income quintile 2: 90% screened Income quintile 3: 90% screened Income quintile 4: 80% screened Income quintile 5: 75% screened
<b>Tools, mechanisms, and strategies for intersectoral action</b>	<b>Initiation:</b> Based on piloted programs <b>Implementation:</b> Clinical advisory group, promotion of activities within existing programs
<b>Social determinants of health</b>	Early childhood development, health services
<b>Level of intervention</b>	Downstream
<b>Population health approach to health equity</b>	Mixed
<b>Cost</b>	Not specified

Figure 1: Search Results



## Appendix 1: Search Strategy

### MEDLINE-OVID

JANUARY 5, 2012

1. (multisectoral or multi-sectoral).tw.
2. (collaboration or collaborative).tw.
3. (cooperation or co-operation or cooperative or co-cooperative).tw.
4. cross-sectoral.tw.
5. (horizontal adj3 management).tw.
6. (horizontal management or horizontal organization).tw.
7. whole of government.tw.
8. joined up.tw.
9. (interministerial or inter-ministerial).tw.
10. (interagency or inter-agency).tw.
11. (integrated adj (health or healthcare)).tw.
12. (intersector\* or inter-sector\*).tw.
13. (interdepartmental or inter-departmental).tw.
14. or/1-13
15. \*interprofessional relations/ or \*interdisciplinary communication/
16. \*interdepartmental relations/ or \*interinstitutional relations/
17. \*Cooperative Behavior/
18. \*\*"Delivery of Health Care, Integrated"/og, td [Organization & Administration, Trends]
19. multi-agency.tw.
20. or/15-19
21. 14 or 20
22. public health.mp.
23. public health/ or preventive medicine/
24. exp \*"delivery of health care"/og, td
25. Community Medicine/og [Organization & Administration]
26. exp \*Community Health Services/og, td [Organization & Administration, Trends]
27. public health administration/ or \*health services accessibility/
28. or/22-27
29. Healthcare Disparities/
30. ((health or healthcare) adj2 (equity or inequit\* or equality or inequalit\* or disparit\*)).tw.
31. "social determinants".tw.
32. exp \*Socioeconomic Factors/
33. "socioeconomic determinants".tw.
34. socioeconomic factors.tw.
35. or/29-34
36. 28 or 35
37. 21 and 36
38. "health in all policies".tw.
39. 37 or 38
40. animals/
41. 39 not 40
42. limit 41 to (english or french)
43. limit 42 to (comment or editorial or in vitro or letter or video-audio media or webcasts)
44. 42 not 43
45. Developing Countries/
46. exp africa/ or exp caribbean region/ or exp central america/ or exp latin america/ or south america/ or exp antarctic regions/ or exp asia/
47. or/45-46
48. 44 not 47
49. limit 48 to yr="2001 -Current"
50. limit 49 to "review articles"
51. meta-analysis.pt,ti,ab,sh.
52. (meta anal\$ or metaanal\$).ti,ab,sh.
53. ((methodol\$ or systematic\$ or quantitativ\$) adj3 (review\$ or overview\$ or survey\$)).ti.
54. ((methodol\$ or systematic\$ or quantitativ\$) adj3 (review\$ or overview\$ or survey\$)).ab.
55. ((pool\$ or combined or combining) adj (data or trials or studies or results)).ti,ab.
56. (medline or embase or cochrane or pubmed or pub med).ti,ab.
57. or/54-56
58. review.pt,sh.
59. 57 and 58
60. or/51-53
61. 59 or 60
62. 49 and 61
63. 50 not 62
64. 49 not 63

**EMBASE-OVID**  
**JANUARY 6, 2012**

1. (multisectoral or multi-sectoral).tw.
2. (collaboration or collaborative).tw.
3. (cooperation or co-operation or cooperative or co-cooperative).tw.
4. cross-sectoral.tw.
5. (horizontal adj3 management).tw.
6. (horizontal management or horizontal organization).tw.
7. whole of government.tw.
8. joined up.tw.
9. (interministerial or inter-ministerial).tw.
10. (interagency or inter-agency).tw.
11. (integrated adj (health or healthcare)).tw.
12. (intersector\* or inter-sector\*).tw.
13. (interdepartmental or inter-departmental).tw.
14. or/1-13
15. \*public relations/
16. \*interdisciplinary communication/
17. exp \*cooperation/
18. integrated health care system/
19. multi-agency.tw.
20. or/15-19
21. 14 or 20
22. community medicine/ or preventive medicine/ or public health/
23. public health.mp.
24. health care disparity/
25. ((health or healthcare) adj2 (equity or inequit\* or equality or inequalit\* or disparit\*)).tw.
26. or/22-25
27. 21 and 26
28. "social determinants".tw.
29. "socioeconomic determinants".tw.
30. \*"social aspects and related phenomena"/ or \*social aspect/ or exp \*social status/ or exp \*socioeconomics/
31. or/28-30
32. 21 and 31
33. "health in all policies".tw.
34. 27 or 32 or 33
35. animal/ or animal experiment/
36. 34 not 35
37. limit 36 to (english or french)
38. limit 37 to (book or book series or conference abstract or editorial or letter or note)
39. 37 not 38
40. limit 39 to yr="2001 -Current"
41. limit 40 to (meta analysis or "systematic review")
42. limit 40 to "review"
43. meta analysis/
44. meta-analysis.ti,ab.
45. (meta anal\$ or metaanal\$).ti,ab.
46. ((methodol\$ or systematic\$ or quantitativ\$) adj3 (review\$ or overview\$ or survey\$)).ti.
47. ((methodol\$ or systematic\$ or quantitativ\$) adj3 (review\$ or overview\$ or survey\$)).ab.
48. ((pool\$ or combined or combining) adj (data or trials or studies or results)).ti,ab.
49. (medline or embase or cochrane or pubmed or pub med).ti,ab.
50. or/47-49
51. review.pt,sh.
52. 50 and 51
53. or/43-46
54. 52 or 53
55. 40 and 54
56. 41 or 55
57. 42 not 56
58. 40 not 57



## COCHRANE CENTRAL-OVID

JANUARY 31, 2012

1. (multisectoral or multi-sectoral).tw.
2. (collaboration or collaborative).tw.
3. (cooperation or co-operation or cooperative or co-cooperative).tw.
4. cross-sectoral.tw.
5. (horizontal adj3 management).tw.
6. (horizontal management or horizontal organization).tw.
7. whole of government.tw.
8. joined up.tw.
9. (interministerial or inter-ministerial).tw.
10. (interagency or inter-agency).tw.
11. (integrated adj (health or healthcare)).tw.
12. (intersector\* or inter-sector\*).tw.
13. (interdepartmental or inter-departmental).tw.
14. or/1-13
15. \*interprofessional relations/ or \*interdisciplinary communication/
16. \*interdepartmental relations/ or \*interinstitutional relations/
17. \*Cooperative Behavior/
18. \*"Delivery of Health Care, Integrated"/og, td [Organization & Administration, Trends]
19. multi-agency.tw.
20. or/15-19
21. 14 or 20
22. public health.mp.
23. public health/ or preventive medicine/
24. exp \*"delivery of health care"/og, td
25. Community Medicine/og [Organization & Administration]
26. exp \*Community Health Services/og, td [Organization & Administration, Trends]
27. public health administration/ or \*health services accessibility/
28. or/22-27
29. Healthcare Disparities/
30. ((health or healthcare) adj2 (equity or inequit\* or equality or inequalit\* or disparit\*)).tw.
31. "social determinants".tw.
32. exp \*Socioeconomic Factors/
33. "socioeconomic determinants".tw.
34. socioeconomic factors.tw.
35. or/29-34
36. 28 or 35
37. 21 and 36
38. "health in all policies".tw.
39. 37 or 38
40. animals/
41. 39 not 40
42. limit 41 to (english or french)
43. limit 42 to (comment or editorial or in vitro or letter or video-audio media or webcasts)
44. 42 not 43
45. Developing Countries/
46. exp africa/ or exp caribbean region/ or exp central america/ or exp latin america/ or south america/ or exp antarctic regions/ or exp asia/
47. or/45-46
48. 44 not 47
49. limit 48 to yr="2001 -Current"

**CINAHL-EBSCO****JANUARY 7, 2012**

- S1 TX ( multisectoral OR multi-sectoral ) OR TX ( collaboration OR collaborative ) OR TX ( cooperation OR co-operation OR cooperative OR co-cooperative ) OR TX cross-sectoral
- S2 TX horizontal N3 management OR TX ( horizontal management OR horizontal organization ) OR TX whole of government OR TX joined up
- S3 TX ( interministerial OR inter-ministerial ) OR TX ( interagency OR inter-agency ) OR TX ( intersector\* OR inter-sector\* ) OR TX ( interdepartmental OR inter-departmental )
- S4 TX integrated health OR TX intergrated healthcare
- S5 (MM "Interprofessional Relations")
- S6 (MM "Interdepartmental Relations") OR (MM "Interinstitutional Relations")
- S7 (MM "Cooperative Behavior")
- S8 (MM "Health Care Delivery, Integrated")
- S9 "multi-agency"
- S10 S1 or S2 or S3 or S4
- S11 S5 or S6 or S7 or S8 or S9
- S12 S10 or S11
- S13 (MM "Preventive Health Care") OR (MH "Public Health")
- S14 (MH "Public Health Administration")
- S15 (MM "Community-Institutional Relations") OR (MM "Community Networks/AM")
- S16 (MM "Community Health Services+")
- S17 TX public health
- S18 S13 or S14 or S15 or S16 or S17
- S19 "economic disparities"
- S20 "healthcare disparities"
- S21 MM "Health Services Accessibility"
- S22 (MM "Socioeconomic Factors+")
- S23 TX social determinants
- S24 TX socioeconomic determinants
- S25 TX health equity OR TX health inequ\* OR TX health equality OR TX health disparit\*
- S26 TX healthcare equity OR TX healthcare inequ\* OR TX healthcare equality OR TX healthcare disparit\*
- S27 TX health care equity OR TX health care inequ\* OR TX health care equality OR TX health care disparit\*
- S28 S19 or S20 or S21 or S22 or S24 or S25 or S26 or S27
- S29 S18 or S28
- S30 S12 and S29
- S31 S12 and S29 Limiters - Published Date from: 20010101-20120131; Human; Language: English, French
- S32 S12 and S29 Limiters - Publication Type: Anecdote, Biography, Book, Book Chapter, Book Review, Editorial, Letter, Masters Thesis, Obituary, Pamphlet, Website
- S33 S31 NOT S32
- S34 MH developing countries
- S35 S33 NOT S34
- S36 TI africa OR TI India OR TI Asia
- S37 S35 NOT S36

**SOCIAL SCIENCE ABSTRACTS-EBSCO**  
**JANUARY 17, 2012**

	Query	Limiters/Expanders
S35	S31 NOT S34	Search modes - Boolean/Phrase
S34	S32 or S33	Search modes - Boolean/Phrase
S33	TI India* OR TI Africa* OR TI China OR TI Asia* OR TI Latin America* OR TI chinese	Limiters - Publication Date: 20010101-20120131 Search modes - Boolean/Phrase
S32	SU developing countries	Limiters - Publication Date: 20010101-20120131 Search modes - Boolean/Phrase
S31	S28 or S29	Limiters - Publication Date: 20010101-20120131 Search modes - Boolean/Phrase
S30	S28 or S29	Search modes - Boolean/Phrase
S29	SU Integrated delivery of health care	Search modes - Boolean/Phrase
S28	S8 and S14	Search modes - Boolean/Phrase
S27	S8 and S26	Search modes - Boolean/Phrase
S26	S24 and S25	Search modes - Boolean/Phrase
S25	TX health OR TX healthcare OR TX health care OR SU health care OR SU healthcare	Search modes - Boolean/Phrase
S24	S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23	Search modes - Boolean/Phrase
S23	TX healthcare equit* OR TX health care inequ* OR TX health care dispar* OR TX health care equal* OR TX health care inequal*	Search modes - Boolean/Phrase
S22	TX healthcare equit* OR TX healthcare inequ* OR TX healthcare dispar* OR TX healthcare equal* OR TX healthcare inequal*	Search modes - Boolean/Phrase
S21	TX health equit* OR TX health inequ* OR TX health dispar* OR TX health equal* OR TX health inequal*	Search modes - Boolean/Phrase
S20	SU health indicators	Search modes - Boolean/Phrase
S19	TX "socioeconomic determinants" OR TX "socioeconomic factors"	Search modes - Boolean/Phrase
S18	SU socioeconomic determinants OR SU socioeconomic factors	Search modes - Boolean/Phrase
S17	TX "social determinants"	Search modes - Boolean/Phrase
S16	SU income distribution	Search modes - Boolean/Phrase
S15	SU health and social status	Search modes - Boolean/Phrase
S14	S9 or S10 or S11 or S12 or S13	Search modes - Boolean/Phrase
S13	SU community health services	Search modes - Boolean/Phrase
S12	"preventive medicine"	Search modes - Boolean/Phrase
S11	SU health services accessibility	Search modes - SmartText Searching
S10	SU health promotion	Search modes - Boolean/Phrase
S9	SU public health administration OR SU public health OR TX public health	Search modes - Boolean/Phrase
S8	S1 or S2 or S3 or S4 or S5 or S6 or S7	Search modes - Boolean/Phrase
S7	SU Interprofessional cooperation OR SU health care teams	Search modes - Boolean/Phrase
S6	SU Cooperative Behavior	Search modes - Boolean/Phrase
S5	TX ( (interdepartmental or inter-departmental) ) OR TX integrated health OR TX integrated healthcare OR TX "integrated health care"	Search modes - Boolean/Phrase
S4	{ (interministerial or inter-ministerial) } OR { (interagency or inter-agency) } OR { (intersector* or inter-sector*) }	Search modes - Boolean/Phrase
S3	TX horizontal N2 organization OR TX "whole of government" OR TX "joined up"	Search modes - Boolean/Phrase
S2	horizontal N3 management	Search modes - Boolean/Phrase
S1	TX { (multisectoral or multi-sectoral) } OR TX { (collaboration or collaborative) } OR TX { (cooperation or co-operation or cooperative or co-operative) } OR TX cross-sectoral	Search modes - Boolean/Phrase

## Appendix 2: Grey Literature Search

**Search Terms:** *intersectoral, inter-sectoral, interagency, inter-agency, collaboration, "health in all", "joined up"*

<http://cadth.ca/en/cadth>

**Canadian Agency for Drugs and Technologies in Health**

[www.chspr.ubc.ca/node/106](http://www.chspr.ubc.ca/node/106)

**UBC Centre for Health Services and Policy Research**

[www.phac-aspc.gc.ca](http://www.phac-aspc.gc.ca)

**Public Health Agency of Canada**

[www.apha.ab.ca](http://www.apha.ab.ca)

**Alberta Public Health Association**

[www.gov.mb.ca/health/index.html](http://www.gov.mb.ca/health/index.html)

**Manitoba Health**

[www.phabc.org/](http://www.phabc.org/) Public Health

**Association of BC**

[www.actnowbc.ca](http://www.actnowbc.ca)

**Act Now BC**

[www.opha.on.ca](http://www.opha.on.ca)

**Ontario Public Health Association**

[www.aohc.org/](http://www.aohc.org/)

**Association of Ontario Health Centres**

[www.health.gov.nl.ca/health/](http://www.health.gov.nl.ca/health/)

**Newfoundland and Labrador, Department of Health and Community Services**

[www.gov.ns.ca/DHW/](http://www.gov.ns.ca/DHW/)

**Nova Scotia, Department of Health and Wellness**

[www.health.alberta.ca/](http://www.health.alberta.ca/)

**Government of Alberta, Health and Wellness, Saskatchewan Health Quality Council**

[www.ices.on.ca/index.html](http://www.ices.on.ca/index.html)

**Institute for Clinical Evaluative Sciences**

[www.ihe.ca/publications/library](http://www.ihe.ca/publications/library)

**Institute of Health Economics, Health Technology Assessment Unit, Alberta**

[www.dh.gov.uk/health](http://www.dh.gov.uk/health)

**UK, Department of Health**

[www.institute.nhs.uk](http://www.institute.nhs.uk)

**UK, National Health Service Institute for Innovation and Improvement**

<http://kingsfund.koha-ptfs.eu>

**UK, The King's Fund Library Database**

[www.health.govt.nz/](http://www.health.govt.nz/)

**New Zealand, Ministry of Health**

[www.pha.org.nz/](http://www.pha.org.nz/)

**Public Health Association of New Zealand**

<http://library.aifs.gov.au/>

**Australian Institute of Family Studies Library**

[www.sweden.gov.se/sb/d/2061](http://www.sweden.gov.se/sb/d/2061)

**Sweden, Ministry of Health and Social Affairs**

[www.fhi.se/en/](http://www.fhi.se/en/)

**Swedish National Institute of Public Health**

[www.regjeringen.no/en/dep/hod.html](http://www.regjeringen.no/en/dep/hod.html)

**Norway, Ministry of Health and Care Services**

[www.fhi.no/eway](http://www.fhi.no/eway)

**Norwegian Institute of Public Health**

<http://dsi.dk/english/>

**Danish Institute for Health Services Research**

[www.si-folkesundhed.dk/0m%20instituttet.aspx](http://www.si-folkesundhed.dk/0m%20instituttet.aspx)

**Danish National Institute of Public Health**

[www.ktl.fi/portal/english/ktl/](http://www.ktl.fi/portal/english/ktl/)

**Finland, National Institute for Health and Welfare**









National Collaborating Centre  
for Determinants of Health

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Centre de collaboration nationale  
des déterminants de la santé

**NATIONAL COLLABORATING CENTRE FOR DETERMINANTS OF HEALTH**

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