



**FINAL REPORT**

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## MAIN RESEARCH AND POLICY RESULTS

- Establishment of the Canadian Adolescents At Risk Research Network as an applied research and policy network, being recognized by stakeholders in Canadian adolescent health settings.
- Development and testing of research concepts on adolescent risk, resilience and contextual influences of school, home and neighborhood.
- Using a newly developed Multiple Risk Behaviour scale, risk for injury was found to increase in association with number of risk behaviours. These findings have implications for injury prevention programming.
- Overweight and obese adolescents were found to be more likely to be victims and perpetrators of bullying behaviors than their normal weight peers.
- Positive school climate, combined with low school pressure, were found to have positive effects on academic achievement, bullying, psychosomatic symptomatology and emotional health.
- Perceived neighbourhood social capital exhibited a moderating effect on the association between risk taking and poor self-reported health.
- Increased risk for girls' pregnancy was associated with: not living with both parents; perceptions of being 'wealthy'; having sex under pressure; low self-confidence; and having multiple partners.
- Health promotion programs about health risk behaviours for adolescents in the general population were found to be unsuitable for adolescents with physical disabilities.
- Advancement of the World Health Organization Health Behaviour in School-aged Children survey as a national monitoring and analysis tool for adolescent health, as well as a student resource.
- Provision of support and advice to the National Children's Alliance regarding the development of a national adolescent health policy agenda.
- Productive research relationship with the United States Health Behaviour in School-aged Children research team to investigate common policy concerns in North America (e.g., injury policy, physical education policy, nutrition policy, bullying policy).
- Completion of a book on adolescent health policy in Canada.

## EXECUTIVE SUMMARY

Adolescence is a time of transition and the dynamics of physical, psychological, social, and vocational changes are complex. The Canadian Adolescents At Risk Research Network (CAARRN) aims to improve understanding of the complex interrelationships of influences that impact on the health status and daily lives of adolescents, and to facilitate policy development in these areas.

The CAARRN program of research and policy support uses the World Health Organization's Health Behaviour in School-aged Children (HBSC) survey as a core database to provide evidence on key issues in adolescent health nationally and internationally. Other Canadian databases supplement the HBSC survey, including the Canadian Youth Sexual Health HIV/AIDS Survey. CAARRN specifically focuses on seven content areas: injuries; disabilities and chronic conditions; bullying and victimization; obesity; social capital; school setting; and, sexual health.

Very little attention has been paid to developing adolescent health policy that is based on current Canadian data. Additionally, there are few conceptual frameworks for adolescent development, from a policy perspective, that adequately span the transitional nature of this group. The knowledge developed through the Canadian Adolescents At Risk Research Network, apart from its value as basic research, is enhancing our understanding of appropriate foci for, and timing of, preventive interventions and the extent to which interventions must be specifically tailored to different sub-populations related to gender and disability.

CAARRN has highlighted adolescence as a crucial transitional stage to life-long health and has been a very positive experience for researchers and stakeholders, including youth. CAARRN has facilitated a productive research and policy analysis of the main issues in adolescent health development in Canada. In the future, CAARRN will continue as a Canadian focal point for adolescent health research, with infrastructure support from the Public Health Agency of Canada and the Canadian Institutes of Health Research. Continued policy interaction with Canadian stakeholders will occur. An adolescent health policy seminar will be held at Queen's University this upcoming fall in conjunction with the launch of the book *Canadian Adolescent Health: Science, Policy & Human Rights*. Collaboration with international groups with similar research and policy mandates will continue to enhance Canadian expertise and policy approaches that can be effective in different environments.

### Summary of Research Findings

Overall, the CAARRN research program focused on the interactions between adolescent risk, adolescent resilience and the contextual influences of school, home and neighborhood. The main findings and implications are as follows:

*Adolescent Risk – What are the predictors of poor health?*

Both Canadian and international studies found clear gradients for injury in regard to the overall number of risk behaviours reported – i.e., a risk-taking youth is more likely to have a negative health outcome (e.g., injury) than one who takes fewer risks in life. This is a good demonstration of the predictive power of the Multiple Risk Behaviour concept – implying that it is not particular risks, but the cumulative number of risks that is useful in predicting youth injury. This general finding needs to be confirmed with other health outcomes such as mental health and subjective health.

Increased risk for pregnancy was associated with girls: not living with both parents; perceptions of being ‘wealthy’; having sex under pressure or coercion; low self-confidence; and having multiple partners.

Same-sex attracted youth were not more likely to take sexual risks than others. However, since there may be an increased opportunity for HIV and other STDs to be introduced into this population (via adults), same-sex attracted youth may ultimately be more at risk of diseases.

Lack of physical activity in youth was more important in predicting obesity/overweight than were dietary habits.

Youth with physical disabilities were more likely to have risky health behaviours, as well as sub-optimal health, and may require targeted health promotion campaigns.

*Adolescent Resilience- What are the protective factors for good health?*

School based studies showed that positive psychosocial adjustment was associated with decreased bullying behaviour and in decreased experiences of being bullied – i.e., youth with good adjustment were more resilient to being bullied by others, and less likely to be bullies themselves. Overweight and obese adolescents were more likely to be both victims and perpetrators of bullying than their peers. The importance of positive emotional health as a tool for youth to cope with their lives is under-scored.

Pregnancy had positive benefits for some young women (although not young men) as some girls perceived increased social status and role acknowledgement in their peer group. Some girls also perceived economic benefits from pregnancy, in terms of access to social welfare benefits, and thus had a positive value on pregnancy.

*Contextual Influence of Place – What external factors influence adolescent health?*

Indicators of positive attachments to home, school and neighborhood peer-group modified the relationship between multiple risk behaviour and injuries, i.e., having a positive attachment to place reduces the chance of negative health outcomes for those engaging in many risk behaviours.

Positive school climate, combined with low school pressure, were found to have positive effects on academic achievement, bullying, psychosomatic symptomatology and emotional health.

Perceived neighbourhood social capital exhibited a moderating effect on the association between risk taking and poor self-reported health, i.e., having higher social capital reduces the chance of poor health for those engaging in many risk behaviours

Even after considering individual predictors of obesity (age, gender, socio-economic status), adolescents who lived in poorer neighbourhoods were more likely to be overweight and obese compared to adolescents who lived in more affluent neighbourhoods.

Overall, behavioural, psychological, social and demographic factors (family structure, sexual orientation, disability) have important influences on youth health, however these are complex and interactive. The positive influence of home, school and neighborhood environments on youth health is encouraging, although the negative influences of poverty and deprivation are serious.

The idea of a clear demarcation between risks and benefits of many health behaviours might be challenged from the youth perspective and should lead to varying conceptualizations of how to measure and model health influences in the future.

## **I. RESEARCH CONTEXT**

Adolescence is a time of transition and the dynamics of physical, psychological, social, and vocational changes are complex, as must be the necessary policy supports. In this important population group, very little attention has been paid historically to developing health policy that is based on current Canadian data. In particular, data that illustrate the influences of school and neighborhood settings, family and peer groups, coping skills, and socio-demographic factors on health behaviours and outcomes have been under-utilized in the formulation of policy.

Secondly, few conceptual frameworks for adolescent development, from a policy perspective, adequately span the transitional nature of this age group. For example, varying legal rights and responsibilities, as illustrated in the wide variance in age of majority across Canada in various sectors (for education, health, social service, transportation, criminal-legal services and rights), complicate the matter of consistent policy development.

Thirdly, in comparison to the early childhood policy community, the attention of funders, researchers and program implementers in adolescent issues has not been focused, nor have comparable resources been directed towards this age group. Consequently, there is a lack of appropriate training opportunities for new researchers and policy analysts.

Finally, there has been insufficient research and policy interaction with other similar countries that could illustrate innovative approaches and advance theoretical and policy development in the area of adolescent health.

In response to these needs and building on existing research collaboration, the Canadian Adolescents At Risk Research Network (CAARRN) was established in August 2001. Since 1989, the Social Program Evaluation Group (SPEG) at Queen's University has conducted the Canadian Health Behaviour in School-aged Children Study (HBSC) with funding from Health Canada's Childhood and Adolescence Division. The HBSC survey, administered internationally every four years, is a major resource for understanding health from the perspective of adolescents. Investigators from Queen's University and the University of Toronto comprise the Canadian team that has played a key role

internationally in this World Health Organization survey as methodology and content experts. As a population health program, CAARRN had four main objectives:

1. Adolescent health policy network development, including training of new researchers to increase analytic capacity;
2. Comparative analysis of international adolescent health data to augment existing Canadian analyses and inform conceptual development of policy relevant research;
3. Dissemination of findings and methodologies to improve utilization of knowledge; and,
4. Infrastructure development to improve access to data and analyses for a range of stakeholders.

## **II. METHODOLOGY**

### **A. Individual Level Studies**

#### **i. Injuries**

Prior to CAARRN, the Canadian Health Behaviour in School-aged Children (HBSC) Study data had been used to demonstrate that strong gradients in risk for youth injury exist in association with multiple risk behaviours, while socio-economic gradients in injury risk are not apparent<sup>23</sup>. Will Pickett and his team extended this work by: 1) performing in-depth analyses of multiple risk behaviours and the potential association with a variety of different youth injuries including: head and neck injury, sports injury, severe injury, and intentional injury; 2) determining how groups of risk behaviours cluster together, and then lead to the occurrence of the different types of injury; 3) exploring whether these same types of risk gradients can be observed in other wealthy countries participating in the HBSC. Countries in the HBSC were divided into high and low risk groups according to the number of multiple risk behaviours (smoking, excess use of alcohol, recreational drug use, failure to use seatbelts, failure to use bicycle helmets, ongoing conflict with parents, and engagement in bullying) reported by youth. Bivariate, stratified, and multivariate logistic regression analyses were used to examine associations between risks for the various types of injury, and the number of risk behaviours reported. Tests for linear trend in the

odds ratios generated were conducted. Factor analyses were used to explore the relative contributions of different clusters of risk behaviours to the occurrence of different types of injury.

## **ii. Bullying and Victimization**

Wendy Craig examined the most prevalent forms of aggression in adolescents' friendships and dating relationships. The goal of the work was to examine contextual factors (socioeconomic factors, family relationships, peer culture, and risk behaviour) that may explain differential prevalence rates in bullying. Since schools vary widely on these, a second goal was to consider whether factors such as school climate, school size, academic press, disciplinary climate, parental involvement in school, and teacher supportiveness explain school differences in bullying and victimization. Finally, the unique contribution of individual factors such as health, emotional, psychological, and social functioning were examined.

Dr. Craig also examined the longitudinal development of bullying and victimization and girls' aggression (e.g., verbal, indirect, sexual, physical) using a variety of methodologies including observations, annual surveys, repeated cross-sectional HBSC surveys and experimental designs. First, through structural equation modeling, latent variables were created to represent each of the levels of the model (individual, family, peer, school, and cultural). Second, hierarchical linear modeling procedures were used (i.e., individuals were nested in schools; schools were nested in countries) and explanatory variables were considered at each level of the model. Through a comparison of the contributions of each of these levels, it was possible to inform the development of social policy aimed at creating violence-free schools. International comparisons provided much needed information on the cultural factors that contribute to bullying and victimization.

## **iii. Sexual Health**

The Canadian Youth Sexual Health & HIV/AIDS Study (CYSHHAS) was administered in 2001 by Queen's University regarding the sexual health of adolescents, using a similar age group sample as the HBSC. Identical questions on sexual health were included by six other countries in the 1998 HBSC

survey. Utilizing both these databases, four major cross-national research questions were addressed by Dr. Boyce and his team: 1) Do cross-national differences and/or similarities exist regarding the patterns of sexual behaviour, sexual risk taking, and related outcomes, especially across gender? 2) What is the relationship among sexual risk behaviours and outcomes, including (but not limited to) age of initiation of intercourse, substance use at last intercourse, use of contraceptives at last intercourse, and negative outcomes (such as pregnancy and sexually transmitted infection)? 3) How do sexual risk behaviours and outcomes relate to other, broader risk taking behaviours, such as tobacco use, drug and alcohol use, inadequate physical activity, unsafe dieting practices, and behaviors that increase risk of injury? 4) What are the influences of various determinants, such as self-esteem, body image, and attitudes towards parents, teachers and school on sexual behaviour, particularly risk-taking?

Descriptive analyses were first conducted to review student responses on particular measures. Factor analysis and reliability analysis were used in the construction of composite measures addressing a number of concepts (peer relationships/social integration, relationships with parents, self-esteem, “sexual health”, etc.). Correlation analysis, linear and logistic regression analysis were employed to examine the relationships among various measures. Statistical models were constructed examining the predictive power of determinant measures (e.g., SES, self esteem, social integration, religiosity) on the composite measure “sexual health”, the individual measures that make up “sexual health” (e.g., “I am comfortable expressing myself with my boyfriend/girlfriend.”) and additional sexual behaviour (e.g., number of sexual partners), intention, and attitude measures. Hierarchical linear modeling examined the impact of school level variables on sexual health behaviours and outcomes.

#### **iv. Disability and Chronic Conditions**

Using HBSC data, Drs. Kalnins and Steele identified cross-national similarities and differences in the profiles of adolescents with chronic conditions and disabilities. They first conducted descriptive analyses of frequencies and examined these in relation to type of chronic condition, age and gender. As a second step they developed an “index of robustness” which grouped significant differences identified

from within-country analyses by the number of countries in which the difference appeared. Logistic regression and path analyses were used to explore the relationships among demographic variables (age, gender, family affluence), the condition (type and severity), and social milieu (family, peers) and community (school and local social capital). In the multi-variate analyses Drs. Kalnins and Steele addressed the following questions: 1) What factors explain these adolescents' perceptions of their own health as represented by self-reported health status and symptoms of poor health? 2) What factors explain these adolescents' engagement/lack of engagement in key lifestyle behaviours? 3) What factors explain these adolescents' engagement with peers? 4) What factors explain both positive and negative school experiences for adolescents with chronic health conditions?

#### **v. Obesity**

Dr. Janssen used the Canadian HBSC database to assess the relationship between bullying behaviours and obesity, as well as the independent and combined effects of obesity and physical inactivity on health and well-being in Canadian youth. Using the international HBSC database Dr. Janssen examined the influence of individual and country level socio-economic factors on overweight and obesity in youth. He also focused on the associations between obesity with bullying, somatic health, and psychological health. We have observed that these findings in Canadian youth are consistent across the 35 participating countries of the HBSC study. As well, Dr. Janssen assessed whether country-level measures of physical activity (e.g., availability of recreational facilities) have an independent effect on cross-national differences in childhood obesity. Both the Canadian and international HBSC databases were used by Dr. Janssen to study obesity prevalence and the associations between obesity with dietary and physical activity habits.

## **B. Community Level Studies**

### **i. School Environment**

Dr. Freeman employed multilevel modeling techniques that accommodated the nested structure of the HBSC data to estimate school effects over and above individual effects. Health outcomes and behaviors as dependent variables in the analysis included peer relationships, physical health, mental health, self-esteem, dental hygiene, nutrition, exercise, leisure activities, injuries, tobacco use, alcohol use, and drug use. Independent variables included a number of child-level, school-level, and community-level variables (used as predictors of health outcomes and behaviours of children). Child-level variables (aggregated to the school level) included a child's gender, age, socioeconomic status (SES), family structure, and number of siblings. Dr. Freeman and his team used two types of school-level variables. The first type represents school context and includes school mean SES, school size, age patterns and streaming policies that vary by country. The second type represents school climate and includes academic pressure, disciplinary climate, social support, and parental involvement.

### **ii. Neighbourhood Social Capital**

Given the potential of social capital as a modifiable social determinant of health, Dr. Boyce and his team examined the relationship between perceived neighbourhood social capital, self-reported health, and risk taking in a group of Canadian adolescents. Canadian HBSC data were examined to determine the relationship between perceived neighbourhood social capital, self-reported health, and risk taking while controlling for family affluence, gender, and school grade. All variables were assessed at the individual level. The sample consisted of 7235 students in grades 6 through 10 across Canada. Data were analyzed using multiple logistic regression modeling.

### **III. RESEARCH RESULTS**

#### **A. Individual Level Studies**

##### **i. Injuries**

Dr. Pickett's collaborative research program on adolescent injury/trauma issues and their relationships with health risk behaviours accomplished a number of important achievements (publications listed in Appendix One).

Two studies, one looking at international youth and another looking at Canadian youth, examined the associations between multiple risk behaviours and occurrence of injury. Both studies found gradients in risk for injury increased in association with the number of risk behaviours reported. These findings have implications for youth injury prevention programming. In collaboration with colleagues at the National Institutes for Health in the United States, Dr. Pickett co-authored an international paper examining cross-national trends in violence-related behaviors in adolescents. As well, Dr. Pickett published a manuscript on fighting and weapon carrying as determinants of adolescent injury in the journal *Pediatrics*. Dr. Pickett and his team worked with colleagues in Israel on an international manuscript describing injury and social determinants. Chapters on injury within the WHO-sponsored HBSC National and International reports on the health of adolescents were completed by Dr. Pickett. With CAARRN colleagues, a paper on risk behaviour and psychosomatic health symptoms in Canadian adolescents is currently in press.

Graduate students played an important role in the CAARRN injury/trauma program. A national paper, the subject of a MSc thesis, examining the use of hierarchical modeling techniques in order to examine the association between socio-economic status and the occurrence of youth injury was published in the *Journal of Community Health and Epidemiology*. Another national paper examining associations between multiple risk behaviours and the occurrence of neurotrauma among young people also highlights graduate student work. The local public health unit is considering use of this multiple risk behaviour screening tool as a method of identify at-risk youth. Similar interests have been expressed by *Smartrisk*, a national injury prevention organization. Collaboration with University of Toronto investigators led to the

development of a PhD research project on the home environment and child injury, a recipient of a major fellowship from the Ontario Neurotrauma Foundation. Recently, two new research protocols for MSc theses in epidemiology were developed, one on risk behaviours, disability and injury which received a one year Canada MSc Scholarship from CIHR and the other on rural vs. urban violence/injury which received one year of funding from a CIHR training program.

As nominated principal investigator (Will Boyce co-PI), Dr. Pickett received an operating grant from the Canadian Institutes of Health Information. This study adds a longitudinal component to the 2005 HBSC to examine risk behaviour and its association with injury, as well as the protective roles of settings in moderating these relationships. A manuscript in association with this study, looking at home, school and peer-group as moderators of risk behaviour and injury relationships, has been published.

## **ii. Bullying and Victimization**

Dr. Craig's research group has published several academic papers. *Adolescent Risk Correlates of Bullying and Different Types of Victimization* is currently in press with the International Journal of Adolescent Medicine and Health. A paper entitled *Cross-national Consistency in the Relationship between Bullying Behaviors and Psychosocial Adjustment* has been published in the Archives of Pediatrics and Adolescent Medicine. As well, Dr. Craig has contributed chapters describing bullying and fighting behaviour among Canadian youth and international youth to HBSC national and international reports. With CAARRN colleagues, Dr. Craig has published papers on the relationship between obesity and victimization among Canadian adolescents, fighting and weapon carrying as determinants of adolescent injury, and injury and social determinants in adolescents.

Dr. Craig played a key role at the *World Congress on Child and Youth Health* in Vancouver, May 11-14, 2003. Dr. Craig spoke twice during the *Support for Youth At Risk Seminar Series*, first on supporting Canadian youth at risk of abuse, exploitation and violence and then on policy and political support for youth at risk programs. Tony Volk, a graduate student working with Dr. Craig, presented a

poster at the World Congress entitled *Health Correlates of Different Types of Victimization in Adolescence*.

The findings from Dr. Craig's HBSC analyses have been included in two reports to the Ministry of Education of Ontario on understanding and assessing bullying problems in schools. These reports are aimed towards providing an empirical understanding of the problems of bullying to inform the development of province wide assessment tools for bullying and interventions for bullying problems.

Dr. Craig's team has completed confirmatory factor analyses on several measurement scales developed from the HBSC survey focusing on family, school, peers, and neighbourhood. These scales have been used in several CAARRN publications.

### **iii. Sexual Health**

The final report for the Canadian Youth, Sexual Health and HIV/AIDS Study was released on September 9<sup>th</sup> 2003. Secondary analyses of the Canadian Youth, Sexual Health and HIV/AIDS Survey data by those outside the core research team were encouraged. For example, medical residents at Queen's University have used the data to examine access to medical services by Canadian youth, specifically around sexual health issues.

A profile of pregnant Canadian students examines a set of determinants that distinguish young women who are sexually active but have not been pregnant, with those who reported becoming pregnant. Increased risk for girls' pregnancy was associated with: not living with both parents; perceptions of being 'wealthy'; having sex under pressure or coercion; low self-confidence; and having multiple partners. This manuscript has been submitted to the Canadian Journal of Human Sexuality. A paper underway with University of Alberta collaborators examines the relationship between sex education and sexual health knowledge in Canadian school youth. With international collaborators (France, USA), Dr. Boyce is co-author of a paper on use of contraceptives by young people. As well, the research team is in the process of developing a scale that encompasses the following aspects of sexual health: a) psychological well-being; b) sexual and social relationships; c) physical well-being; and d) resources. Two new papers are

underway with Queen's colleagues looking at sexual behaviours of Canadian youth reporting same-sex attraction, and how social support provided by parents interact to predict condom use among Canadian adolescents.

A Master's thesis concerning body image, condom self-efficacy and risk taking was completed and presented at an international interdisciplinary conference on 'Gender, Sexuality & Health', Simon Fraser University, Vancouver, June 2004.

Team member Hana Saab presented selected findings from the Canadian Youth, Sexual Health and HIV/AIDS Survey at the CAARRN workshop in Halifax, January 2005. Ms. Saab also presented sexual health findings at the *A Place for Youth* workshop in Ottawa in October 2005.

#### **iv. Disability and Chronic Conditions**

Drs. Kalnins and Steele's research activity has focused on the analysis of data about the health and health behaviour of adolescents with physical disabilities and chronic conditions.

A paper on changes with age in key lifestyle health behaviours (nutrition, physical activity, tobacco and drug use, seat belt use, dental hygiene), entitled *Age-related health risk behaviours of adolescents with physical disabilities*, was published in *Social and Preventive Medicine*. In this paper, health survey data from 319 adolescents with physical disabilities were compared with the same data from 7,020 adolescents in the Canadian HBSC sample. The authors concluded that health promotion programs about health risk behaviours designed for adolescents in the general population might not be appropriate for adolescents with physical disabilities.

A paper based on the qualitative analyses of family actions and beliefs regarding the promotion of health for their child with a physical disability *Health promotion in families of adolescents with physical disabilities: Perceptions and concerns of parents* has been resubmitted to the Journal of Adolescent Health. In-depth interviews were conducted with 15 families about what they do in the course of daily living to promote the health of their child with a physical disability. Two presentations have been

made on these findings: 1) *American Academy for Cerebral Palsy and Developmental Medicine meeting in New Orleans, September 2002*; and 2) *A Place for Youth Workshop in Ottawa, October 2005*.

A paper entitled *Methodological issues in assessing chronic medical conditions and disabilities among adolescents in international health surveys* is in the final stages of preparation. A paper comparing lifestyle health behaviours of adolescents and young adults with physical disabilities is in preparation. The preliminary findings were presented at the 131st Annual Meeting of the American Public Health Association, San Francisco, California, November 2003.

A student from the University of Maastricht, supervised by Dr. Kalnins, defended a MSc thesis based on the 1997-98 Health Behaviour in School-aged Children (HBSC) dataset entitled *Determinants of self-perceived pressure from schoolwork among Canadian, Finnish and Scottish adolescents with chronic ill health conditions*. A MSc student supervised by Drs. Boyce and Pickett is currently completing a thesis on injuries in children with disabilities.

Additional analyses compared Finnish and Canadian chronic condition data. Finland and Canada were the only two countries to include these items on the 2001/2002 HBSC survey. Initial analyses compared prevalence data on reported chronic conditions. Further analyses examined increased feelings of anxiety and depression amongst adolescents reporting multiple chronic conditions. Aspects of this work have been presented in both poster and oral format at HBSC meetings.

#### **v. Obesity**

Dr. Janssen work on obesity in young people has led to several publications. The association between obesity with dietary and physical activity habits was published in the *Journal of Adolescent Health*. Results from this manuscript were presented at the Canadian Society for Exercise Physiology annual meeting in October 2003. Dr. Janssen has also used the Canadian HBSC database to write a manuscript on the relationship between bullying behaviours and obesity, published in the journal *Pediatrics*. This paper received extensive media coverage in Canada and internationally, thanks in large measure to the press release provided by CPHI. Work exploring the independent effects of obesity and

physical inactivity on health and well-being in Canadian youth was published in the *Journal of Physical Activity & Health*. Comparison of overweight and obesity prevalence in 34 countries was published in *Obesity Reviews*. A paper on the individual and area level determinants of obesity, physical inactivity, and poor eating was recently published in the *American Journal of Clinical Nutrition*. This study was presented at the North American Association for the Study of Obesity annual scientific meeting in October 2005.

In addition, Dr. Janssen has been involved with several papers led by other CAARRN investigators including *Risk Taking and Recurrent Health Symptoms in Canadian Adolescents* (Preventative Medicine) and *Multi-level Analysis of Associations Between Socio-economic Status and Injury Among Canadian adolescents* (Journal of Community Health Epidemiology). Papers currently in press and submitted include work on risk taking and recurrent health symptoms, physical activity related injuries, television viewing and computer use in Canadian youth.

Dr. Janssen has given invited presentations at numerous conferences and meetings, including most recently, the Association of Public Health Epidemiologists of Ontario, the Canadian Council of Food and Nutrition Obesity Summit, and the Kingston Health Unit.

## **B. Community Level Studies**

### **i. School Environment**

Along with international colleagues in the HBSC Positive Health and School Climate focus group, including Oddrun Samdal and Jorn Hetland from Norway, Ulrike Ravens-Sieberer and Christiane Thomas from Germany, and Wolfgang Dur from Austria, Dr. Freeman has authored and co-authored several publications.

One paper, of which Dr. Freeman is the lead author, is an international comparative study (Canada, Norway, and the United States) which examined clusters of students as defined by their school support, school pressure, and school climate. The results demonstrate that high school support and climate, combined with low school pressure, have positive effects on school-related measures, including

academic achievement and bullying, and on health measures, such as decreased psychosomatic symptomatology and better emotional health. This work was presented at the *World Congress on Child and Youth Health* in Vancouver, the *Canadian Society for the Study of Education* in Halifax, and the *HBSC Research Meeting* in Bergen (Norway) and is currently being revised for resubmission. Another paper led by Dr. Freeman, also under revision, is looking at the relationship of schools to emotional health and bullying across several countries.

Additional work with international colleagues includes *Subjective health complaints and being bullied in early adolescence: A longitudinal study* (submitted to the *Journal of Research in Adolescence*), *Generating a positive health index using item response theory models* (submitted to the *Journal of Clinical Epidemiology*), *School as a determinant for health outcomes of 15 year olds in 10 countries* (in progress) and *Country-specific impacts of school factors on the health of 11 to 15 year old students in 32 countries* (in progress).

Dr. Freeman co-authored (with Oddrun Samdal and Wolfgang Dur) the descriptive chapter on school for the W.H.O. HBSC International Report and edited the chapter linking school with health indices. In addition, Dr. Freeman was the lead author on the emotional health chapter for the Canadian HBSC Report.

## **ii. Neighbourhood Social Capital**

An extensive literature review on youth health and social capital was conducted to assist in the development of indicators of neighbourhood-level social capital from existing databases. Preliminary analyses of HBSC data revealed sufficient sample sizes to conduct the analyses (examining the relationship between community level social capital indicators, adolescent risk taking, and health outcomes). Variation between geographical units and the utility of various databases were examined. HBSC data was added to provide health outcome data, specifically self-reported health, medicine use, and injuries, as well as risk taking and some social capital data.

Analyses conducted at the person level indicated: 1) increased risk behaviors are associated with decreased self-perceived health; 2) increased local social capital is associated with increased self-perceived health; and 3) increased local social capital is associated with decreased risk behaviours. Analyses at the county level (21 Ontario counties for which data exists) revealed a significant association between self-perceived health and risk behaviours in youth. Consultation has taken place with international social capital researchers on several occasions, most recently Italian researchers, through the HBSC network.

A presentation entitled *Perceived Neighbourhood Social Capital and Self-Reported Health Among Canadian Adolescents* was given by Diane Davies at the Canadian Public Health Association conference in September 2005. Diane Davies also presented research findings on social capital, risk taking, and adolescent health at *A Place for Youth* workshop. Through these presentations and feedback, a paper on social capital is being prepared this summer for publication.

A Master's thesis entitled *Perceived social capital and emotional health among adolescents in Canada* was completed in the Department of Epidemiology and Community Health at Queen's University. Dr. Boyce has been collaborating with researchers in Ghana and Palestine on analyses related to the community context of youth mental health.

### **C. Research Infrastructure Development**

The CAARRN research infrastructure was enhanced through the CPHI resources in the following ways (each described in more detail in policy and dissemination sections of the report):

- CAARRN network development, listserve, website
- HBSC and CYSHHAS dataset distribution mechanism
- Collaborations with other Canadian university/policy networks
- Collaborations with youth networks
- Graduate student training opportunities

- HBSC monitoring tool
- Staff development in media, Internet, desktop publishing skills

#### **IV. Implications for Future Research on Population Health in Canada**

##### **A. Individual Level Studies**

###### **i. Injuries**

As part of his contribution to CAARRN, Dr. Pickett has led several new research analyses surrounding the epidemiology injury and violence in adolescents. Most of this research has focused on determinants of injury. Of particular importance is the demonstration of the predictive power of the Multiple Risk Behaviour concept – implying that it is not particular risks, but the cumulative number of risks, that is useful in predicting youth injury. Applying the concept to other outcomes, such as general health, emotional health and bullying is the next step required.

Manuscripts that have arisen from this work include both national and cross-national publications. Our collaborations also led to a successful CIHR grant that is examining the role of social contexts on moderating relationships between adolescent risk-taking and several health outcomes. This work has led to some original thinking around the modeling of adolescent health outcomes. It has also led to new local, national and international collaborations, and we believe that this focused area of youth health research is a leading part of our research program. CAARRN has been quite a helpful initiative to that end.

###### **ii. Bullying and Victimization**

Dr Craig research with HBSC data has made significant advances in the bullying research field. One outcome of importance has been the development of a National Assessment tool on bullying that allows in-depth examination of the issue for children of differing ages – from the perspectives of students, teachers and parents. She has also worked with the Ministry of Education, Ontario, in a project on Developing Prevention and Assessment Tools for Bullying.

A second opportunity arising from this work has been the funding of a Canadian Centre of Excellence - PREV net – on bullying that will continue research and advocacy. For example, PREV NET works with Concerned Children's Advertisers on an anti-Bullying media campaign.

In the international sphere, Dr Craig's work on bullying has earned her representation at the UNICEF Roundtable on the Rights of the Child and she is a Representative on the OECD, bringing bullying forward as an international issue. She has also worked with UNICEF Canada on the UN Secretary-General's Study on Violence Against Children. Finally, she has advanced the development of international research collaborations with the US HBSC team.

### **iii. Sexual Health**

Dr. Boyce and his team have identified the need for a generic 'youth sexual health' set of items/indicators/scale and have made progress on a set of 'positive' health-enhancing aspects of sexuality as well as 'negative' risk-taking aspects. Further work needs to be done on item/scale development to test a generic indicator of sexual health, as well as sexual risk. Particularly, these need to be checked by qualitative studies. Policy-wise, the researchers have identified that same-sex attracted youth are NOT more likely to take sexual risk than others. However, since there may be an increased opportunity for HIV and other STDs to be introduced into this population (via adults), they may ultimately be more at risk of diseases.

Secondly, pregnancy is still a major outcome for youth, especially girls. There is increasing evidence, however, that pregnancy may have 'perceived positive benefits' for some young women (although not young men) as some young women may achieve increased social status and role acknowledgement in their peer group. There also may be perceived economic benefits for young women who access social welfare benefits once they are pregnant or have children.

Finally, in a context of available AIDS treatments that are perceived by youth to transform the disease to a chronic condition that can be 'lived positively' although not cured (in the same way as diabetes), there is a seeming reluctance to alter behaviour fundamentally. The availability of an AIDS

treatment protocol and, importantly, full access to it in a socialized medicine context, may lead youth to underestimate the life-long medical and social costs of HIV (and other STD) infection.

These three research findings require further focused study to elucidate their particular validity and applicability within youth sub-groups.

#### **iv. Disability and Chronic Conditions**

Our analyses of the information obtained from HBSC surveys highlighted that having a chronic condition or a physical disability is significantly associated with 'sub-optimal' health. That is, youth and adults with chronic conditions or physical disabilities more frequently report experiencing a variety of 'everyday' health problems. Either singly or in combination these include headaches, stomachaches, backaches, feeling low, feeling irritable, difficulties sleeping, and/or dizziness. We conjecture that these health problems do not limit functionality, that is, the ability to engage in age-appropriate activities of daily living. They may, however, mean that young people and adults must summon greater will power and expend more energy to engage in such activities in the face of not feeling well. The issue of limited energy was also a major finding in our qualitative study of family health promotion for adolescents with a physical disability. In this study parents noted that they are constantly judging how best to balance fostering their child's independence with the need to make time, and conserve energy, for themselves and their child, for activities of daily living.

From a policy and research perspective, we believe that further research should be carried out on devising questions about the presence of chronic conditions and physical disabilities, and symptoms of poor health, for health survey research so that information is routinely collected. Such data would support further research focused on: a) an examination of symptoms of poor health in relation to the type and number of functional disabilities present, b) an examination of symptoms of poor health in relation to engagement in activities of daily living with respect to school, family and friends.

Our research also revealed that the age-related profile for behaviours that place youth health at risk (e.g. smoking, alcohol use, drug abuse, lack of physical activity, and diet) differs significantly between youth with physical disabilities and youth in the general population. The profile further changes between youth and young adults with physical disabilities.

From a policy perspective the findings suggest that health promotion programs about health risk behaviours designed for adolescents and young adults in the general population may not be appropriate for those with physical disabilities. While our research was limited to descriptive analyses of prevalence, we think that studies using qualitative methods should be conducted to better understand how risk is defined by young people with chronic conditions or physical disabilities, and how their perception of risk is balanced against the need to be accepted in society (family, peers, and community).

#### **v. Obesity**

Three primary observations and implications can be made from the research on adolescent obesity that was part of the CAARRN project.

A high prevalence of Canadian adolescents are overweight or obese. Amongst the 34 countries that comprise the World Health Organization *Health Behaviour in School-aged Survey*, Canada was the fifth most obese nation. Clearly, the research resources in Canada that are currently being devoted to the area of childhood and adolescent obesity are warranted.

Within adolescents, physical activity levels are quite low and sedentary behaviours (T.V., computer) are quite high. Furthermore, physical inactivity and sedentary behaviors are considerably better predictors of overweight and obesity than are dietary and nutrition variables. This suggests that greater research emphasis needs to be placed on the physical inactivity side of the energy balance equation.

Initial observations from the national level analysis of the HBSC confirm that the area in which adolescents live has a significant independent effect on obesity. That is, after considering individual level obesity predictors (age, gender, socio-economic status), adolescents who live in poorer neighbourhoods

are more likely to be overweight and obesity compared to adolescents who live in more affluent neighbourhoods. Additional research within the Canadian context is needed to determine which features of the environment are important predictors of unhealthy eating, physical inactivity, and obesity.

## **B. Community Level Studies**

### **i. School Environment**

Population health is an important aspect of adolescents' lives that is too often overlooked by educators in their quest to meet the demands of more rigid curriculum and standardized testing. In particular, the emotional and physical needs are neglected as teachers focus narrowly on academic needs. Such an emphasis is not only narrow-minded; it is ultimately unproductive to Canada as a nation.

CAARRN is one of the few research initiatives that is fighting against this general trend in schooling. Through amassing concrete evidence on the nature of adolescent lives and coupling this evidence with a thorough understanding of policy implications and the state of schooling in Canada, CAARRN has a great potential to influence the way students are educated. While this potential has not yet been fully realized, the beginnings are now in place, and we will continue to work diligently to ensure that the understandings we have gained from this research program will continue to challenge teachers to include issues of population health in their work.

### **ii. Neighbourhood Social Capital**

This attractive concept has yet to yield strong evidence of influence on public health. Part of the problem is conceptual (i.e., is social capital a resource or a community process?), part is methodological (i.e., should social capital be measured at individual, aggregated, or ecological levels?), and part is theoretical (i.e., does social capital have a main effect on health? or does it have a key intermediary influence on the relationship between SES, demographics and health? or does it have a moderating influence on this relationship that can assist in identifying important sub-groups on which to focus?)

The research field is still young, but must soon yield some ‘standards for investigation’ that allow progress to be made or else other concepts will supersede social capital.

The policy implications of potential findings, at the moment, are not clear. There do not appear to be unique ‘social capital interventions’ that have not already been investigated under the mantra of ‘community participation’, ‘community empowerment’, or ‘community development’. This lack of action-oriented thought in social capital may ultimately relegate this area of research to ‘academic irrelevance’, unless conceptual and programmatic directions are improved.

## **V. POLICY**

### **A. Identification of general policy implications arising from the research**

#### Knowledge Base

CAARRN provided venues for policy developers to engage with researchers leading to increased awareness of adolescent health needs. However, the lack of an accepted monitoring tool, for collecting data more frequently at national and provincial/territorial levels, hampers ongoing dialogue. The Public Health Agency of Canada approached Queen’s about the potential of using the HBSC as monitoring tool for school health programs. A report was provided to PHAC outlining feasibility and cost information.

#### Youth Engagement in Health Research and Policy

CAARRN investigators, along with Health Canada’s Centre of Excellence for Youth Engagement, successfully secured funding (\$200,000) from Health Canada’s Population Health Fund for a 19 month training program entitled *Youth Engagement in Health Research and Policy (YEHRP)*. The project represented a national collaborative initiative to promote better understanding of the determinants of youth health, for youth to gain skills in research and policy development and, ultimately, to better influence the health policy environment. These objectives were addressed through the training of youth in: participatory research techniques in youth health; reading and interpreting health research findings; organization of youth health awareness research workshops; and participation of youth in health policy

development activities. Concrete linkages were established between youth and researchers. The YEHRP project enhanced capacity among Canadian youth to participate in, and influence, the development of adolescent health policy at various jurisdictional levels. The project website is at <http://www.tgmag.ca/yehrp2>. Resulting from this work is the engagement of CAARRN with an Ottawa youth group regarding mental health issues and with an IDRC project in the West Bank: *Palestinian Adolescents Coping with Trauma*.

#### National Youth Policy Agenda

CAARRN data was used in a position paper produced by the National Children's alliance to advance the emerging policy issue of a National Youth Agenda in Canada. CAARRN's association with the Centre of Excellence for Youth Engagement has been instrumental in not only obtaining youth feedback on various research processes and reports, but in sensitizing researchers to the importance of more direct contact with youth.

### **B. Description of interaction with policy actors undertaken by the Applicant**

#### CAARRN Development Meeting

A national inauguration meeting of 24 key network participants was held in Kingston on February 6, 2002. The purpose of this meeting was to develop the CAARRN mission statement, goals and indicators of success. Participants included youth, researchers, policy makers, and program planners from across Canada. Policy experts from Health Canada's Child and Youth Division, Health Canada's Population and Public Health Branch, and the Canadian Education Association were in attendance. A meeting facilitator guided the group through discussions on the network expectations, benefits and roles.

#### CAARRN Regional Workshops

In February 2004, CAARRN teamed up with CPHI in hosting a workshop in Toronto entitled *Improving the Health of Canada's Youth: From Research to Policy*. Researchers, policy experts, and youth organizations from across Canada attended to listen to research findings, learn about policy development, and practice creating policy implications from research findings. CPHI produced a report

entitled *You say 'to-may-to(e)' and I say 'to-mah-to(e)': Bridging the Communications Gap Between Researchers and Policy-Makers* based on this workshop.

In conjunction with the McCreary Centre Society and the British Columbia Consortium for Youth Health, CAARRN conducted a Youth Policy Forum at the *Early Adolescence: Vulnerability & Resilience* Conference Nov. 20, 2004 in Vancouver. The Forum, facilitated by Lillian Bayne, began with a general overview of the policy-making process then identified key components and the way these components work together in defining policy requirements and shaping policy formulation. Participants mapped out the policy process in relation to issues of interest.

CAARRN teamed up with Dr. Christiane Poulin for a one day workshop (Jan. 6, 2005) in Halifax, *An Adolescent Health Forum: What's New? So What?*, to share finding from CPHI funded youth projects with researchers, programmers, and policy developers. Four CAARRN members presented findings to, and discussed implications with an audience of 80 from Atlantic Canada Addiction Services, Departments of Health, Education, Community Services and School Boards.

CAARRN partnered with Professor Jiri Zuzanek and his team from the University of Waterloo for a workshop entitled *Adolescent Time Use, Emotional Well-Being, and Health* on March 4, 2005. Researchers and graduate students from CPHI funded projects presented findings to representatives from the Regional Health Authority and a local Secondary School. Policy and programmatic options were discussed at length resulting in a series of policy recommendations.

#### CAARRN National Workshop

A final workshop to advance youth health policy through information exchange and participation, entitled *A Place for Youth*, took place on October 20<sup>th</sup>, 2005 in Ottawa. Objectives of the workshop were: 1) to share current research finding on the influences of “place” on the health of Canadian youth; 2) to facilitate knowledge exchange with researchers, policy- and decision-makers and youth; and 3) to discuss implications and propose directions for policy development related to youth health issues. The Centre of Excellence for Youth Engagement, the National Children’s Alliance, and the Public Health Agency of

Canada organized the event. CAARRN research findings were presented in team presentations of researchers with young people. Other presentations by participants focused on initiatives and issues in their environments. Workshop proceedings entitled *From Patches to a Quilt: Piecing Together a Place for Youth* will be available from CPHI in spring 2006.

#### Research to Policy Workshops

Dr. Pickett conducted a workshop addressing risk and protective factors for injury among adolescent populations as part of the *2003 Canadian Injury Prevention and Safety Program Conference* in Ottawa. The workshop focused on how to use research results to make programmatic and policy changes.

Dr. Craig contributed to a series of workshops conducted in Fall 2003 at a conference entitled *Moving Beyond Bullies and Victims: Positive, Practical Strategies to Ensure a Climate of Emotional Safety in Our Families, Schools, Communities, and Workplaces* in Fredericton, New Brunswick. Two pre-conference workshops entitled *Creating Circles of Support in Middle Schools/High Schools and Elementary Schools* took place. A third workshop was offered entitled *How Girls Bully and What We Can Do About It*.

#### Links with Public Health Agency of Canada

The Public Health Agency of Canada (PHAC) invited CAARRN investigators to present findings from the 2004 HBSC report *Young People in Canada: Their Health and Well-being* to 50 staff and other policy experts in January 2005. Additionally, the Public Health Agency requested Queen's University to prepare a viability analysis for use of the HBSC instrument as a monitoring tool for a new initiative on Health Promoting Schools in Canada. This request followed a Joint Consortium on School Health meeting held in Ottawa in November 2004 entitled '*Communities & Schools for Health: A Canadian/International Symposium on School Health Promotion*' involving CAARRN representatives. Finally, CAARRN's Policy Response Team provided direction to Health Canada's HIV/AIDS unit based

on the finding from the Canadian Youth, Sexual Health and HIV/AIDS Study and to Kingston area school boards regarding bullying and victimization prevention.

### **C. Identification of relevant decision-makers / audiences for the research results**

Attendees at the following workshops and meetings represent a national audience for research results. CPHI was involved in the organization of two of the four events and had representation at the Halifax meeting. A list of attendees at the *Early Adolescence* meeting in Vancouver can be provided upon request.

- *Improving the Health of Canada's Youth: From Research to Policy*, February 2004, Toronto
- *Early Adolescence: Vulnerability & Resilience*, November 2004, Vancouver
- *An Adolescent Health Forum: What's New? So What?* January 2005, Halifax
- *A Place for Youth* October 2005, Ottawa

### **D. Future priorities in research and policy**

- Establishment of the World Health Organization - Health Behaviour in School-aged Children survey as a national monitoring and analysis tool for Canadian adolescent school health, as well as a student learning and teaching resource.
- Provision of advice to the National Children's Alliance regarding the development of a national adolescent health policy agenda.
- Development of research relationships with other Health Behaviour in School-aged Children research teams to investigate common policy concerns in North and South America (e.g., injury policy, physical education policy, nutrition policy, bullying policy).
- Development of increased collaboration with youth in revising basic assumptions and models of youth health behaviour.
- Analysis of the Ontario longitudinal HBSC study to establish cause/effect relationships more clearly.

- Analysis of HBSC data to delineate the influence of ‘place’ in youth health – e.g., home-school-neighborhood; urban-rural; national-international.
- Development of an intervention evaluation model for school health in Canada.

## **VI. DISSEMINATION / KNOWLEDGE TRANSFER**

### **A. Completed Activities**

A comprehensive dissemination plan for CAARRN was developed in conjunction with CPHI.

Below is a description of dissemination activities achieved and products developed.

#### Listserv Mailing List

A listserv mailing list was established to facilitate communication amongst network participants. Open to anyone with an interest in youth health, close to 80 individuals and organizations joined to share information about conferences, funding opportunities, and other information pertaining to adolescent health. Electronic newsletters highlighting CAARRN activities were distributed in spring 2002, spring 2003, and winter 2005.

#### CAARRN Website

A CAARRN website [www.educ.queensu.ca/~caarrn](http://www.educ.queensu.ca/~caarrn) was established to highlight CAARRN findings and share youth health related information.

#### Adolescent Health Policy Book

A book edited by Dr Boyce, with contributions from many CAARRN participants, *Canadian Adolescent Health: Science, Policy & Human Rights*, is currently being published through McGill-Queen’s University Press. The book compiles Canadian adolescent health research findings and implications situating the issues within current policy frameworks, including the UN Convention on the Rights of the Child.

### 2001/2002 Health Behaviour in School-aged Children Reports

*Young People in Canada: Their Health & Well-being* was released by Health Canada in October 2004. This report, authored by CAARRN Investigators, focused on the results in the Canadian sample of the 2001/2002 HBSC survey. The International HBSC Report, *Young People's Health in Context*, was released in June 2004 in Scotland by the World Health Organization. Several chapters in the report (socioeconomic inequality, school, bullying, physical fighting and victimization, injuries, and, methods) were authored by CAARRN investigators.

### Fact Sheets

Ten fact sheets summarizing CAARRN research were produced and proved to be a very popular item. The fact sheets were professionally edited and designed. Consultation with the Canadian Public Health Association's Plain Language Service was sought to improve readability. Fact sheets were distributed at workshops, conferences, meetings and events, as well as the CAARRN listserv website. A targeted mailing of CAARRN fact sheets to school boards and schools across Canada occurred summer 2005 through winter 2006. Hard copies of the fact sheets have been sent to 100 school boards and 400 schools across Canada. Two fact sheets were been translated into French for school boards and schools in Quebec.

### World Congress on Child and Youth Health

In addition to CAARRN investigators disseminating research findings at local, regional, national, and international academic meetings, Dr. Boyce led a seminar series entitled *Support for Youth At Risk* at the World Congress on Child and Youth Health in Vancouver May 11 – 14, 2003. The seminar series addressed supporting Canadian and international youth at risk of abuse, exploitation, and violence, as well as examining the role of policy and political supports in youth programming. Two young people from our *Youth Engagement in Health Research and Policy* project were seminar speakers, as were other youth from Palestine and the Ivory Coast. CAARRN investigators Drs. Craig and Freeman played a key role in the Congress. Additionally, Dr. Boyce presented posters on the Health Behaviour in School-aged

Children Survey and Better Beginnings, Better Futures, a longitudinal prevention policy research demonstration project in Ontario.

#### Knowledge Translation Case Study

A case study of the CAARRN knowledge translation experience, titled *The Canadian Adolescents At Risk Research Network: Research For And With Youth*, has recently been published by CIHR for their joint KT Casebook initiative with CPHI *Moving population and public health knowledge into action: A casebook of knowledge translation stories*.

#### Data Distribution

The 2001/2002 HBSC dataset has been made available to researchers via the Queen's University Library website. Also, the dataset tables have been integrated into Statistics Canada's E-STAT program, an interactive teaching and learning tool for the education community. The Canadian Fitness and Lifestyle Institute has prepared a report *Physical Activity of Canadian Youth* based on analyses of the HBSC dataset.

#### Education Curriculum

In conjunction with Statistics Canada and Kate MacKrell from the Faculty of Education at Queen's University, CAARRN has produced a web-based mathematics curriculum module for grades 12 students using HBSC data. The final graphics for the module will be completed in April 2006 and will be then forwarded to CPHI. This will provide a model for future modules in health education curricula.

#### Media Interviews

CAARRN team members worked with CIHI's communication department and Queen's media services on several high profile publications: for example, Dr. Pickett's publication examining associations between multiple risk behaviours in youth and the occurrence of injury, as well as several of Dr. Janssen's publication focusing on obesity in young people.

## **B. Future Activities**

In the future, an adolescent health policy seminar will be held at Queen's University this fall (2006) in conjunction with the launch of the book *Canadian Adolescent Health: Science, Policy & Human Rights*. The new 2005-6 HBSC dataset will be available in Fall 2006 and will be used in conjunction with an expanded set of school level questions to more precisely analyse the influence of school and neighborhood environments on student health. Fact sheets will be updated with new data and distributed to various stakeholders. The users of these activities will be:

- youth participants and networks
- school board personnel
- school health consortium members
- health unit personnel
- academic research groups
- media
- non-governmental agencies – CPHI/CIHI
- parents
- Centre of Excellence for Youth Engagement
- National Children's Alliance
- Public Health Agency of Canada
- Stats Canada
- Human Resources Development Canada
- Provincial health and education ministries

**APPENDIX I**

**CAARRN PUBLICATION LIST**

- Antle BJ, Mills W, Steele C, Kalnins I, Rossen B. Perceptions of Health and Health Promotion among Parents of Adolescents with Physical Disabilities. Submitted to *Journal of Adolescent Health*.
- Boyce W, Davies D, Raman S, Tynjälä J, Välimaa R, King M<sup>1</sup>, Kannas L. Disabilities/chronic conditions and emotional health in Finnish and Canadian Students. In preparation.
- Boyce W, Davies D, Shortt S. Risk taking, social capital, and self-reported health among Canadian adolescents. In preparation.
- Boyce W, Saab H, King M, Moir A. Profile of pregnant Canadian school girls. *Submitted to the Canadian Journal of Human Sexuality*.
- Boyce W, Saab H, King M, Moir A. Predictors of sexual intercourse in Canadian school youth. In preparation.
- Boyce W, Torsheim T, Zambon A, Currie C. The Family Affluence Scale as a measure of national wealth: validity of an adolescent self-report measure. In press *Social Indicators Research*
- Craig W, Boyce W., & King M. Adolescent correlates of bullying and different types of victimization. Under review.
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- Dür W, Freeman J, Samdal O, Välimaa R, & Stergar E. School as a determinant for health outcomes of 15 year olds in 10 countries participating in the HBSC-study. In preparation.
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- Hublet A, Maes L, Boyce W. Asthma and asthmatic symptoms: prevalence in 6 countries. Submitted to the *Journal of Epidemiology and Public Health*.
- Janssen I, Boyce WF, Simpson K, Pickett W. Influence of individual- and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *Am J Clin Nutr*. 2006;83:139-145.
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- Janssen I, Dostaler S, Boyce WF, Pickett W. Influence of multiple risk behaviors on physical activity related injuries in adolescents. Submitted to *Pediatrics*.
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**APPENDIX II**

**CAARRN FACT SHEETS**