

Evidence *in* Context

Issue: Childhood Obesity
Released: March 2009

Health research — synthesized and contextualized for use in Newfoundland and Labrador

CHRSP

About NLCAHR's Contextualized Health Research Synthesis Program

The Newfoundland and Labrador Centre for Applied Health Research is working with decision makers in the provincial health system to identify and address issues of pressing interest to Newfoundland and Labrador on which guidance from the research evidence is important. These issues are being addressed through the Contextualized Health Research Synthesis Program (CHRSP).

CHRSP analyzes the findings of high-level research (systematic reviews, meta-analyses and health technology assessments) that has already been done on the issue in question. The findings of these studies are synthesized and are subjected to a systematic process of 'contextualization': they

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Synthesis Topic

Preventing and Treating Childhood Overweight and Obesity in NL

Newfoundland & Labrador (NL) has the highest prevalence of overweight and obesity for adults and children among the provinces of Canada.

Since the 1980's, childhood overweight has increased by 28% and obesity by 175%. Nearly 80% of middle-school and high-school children in the province do not get enough exercise, and it is estimated that only a quarter of children and adolescents are physically active at all in their spare time.

The causes of the current growth in childhood obesity are complex and interrelated. NL exhibits all the major clusters of risk factors for childhood overweight and obesity.

Overweight and obesity have significant health consequences involving increases in the risk of weight-related diseases. These diseases accounted for \$1.6B in direct costs to the Canadian health care system, and \$4.3B in indirect costs to the country as a whole. From 1985 to

2000, it is estimated that the number of deaths in NL related to overweight and obesity increased 58.9%. Since a child who becomes overweight or obese is less likely to return to a healthy weight status, childhood obesity presents significant long-term health and economic challenges to the province.



A wide and diverse range of prevention and treatment interventions has been developed to address childhood overweight and obesity. The purpose of this synthesis is to summarize the research findings on the prevention and treatment of childhood obesity, with the goal of informing policy and program design.

The review is not intended to recommend any specific intervention over any other, or to evaluate existing programs. The findings of this synthesis are intended to provide information that can be used in making decisions about how to develop, implement and modify childhood obesity interventions.

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The Research Question

“What types of non-clinical interventions to prevent and treat childhood overweight and obesity have been found to be effective? How do the findings relate to the context of Newfoundland & Labrador?”

About Childhood Obesity

Causes and Consequences

As previously noted, the causes of the current growth in childhood obesity are complex and interrelated. They include: individual and family weight histories; “obesogenic” environments that are conducive to low rates of physical activity, high rates of sedentary behaviour, and poor nutrition choices; social influences; and socio-economic gradients at the population level.

Known health consequences of obesity include increases in the risk of weight-related diseases, including hypertension, Type II diabetes and coronary artery disease (see table 2).

Focus of the Synthesis

What We Looked At

Research Review

The project team looked at systematic reviews, meta-analyses, and other reviews published between 2000 and 2008 that studied prevention and treatment interventions for childhood and adolescent overweight and/or obesity. Documents were identified through strategies for searching periodical indexes, hand-searching of review catalogues, and cross-referencing of academic literature and government reports.

The main outcomes of interest for this report were: impact on adiposity (fat tissue), reliability, scalability, lasting effects, intermediate factors related to sub-groups, and meta-effects related to settings. Reviews were evaluated for methodological rigour and for relevance to the topic, and were weighted accordingly in the synthesis.

Sources of Evidence

The results of the review studies were grouped into two themes: prevention interventions and treatment interventions and the thematic findings were assessed using a three-part scale. In total, 33 review papers were identified and of these 26 –reporting on approximately 400 individual research projects– were included in the current synthesis.

Limitations of the Evidence

Despite the large number of primary research studies and review papers, the literature was found to be disappointing in quality, characterized by a significant lack of rigour in research design at the individual study level, heterogeneity of treatment interventions, a lack of appropriate control groups for comparison, and an absence of attention to long-term follow-up.

Putting the Evidence Into Context

A contextualization panel, consisting of local experts with a history of involvement in childhood overweight and obesity, reviewed the research synthesis to identify variables and results that were of special relevance to Newfoundland & Labrador, to assess the feasibility of various interventions here, and to suggest examples of relevant programs in the province. The contextualization panel was consulted during the successive drafts of the report for feedback and additional contextual information.

Findings

Overall effectiveness and Adverse effects

The current available evidence does not support the overall effectiveness of interventions for the *prevention* of childhood obesity. Several critical limitations in research design account for much, if not most, of this finding, in particular the lack of a consistent definition for obesity prevention.

The evidence does, however, support the overall effectiveness of childhood obesity *treatment*. Although similar limitations prevent the most methodologically demanding systematic reviews from drawing unequivocal conclusions regarding effectiveness, most reviews do find consistent evidence that obesity treatment in general has a positive impact on body weight status.

The consistent lack of adverse effects from childhood obesity treatment interventions is an important finding for decision makers. Although often overlooked in the research literature, the lack of adverse effects indicates that there are few, if any, risks to delivering well designed childhood obesity interventions. As a result, the review literature is unanimous in recommending treatment interventions rather than inaction. Given the high and increasing rates of childhood obesity and overweight in NL, this is an important finding.

Physical activity

The review literature indicates that increasing physical activity (PA) is consistently effective for childhood obesity treatment. Increasing PA for prevention shows inconsistent results, with compulsory PA (instead of voluntary) having the best outcomes. While there is no evidence that a specific PA strategy for childhood obesity treatment is the most effective, structured PA has better outcomes than unstructured PA.

In NL, motorized transportation and sedentary behaviour increase the need to have accessible venues where children can engage in PA. A crucial challenge for prevention and treatment interventions is to find successful strategies for getting children engaged in PA, especially at-risk and overweight children.

Sedentary behaviour

Sedentary behaviour (SB) is defined primarily as “screen time” (television, video games and computer use). Canadian children devote an average of 4-6 hours daily to screen time, accounting for the single largest reduction in PA. Decreasing screen time is an effective

Table 1: Obesity & Overweight prevalence rates for NL children

NL Cohort	1984 (781)			1997 (4171)			% Change		
	Both	Boys	Girls	Both	Boys	Girls	Both	Boys	Girls
Overweight	13.8%	13.7%	14.0%	17.7%	16.8%	18.5%	+28.26%	+22.63%	+32.14%
Obese	2.9%	2.8%	3.1%	8.0%	7.8%	8.2%	+175.86%	+178.57%	+164.52%

Source: Canning PM, Courage ML, Frizzell LM. Prevalence of overweight and obesity in a provincial population of Canadian preschool children. *Can. Med. Assoc. J.* 2004; 171 (3): 240-242.

way to slow gains in childhood body weight and has been shown to produce modest but consistent improvements in body weight status. The review literature suggests that, unlike the case for PA, decreasing SB is more effective when the alternative activities are left unstructured.

The availability of television, video games and internet access in the province facilitates weight gain, but they also represent focused opportunities for intervention programs. Decreasing SB may represent an important target for intervention.

Nutrition

Nutrition education for childhood obesity prevention and treatment is, by itself, insufficient to change body weight status. However, changes to nutrition choices through structured diets and other behavioural modifications do show modest but consistent effects on childhood obesity and overweight. Environmental changes in nutrition choices in NL, e.g., nutrition guidelines for schools, are consistent with these findings and can be expected to contribute to improving body weight status.

Behaviour modification

The research evidence shows that overweight and obese children have an increased need for skills to change their behaviour and to maintain those changes.

As a result, childhood obesity treatment interventions that incorporate behaviour modification techniques, regardless of the intervention strategy, are more effective than those that do not. NL has a broad and deep range of risk factors for overweight and obesity, so that any treatment intervention will be working against the influence of obesity promoting customs and environments.

Behaviour modification skills can be expected to play an important role in achieving and maintaining healthy body weights in the context of those influences.

Duration & scalability

There is inconsistent evidence on the effectiveness of obesity interventions of differing durations. However, the review literature concludes that, until there is robust evidence indicating otherwise, longer treatment durations are expected to be more effective.

Given the number and persistence of risk factors in the province, childhood obesity prevention and treatment interventions in NL may be expected to be more effective if they are implemented over relatively long timeframes, e.g., for the duration of the school year.

Specialized training

Relatively little research has been dedicated to the impact of specialized training for program leaders in programs of childhood obesity prevention, for example teachers. What evidence exists indicates that specialist training for program leaders increases the effectiveness of program delivery. The evidence also indicates that access for program leaders to do consultations with specialists may also enhance the effectiveness of obesity prevention initiatives.

Intervention setting

Families and schools are two key settings for childhood obesity prevention and treatment interventions. Although it is clear that family plays a role in children's body weight, the review literature

shows its role to be complex and inconsistent. The evidence indicates that integrating family into obesity treatment interventions may enhance effectiveness, but more so with children than with adolescents.

Schools are the most common setting for childhood obesity prevention and treatment interventions. There is inconsistent evidence that school settings contribute to the effectiveness of childhood obesity prevention, but the lack of positive findings may be more related to methodological challenges than to actual effect sizes.

In the research literature, schools are implicitly accepted as effective settings but are rarely found to contribute independently to the effectiveness of the intervention. There is some evidence that schools are effective at the population level for treating childhood obesity and that they represent the most cost-effective access points to children and adolescents.

Specialized settings, such as clinics or camps, were found to be more effective for treatment at the individual level.

Intervention design

The research literature consistently recommends that childhood obesity prevention and treatment interventions should be: a) tailored for the target population and b) multi-faceted and with limited outcome objectives. Although direct evidence supporting these contentions is limited, the review literature finds indirect evidence in the prevalence of inconsistent findings in the predominantly single-component research literature.

The primary variables for tailoring childhood obesity interventions are age, gender and ethnicity. Group-appropriate programming is considered critical for successfully engaging and recruiting children and adolescents. Limited evidence indicates that prevention and treatment interventions are more effective if they include multiple, independent and integrated program components that address the individual's physical and dietary behaviour, as well as family, social and environmental factors.

The same evidence indicates that interventions are more effective if they have a small number of objectives specifically related to bodyweight rather than being part of a broader lifestyle intervention.

CHRSP Project Team: Childhood Overweight & Obesity

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see the full CHRSP report for additional contextualization consultants & advisors for this project:

www.nlcahr.mun.ca/research/chrsp

Implications For Decision Makers

The evidence increasingly shows the causes of childhood obesity to be complex and inter-related. As a result, addressing childhood obesity will require prevention and treatment interventions that can address the multiple and linked causes. The individual intervention components reviewed in this synthesis are characterized by limited or inconsistent effectiveness. This finding indicates that truly effective prevention and treatment will need to integrate a range of intervention strategies.

Although there is a consensus that prevention efforts are both needed and worth the time and resources required, the research literature does not provide sufficiently robust evidence to support any one type of childhood obesity prevention program or strategy over all others. The full CHRSP report provides details on best practices for implementing prevention efforts. Interventions that are multi-component in nature but focused on a limited set of objectives should be prioritized, and prevention strategies targeted to specific participant groups will be more effective.

The research literature is unequivocal in recommending treatment for obese children. Although there is no consensus on the most effective treatment designs, several treatment components have demonstrated successful outcomes. Multi-component and longer-term interventions are more successful at reducing rates of obesity; treatment design should include components that increase calorie expenditure and integrate behaviour modification strategies. The school environment provides an efficient and economical setting for childhood obesity treatment programs. Nutrition education and reduced access to fat-rich/sugar-rich foods, as well as increased access to healthy foods in the school environment, may facilitate healthier eating habits.

Finding opportunities for children and adolescents to be physically active and/or reduce sedentary behaviour is critical to balancing the energy equation that leads to overweight and/or obesity.

Given the dramatic increase in obesity rates over the last few decades in adults and children alike, and the health risks associated with obesity, it is evident that waiting for better evidence is not an option. The importance of tailoring interventions to culture, as well as to age and sex, indicates that effective prevention and treatment programs for Newfoundland & Labrador will need to be designed, at least in part, right here. Any interventions that are implemented should include an evaluation component to develop a local evidence base, both to refine existing interventions and to address the limitations in the available research.

Table 2: Health Consequences of Obesity

Disease	Summary Relative Risk ¹	95% Confidence Interval	Population Attributable Risk ² (%)
Hypertension	4.50	4.15 – 4.84	34.0
Type 2 diabetes	3.73	3.45 – 4.06	28.6
Gall bladder disease	3.33	2.86 – 3.85	25.5
Coronary artery disease	2.24	2.04 – 2.45	15.4
Osteoarthritis	1.99	1.76 – 2.24	12.7
Stroke	1.50	1.28 – 1.77	6.8
Colon cancer	1.45	1.23 – 1.71	6.2

Source: C. L. Birmingham, J. L. Muller, A. Palepu, J. J. Spinelli and A. H. Anis. The cost of obesity in Canada. *Can. Med. Assoc. J.* 1999; Vol 160 (4): 483-488.

Notes:

¹The Relative Risk is a comparison of the probability of developing the disease if a person is obese to the probability of developing the disease if not obese; an RR greater than 1 indicates an increased risk of developing the disease.

²The Population Attributable Risk is the expected change in prevalence of a disease in a population if an exposure, i.e. obesity, did not exist.

About CHRSP

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are analyzed in terms of their applicability to the conditions and capacities of the unique context of Newfoundland and Labrador. CHRSP uses a combination of external experts and local networks to synthesize and contextualize the research and to facilitate the uptake of the results by local research users.

The CHRSP Process

CHRSP endeavours to be timely and relevant to research users while ensuring a reliable and comprehensive process. Our goal is to produce a synthesis report within six months of topic identification.

When the synthesis is complete, an external expert reviews the work of the project team, providing feedback to ensure validity. The results of the synthesis project are then communicated to the province's decision makers and health professionals in formats and forums designed to maximize their uptake into the decision-making process.

For the complete CHRSP report on this project, including details on the evidence reviewed by the project team, see the NLCAHR website:

www.nlcahr.mun.ca/research/chrsp

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