Promoting healthy bodies:

Physical activity, weight, and tobacco use among B.C. youth

The McCreary Centre Society

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3552 East Hastings Street
Vancouver, BC V5K 2A7
Tel: 604-291-1996
Fax: 604-291-7308
Email: mccreary@mcs.bc.ca
www.mcs.bc.ca

The *Adolescent Health Survey* is a project of The McCreary Centre Society, a non-government, non-profit organization committed to improving the health of B.C. youth through research, education, and youth leadership projects. Founded in 1977, the Society sponsors and promotes a wide range of activities and research to address unmet health needs of young people. Areas of interest include:

- Health promotion
- Health risk behaviours
- Youth participation and leadership skills development

Project team

Aileen Murphy
Managing Director

Minda Chittenden
Research Associate

Colleen Poon
Research Associate

Elizabeth Saewyc
Methods and Measurement Consultant

Alison Liebel
Communications Coordinator

Lisa May
Communications Consultant

Maps prepared by:

Les Foster
University of Victoria

Brian McKee
University of Victoria

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Why Promote the Health of B.C. Youth?

The health of B.C. youth has gradually improved over the past decade. The three Adolescent Health Surveys show that most young people are healthy, exercise regularly, feel close to their families, enjoy school, and have aspirations for the future. As well, research has shown that supporting youth to build strengths and skills enables them to develop the self-esteem and resilience needed to overcome challenges and thrive as they grow into adulthood.

Obesity or being overweight is a concern for young people, their parents, health care providers and educators across Canada, as rates among youth have increased in recent years.

Research tells us that physical inactivity, tobacco use, obesity and poor nutrition are risk factors that can cause serious and preventable chronic diseases, such as cardiovascular disease, type-2 diabetes, hypertension and some types of cancer. The good news is that these conditions are largely preventable.

In British Columbia, the Ministry of Health is responding to the prevention challenge with policies and programs that promote healthy eating, physical activity and healthy weight, and reduce tobacco use. For example:

- **ActNow BC** identifies goals for promoting the health of the B.C. population. Visit www.health.gov.bc.ca/prevent/actnow.html for more information.
- **Action Schools!** BC is a project designed to help schools create action plans to integrate healthy eating and 150 minutes of weekly physical activity among students in kindergarten to grade nine by 2010. The government will spend $15 million on this major initiative to improve the health of B.C. students, consistent with a comprehensive school health approach. For more information, visit www.healthservices.gov.bc.ca/cpa/mediasite/action_schools.html

Physical inactivity, tobacco use, obesity and poor nutrition can cause preventable chronic diseases

In addition, B.C. will host the 2010 Olympic and Paralympic Winter Games, increasing the focus on athletic achievement and winter sports in the coming years. The 2010 Olympic website says:

> "The Olympic Movement believes in developing the whole human being: body and mind. Our education programs will begin in 2006, with a particular emphasis on motivating and inspiring youth."

A recent report, *Improving the Health of Canadians: Promoting Healthy Weights*, by the Canadian Institute for Health Information (CIHI), highlights the complexity involved in promoting healthy weights and treating obesity:

> "The solution to promoting healthy weights is often presented as a simple one—eat right and exercise. However, the solutions to this complex health issue are anything but simple, and can involve both our genetic make-up and the choices that we make as individuals about what to eat and how physically active we are. The solutions also involve the social, cultural, physical and economic environments around us."

The full CIHI report is available online at www.cihi.ca

Information in the 2003 province-wide Adolescent Health Survey (AHS) offers an opportunity to assess the health of B.C. youth. The survey included questions on physical activity, height and weight (from which Body Mass Index was calculated), and tobacco use. *Promoting Healthy Bodies* uses data from the AHS to:

- Provide prevalence information on a number of indicators related to physical activity, weight, and tobacco use among B.C. youth.
- Explore risk factors associated with an increased risk of being inactive, underweight, overweight, obese or a smoker, as well as protective factors associated with a decreased likelihood of these poor health outcomes.

Key Findings

How Healthy Are B.C. Teens?

Physical activity

- Daily physical activity is considered optimal for teens, yet only 18% of B.C. youth exercise seven days a week. And almost one in 10 students did no exercise in the week before the survey.
- The level of physical activity decreases with age.
- Girls are half as active as boys: just 11% of girls exercised daily, compared to 24% of boys.
- Levels of physical activity have not changed over the past decade.
- Students in Vancouver and Richmond are some of the least active youth in the province.
- 60% of B.C. youth participate in organized extracurricular physical activities like sports teams or dance/aerobic classes.
- More girls are involved in organized physical activities, but more boys participate in recreational activities without a coach.
- Over a third of B.C. youth (38%) spend more than four hours watching TV or playing on the computer on school days.

Only 18% of B.C. youth exercise daily

Weight

- 78% of B.C. youth (84% of girls and 73% of boys) are a healthy weight.
- 14% of B.C. youth are overweight, 4% are obese and 4% are underweight.
- Boys are twice as likely to be overweight or obese as girls (23% vs. 11%).
- The proportion of overweight or obese boys increased between 1992 and 2003, but did not for girls.

- Vancouver and Richmond have some of the lowest proportions of overweight or obese teens (14%), and the Northwest has one of the highest (24%).
- The proportion of overweight and obese teens in B.C. is slightly lower than the national average.
- Eating breakfast is considered a health-promoting behaviour, but only half of B.C. teens always eat breakfast on school days. More boys than girls eat breakfast.
- Dieting is a very common weight control practice among B.C. youth, especially for girls. Almost half (46%) of healthy or underweight girls dieted in the year before the survey.
- Problem eating behaviours—bingeing or vomiting on purpose—have declined over the past decade.

78% of B.C. youth are a healthy weight

Tobacco use

- Smoking among B.C. youth has declined dramatically since 1998.
- About three-quarters of B.C. youth (73%) have never smoked, while 7% are current smokers.
- More girls have smoked than boys.
- Vancouver, Richmond and Fraser North have some of the lowest smoking rates for youth in the province.
- Rates of smoking among youth in B.C. are considerably lower than elsewhere in Canada, the U.S., and Europe.

Risk & Protective Factors

Most young people have a combination of risk and protective factors in their lives. Protective factors promote healthy youth development, while risk factors make youth more vulnerable to engaging in risky or health compromising behaviours.

Promoting Healthy Bodies shows some of these factors are consistently associated with being physically active; being underweight, overweight, or obese; or being a current smoker.

Self-rated health status

- Youth rating their health as good or excellent was associated with each healthy outcome: youth who felt healthy were more likely to be physically active, a healthy weight, and a non-smoker. Still, engaging in healthy behaviours may lead to youth feeling healthy, rather than healthy feelings predicting healthy behaviour.

Activity level

- This report supports the importance of being active and reducing sedentary activities like watching television or playing computer games:
  - » Participation in extracurricular sports forms part of students' exercise routines, and is associated with lower odds of smoking and being underweight, overweight or obese.
  - » More screen time is a risk factor for smoking and having an unhealthy weight.

Connectedness to family and school

- Youth who felt connected to family and/or school had higher odds of being active and lower odds of smoking or being underweight.

Eating habits and weight control strategies

- Dieting and/or binge eating were risk factors associated with being underweight, overweight or obese.
- Vomiting on purpose after eating was associated with smoking.
- Eating breakfast on school days decreased the chances of being obese among both boys and girls.

Risky behaviours

- Engaging in risky behaviours such as binge drinking, using marijuana, having sex, and fighting were associated with smoking, indicating that some youth are more likely to engage in a cluster of risky behaviours.

Recommendations

We cannot always prevent every circumstance that puts young people at risk for being inactive, an unhealthy weight, or a smoker. But helping to ensure youth also have protective resources in their lives may buffer these risks.

The risk and protective factors that distinguish physically active teens, youth with healthy weights, and those who have never smoked from their counterparts suggest key areas for promoting healthy lifestyles among youth:

- Encouraging participation in extracurricular sports and recreational activities
- Encouraging communities to find resources for organized sports and dance or aerobic classes, and places for teens to enjoy other physical activities such as biking or roller blading
- Spending less leisure time in front of the TV or computer
- Encouraging healthy eating practices such as eating breakfast, and avoiding unhealthy dieting strategies, binge eating, or vomiting on purpose after meals
- Avoiding risky behaviours like binge drinking and marijuana use
- Fostering family connections such as helping families to reduce stress, and create warm and loving environments for their teenagers
- Fostering school connections and youths' sense of safety at school

Youth need strong connections with family and school

About the Adolescent Health Survey

The McCreary Centre Society has conducted three province-wide Adolescent Health Surveys: the first (AHS I) in 1992, the second (AHS II) in 1998, and the most recent (AHS III) in 2003. More than 30,500 students in grades seven to twelve filled out the 2003 questionnaire. In total, over 72,000 students have completed surveys over the past decade, providing important information about trends among B.C.'s youth.

The 2003 survey included 140 questions on health status, health-promoting practices and risky behaviours. AHS III covered most topics included in the previous two surveys, with new questions added to give insight into emerging risks facing today's youth and protective factors that promote health and well-being. Adolescence is the period when young people often establish lifelong attitudes and habits with smoking, diet, exercise and other behaviours. Consequently, the questions were designed to identify factors that can influence present and future health. In addition, both the 2003 and 1998 surveys looked at students' family background, feelings of connectedness with family and school, and their involvement in the community to assess how these broader determinants of health affect youth.

Over 72,000 students have completed surveys over the past decade, providing important information about trends among B.C.'s youth

Who Was Involved?

Not every student in B.C. was asked to participate in the survey. Classes in public schools were randomly selected to provide a representative sample of all regions in the province. Public health nurses and trained administrators conducted the survey in more than 1,500 grade seven to 12 classrooms. Students took about 45 minutes to complete the anonymous questionnaire, and were given McCreary's contact information to address any concerns or questions about the survey. Participation was voluntary,

and parents' consent was arranged through each school district. In all, 45 of B.C.'s 59 school districts agreed to take part in the survey. School districts that chose not to participate for various reasons will, unfortunately, not have current, accurate data about the health status of their youth.

Staff from the McCreary Centre Society coordinated the project, with advice from an inter-ministry committee with representatives from six provincial ministries, and an expert advisory committee representing the medical community, universities, government, education and organizations serving youth.

Are the Results Accurate?

To ensure the accuracy of the survey results, the McCreary Centre Society paid careful attention to sample size and selection, confidentiality, administration procedures, validity of responses and data analysis. Detailed information on survey methodology is available from the Society.

AHS III provides information only about youth who are in school, about 90% of B.C. youth in the study age group. McCreary has conducted additional studies to collect data on the health status of street youth and young people in custody who are not enrolled or regularly attending school.

What Happens To the Information?

The McCreary Centre Society shares the survey results with organizations and individuals working to improve the status of youth health in British Columbia. Schools, communities, government agencies, health professionals and young people use the survey results in planning youth programs and services. McCreary is careful to protect students' confidentiality and privacy; only aggregated results are shared, so individual students or schools are not identified.

The 2003 provincial report, *Healthy Youth Development: Highlights from the 2003 Adolescent Health Survey III*, and 14 regional reports present findings on youth health, and include comparative results from the previous surveys where available. Additional reports and fact sheets on specific population groups and topics have also been produced. McCreary also designed a Next Steps workshop that gives students an opportunity to respond to the AHS data.

Visit the McCreary website at **www.mcs.bc.ca** to see the complete 2003 provincial highlights report, regional reports, details of the survey methodology, information about McCreary and additional publications from the Adolescent Health Surveys.

Defining Regions and Geographic Areas

Promoting Healthy Bodies compares data by Health Service Delivery Areas (HSDAs) and geographic areas.

Health Service Delivery Areas

In 2001, the B.C. government established new health boundaries in the province, with 16 administrative Health Service Delivery Areas (HSDAs) within five regional health authorities. The AHS III sample was designed to provide statistically significant estimates for each of the province's HSDAs, and sufficient data was collected from 13 HSDAs. Since some school districts did not participate in the survey, there is no AHS III data available for the Fraser South, Fraser East and Northeast HSDAs.

Geographic areas

All three Adolescent Health Surveys from 1992, 1998 and 2003 drew samples of students from eight geographic areas: Greater Vancouver, Capital, Fraser Valley, Interior, Kootenays, Upper Island, Northwest and Northeast. These areas are used when examining regional trends. (Due to low school district participation in the Fraser Valley, 2003 results are not available for that area.)

Interpreting regional differences

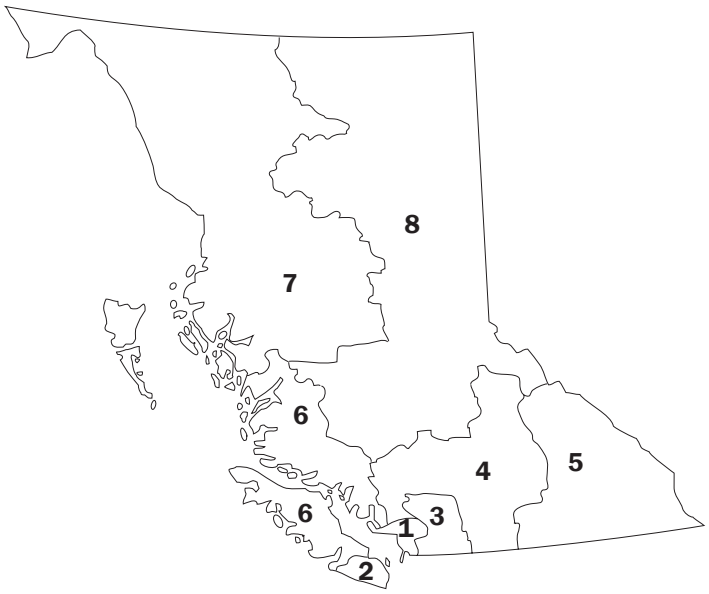
Unfortunately, the AHS cannot identify the cause of any regional differences by HSDA or geographic area. However, the AHS shows there are important regional differences in ethnic diversity. The Vancouver, Richmond and Fraser North HSDAs and the Greater Vancouver Geographic Area have much higher proportions of students who identified themselves as East Asian compared with other provincial regions:

- 49% of students in Vancouver identified themselves as East Asian, 47% in Richmond and 31% in Fraser North.
- The proportion of East Asian students in other regions of the province ranged from 2% to 11%.

The proportion of Aboriginal students also varies, and is highest in the Northwest (20%) and low in Lower Mainland HSDAs (2% in Vancouver, 3% in Richmond, and 4% in Fraser North).

Note: Throughout the report "#" indicates there was insufficient data to make an accurate estimate.

Defining geographic areas and regions



1. Greater Vancouver
2. Capital
3. Fraser Valley
4. Interior
5. Kootenays
6. Upper Island
7. Northwest
8. Northeast

Geographic areas and school districts

1. Greater Vancouver
Langley #35[A]
Surrey #36
Delta #37
Richmond #38
Vancouver #39
New Westminster #40
Burnaby #41
Maple Ridge #42[A]
Coquitlam #43
North Vancouver #44
West Vancouver #45

2. Capital
Greater Victoria #61
Sooke #62
Saanich #63
Gulf Islands #64

3. Fraser Valley
Chilliwack #33
Abbotsford #34
Mission #75
Fraser-Cascade #78

4. Interior
Revelstoke #19[B]
Vernon #22
Central Okanagan #23
Okanagan Similkameen #53
Nicola-Similkameen #58
Okanagan Skaha #67
Kamloops/Thompson #73
Gold Trail #74
N. Okanagan-Shuswap #83

5. Kootenay
Southeast Kootenay #5
Rocky Mountain #6
Kootenay Lake #8
Arrow Lakes #10
Kootenay-Columbia #20
Boundary #51

6. Upper Island
Sunshine Coast #46
Powell River #47
Howe Sound #48[C]
Central Coast #49
Nanaimo-Ladysmith #68
Qualicum #69
Alberni #70
Comox Valley #71
Campbell River #72
Cowichan Valley #79
Vancouver Island West #84
Vancouver Island North #85

7. Northwest
Haida Gwaii/
Queen Charlotte #50
Prince Rupert #52
Bulkley Valley #54
Coast Mountains #82
Stikine #87
Nisga'a #92

8. Northeast
Cariboo-Chilcotin #27
Quesnel #28
Prince George #57
Peace River South #59
Peace River North #60
Fort Nelson #81
Nechako Lakes #91[D]

Health Service Delivery Areas

Northern:
Northwest
Northeast
Northern Interior

Interior:
Thompson Cariboo Shuswap
Okanagan
Kootenay Boundary
East Kootenay

Vancouver Island:
North Vancouver Island
Central Vancouver Island
South Vancouver Island

Vancouver Coastal:
Coastal
Vancouver
Richmond

Fraser:
Fraser North
Fraser South
Fraser East

[A] Reassigned from Fraser Valley in 1992 to Greater Vancouver for the 1998 survey.
[B] Reassigned from Kootenay in 1992 to the Interior for the 1998 survey.
[C] Reassigned from Interior in 1992 to the Upper Island for the 1998 survey.
[D] Reassigned from Northwest in 1992 to the Northeast for the 1998 survey.

Measuring Physical Activity, Weight & Tobacco Use

Physical Activity

Guidelines for activity levels

Canada

According to Health Canada, youth (ages 10 to 14) could improve various aspects of their health, including their self esteem, fitness and heart strength, and achieve and maintain a healthy weight, by increasing their level of physical activity.

Health Canada suggests youth engage in endurance, flexibility and strength activities for the best health results, and has produced *Physical Activity Guides for Youth*, targeting families, teachers and youth, to encourage youth to:

- Increase the time they currently spend on physical activity, starting with at least 30 minutes or more a day, increasing by up to 90 minutes a day (30 minutes of vigorous activity such as running and 60 minutes of moderate activity). This increase can be done in five to 10 minute increments over a five-month period.
- Reduce non-active time spent on television, video, computer games and surfing the Internet, starting with at least 30 minutes less a day (up to a maximum of 90 minutes a day).

Australia

Australia's physical activity guidelines for 12 to 18-year-olds say that youth need to do at least 60 minutes of moderate to vigorous activity daily in order to stay healthy. The guidelines also say youth shouldn't spend more than two hours a day watching TV or using the computer for non-educational purposes.

Health Canada guides

(accessed March 2006):

Youth friendly handout
www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/pdf/guide_y_en.pdf

Family guide
www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/pdf/YthFamilyGuideEnFinal.pdf

Teachers' guide
www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/pdf/YthTeachersGuideEnFinal.pdf

Australian guide

(accessed March 2006):

www.health.gov.au/internet/wcms/publishing.nsf/Content/phd-physical-activity-youth-pdf-cnt.htm/$FILE/youth_phys.pdf

United States

The National Association for Sport and Physical Education in the United States recommends that children between the ages of five and 12 exercise for a minimum of 60 minutes a day, up to a maximum of a few hours a day. The association does not provide guidelines for youth older than 12.

The U.S. Centers for Disease Control and Prevention considers 'sufficient vigorous physical activity' for youth to be physical activities that make youth sweat and breathe hard for 20 minutes or more on three or more days per week.

U.S. guides

(accessed March 2006):

www.aahperd.org/NASPE/template.cfm?template=pr_123103.html

http://www.cdc.gov/mmwr/PDF/SS/SS5302.pdf

Physical activity: Measurement issues

Common speculation posits that adults and youth over-report their physical activity levels (Brener, Billy, and Grady, 2003; Rzewnicki, Auweele, and De Bourdeavdhuij, 2003), due to:

- Social desirability (although this varies by culture, age, education, and income groups).
- Difficulties in retrospective recall.
- Problems in quantifying physical activity and accurately judging exercise intensity.

However, much of the variation in responses is attributed to the way the physical activity question is asked in surveys. In addition, many studies have found that questions for self-reporting physical activity and sports participation among adolescents (for instance, in the Health Behaviour in School-Aged Children Survey in Canada and the Adolescent Physical Activity Recall Questionnaire in Australia) are moderately to substantially reliable (Booth, Okely, Chey, and Bauman, 2001, 2002; Brener et al., 2003).

Weight

Body Mass Index (BMI) is calculated based on height and weight:

- *Metric BMI formula:*
  BMI (kg/m^2)= (weight in kilograms) ÷ (height in metres)^2
- *Calculating BMI using imperial values:*
  BMI (kg/m^2)= [(weight in pounds) ÷ (height in inches)^2] * 703

Since levels of body fat differ between boys and girls as they age, the BMI cut offs for adolescents are gender and age specific and are called "BMI-for-age."

For more information on Body Mass Index for children and teens, visit: www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm (accessed March 2006).

Underweight

Body Mass Index increases as children and youth move into adulthood. The U.S. Centers for Disease Control and Prevention (CDC)—part of the U.S. Department of Health and Human Services—plot BMI-for-age on gender specific charts with curved lines that show this pattern of growth and list different percentiles for each age group. For example, if a child is in the 60th percentile, it means that, compared to children of the same gender and age, 60% will have a lower BMI.

CDC uses the following percentile cut off points to identify underweight and overweight in children:

Underweight	BMI-for-age < 5th percentile
Normal	BMI-for-age 5th percentile to < 85th percentile
At risk of overweight	BMI-for-age 85th percentile to < 95th percentile
Overweight	BMI-for-age ≥ 95th percentile
Source: www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm	

The CDC has determined that any youth whose BMI-for-age is less than the fifth percentile is underweight. The percentiles listed in the 2000 CDC BMI-for-age charts (for two to 20-year-olds) were used to determine which youth were underweight in the *Adolescent Health Survey*. Our AHS data lists youth ages in years, but the CDC tables provide ages at the half-way point of each month, so each student's age was taken at the midpoint of the year. For example, a student who is 13 years old is assumed to be a 13.5-year-old.

These tables are available at: www.cdc.gov/nchs/data/nhanes/growthcharts/bmiage.txt (accessed March 2006).

	CDC Underweight BMI cut off		CDC Underweight BMI cut off
MALES	Less than	FEMALES	Less than
12.5 years old	15.21	12.5 years old	15.07
13.5 years old	15.72	13.5 years old	15.56
14.5 years old	16.27	14.5 years old	16.06
15.5 years old	16.84	15.5 years old	16.55
16.5 years old	17.42	16.5 years old	17.01
17.5 years old	17.98	17.5 years old	17.39
18.5 years old	18.50	18.5 years old	17.68
19.5 years old	18.94	19.5 years old	17.81

(The BMI findings for the Adolescent Health Survey are presented on pages 41-46.)

Overweight and obesity

Being overweight or obese has been found to be associated with risk factors for heart disease and other chronic conditions such as hypertension, early atherosclerosis, hyperlipidaemia (higher than normal fat and cholesterol levels in the blood) and hyperinsulinemia (excess production of insulin) (Cole, Bellizzi, Flegal, and Dietz, 2000). It is widely believed that an adult's (18 and older) risk of developing some of these health problems is increased with a BMI of 25-29.9 kg/m^2 and is even higher at a BMI of 30 kg/m^2 or greater. Obese children have also been found to be at risk for health problems in later life and this is believed to operate through the association between child and adult obesity and possibly independently as well (Cole et al., 2000).

For the purposes of this report, Cole et al.'s (2000) BMI-for-age cut off points for overweight and obese youth were used to determine which youth were overweight and obese in the AHS sample. Cole's group developed international cut off points for overweight and obese youth (but not for underweight) using data from large, nationally representative, cross-sectional growth studies in Brazil, Great Britain, Hong Kong, Netherlands, Singapore and the United States. The adult BMI cut offs of 25 kg/m^2 and 30 kg/m^2 were extrapolated to create international age and gender specific cut off points for 2-18 year olds.

Cole et al.'s (2000) international criteria are used by Statistics Canada, and are recommended by the Dietitians of Canada, the Canadian Paediatric Society, the College of Family Physicians of Canada and the Community Health Nurses Association of Canada (Canadian Institute for Health Information (CIHI), 2006).

Terminology differs between Cole et al. and the CDC:

- Cole et al. use "overweight" for a BMI-for-age equivalent to an adult BMI of 25-29.9 kg/m^2, and "obese" for a BMI-for-age adult equivalent of 30 kg/m^2 or higher.
- The U.S. CDC uses "at risk for being overweight" for youth between the 85th and 95th percentile and "overweight" for youth with a BMI at or above the 95th percentile. According to the Canadian Institute for Health Information (2006), this approach is used to avoid possible "negative connotations" associated with the use of the word obesity, and is commonly practiced with children and youth, but not officially accepted internationally.

Therefore, this report will use Cole et al.'s terminology.

Lastly, the Cole et al. cut offs are available on the year and the half-year. The half-year point was used for the AHS in order to be consistent with the U.S. CDC tables.

	Cole et al. Overweight BMI cut off	Cole et al. Obese BMI cut off
Males	Greater than or equal to	Greater than or equal to
12.5 years old	21.56	26.43
13.5 years old	22.27	27.25
14.5 years old	22.96	27.98
15.5 years old	23.60	28.60
16.5 years old	24.19	29.14
17.5 years old	24.73	29.70
18.5 and older	25	30
Females	Greater than or equal to	Greater than or equal to
12.5 years old	22.14	27.24
13.5 years old	22.98	28.20
14.5 years old	23.66	28.87
15.5 years old	24.17	29.29
16.5 years old	24.54	29.56
17.5 years old	24.85	29.84
18.5 and older	25	30

Healthy weight

"Healthy weight" will be used to refer to BMIs that do not suggest that a youth is at risk of developing health problems as a result of being underweight, overweight or obese. That is, youth with a BMI-for-age that falls between the underweight and overweight cut offs are considered a healthy weight.

BMI categories for this report:

Underweight	BMI-for-age < 5th percentile (CDC criteria)
Healthy weight	BMI-for-age ≥ 5th percentile but < BMI-for-age adult equivalent of 25 kg/m^2
Overweight	BMI-for-age adult equivalent of 25-29.9 kg/m^2 (Cole et al. criteria)
Obese	BMI-for-age adult equivalent of 30 kg/m^2 or higher (Cole et al. criteria)

Using BMI to Assess Weight: Measurement Issues

Limitations

The BMI measurement is limited by the fact that it does not consider the ratio of lean to fat mass in a person's body. Lean muscle mass and fat distribution can vary significantly based on age, sex, and ethnicity, so BMI may not accurately measure very muscular individuals, youth who have not finished growing, or people from certain racial or ethnic groups. However, BMI is believed to be a good indicator of body fat on a population level, and provides a standard that allows for regional and trend comparisons (CIHI, 2006).

To account for varying pubertal stages, both the U.S. CDC and Cole et al. created cut offs that are gender and age specific (BMI-for-age). Since Cole et al. cut offs are an average of BMIs for six different national data sets, these cut offs correct for some ethnic differences in BMI.

Waist circumference and Waist to Hip Ratio measurements are also commonly used to estimate fat in the abdominal area (excess abdominal fat is associated with an increased risk of heart disease), but the AHS did not collect waist or hip circumferences from youth.

Self-reported height and weight

For practical reasons, the AHS asks youth to self-report their height and weight. Many studies show that self-reported data are reliable and correlate highly with measured data in adolescents and adults. However, the accuracy of self-reported height and weight has been called into question at times.

A recent study compared the actual measured weight of grade 11 adolescents in Wales with their self-report on the World Health Organization's *Health Behaviour of School-Aged Children Survey* (Elgar, Roberts, Tudor-Smith, and Moore, 2005). The study found there is some under-reporting of weight, especially among youth with a larger body size or body dissatisfaction, but the average amount under-reported was minimal (.52 kg or 1.1 pounds).

Also, our analyses excluded respondents who provided improbable answers, adapted from Statistics Canada's recommended strategies for data cleaning. BMI was not calculated for students who said they did not know their height or their weight, or skipped one or both answers. These students tended to be younger (13 or under), to speak a language other than English at home, to be non-European, or to be East Asian. In all, 17% of respondents did not have a BMI because of missing data.

Metric versus imperial

The AHS asks students to report their height and weight in imperial measures because pilot testing indicated that pounds, feet and inches were more commonly used and understood by B.C. students. It is possible that a small number of students unintentionally answered the height and weight questions in metric due to literacy problems or confusion. Some school districts requested that students answer in metric, and the values were subsequently converted to imperial measures for analysis.

Eating Breakfast

Regularly eating breakfast is widely believed to be a good practice, both for school performance and for maintaining a healthy weight, and is an important part of a healthy diet and lifestyle (Elgar, Roberts, Moore, and Tudor-Smith, 2005; Rampersaud, Pereira, Girard, Adams, and Metzl, 2005; Veugelers and Fitzgerald, 2005).

Supporting research can be found at the following websites (accessed March 2006):

- www.breakfastforlearning.ca/english/resources/index_ns.html
- www.dialadietitian.org/resources/handouts/lifestyle_weight_new.html

Disordered Eating

Eating disorders are an important part of the big picture of weight issues for adolescents. It is widely known that some youth suffer from disordered eating, which can pose a serious risk to their health and can even lead to death. Because of the gravity of the risk, the AHS contains questions about binge eating, vomiting on purpose after eating, and excessive or inappropriate dieting, which are key behaviours associated with eating disorders such as bulimia and anorexia nervosa.

For more information on eating disorders and weight preoccupation, visit www.nedic.ca/knowthefacts/statistics.shtml (accessed March 2006).

Tobacco Use

Smoking definitions

The definitions used to classify cigarette smoking vary widely. The AHS II and III defined cigarette smoking status similarly to other recurring Canadian surveys (The McCreary Centre Society, 2000).

We determined smoking status based on whether youth had ever smoked a whole cigarette, and their responses to the following questions:

- During your life, have you smoked at least 100 or more cigarettes?
- At the present time, do you smoke cigarettes every day, occasionally or not at all?
- During the past 30 days, on how many days did you smoke cigarettes?

"Non-smokers" have never smoked a whole cigarette. "Experimental smokers" have smoked less than 100 cigarettes, and "current smokers" have smoked 100 or more cigarettes in their lifetime, were smoking every day or occasionally at the time of the survey, and smoked on one or more days in the past month. "Former smokers" have smoked 100 or more cigarettes in their lifetime, but did not smoke in the month before the survey.

Other definitions include the:

- **Canadian Tobacco Use Monitoring Survey (CTUMS)**
  CTUMS defined a current smoker as someone who smokes daily or occasionally, which was determined by responses to the question, "At the present time, do you smoke cigarettes every day, occasionally, or not at all?". CTUMS defines a never smoker as someone who was not smoking at the time of the survey and answered no to the question, "Have you smoked at least 100 cigarettes in your life?"
  Source: http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/terminolog/index_e.html (accessed March 2006)
- **Health Canada 2002 Youth Smoking Survey**
  The Health Canada survey considered current smokers to be anyone who smokes daily or non-daily, and never smokers to have never tried a cigarette, even one or two puffs.
  Source: http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/yss-etj-2002/chap3_e.html (accessed March 2006)
- **CDC National Youth Risk Behaviour Survey (1991-2003)**
  The CDC defined "current cigarette use" as having smoked cigarettes on one or more of the 30 days preceding the survey. "Current frequent cigarette use" was defined as smoking cigarettes on 20 or more of the 30 days preceding the survey. "Lifetime cigarette use" was ever trying cigarette smoking, even one or two puffs.
  Source: http://www.cdc.gov/mmwr/PDF/SS/SS5302.pdf (accessed March 2006)

References

Booth, M.L., Okely, A.D., Chey, T., & Bauman, A. (2001). The Reliability and Validity of the Physical Activity Questions in the WHO Health Behaviour in Schoolchildren (HBSC) Survey: A Population Study. *British Journal of Sports Medicine*, 35, 263-267.

Booth, M.L., Okely, A.D., Chey, T., & Bauman, A. (2002). The Reliability and Validity of the Adolescent Physical Activity Recall Questionnaire. *Medicine and Science in Sports and Exercise*, 1986-1995.

Brener, N. D., Billy, J.*O.G.,* & Grady, W.R. (2003). Assessment of Factors Affecting Self-Reported Health-Risk Behaviours among Adolescents: Evidence from the Scientific Literature. *Journal of Adolescent Health*, 33, 436-457.

Canadian Institute for Health Information (2006). *Improving the Health of Canadians: Promoting Healthy Weights*. Ottawa, ON: Canadian Institute for Health Information.

Cole, T.J., Bellizzi, M.C., Flegal, K.M., & Dietz, W.H. (2000). Establishing a Standard Definition for Child Overweight and Obesity Worldwide: International Survey. *British Medical Journal*, 320, 1-6.

Elgar, F.J., Roberts, C., Moore, L., & Tudor-Smith, C. (2005). Sedentary Behaviour, Physical Activity and Weight Problems in Adolescents in Wales. *Public Health,* 119, 518-524.

Elgar, F.J., Roberts, C., Tudor-Smith, C., & Moore, L. (2005). Validity of Self–Reported Height and Weight and Predictors of Bias in Adolescents. *Journal of Adolescent Health*, 37, 371-375.

Rampersaud, G.C., Pereira, M.A., Girard, B.L., Adams, J., & Metzl. J.D. (2005). Breakfast Habits, Nutritional Status, Body Weight, and Academic Performance in Children and Adolescents. *Journal of the American Dietetic Association*, 105(5), 743-760.

Rzewnicki, R., Auweele, Y.V., & De Bourdeaudhuij, I. (2003). Addressing Over-reporting on the International Physical Activity Questionnaire (IPAQ) Telephone Survey with a Population Sample. *Public Health Nutrition*, 6(3), 299-305.

The McCreary Centre Society (2000). *Lighting Up–Tobacco Use Among BC Youth*. Vancouver, BC: The McCreary Centre Society.

Veugelers, P.J., & Fitzgerald, A.L. (2005). Prevalence of and Risk Factors for Childhood Overweight and Obesity. *Canadian Medical Association Journal*, 173(6), 607-613.

Indicators: Provincial & Regional Profiles

This section of *Promoting Healthy Bodies* provides provincial and regional data on three key indicators related to physical health:

- *Physical activity* levels, including information on youth who:
  - » Exercise seven days a week
  - » Participate in weekly organized physical activities
  - » Take part each week in sports without a coach
  - » Spend time watching television or using a computer for recreational purposes
- *Weight*, including information on:
  - » Youth who are underweight, a healthy weight, overweight or obese
  - » Weight control activities like dieting, bingeing, or purging
  - » Who eats breakfast on school days
- *Tobacco use*, including information on:
  - » Smoking trends among B.C. youth in the last decade

Note: All differences noted in the text have been tested for statistical significance.

Physical Activity

Exercise seven days a week

Provincial profile

In 2003, 18% of students in B.C. said they participated in physical activities on seven days in the week before the survey. Nine percent did no aerobic exercise in the previous week, while 20% exercised on one to two days, 30% on three to four days, and 23% on five to six days. Over the past decade, exercise patterns among B.C. youth have remained relatively stable.

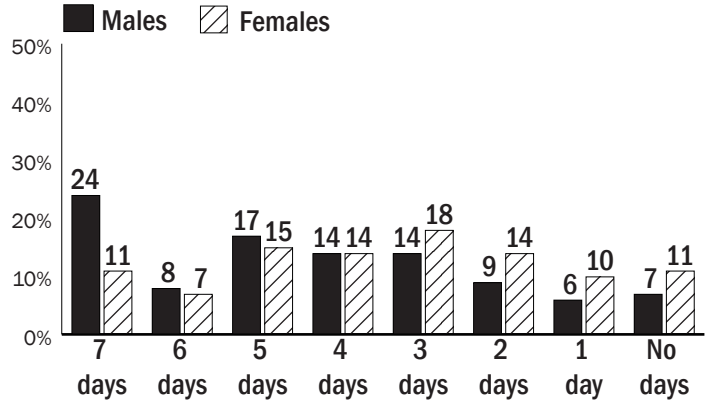
AHS question

On how many of the past seven days did you exercise or participate in physical activities for at least 20 minutes that made you sweat and breathe hard, such as soccer, jogging, dancing, swimming, tennis, bicycling, or similar aerobic activities?

Days of exercise in the past week by survey year

	1992	1998	2003
7 days	19%	15%	18%
6 days	7%	7%	8%
5 days	13%	15%	16%
4 days	13%	15%	14%
3 days	16%	17%	16%
2 days	11%	13%	12%
1 day	9%	9%	8%
No days	11%	9%	9%

Days of exercise in the past week by gender



Half as many girls exercised seven days a week as boys (11% compared to 24%).

Both males and females were less likely to exercise as they got older:

- 31% of boys 12 and younger exercised seven days a week, compared to 16% of boys 18 and older.
- 18% of girls 12 and younger exercised daily, compared to 6% of girls 18 and older.

Exercised seven days in past week by age

MALES	
12 years and under	31%
13 years	32%
14 years	27%
15 years	26%
16 years	19%
17 years	16%
18+ years	16%
Overall percentage for males	24%
FEMALES	
12 years and under	18%
13 years	16%
14 years	13%
15 years	11%
16 years	9%
17 years	6%
18+ years	6%
Overall percentage for females	11%

Physical activity among youth in Greater Vancouver increased over the past decade. Conversely, in the Interior, Kootenays and Upper Island more students exercised daily in 1992 than in 2003.

Exercised seven days in past week by geographic area

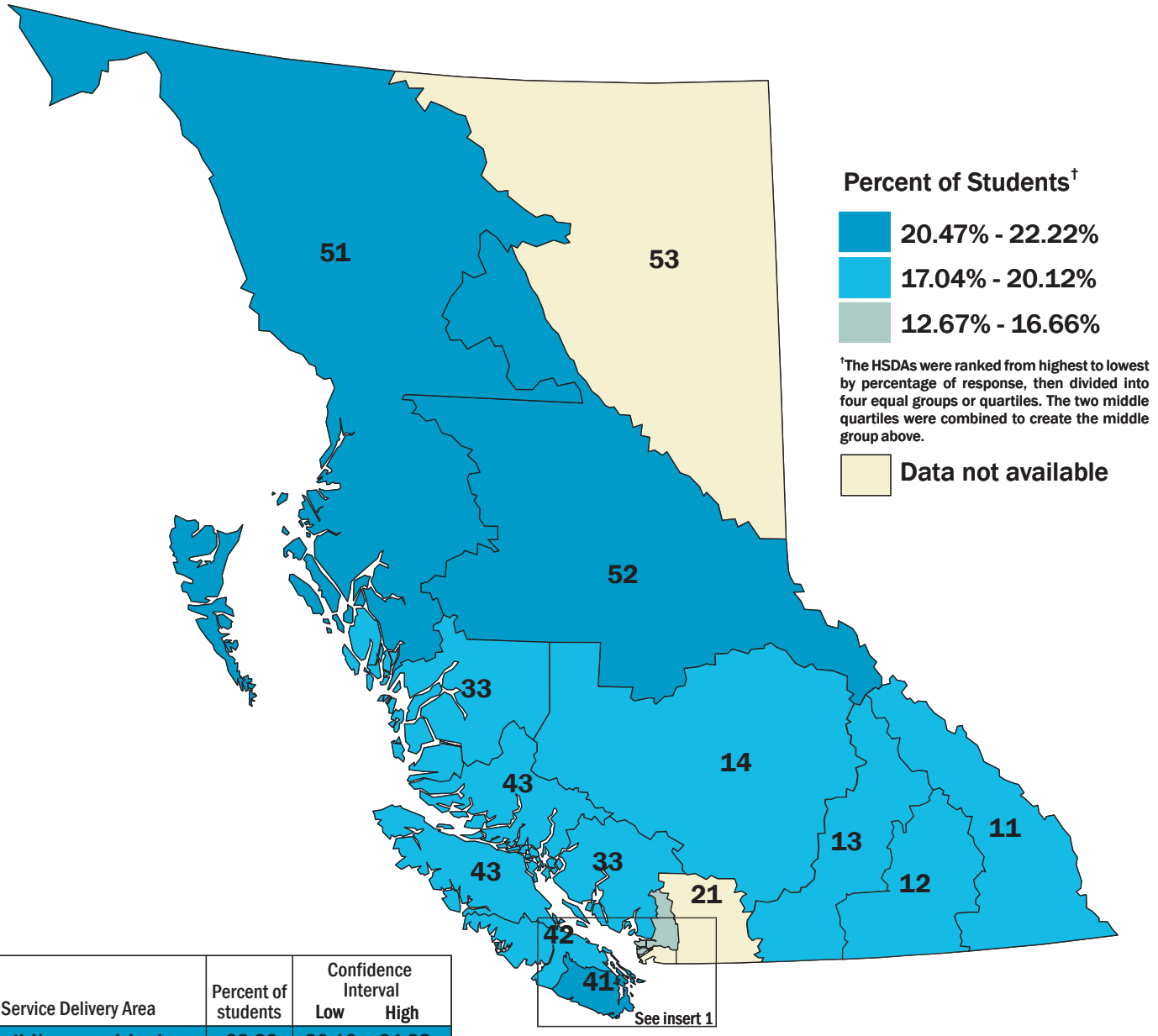
	1992	1998	2003
Greater Vancouver	12%	13%	15%
Capital	26%	19%	22%
Fraser Valley	22%	15%	—
Interior	22%	16%	18%
Kootenays	26%	17%	19%
Upper Island	24%	16%	18%
Northwest	23%	18%	21%
Northeast	25%	16%	21%

— Data not available

Regional profile

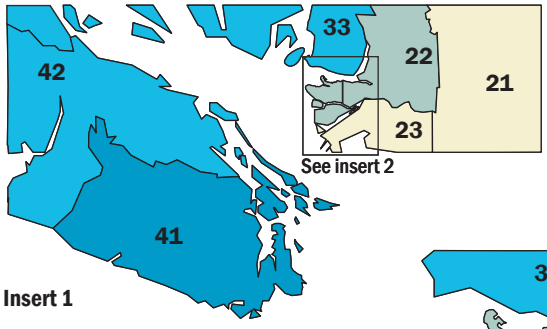
The South Vancouver Island Health Service Delivery Area (HSDA) had one of the highest percentages of students who exercised daily (22%), compared to 13% of students in the Vancouver HSDA and 14% in the Richmond HSDA who were among the lowest.

Exercised 7 Days a Week, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	High
41 South Vancouver Island	22.22	20.16	24.28
52 Northern Interior	21.06	18.79	23.33
51 Northwest	20.47	17.98	22.96
12 Kootenay Boundary	20.12	18.14	22.10
14 Thompson Cariboo Shuswap	20.01	18.11	21.91
11 East Kootenay	18.69	16.79	20.59
33 Coastal	17.94	15.92	19.96
42 Central Vancouver Island	17.74	16.07	19.41
43 North Vancouver Island	17.47	15.12	19.82
13 Okanagan	17.04	15.47	18.61
22 Fraser North	16.66	15.03	18.29
31 Richmond	14.09	11.29	16.89
32 Vancouver	12.67	10.85	14.49
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.



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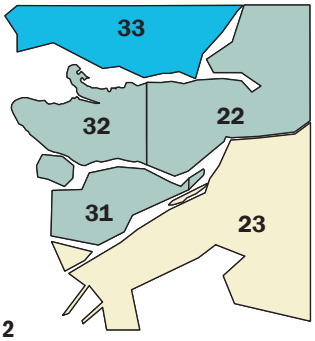

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Weekly participation in organized physical activities

Provincial profile

Overall, 60% of youth participated weekly in the following types of activities (some youth took part in both):

- *Organized sports* ~ More than half (55%) of B.C. students participated each week in these physical activities with a coach: 27% participated four or more times a week, 28% took part one to three times a week, 11% participated less than once a week, and 35% did not participate in an organized physical activity in the past year.
- *Aerobic or dance classes* ~ 20% participated weekly: 7% four or more times a week, 13% one to three times a week, 11% less than once a week, and 69% did not participate in dance or aerobic classes in the past year.

AHS question

In the past 12 months, how often have you …

Played sports WITH a coach or instructor, other than in gym class (school teams, etc.)?

Taken part in dance or aerobic classes or lessons, other than in gym class?

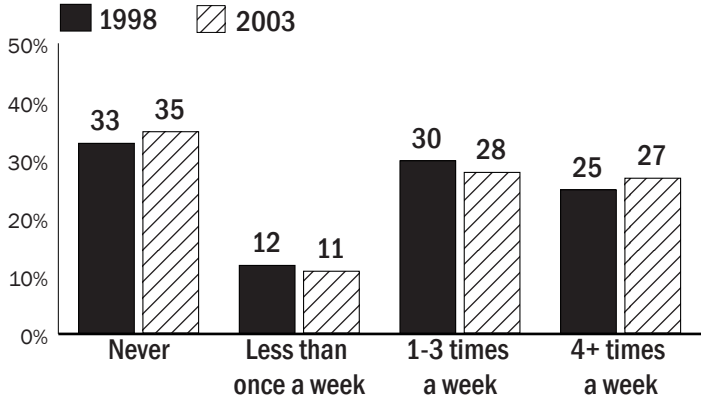
Participation in organized physical activity (including team sports and aerobic or dance classes) remained the same between 1998 and 2003.

Weekly participation in organized physical activities

1998	60%
2003	60%

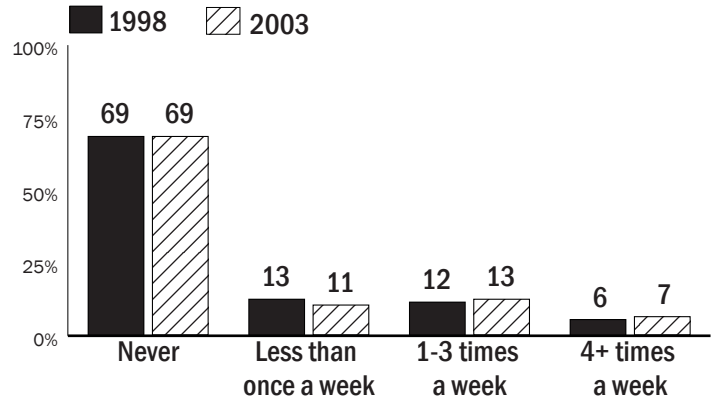
Question not asked on 1992 AHS

Played sports with a coach or instructor other than in gym class by survey year



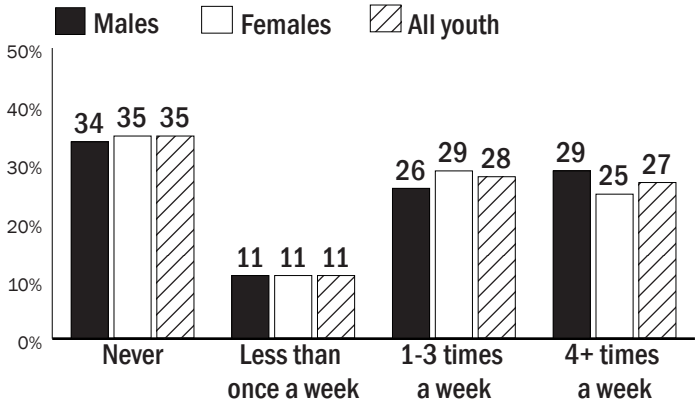
Question not asked on 1992 AHS

Took part in dance or aerobic classes/lessons by survey year

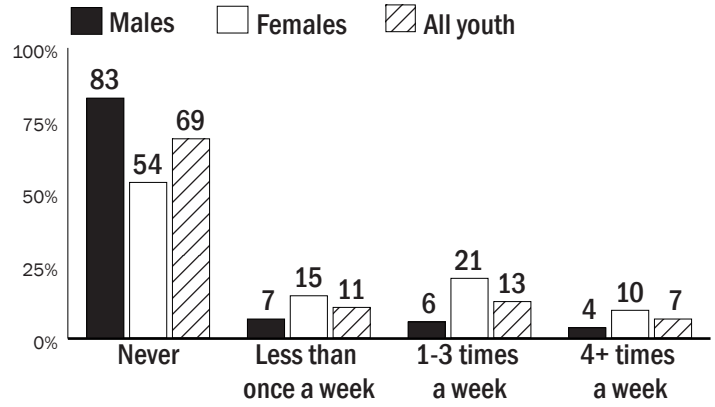


Question not asked on 1992 AHS

Played sports with a coach or instructor each week (other than in gym class) by gender



Took part in dance or aerobic classes/lessons by gender



Overall, girls were more likely than boys to participate in weekly organized physical activities (63% compared to 57%). Girls and boys were equally likely to participate in weekly sports (54% versus 55%), but girls were more likely to participate in aerobic or dance lessons (31% versus 10%).

Both males and females were less likely to participate in weekly organized physical activities as they got older:

- 67% of boys 12 and younger participated weekly, compared to 45% of boys 18 and older.
- 74% of girls 12 and younger took part weekly, compared to 47% of girls 18 and older.

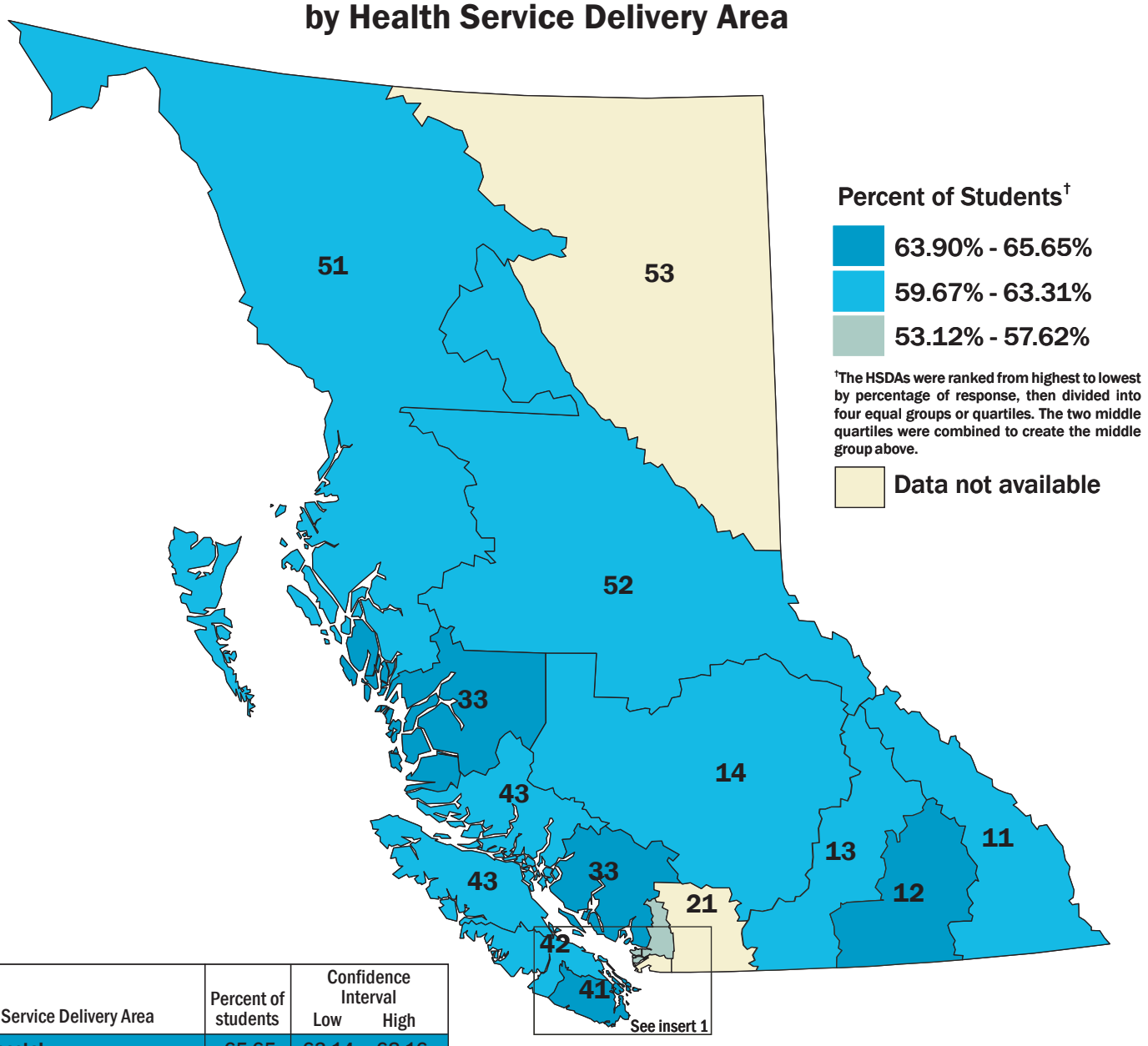
Weekly participation in organized physical activities by age

MALES	
12 years and under	67%
13 years	65%
14 years	62%
15 years	59%
16 years	54%
17 years	46%
18+ years	45%
Overall percentage for males	57%
FEMALES	
12 years and under	74%
13 years	71%
14 years	69%
15 years	66%
16 years	59%
17 years	51%
18+ years	47%
Overall percentage for females	63%

Regional profile

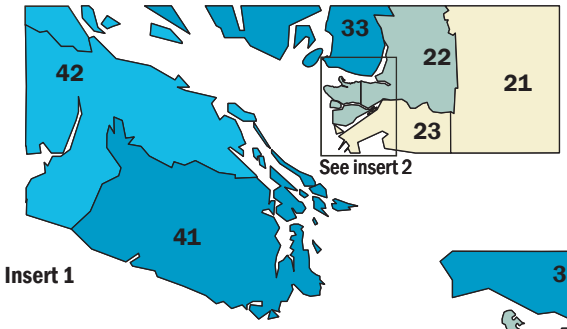
Each week, 66% of youth in the Coastal HSDA and 65% of youth in the South Vancouver Island HSDA participated in an organized physical activity compared to 54% of youth in the Richmond HSDA, and 53% in the Vancouver HSDA.

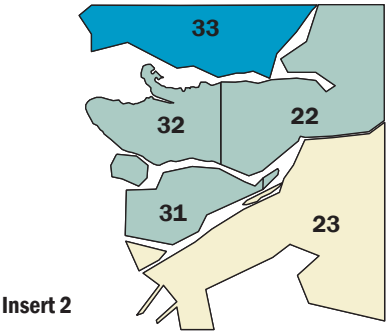
Organized Physical Activity 1+ Times a Week, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
33 Coastal	65.65	63.14	68.16
41 South Vancouver Island	65.14	62.77	67.51
12 Kootenay Boundary	63.90	61.55	66.25
51 Northwest	63.31	60.33	66.29
42 Central Vancouver Island	63.18	61.12	65.24
13 Okanagan	62.02	60.02	64.02
14 Thompson Cariboo Shuswap	61.91	59.58	64.24
43 North Vancouver Island	61.12	58.12	64.12
52 Northern Interior	60.54	57.85	63.22
11 East Kootenay	59.67	57.26	62.08
22 Fraser North	57.62	55.46	59.78
31 Richmond	53.71	49.69	57.73
32 Vancouver	53.12	50.34	55.90
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.





Participation in organized physical activities did not vary greatly in any of the province's geographic areas between 1998 and 2003.

Participated weekly in an organized physical activity by geographic area

	1998	2003
Greater Vancouver	60%	58%
Capital	65%	65%
Fraser Valley	58%	—
Interior	60%	62%
Kootenays	61%	62%
Upper Island	60%	62%
Northwest	61%	63%
Northeast	58%	61%

Question not asked on 1992 AHS
— Data not available

Weekly participation in sports without a coach

AHS question

In the past 12 months, how often have you played sports or done physical activities WITHOUT a coach or instructor (biking, skateboarding, roller blading, road hockey, etc.)?

Provincial profile

In 2003, 71% of B.C. students said they participated in weekly physical activities without a coach, such as biking, skateboarding, roller blading, road hockey, etc., in the previous year:

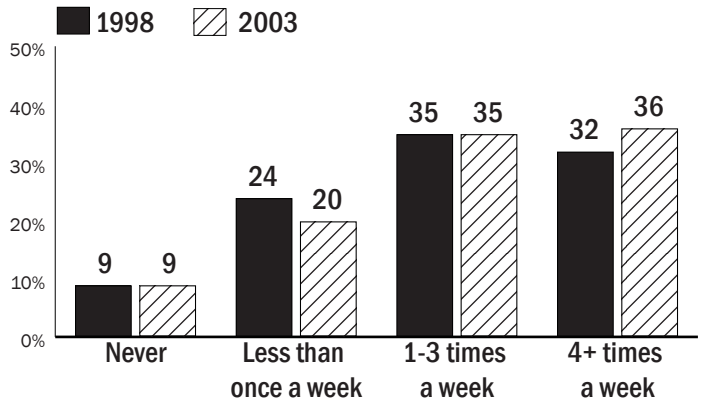
- 36% took part four or more times a week.
- 35% took part one to three times a week.

Twenty percent of youth took part in these activities less than once a week, and 9% did no physical activity without a coach in the previous year.

The proportion of youth participating in weekly physical activities without a coach or instructor increased slightly between 1998 and 2003, from 67% to 71%. In addition, more youth participated in weekly physical activities without a coach or instructor than with one (71% compared to 60%), in the previous year.

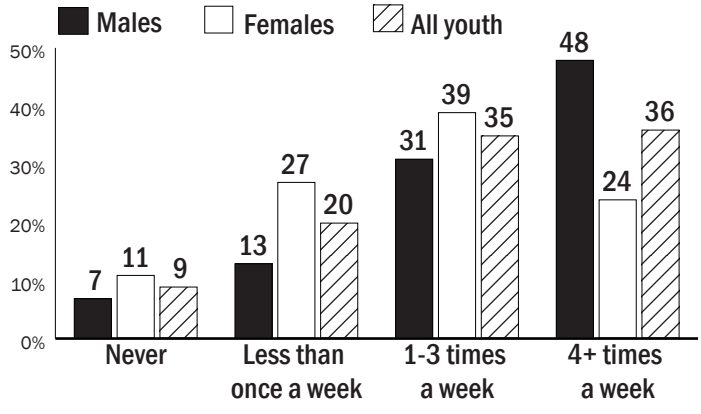
More youth participate in weekly physical activity without a coach or instructor than with one

Participated in a physical activity without a coach in the past year by survey year



Question not asked on 1992 AHS

Participated in a physical activity without a coach in the past year by gender



Boys were more likely than girls to participate in weekly physical activities without a coach (79% compared to 63%). Girls were more likely than boys (63% vs. 57%) to participate in weekly organized physical activities (including sports and aerobic or dance classes).

Weekly participation in physical activity without a coach decreases among both males and females as they get older:

- 84% of boys 12 and younger participated weekly, compared to 72% of 18-year-old boys.
- 69% of girls 12 and younger participated weekly, compared to 51% of 18-year-old girls.

Weekly participation in sports without a coach in the past year by age

MALES	
12 years and under	84%
13 years	83%
14 years	82%
15 years	83%
16 years	77%
17 years	76%
18+ years	72%
Overall percentage for males	80%
FEMALES	
12 Years and under	69%
13 Years	69%
14 years	63%
15 years	63%
16 years	59%
17 years	58%
18+ years	51%
Overall percentage for females	62%

Regional profile

Youth in the Kootenay Boundary HSDA were the most likely to participate each week in physical activities without a coach (80%), while youth in the Vancouver and Richmond HSDAs were among the least likely to participate, at 63% and 64%.

Weekly participation in sports without a coach by Health Service Delivery Area

	% of students	Confidence Intervals	
		Low	High
12 Kootenay Boundary	80.15	78.17	82.13
11 East Kootenay	75.69	73.57	77.81
13 Okanagan	74.72	72.84	76.60
14 Thompson Cariboo Shuswap	75.11	73.07	77.15
51 Northwest	74.98	72.24	77.72
43 North Vancouver Island	74.31	71.62	76.00
52 Northern Interior	74.29	71.88	76.70
41 South Vancouver Island	72.56	70.33	74.79
42 Central Vancouver Island	72.93	70.99	74.87
33 Coastal	72.07	70.13	74.01
22 Fraser North	68.51	66.35	70.67
31 Richmond	63.57	59.73	67.41
32 Vancouver	62.68	59.94	65.42
21 Fraser East	–	–	–
23 Fraser South	–	–	–
53 Northeast	–	–	–

– Data not available

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.

Weekly participation in sports without a coach by geographic area

	1998	2003
Greater Vancouver	64%	67%
Capital	72%	73%
Fraser Valley	65%	–
Interior	71%	75%
Kootenays	75%	78%
Upper Island	69%	74%
Northwest	68%	75%
Northeast	70%	75%

Question not asked on 1992 AHS

– Data not available

Youth in the Kootenays were the most likely to participate in weekly physical activities without a coach (78%), while youth in Greater Vancouver were the least likely to participate (67%). Weekly physical activity without a coach was higher in all regions of the province in 2003 than in 1998.

Screen time

AHS questions

On an average school day, how many hours do you watch TV (including videos)?

On an average school day, how many hours do you use a computer for playing games, emailing, chatting and surfing the Internet?

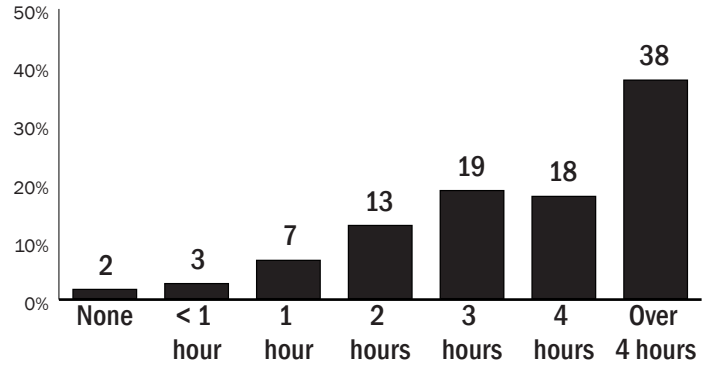
Provincial profile

Television watching ~ On an average school day in 2003, 18% of youth watched TV for four or more hours, 20% watched for three hours, 25% for two hours, 16% for one hour, 14% for less than an hour, and 7% said they did not watch TV at all on an average school day.

Computer use ~ 15% of students used a computer for recreational purposes for four or more hours on an average school day, 13% for three hours a day, 21% for two hours, 18% for one hour, 21% for less than one hour, and 11% said they did not use a computer recreationally at all on an average school day.

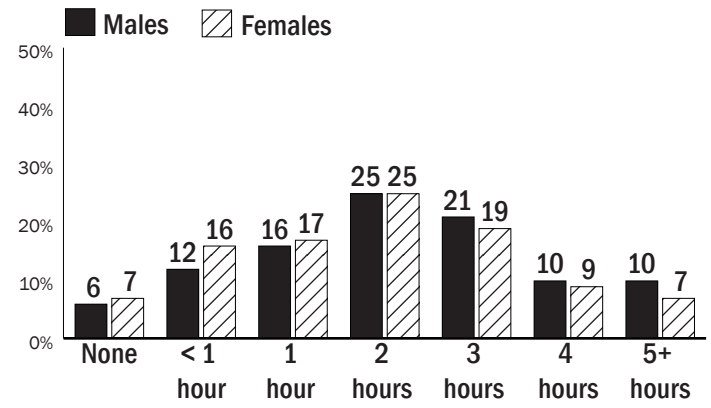
Number of hours watching TV on school days	
None	7%
Less than 1 hour	14%
1 hour	16%
2 hours	25%
3 hours	20%
4 hours	10%
5+ hours	8%
Number of hours of recreational computer use on school days	
None	11%
Less than 1 hour	21%
1 hour	18%
2 hours	21%
3 hours	13%
4 hours	7%
5+ hours	8%

Total screen time on a school day



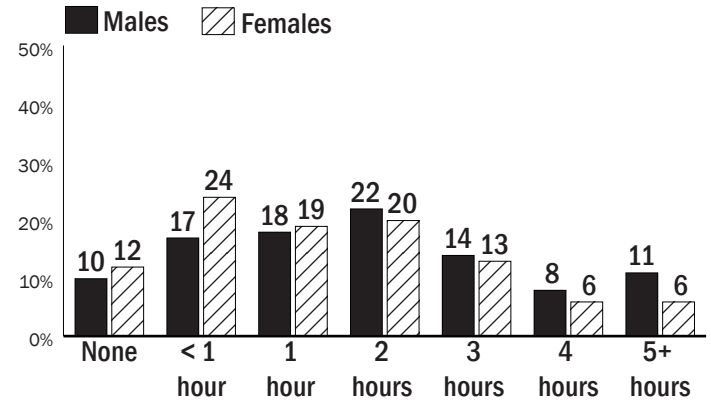
When these questions were combined, 38% of youth watched TV or used a computer recreationally for more than four hours on an average school day, 37% did so for two and a half to four hours a day, 23% for two hours or less, and 2% did not watch TV or use a computer recreationally at all on a school day.

Number of hours watching TV on school days by gender



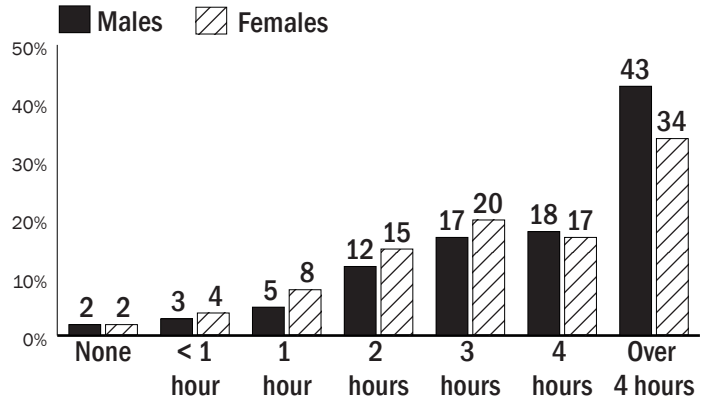
Males were more likely than females to watch TV for four or more hours on an average school day (20% compared to 16%), and to use a computer recreationally for four or more hours a day (19% compared to 12%).

Number of hours of recreational computer use on school days by gender



Males and females were equally likely to not watch TV or use a computer for recreational purposes on a school day (2%). However, males were more likely than females to watch TV or use a computer recreationally for more than four hours on an average school day (43% versus 34%).

Total screen time on a school day by gender



Screen time increases among males from age 12 to 16:

- Males at 12 and younger were the least likely (at 34%) to watch TV or use a computer recreationally for more than four hours on an average school day, increasing to 41% for 13-year-olds.
- As boys aged, they were increasingly likely to have more than four hours of daily screen time until the age of 16 (47%) when levels peak.
- Daily use was 42% by the age of 18 or older.

Fourteen year old girls were the most likely to watch TV or use a computer recreationally for more than four hours on a school day (39%). Among girls 12 and younger, 32% had more than four hours of screen time a day, and this decreased to 26% of girls 18 and older.

More than four hours of daily screen time by age

MALES	
12 years and under	34%
13 years	41%
14 years	43%
15 years	46%
16 years	47%
17 years	43%
18+ years	42%
Overall percentage for males	43%
FEMALES	
12 years and under	32%
13 years	36%
14 years	39%
15 years	36%
16 years	31%
17 years	31%
18+ years	26%
Overall percentage for females	34%

Regional profile

Youth in the Vancouver and Richmond HSDAs were some of the most likely to watch more than four hours of TV on an average school day (21%), followed closely by the Northern Interior HSDA, where 20% of youth watched more than four hours of television daily. Youth in the Okanagan and Coastal HSDAs were among the least likely to watch four or more hours of television a day (15%).

Watching TV for four or more hours on a school day by Health Service Delivery Area

31 Richmond	21%
32 Vancouver	21%
52 Northern Interior	20%
22 Fraser North	19%
43 North Vancouver Island	19%
11 East Kootenay	18%
14 Thompson Cariboo Shuswap	18%
12 Kootenay Boundary	17%
42 Central Vancouver Island	17%
51 Northwest	17%
41 South Vancouver Island	16%
13 Okanagan	15%
33 Coastal	15%
21 Fraser East	—
23 Fraser South	—
53 Northeast	—

— Data not available

Youth in the Vancouver (23%) and Richmond (25%) HSDAs were twice as likely to use a computer recreationally for more than four hours daily as youth in the Thompson Cariboo Shuswap (10%), East Kootenay (11%), Kootenay Boundary (11%), Okanagan (11%), and Northern Interior (12%) HSDAs.

Four or more hours of recreational computer use on a school day by Health Service Delivery Area

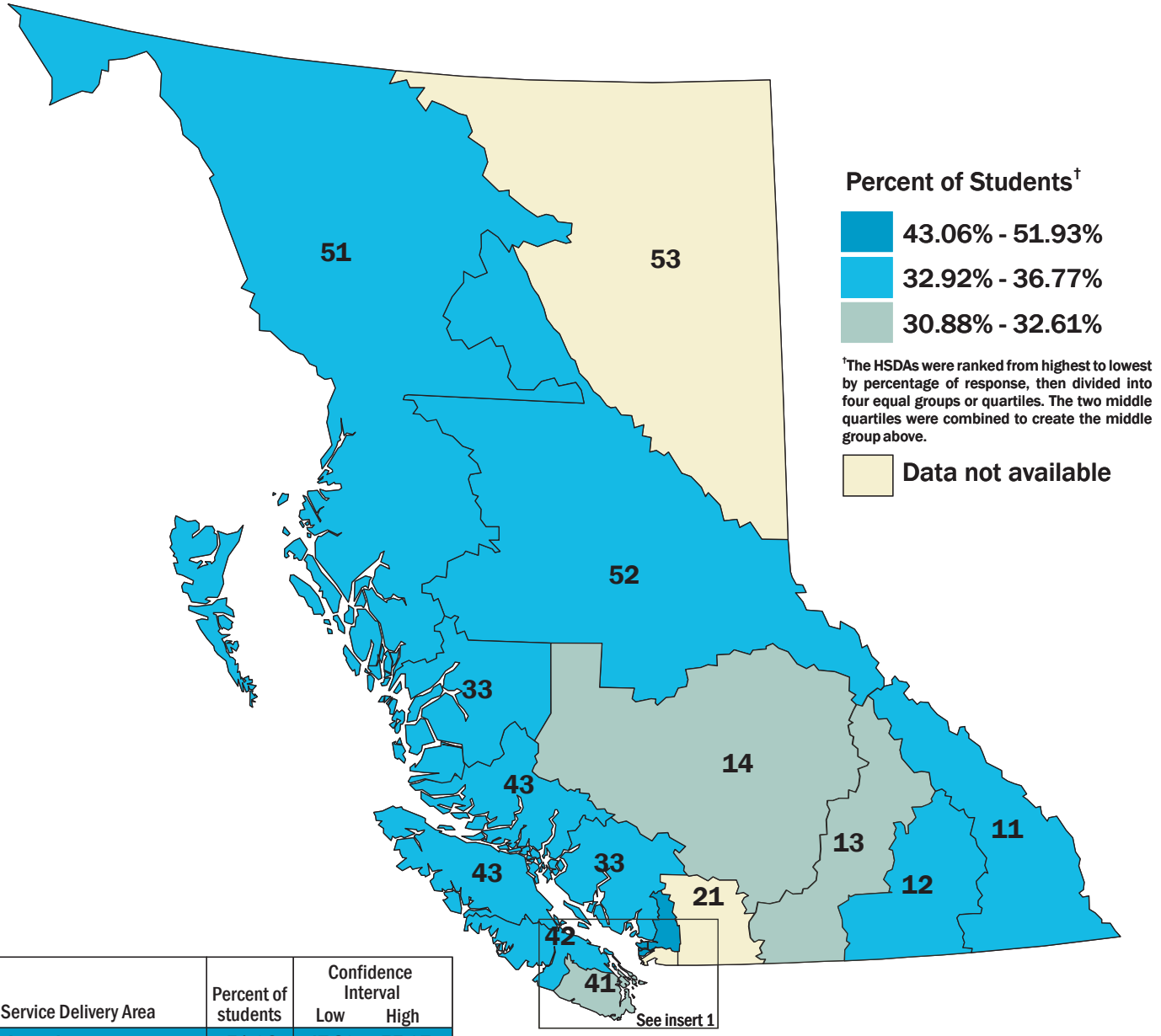
31 Richmond	25%
32 Vancouver	23%
22 Fraser North	18%
33 Coastal	13%
41 South Vancouver Island	13%
42 Central Vancouver Island	13%
43 North Vancouver Island	13%
51 Northwest	13%
52 Northern Interior	12%
11 East Kootenay	11%
12 Kootenay Boundary	11%
13 Okanagan	11%
14 Thompson Cariboo Shuswap	10%
21 Fraser East	–
23 Fraser South	–
53 Northeast	–

– Data not available

Youth in the Richmond (52%), Vancouver (47%), and Fraser North (43%) HSDAs were the most likely, and youth in the Okanagan (31%) and South Vancouver Island (32%) HSDAs were among the least likely, to watch TV or use a computer recreationally for more than four hours daily.

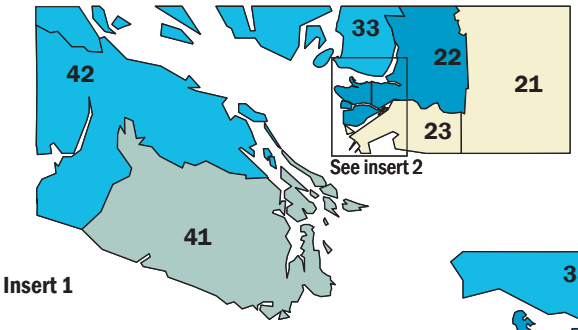
Recreational computer use was higher among youth in the Vancouver and Richmond HSDAs than elsewhere in the province

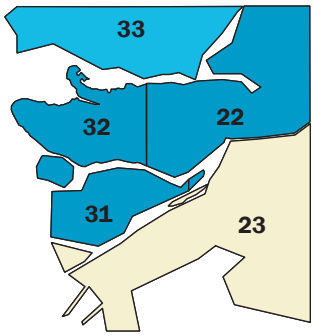
Screen Time More Than 4 Hours, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
31 Richmond	51.93	47.89	55.97
32 Vancouver	46.97	44.42	49.52
22 Fraser North	43.06	40.71	45.41
42 Central Vancouver Island	36.77	34.71	38.83
51 Northwest	36.33	33.35	39.31
43 North Vancouver Island	35.93	33.01	38.85
52 Northern Interior	35.05	32.44	37.66
11 East Kootenay	34.98	32.63	37.33
33 Coastal	34.31	32.25	36.37
12 Kootenay Boundary	32.92	30.57	35.27
14 Thompson Cariboo Shuswap	32.61	30.34	34.88
41 South Vancouver Island	32.10	29.83	34.37
13 Okanagan	30.88	29.00	32.76
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.





TV watching for four or more hours on a school day by geographic area	
Greater Vancouver	19%
Capital	16%
Fraser Valley	—
Interior	16%
Kootenays	18%
Upper Island	18%
Northwest	17%
Northeast	20%

— Data not available

Youth in Greater Vancouver were the most likely to use a computer recreationally for four or more hours on an average school day.

Recreational computer use for four or more hours on a school day by geographic area	
Greater Vancouver	20%
Capital	13%
Fraser Valley	—
Interior	11%
Kootenays	11%
Upper Island	13%
Northwest	13%
Northeast	11%

— Data not available

Youth in Greater Vancouver were also the most likely to have a total screen time of four or more hours on an average school day.

More than four hours of daily screen time on a school day by geographic area	
Greater Vancouver	44%
Capital	32%
Fraser Valley	—
Interior	32%
Kootenays	34%
Upper Island	36%
Northwest	36%
Northeast	34%

— Data not available

Weight

Body Mass Index

Body Mass Index (BMI) was calculated using the height and weight data youth provided in the survey, combined with their gender and age. Using the BMI, students were grouped into four categories: underweight, healthy weight, overweight, or obese.

Provincial profile

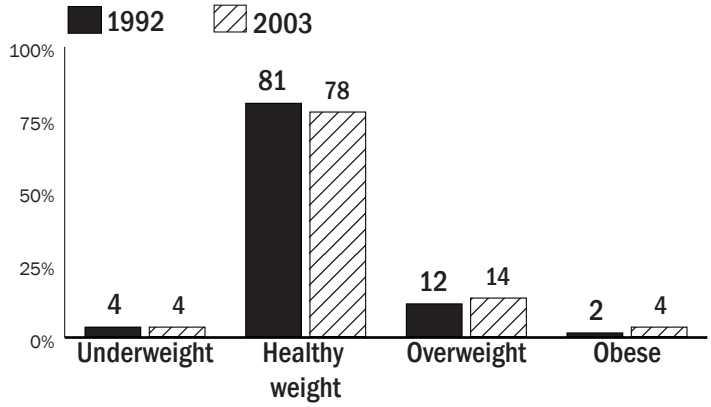
Using the BMI measure, the majority of youth (78%) was a healthy weight, 14% were overweight, 4% were obese, and 4% were underweight. The proportion of overweight or obese male youth has increased since 1992, but stayed the same for overweight or obese female youth.

AHS questions

How much do you weigh?

How tall are you?

BMI weight categories by survey year



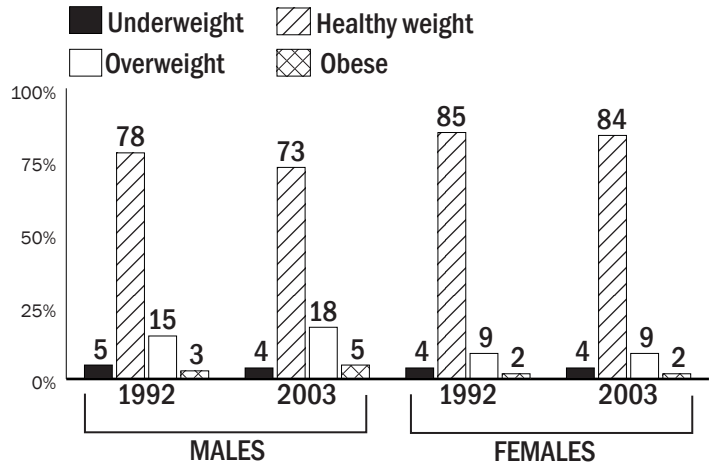
Height and weight not asked on 1998 AHS

Boys were twice as likely as girls to be overweight (18% compared to 9%) or obese (5% versus 2%).

Girls were more likely than boys to be a healthy weight (84% compared to 73%), and boys and girls were equally likely to be underweight (4%).

In addition, the likelihood of being overweight or obese did not vary much by age.

BMI weight categories by gender



Height and weight not asked on 1998 AHS

BMI weight categories by age

	Under-weight	Healthy weight	Over-weight	Obese
MALES				
12 years and under	3%	74%	18%	5%
13 years	6%	74%	16%	4%
14 years	2%	76%	17%	5%
15 years	2%	75%	17%	5%
16 years	4%	72%	19%	5%
17 years	5%	70%	18%	7%
18+ years	4%	70%	19%	6%
Overall percentage for males	4%	73%	18%	5%
FEMALES				
12 years and under	4%	83%	10%	4%
13 years	6%	84%	7%	2%
14 years	4%	85%	9%	2%
15 years	4%	84%	10%	2%
16 years	3%	86%	8%	2%
17 years	5%	81%	10%	3%
18+ years	5%	80%	13%	#
Overall percentage for females	4%	84%	9%	2%

Insufficient data to make an accurate estimate

Regional profile

Youth in the Northwest HSDA were some of the most likely (24%), and youth in the Vancouver and Richmond HSDAs were among the least likely (14%), to be overweight or obese.

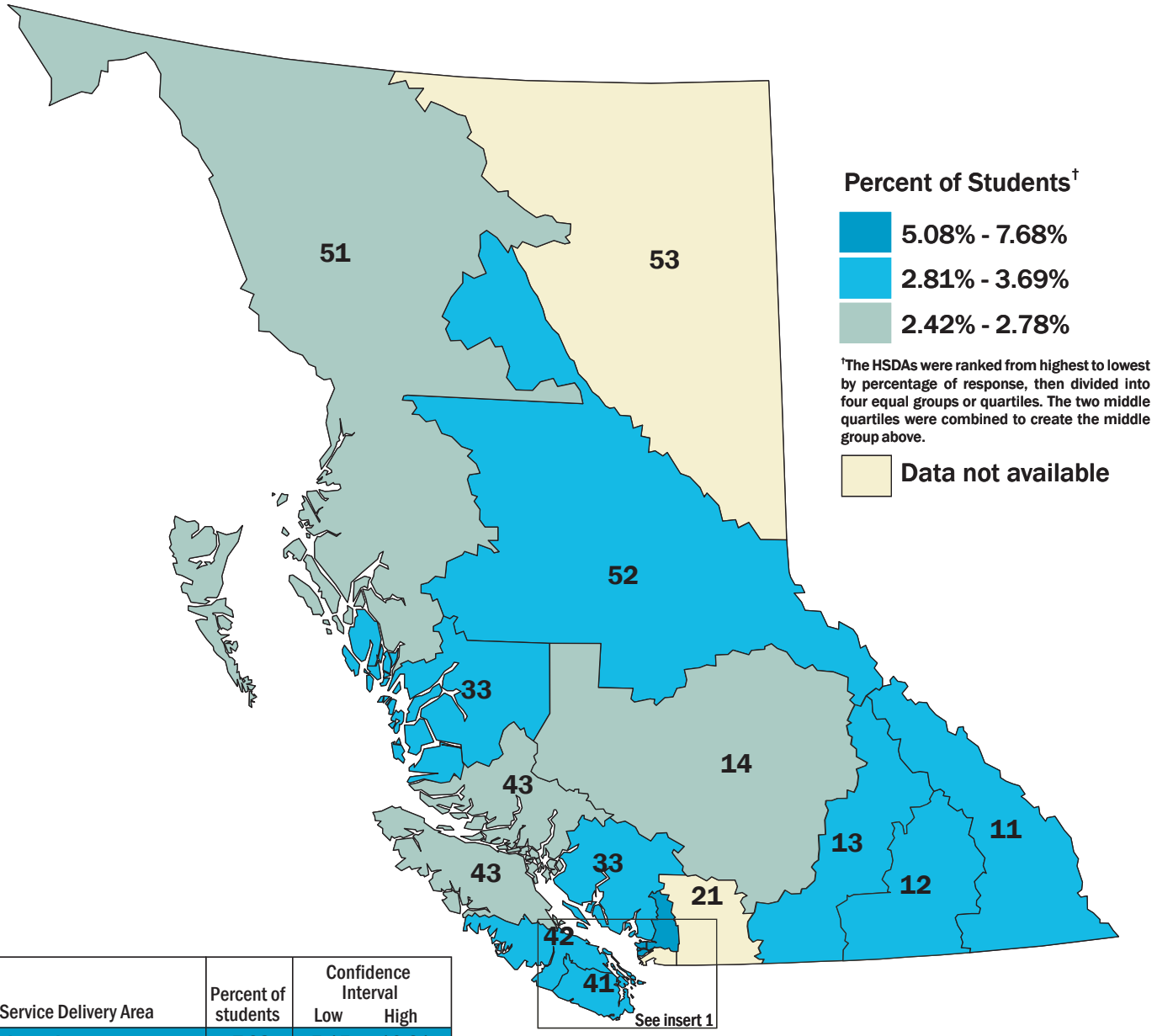
BMI weight categories by Health Service Delivery Area

	Under-weight	Healthy weight	Over-weight	Obese
11 East Kootenay	3%	78%	15%	4%
12 Kootenay Boundary	3%	79%	15%	3%
13 Okanagan	4%	81%	12%	4%
14 Thompson Cariboo Shuswap	3%	79%	15%	4%
21 Fraser East	–	–	–	–
22 Fraser North	5%	77%	14%	4%
23 Fraser South	–	–	–	–
31 Richmond	8%	78%	11%	3%
32 Vancouver	7%	79%	11%	3%
33 Coastal	4%	81%	13%	2%
41 South Vancouver Island	3%	79%	14%	4%
42 Central Vancouver Island	3%	78%	15%	4%
43 North Vancouver Island	#	81%	13%	#
51 Northwest	2%	73%	17%	7%
52 Northern Interior	3%	77%	15%	5%
53 Northeast	–	–	–	–

– Data not available

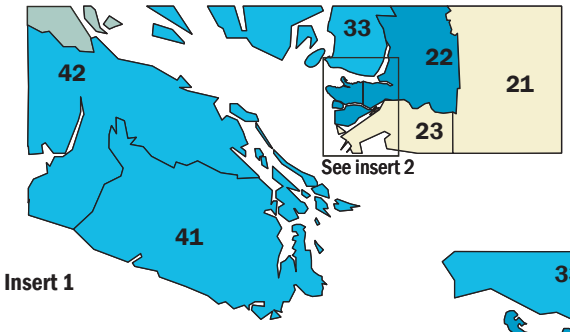
Insufficient data to make an accurate estimate

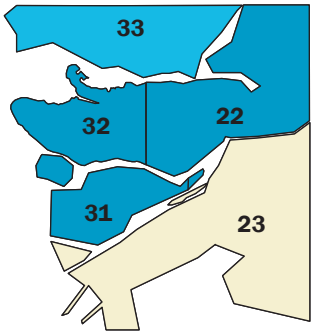
Underweight, by Health Service Delivery Area



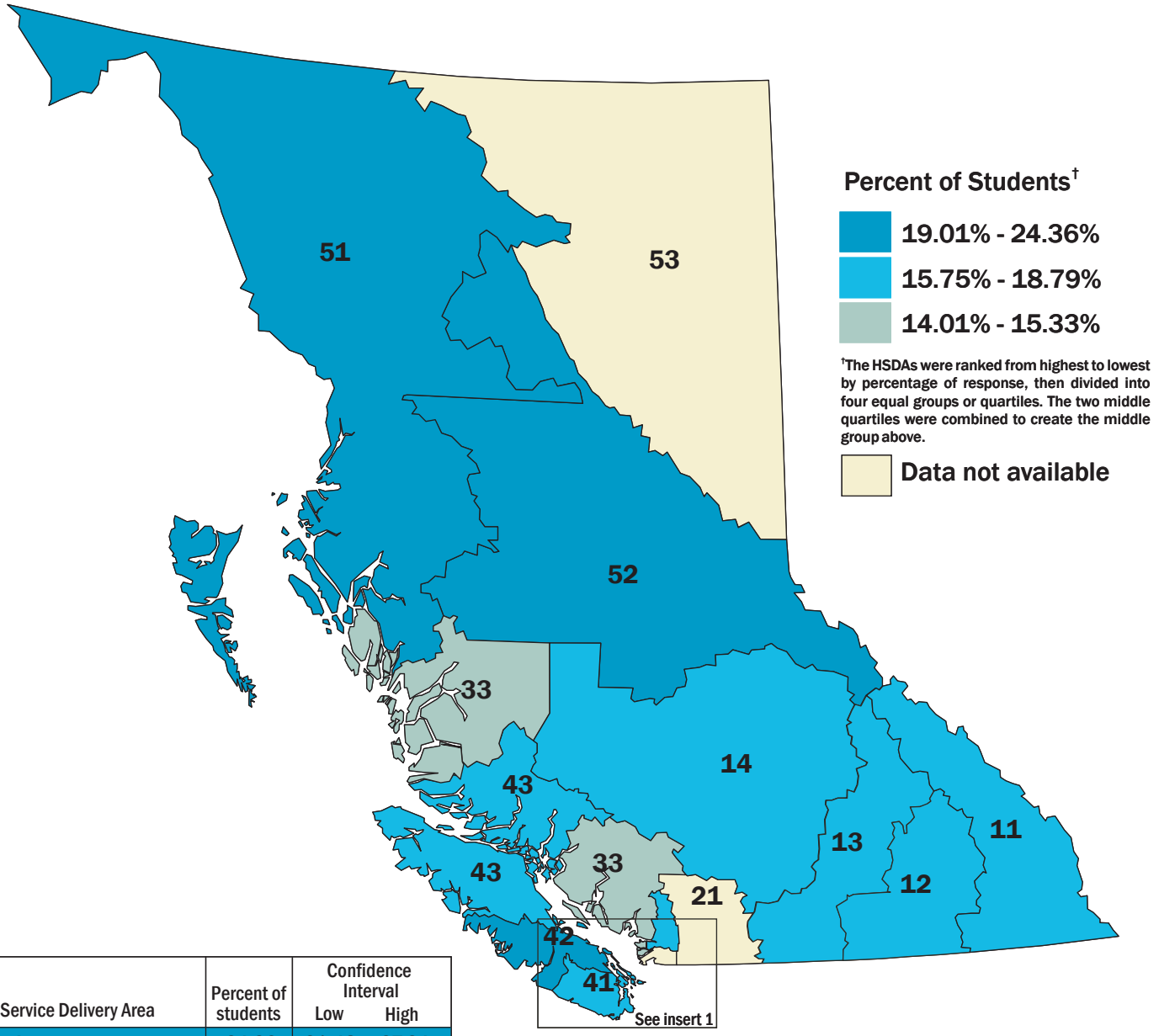
Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
31 Richmond	7.68	5.15	10.21
32 Vancouver	6.84	5.35	8.33
22 Fraser North	5.08	3.96	6.20
33 Coastal	3.69	2.79	4.59
13 Okanagan	3.59	2.71	4.47
41 South Vancouver Island	3.44	2.54	4.34
52 Northern Interior	3.02	2.00	4.04
42 Central Vancouver Island	2.88	2.10	3.66
11 East Kootenay	2.81	1.97	3.65
12 Kootenay Boundary	2.78	1.86	3.70
14 Thompson Cariboo Shuswap	2.69	1.83	3.55
51 Northwest	2.42	1.48	3.36
43 North Vancouver Island	-	-	-
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.



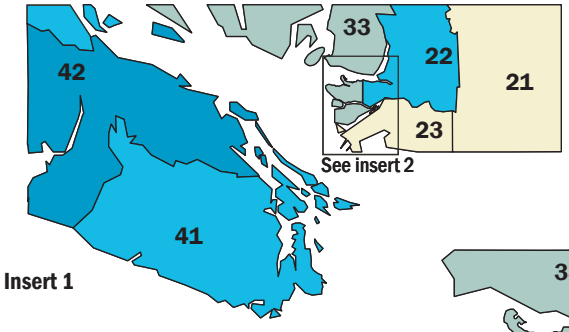


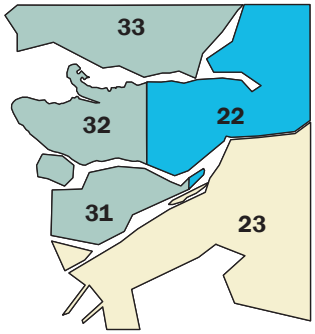
Overweight and Obese, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
51 Northwest	24.36	21.48	27.24
52 Northern Interior	20.21	17.80	22.62
42 Central Vancouver Island	19.01	17.19	20.83
11 East Kootenay	18.79	16.89	20.69
14 Thompson Cariboo Shuswap	18.78	16.82	20.74
22 Fraser North	17.90	15.94	19.86
12 Kootenay Boundary	17.69	15.61	19.77
41 South Vancouver Island	17.60	15.58	19.62
43 North Vancouver Island	17.40	14.91	19.89
13 Okanagan	15.75	14.10	17.40
33 Coastal	15.33	13.64	17.02
31 Richmond	14.32	11.09	17.55
32 Vancouver	14.01	11.83	16.19
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.





Youth in the Vancouver (7%) and Richmond (8%) HSDAs were among the most likely to be underweight.

The Greater Vancouver, Capital and Upper Island areas had significant increases in the proportion of overweight and obese youth between 1992 and 2003.

BMI weight categories by geographic area

	Underweight		Healthy weight		Overweight or obese	
	1992	2003	1992	2003	1992	2003
Greater Vancouver	6%	6%	81%	79%	13%	15%
Capital	3%	3%	86%	79%	10%	18%
Fraser Valley	3%	–	80%	–	17%	–
Interior	4%	3%	82%	80%	14%	17%
Kootenays	4%	3%	81%	79%	15%	18%
Upper Island	4%	3%	81%	79%	15%	18%
Northwest	#	#	78%	73%	20%	24%
Northeast	3%	3%	80%	78%	17%	20%

Height and weight not asked on 1998 AHS

– Data not available

Insufficient data to make an accurate estimate

Weight control practices

Provincial profile

Almost a third of B.C. students (32%) dieted to lose weight in the year before the 2003 survey.

Also in 2003, 28% of youth said they had ever binge eaten, down from 34% in 1992, and 12% were bingeing more than once a month. Five percent had ever vomited on purpose after eating, and 2% were vomiting on purpose more than once a month. When the questions were combined, 30% had ever binged or purged, also down in the last decade, from 36% in 1992.

AHS questions

During the past year, how often have you gone on a diet to lose weight?

How often do you eat so much food in a short period of time that you feel out of control and would be embarrassed if others saw you (binge eating or gorging)?

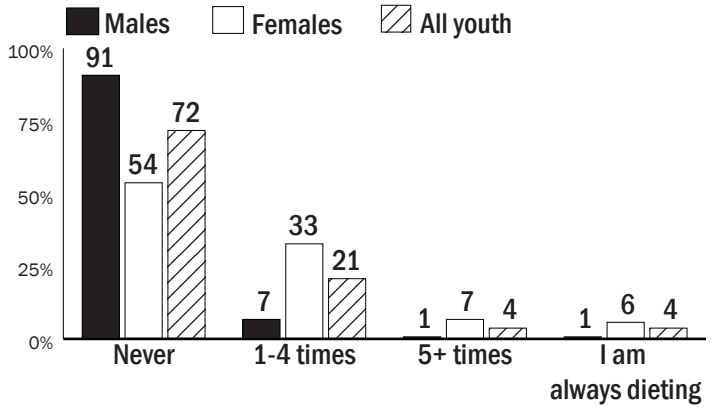
How often do you vomit (throw up) on purpose after eating?

Weight control practices by survey year

	1992	1998	2003
Dieting			
Never	—	—	68%
1-4 times in past year	—	—	23%
5+ times in past year	—	—	5%
I am always dieting	—	—	4%
Bingeing or gorging			
Never	66%	68%	72%
Once a month or less	20%	20%	17%
2-3 times a month	6%	6%	6%
Once a week	4%	3%	3%
2+ times a week	4%	3%	3%
Vomited on purpose after eating			
Never	94%	93%	95%
Once a month or less	4%	5%	3%
2-3 times a month	1%	1%	1%
Once a week or more	1%	1%	1%
Ever binged or vomited on purpose after eating			
	36%	35%	30%

— Question not asked on 1992 and 1998 AHS

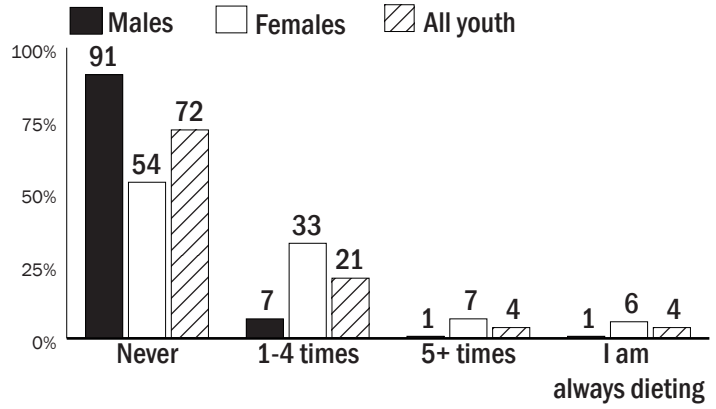
Dieted in the past year by gender



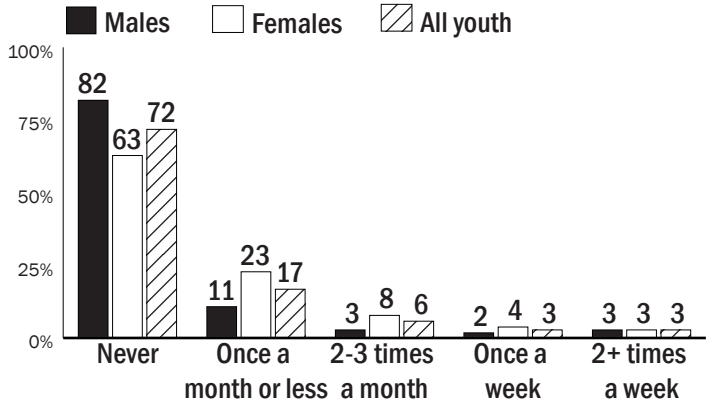
Girls were more likely than boys to diet, binge eat, and vomit on purpose after eating:

- More than three times more girls dieted in the previous year than boys (49% vs. 14%).
- Almost half of underweight and healthy weight girls had dieted in the year before the survey (46%).
- Females were twice as likely as males to have binged or gorged (37% vs. 18%).
- Females were more likely than males to have vomited on purpose after eating (7% vs. 3%).
- Females were also more likely than males to have ever binged or purged (39% compared to 20%).

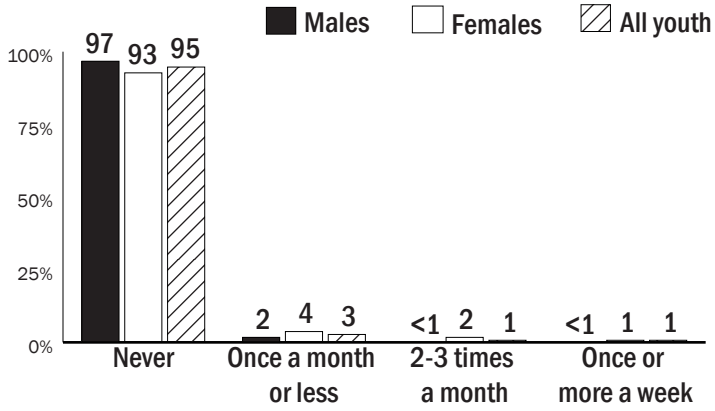
Dieted in the past year (of youth who are underweight or a healthy weight) by gender



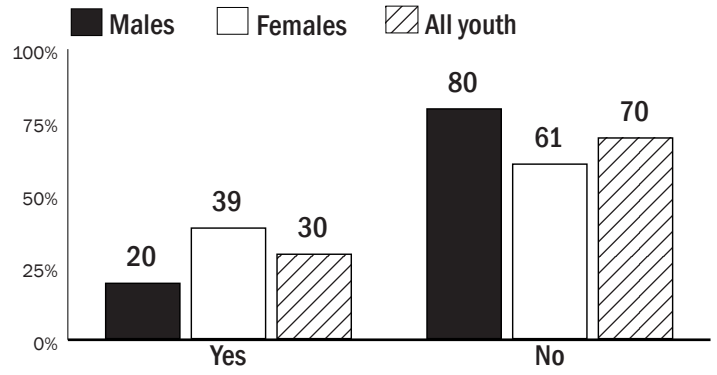
Bingeing or gorging by gender



Vomiting on purpose after eating by gender



Ever binged or vomited on purpose by gender



Dieted in the past year by age

MALES	
12 years and under	17%
13 years	15%
14 years	13%
15 years	14%
16 years	14%
17 years	13%
18+ years	15%
Overall percentage for males	14%
FEMALES	
12 years and under	32%
13 years	40%
14 years	47%
15 years	53%
16 years	54%
17 years	56%
18+ years	59%
Overall percentage for females	49%

As girls got older, they were more likely to have dieted in the previous year: 32% of girls 12 and younger had dieted, compared to 59% of girls 18 and older. The rate of dieting among boys remained fairly stable as they got older.

Regional profile

The rate of dieting among underweight and healthy weight girls is relatively consistent across the province, with the Richmond HSDA having one of the highest (49%) and the Central Vancouver Island HSDA with one of the lowest rates of dieting (42%).

Underweight or healthy weight females who dieted in the past year by Health Service Delivery Area

	% of students	Confidence Intervals	
		Low	High
31 Richmond	49.07	42.07	56.07
13 Okanagan	47.69	44.36	51.02
14 Thompson Cariboo Shuswap	47.52	43.64	51.40
33 Coastal	47.37	43.90	50.84
51 Northwest	46.35	41.16	51.54
11 East Kootenay	45.45	41.20	49.70
22 Fraser North	45.19	41.17	49.21
52 Northern Interior	44.75	40.52	48.98
43 North Vancouver Island	44.44	39.56	49.32
12 Kootenay Boundary	44.19	40.39	47.99
32 Vancouver	43.24	38.85	47.63
41 South Vancouver Island	42.50	38.33	46.67
42 Central Vancouver Island	41.92	38.53	45.31
21 Fraser East	—	—	—
23 Fraser South	—	—	—
53 Northeast	—	—	—

— Data not available

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error, and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.

Almost half of underweight and healthy weight girls dieted in the year before the survey

Underweight or healthy weight females who dieted in the past year by geographic area	
Greater Vancouver	46%
Capital	43%
Fraser Valley	—
Interior	47%
Kootenays	45%
Upper Island	43%
Northwest	46%
Northeast	46%

— Data not available

Eating breakfast on school days

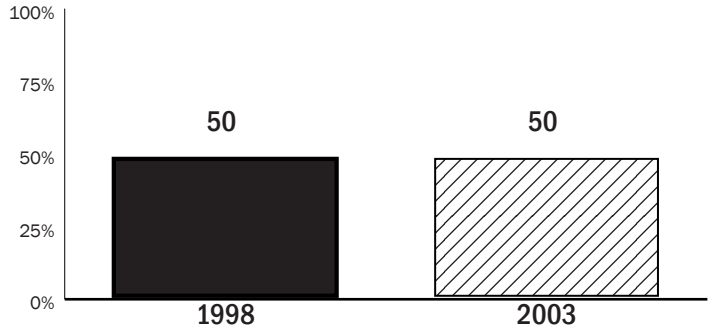
Provincial profile

Half (50%) of B.C. youth always eat breakfast on school days, 33% sometimes eat breakfast, and 18% never eat breakfast on school days. The proportion of youth who always eat breakfast remained the same between 1998 and 2003.

AHS question

How often do you eat breakfast on school days?

Always eat breakfast on school days by survey year



Question not asked on 1992 AHS

Boys were more likely than girls to always eat breakfast on school days (54% compared to 45%). Both males and females were less likely to always eat breakfast as they got older:

- 64% of boys 12 and younger always ate breakfast on school days, compared to 41% of boys 18 and older.
- 55% of girls 12 and younger always ate breakfast on school days, compared to 38% of girls 18 and older.

Eating breakfast on school days by age

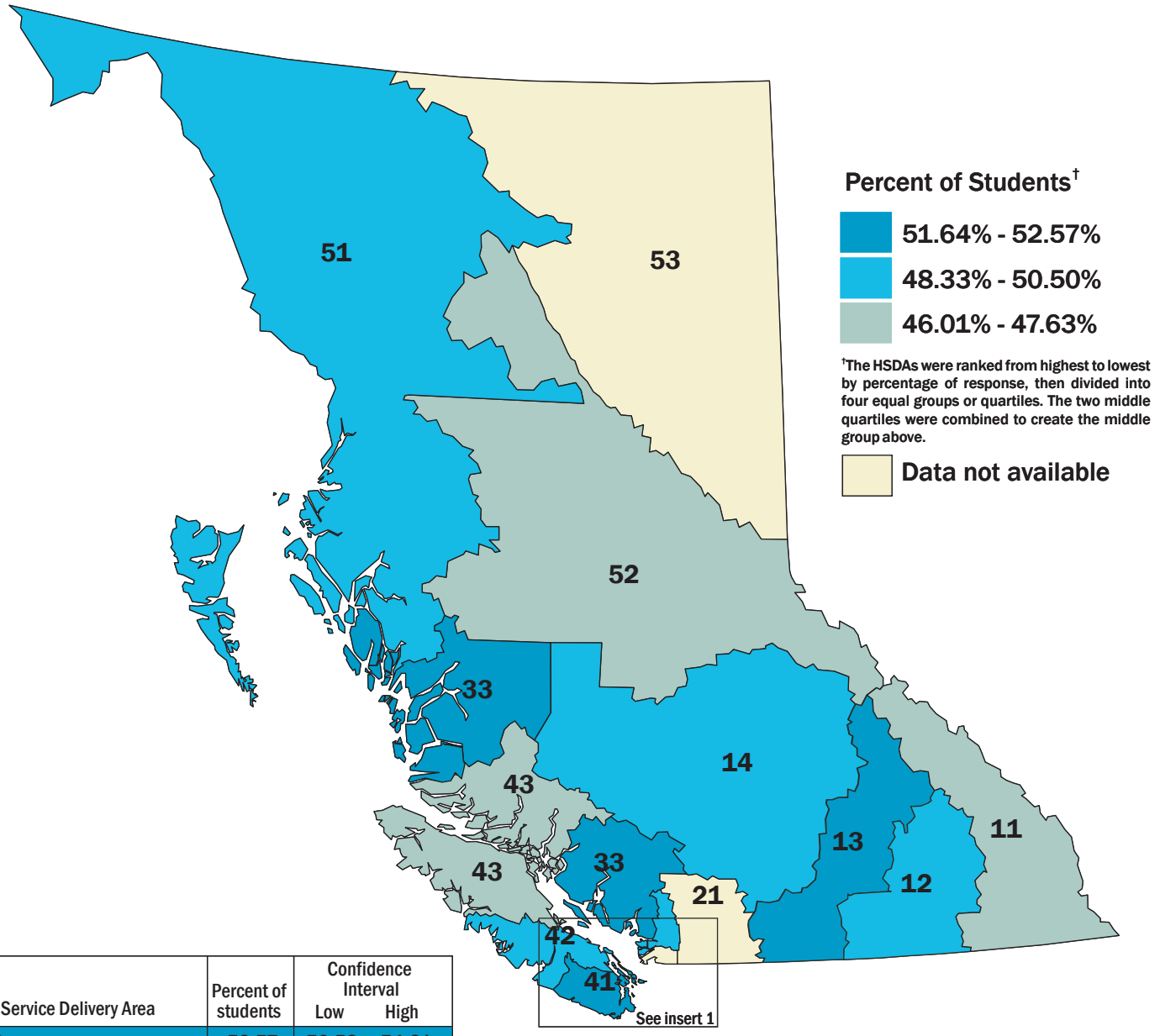
	Always	Sometimes	Never
MALES			
12 years and under	64%	26%	10%
13 years	62%	28%	10%
14 years	60%	27%	13%
15 years	57%	31%	13%
16 years	51%	30%	19%
17 years	45%	34%	21%
18+ years	41%	36%	23%
Overall percentage for males	54%	30%	15%
Females			
12 years and under	55%	31%	14%
13 years	49%	35%	16%
14 years	43%	36%	21%
15 years	44%	34%	21%
16 years	43%	36%	21%
17 years	42%	37%	22%
18+ years	38%	42%	21%
Overall percentage for females	45%	36%	20%

Regional profile

There is minimal variation among youth eating breakfast on school days in different regions, from 53% of youth in the Okanagan HSDA, to 46% of youth in the Northern Vancouver Island HSDA, who eat breakfast daily.

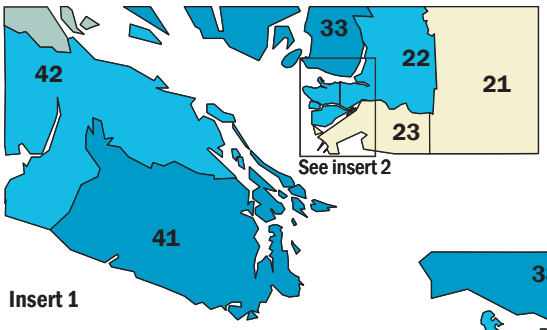
Half of B.C. youth always eat breakfast on school days

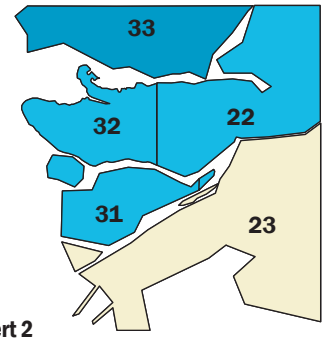
Always Eats Breakfast, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	High
13 Okanagan	52.57	50.53	54.61
41 South Vancouver Island	52.30	49.81	54.79
33 Coastal	51.64	49.01	54.27
51 Northwest	50.50	47.38	53.62
14 Thompson Cariboo Shuswap	50.33	47.96	52.70
22 Fraser North	49.70	47.49	51.91
32 Vancouver	49.54	46.99	52.09
42 Central Vancouver Island	48.95	46.79	51.11
12 Kootenay Boundary	48.78	46.31	51.25
31 Richmond	48.33	44.29	52.37
11 East Kootenay	47.63	45.16	50.10
52 Northern Interior	47.41	44.88	49.94
43 North Vancouver Island	46.01	42.92	49.05
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.





The number of students who always eat breakfast on school days was similar between 1998 and 2003 for most regions. Still, significantly more youth in the Northwest always ate breakfast in 2003 than in 1998, and significantly less youth in the Upper Island always ate breakfast in 2003 than in 1998.

Always eat breakfast on school days by geographic area

	1998	2003
Greater Vancouver	51%	50%
Capital	54%	52%
Fraser Valley	47%	—
Interior	51%	52%
Kootenays	50%	48%
Upper Island	52%	49%
Northwest	45%	51%
Northeast	49%	48%

Question not asked on 1992 AHS

— Data not available

Tobacco Use

Non-smokers/current smokers

Smoking definitions

- **Non-smoker** – has never smoked a cigarette
- **Experimental smoker** – has smoked one, but less than 100 cigarettes
- **Current smoker** – has smoked 100 or more cigarettes, smoked every day or occasionally at the time of the survey, and smoked in the past month
- **Former smoker** – has smoked 100 or more cigarettes, but did not smoke in the month before the survey, and was not currently smoking

AHS questions

Have you ever tried tobacco smoking, even one or two puffs?

How old were you when you smoked a whole cigarette for the first time?

During your life, have you smoked at least 100 or more cigarettes?

At the present time, do you smoke cigarettes every day, occasionally or not at all?

During the past 30 days, on how many days did you smoke cigarettes?

Provincial profile

Almost three-quarters of B.C. youth (73%) have never smoked a whole cigarette, 7% are current smokers, 19% are experimental smokers, and 1% of students are former smokers. In addition, smoking declined dramatically between 1998 and 2003.

Smoking by survey year

	1992	1998	2003
Smoked in past 30 days	25%	25%	13%
Never smoked	—	55%	73%
Experimental smokers	—	28%	19%
Current smokers	—	15%	7%
Former smokers	—	2%	1%

— Data not available for 1992 AHS due to question variance

Boys were more likely than girls to have never smoked a whole cigarette (76% vs. 71%). Seven percent of girls and 6% of boys were current smokers. Both males and females were more likely to try smoking as they got older:

- 93% of boys 12 and younger had never smoked a whole cigarette, compared to 53% of boys 18 and older.
- 92% of girls 12 and younger had never smoked a whole cigarette, compared to 52% of girls 18 and older.

Smoking status by age

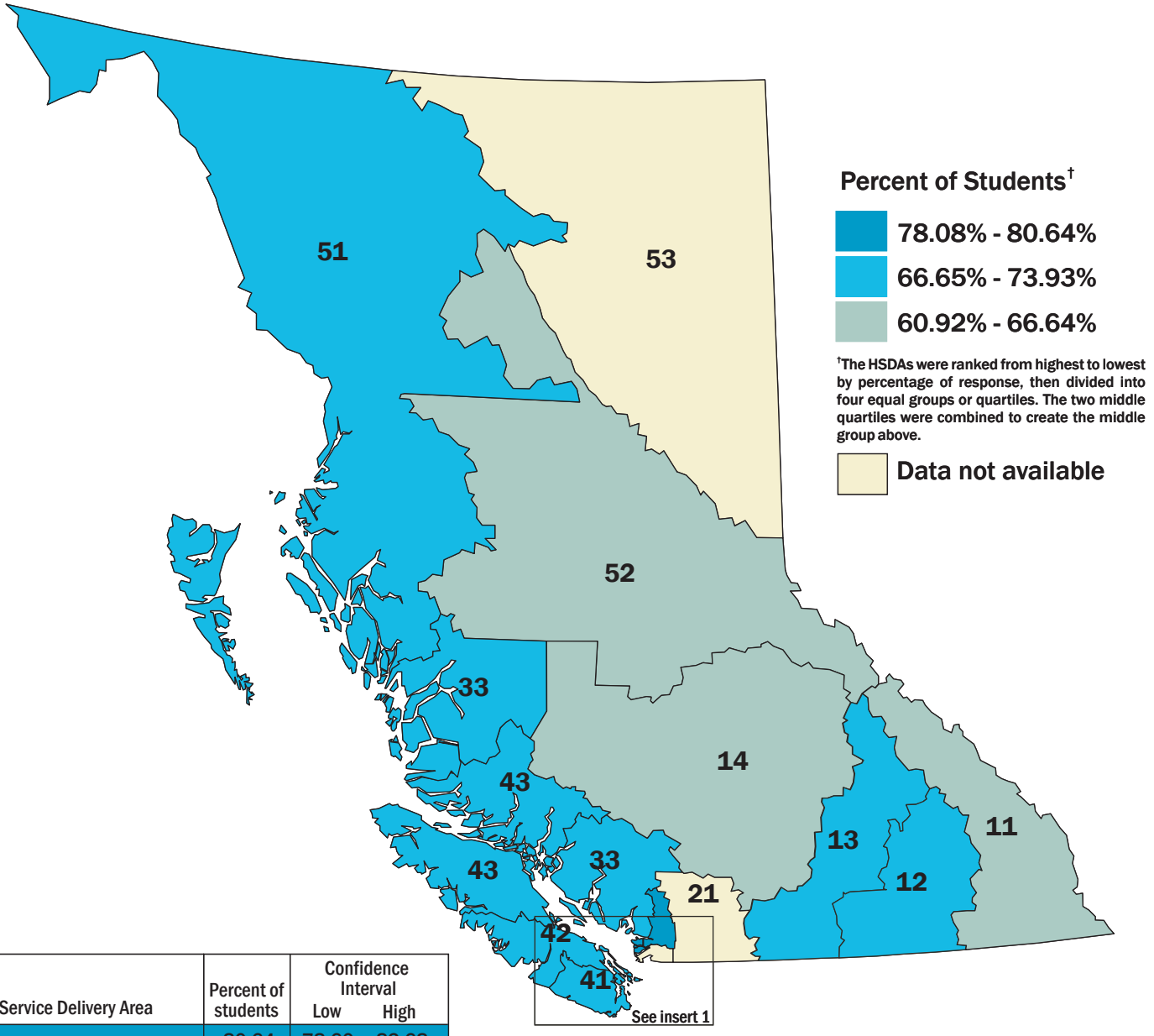
	Non-Smoker	Experimental Smokers	Current Smokers	Former Smokers
MALES				
12 years and under	93%	6%	#	#
13 years	90%	9%	#	#
14 years	85%	12%	2%	#
15 years	79%	16%	5%	#
16 years	68%	24%	7%	1%
17 years	63%	23%	12%	2%
18+ years	53%	28%	17%	2%
Overall percentage for males	76%	17%	6%	1%
FEMALES				
12 years and under	92%	8%	#	#
13 years	87%	12%	1%	#
14 years	77%	19%	4%	#
15 years	69%	24%	7%	#
16 years	62%	26%	11%	1%
17 years	55%	30%	13%	1%
18+ years	52%	28%	16%	#
Overall percentage for females	71%	21%	7%	1%

Insufficient data to make an accurate estimate

Regional profile

Youth in the East Kootenay HSDA were some of the most likely to have smoked a whole cigarette (39%) and to be current smokers (12%). Conversely, youth in the Vancouver HSDA were some of the most likely to have never smoked a whole cigarette (81%), and least likely to be current smokers (4%).

Never Smoked, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
32 Vancouver	80.64	78.60	82.68
31 Richmond	78.21	74.86	81.56
22 Fraser North	78.08	76.26	79.90
41 South Vancouver Island	73.93	71.75	76.11
33 Coastal	72.73	70.38	75.08
42 Central Vancouver Island	72.66	70.72	74.60
13 Okanagan	70.11	68.23	71.99
12 Kootenay Boundary	69.26	67.01	71.54
51 Northwest	68.34	65.48	71.20
43 North Vancouver Island	66.65	63.73	69.57
14 Thompson Cariboo Shuswap	66.64	64.37	68.91
52 Northern Interior	64.55	61.94	67.16
11 East Kootenay	60.92	58.51	63.33
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

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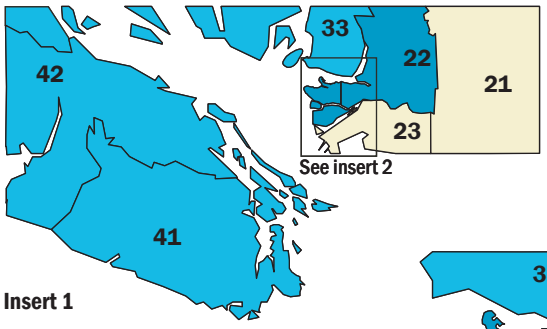
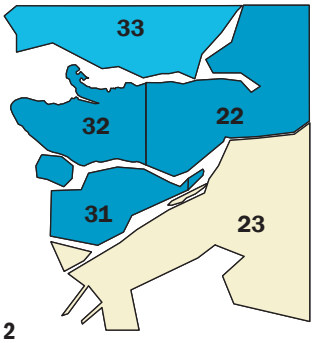
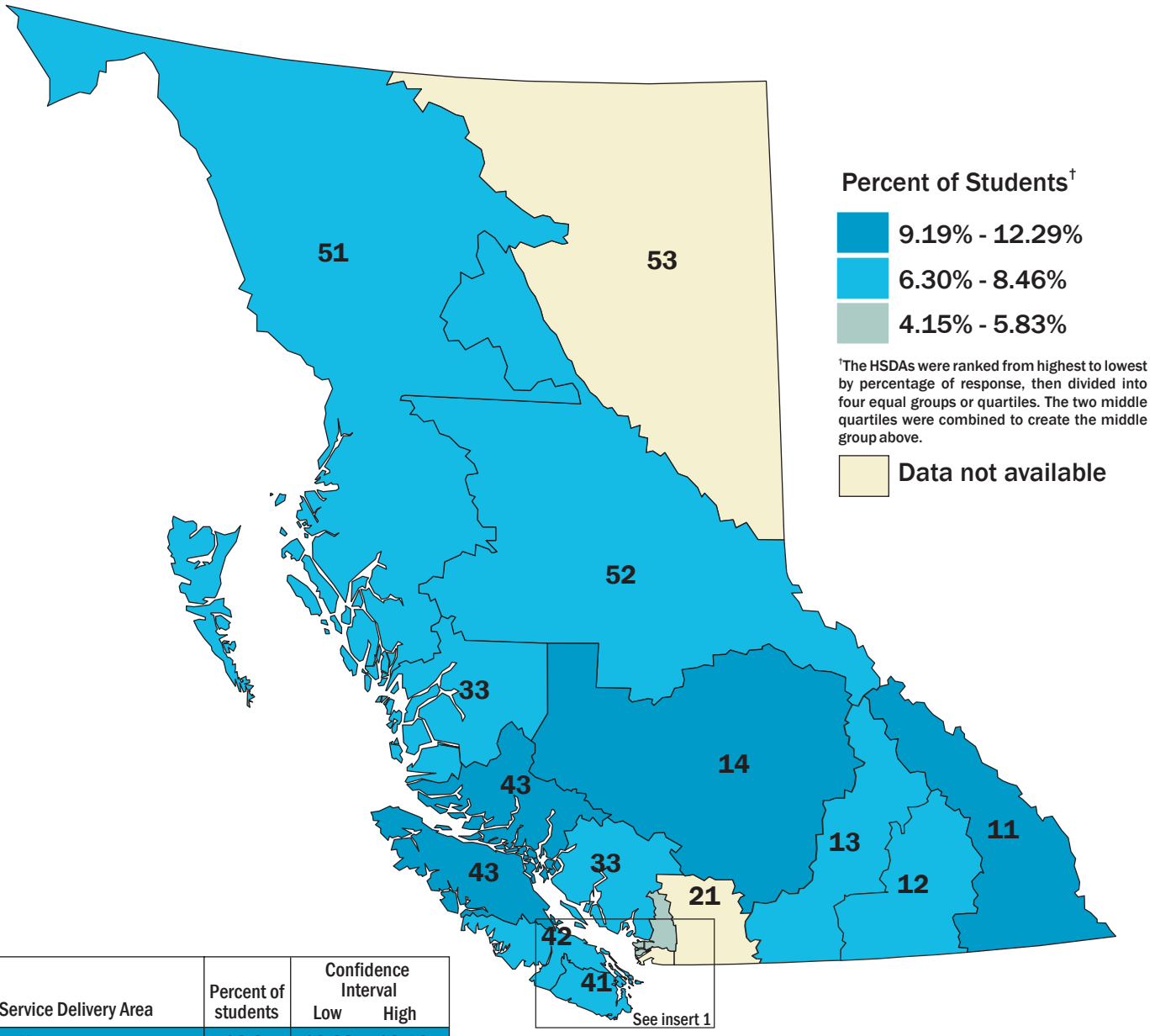


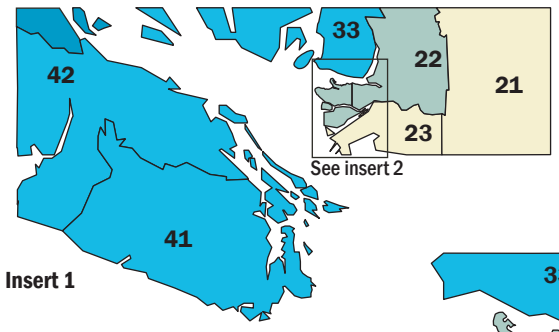


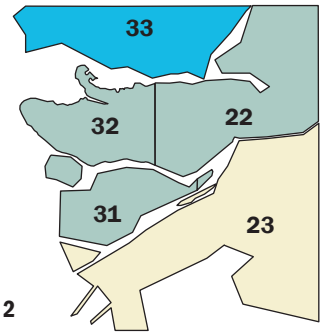
Current Smoker, by Health Service Delivery Area



Health Service Delivery Area	Percent of students	Confidence Interval Low	Confidence Interval High
11 East Kootenay	12.29	10.68	13.90
14 Thompson Cariboo Shuswap	9.30	7.87	10.73
43 North Vancouver Island	9.19	7.37	11.01
52 Northern Interior	8.46	6.97	9.95
13 Okanagan	8.16	7.04	9.28
33 Coastal	6.97	5.72	8.22
12 Kootenay Boundary	6.70	5.52	7.88
51 Northwest	6.65	5.16	8.14
42 Central Vancouver Island	6.50	5.48	7.52
41 South Vancouver Island	6.30	5.12	7.48
22 Fraser North	5.83	4.77	6.89
31 Richmond	5.17	3.41	6.93
32 Vancouver	4.15	3.15	5.15
21 Fraser East	-	-	-
23 Fraser South	-	-	-
53 Northeast	-	-	-

Confidence Interval (CI) is the term used when percentages are calculated based on a sample of the population. CIs estimate the margin of error and show the range within which the true percentage lies (listed in the table as low and high). These are 95% CIs, meaning that this sample, if repeated, would produce results in this range 95 out of 100 times.





Smoked in past 30 days by geographic area

	1992	1998	2003
Greater Vancouver	20%	22%	11%
Capital	29%	25%	13%
Fraser Valley	30%	27%	–
Interior	27%	28%	16%
Kootenays	27%	29%	18%
Upper Island	31%	27%	13%
Northwest	27%	33%	13%
Northeast	28%	28%	16%

– Data not available

The number of youth smoking in the month before the survey declined in every area of the province between 1992 and 2003.

Never smoked by geographic area

	1998	2003
Greater Vancouver	60%	78%
Capital	52%	74%
Fraser Valley	53%	–
Interior	51%	69%
Kootenays	48%	65%
Upper Island	51%	71%
Northwest	48%	68%
Northeast	52%	66%

Data not available for 1992 AHS due to question variance

– Data not available

The percentage of youth who have never smoked increased between 1998 and 2003 in every area of the province.

Current smokers by geographic area

	1998	2003
Greater Vancouver	12%	6%
Capital	15%	6%
Fraser Valley	17%	–
Interior	18%	9%
Kootenays	17%	10%
Upper Island	17%	7%
Northwest	23%	7%
Northeast	17%	8%

Data not available for 1992 AHS due to question variance

– Data not available

Risk & Protective Factors

This section of *Promoting Healthy Bodies* outlines some behaviours and experiences that differentiate:

- Youth who are physically active from those who are not active enough
- Youth who are a healthy weight compared to those who are underweight, overweight, or obese
- Youth who currently smoke versus those who have never smoked

Most young people have a combination of risk and protective factors in their lives, areas of vulnerability and strength. Some factors increase the likelihood that students will be in a particular category, such as being physically active or a smoker, while other factors lower the odds of being in that category.

Protective factors promote healthy youth development and reduce the risk of harmful behaviours

Protective factors promote healthy youth development and reduce the risk of harmful behaviours. Research shows that youth who feel connected and safe at home with their family, at school and in the community have better health, take fewer risks, and have higher educational aspirations.

Risk factors are associated with an increased likelihood of behaviours that are harmful to youth health and development.

Understanding these risk and protective factors can help improve the lives of youth, by identifying where and how to intervene with preventive education and health promotion efforts to help youth develop resilience and overcome challenges.

Asking Outcome Questions

We asked three questions about physical activity, weight and smoking:

1) The overwhelming majority of students did not meet the recommended guidelines for physical activity for adolescents. We asked: What distinguishes physically active teens from their peers who are not active enough? Youth were defined as physically active if, in the week before the survey, they reported engaging in daily exercise or participating in physical activities that made them sweat and breathe hard for at least 20 minutes.

The majority of students did not meet recommended guidelines for physical activity

2) Most students were within a healthy weight range. However, being either underweight or overweight has potential health risks. Our question was: What distinguishes healthy weight teens from their underweight, overweight and obese peers? We used students' Body Mass Index (BMI) to determine these weight categories. Since we anticipated risk factors would be different for under and overweight, we examined three separate outcomes:
   - Being underweight
   - Being overweight
   - Being obese

3) The majority of students has never smoked, but those who take up smoking during adolescence are more likely to keep smoking during adulthood and have a harder time quitting. Our question was: What distinguishes youth who have never smoked from current smokers? Youth were defined as current smokers if they had smoked in the past month and were smoking every day or occasionally at the time of the survey, and if they had smoked 100 or more cigarettes in their lifetime.

The majority of students has never smoked

Examining Factors Associated With Outcomes

We examined variables that have been linked as protective or risk factors for particular outcomes in previous research and are measured in the Adolescent Health Survey, as well as other variables from the AHS that we theorized could have some associative value. These factors were classified into seven categories:

- Eating habits and weight control strategies
- Body image
- Activity level
- Mental and physical health
- Family relationships
- School connections
- Risky behaviours (such as substance use, sex or violence)

Different outcomes are linked to different factors in the research literature. Factors considered potentially protective or risky for an outcome are marked with a '●' in the table below, and included in the analysis for that outcome. (A detailed description of the statistical analyses is contained in Appendix A.)

In some instances, the responses to two questions may overlap. For example, students who reported being involved in organized sport activities several times a week may have counted this participation as part of their daily 20 minutes of exercise. As a result, only one response can be included in the analysis for that outcome; in this case, physical activity.

The list of factors examined in this section of the report is limited by the types of items included in the AHS. For example, factors such as socioeconomic status or consumption of high fat foods could not be determined.

List of potential risk and protective factors

FACTOR	OUTCOME		
	Physical activity	Weight	Smoking
Eating habits and weight control strategies			
Eat breakfast on school days	●	●	
Parent(s) in room while ate evening meal on past five school days	●	●	●
Dieted to lose weight in past year	●	●	●
Binge eat	●	●	
Vomit on purpose after eating	●	●	●
Trying to do something about weight	●		●

FACTOR	OUTCOME		
	Physical activity	Weight	Smoking
Body image			
Looking younger or older compared to peers	●		●
Satisfied with how body looks	●		
Think of body as underweight or overweight	●		●
Unhealthy weight according to BMI classification	●		
Activity level			
Daily exercise or physical activity in past week		●	●
Participated in sports or physical activities without a coach in past year		●	●
Participated in sports with a coach in past year		●	●
Participated in dance or aerobic classes in past year		●	●
Screen time on average school day	●	●	
Mental and physical health			
Emotionally distressed in past month	●	●	●
Sexually abused and/or forced to have sex		●	●
Physically abused		●	●
Sexually harassed in past year		●	●
Health complaints during past six months (headache, stomachache, backache, dizziness)	●	●	●
Self-rated health status	●	●	●
Chronic illness, physical disability, or mental illness that limits activities	●	●	●
Chronic weight condition that limits activities	●		●
Family			
Connected to family	●	●	●
In government care (foster or group home) in past year			●
Recent immigrant	●	●	●
Worry about family having enough food or money	●	●	●
School			
Connected to school	●	●	●
Like school	●		●
Risky behaviours			
Current smoker	●	●	
Binge drank in past month	●	●	●
Used marijuana in past month	●		●
Ever had sex			●
Involved in physical fights in past year			●
Exposed to tobacco smoke in home			●

● Considered a potential protective or risk factor for outcome

Results

We used four steps to answer our outcome questions:

Step 1 First, we identified which factors were individually linked to an outcome for youth of the same age. Because the outcomes and potential factors differ for boys and girls, we tested them separately for each gender. Detailed tables showing these results are contained in Appendix B.

Step 2 Next, we took the factors that had moderately strong links to an outcome and combined all the risk factors in one model and all the protective factors in a separate model to see if, when all the other factors were accounted for, any were still independently related to the outcome.

Step 3 Then we combined the strongest risk and protective factors in a single model to identify how the combination of risk and protective factors might influence the odds of being in one group or the other. Detailed tables showing these results are contained in Appendix C.

Step 4 Finally, we calculated the chances of being underweight, obese or a current smoker with different combinations of the top two to three risk factors and top two to three protective factors. Detailed tables showing these results are contained in Appendix C.

Note: The relationships between risk or protective factors and various outcomes are associations only, not cause and effect; since the survey took place at a single point in time, it is not possible to determine which came first, the outcome or the related factor.

Step 1: Linking factors to physical activity, weight and smoking status

What distinguishes physically active teens from peers who are not active enough?

Only 24% of boys and 11% of girls from the 2003 AHS met the recommended guidelines for being physically active. A number of protective factors increased the odds of being in the physically active group, versus the group that was not active enough, for students of the same age and gender. For both boys and girls, these protective factors included:

- Always eating breakfast before school
- Having dinner regularly with parents
- Feeling connected to family and school
- Looking older than peers

- Being satisfied with how their body looks
- Reporting good/excellent health

Some unexpected or risky behaviours were also associated with being physically active, and other research helps explain these findings. For example, students who reported higher emotional distress in the past month were more likely to be in the physically active group, and may be using exercise as a way of coping with anxiety and stress. Similarly, boys and girls who binge drank at least once in the past month were more likely to be physically active, but one explanation might be that these youth are drinking after sporting events.

Other risk factors lowered the odds of being in the physically active group. For both boys and girls, these risk factors were:

- Weight and eating issues, such as binge eating, dieting to lose weight, being obese, and having a chronic weight condition that limits activity.
- Spending more than two hours of screen time on an average school day.
- Being a recent immigrant.
- Worrying about family not having enough food or money. Teens whose families are struggling with poverty may have less access to organized sports that require costly equipment or fees.

4% of B.C. youth are underweight

What distinguishes healthy weight teens from underweight, overweight, and obese peers?

In 2003, 4% of boys and girls in B.C. were classified as underweight based on their BMI. The factors linked to being underweight instead of a healthy weight for boys and girls included:

- Spending four or more hours on screen time during school days
- Having breakfast on weekdays
- Eating dinner with parents on weekdays (One explanation might be that students with eating disorders such as anorexia nervosa will often have a specific family plan for their treatment that requires parents to monitor their meals.)
- Being a recent immigrant
- Worrying about the family not having enough food or money

For boys, a history of sexual abuse, vomiting after meals and having a chronic illness or disability also increased the odds of being in the underweight group. For girls, additional risk factors included daily exercise and being emotionally distressed in the past month.

Other factors increased the likelihood of being a healthy weight instead of underweight, including:

- Dieting to lose weight in the past year
- Binge eating
- Participating several times a week in sports with or without a coach
- Participating in dance or aerobic classes
- Rating one's health as good/excellent
- Family connectedness
- Binge drinking
- Being a current smoker
- Reporting a history of sexual abuse (for girls but not boys)
- Reporting being sexually harassed in the past year
- Reporting multiple health complaints such as headaches or stomachaches during the past six months

Eating breakfast, reporting good/excellent health, and feeling connected to school distinguished teens from their overweight or obese peers

About 18% of male and 9% of female youth in B.C. were overweight, and an additional 5% of boys and 2% of girls were obese. The factors that distinguished overweight and obese teens from their healthy weight peers were generally the opposite of those linked with being underweight:

- As expected, dieting, binge eating, and vomiting after meals all were linked with being in the overweight or obese group, while eating breakfast every day, reporting good/excellent health and feeling connected to school were predictive of being in the healthy weight group.
- Regular exercise and involvement in sports or dance or aerobic classes all increased the odds of being in the healthy weight group, while more than two hours of screen time was more closely linked to the overweight and obese groups.
- Having health complaints like headaches and stomach pains in the past six months increased the odds of being in the overweight or obese groups.
- Worrying about the family having enough food or money increased the odds of being overweight or obese.
- For girls only, being emotionally distressed or having a history of sexual or physical abuse was also more closely associated with being overweight or obese than being a healthy weight.
- Overweight teens were more likely to be current smokers, but this was not the case for obese teens.

What distinguishes youth who have never smoked from current smokers?

Teens with chronic health conditions were more likely to be smokers

In 2003, 6% of boys and 7% of girls in B.C. were current smokers. Current smokers were readily identified from youth who never smoked by their differences on a number of risk factors:

- Engaging in risky behaviours such as binge drinking, marijuana use, ever having sex and involvement in physical fights were all strongly associated with being a current smoker.
- Being exposed to tobacco smoke in the home increased the odds of being a current smoker.
- Looking older than same aged peers increased the odds of being a smoker.
- Youth who worried about their family having enough food or money were more likely to be current smokers.
- Teens who felt emotionally distressed, reported a history of physical or sexual abuse, had been sexually harassed in the past year, or had been in government care in the past year were more likely to be current smokers. (These factors could be linked, as many youth are in care because of abuse within the family, and may be using smoking as a way of coping with stress.)
- Teens with chronic illnesses, disabilities, or weight conditions that limit their activity, and health complaints like headaches (in the six months before the survey) were more likely to be current smokers.
- As well, smoking may have been a weight management strategy for some youth: teens who reported vomiting on purpose after meals or trying to change their weight were all more likely to be current smokers.

A number of protective factors significantly decreased the odds of being a current smoker:

- Having dinner with parents regularly
- Increased family connectedness
- Increased school connectedness
- Liking school
- Engaging in regular exercise
- Participating in sports with or without a coach several times a week
- Rating one's health as good/excellent
- Being a recent immigrant

Step 2

Some risk and protective factors are more strongly linked to outcomes, even in the presence of other risk and protective factors

With so many possible factors that increase or decrease the likelihood of being physically active, underweight, overweight, obese or a current smoker, how can we identify the most salient or strongly associated factors? One way is to look at all the risk factors that have a moderate or strong link to an outcome together, and see if any of these factors still independently distinguish between the outcomes, when you take all the other risk factors into account. We do the same thing with the protective factors.

Step 3

Looking at risk and protective factors together

Young people rarely have only risk or only protective factors in their lives. This step combines the most strongly associated risk and protective factors. Appendix C includes tables from Step 3 and shows which factors independently contribute to outcomes after the other factors are taken into account. Findings differed somewhat between girls and boys.

Top risk and protective factors for being physically active

	Male	Female
Good/excellent health	↑	↑
Satisfied with how body looks	↑	NA
Connected to family	–	↑
Underweight	↓	–
Overweight	–	↓
Obese	↓	–
Consider self overweight	↓	NA
>2 hours screen time	NA	↓
Recent immigrant	NA	↓

↓ decrease odds of being physically active (risk factor)

↑ increase odds of being physically active (protective factor)

– neither a top protective nor a top risk factor

NA: Factor not included in analysis

Physical activity

Males

For boys, the factors that increased the odds of being physically active in the presence of the other factors were:

- Rating themselves as being in good/excellent health: these boys were twice as likely to be active as those in poor/fair health.
- Being satisfied with the way their bodies look: satisfied boys were almost one and a half times more likely to be active than those who were unsatisfied or had neutral feelings about their bodies.

Factors that still lowered the odds of being physically active were:

- Being underweight: these boys were only about two-thirds as likely as healthy weight boys to be physically active.
- Being obese: boys who were obese were nearly three-quarters as likely as healthy weight boys to be active.
- Thinking of themselves as being overweight: these boys were about three-quarters as likely to be active as those who thought they were the right weight.

Females

Factors that still increased the odds of being physically active for girls included:

- Rating themselves as being in good/excellent health: these girls were about one and a half times more likely to be active than girls who rated themselves in poor/fair health.
- Being connected to family: girls who felt the most connected to their families were about 1.3 times more likely to be active compared to girls with the lowest connections.

Factors that still lowered the odds of being physically active when accounting for the other factors:

- Being a recent immigrant: girls who lived in Canada for five years or less were only about half as likely to be physically active as girls who lived here for more than five years.
- More than two hours of screen time on weekdays: these girls were about two-thirds as likely to be active as girls with two hours or less screen time.
- Being overweight: overweight girls were nearly three-quarters as likely as healthy weight girls to be physically active.

Girls who felt the most connected to their families were more likely to be physically active

Being underweight

Males

The factors that most strongly decreased the odds of being underweight were:

- Dieting: boys who dieted were only a third as likely as non-dieters to be underweight. This result seems logical, because underweight youth would not feel the need to diet (unless they have an eating disorder).
- Participating in sports with a coach: sports involvement lowered the odds of being underweight by as much as half, depending on the level of participation.
- Connected to family: boys with the highest connections to family were half as likely to be underweight as those with the lowest connections to family.

For boys, the factors still associated with higher odds of being underweight when all the other variables are taken into account include:

- Vomiting on purpose after eating: these boys were twice as likely as those who did not purge to be underweight (a potential sign of an eating disorder).
- Being a recent immigrant: boys who lived in Canada for five years or less were 1.7 times more likely to be underweight than those who lived here for more than five years.

Top risk and protective factors for being underweight

	Male	Female
Sports with a coach	↓	↓
Connected to family	↓	↓
Dieted	↓	↓
Vomited on purpose	↑	NA
Eat dinner with parents	NA	↑
Recent immigrant	↑	↑

↓ decrease odds of being underweight (protective factor)

↑ increase odds of being underweight (risk factor)

NA: Factor not included in analysis

Females

For girls, the factors that most strongly lowered the odds of being underweight, when the other factors were taken into account, included:

- Dieting: Girls who dieted were a third as likely to be underweight as girls who did not diet.
- Participating in sports with a coach: Sports participation lowered the odds of being underweight by as much as half, depending on the level of participation.
- Connected to family: Girls who were most highly connected to their family were three-quarters as likely to be underweight as those who were the least connected.

Factors still associated with higher odds of being underweight were:

- Being a recent immigrant: Girls who lived in Canada for five years or less were 1.8 times more likely to be underweight.
- Eating the evening meal with parent(s) on the past five school days: Girls who ate meals with parents were almost one and a half times more likely to be underweight. (This result may be linked to eating disordered behaviour.)

Being overweight

Males

For boys, one factor lowers the odds of being overweight:

- Rating themselves as being in good/excellent health: These boys were only half as likely to be overweight as those in poor/fair health.

And one factor was associated with increased odds of being overweight:

- Dieting: Boys who dieted were 3.5 times more likely to be overweight than those who did not.

Females

The factors that lowered the odds of being overweight for girls included:

- Involvement in dance or aerobic classes: Participation in these activities lowered the odds of being overweight among girls by as much as half, depending on the level of activity.
- Rating themselves as being in good/excellent health: These girls were two-thirds as likely to be overweight as those in poor/fair health.

Top risk and protective factors for being overweight

	Male	Female
Good/excellent health	↓	↓
Dance or aerobics classes	NA	↓
Dieted	↑	↑
Binge eating	NA	↑
Chronic illness or disability	NA	↑

↓ decrease odds of being overweight (protective factor)

↑ increase odds of being overweight (risk factor)

NA: Factor not included in analysis

The factors most strongly associated with higher odds of being overweight were:

- Dieting: Girls who dieted were about two and a half times more likely to be overweight than those who did not diet.
- Binge eating: These girls were 1.3 times more likely to be overweight than those who did not binge.
- Chronic illness, physical disability, or mental illness: Girls with these conditions were 1.3 times more likely to be overweight than those without them.

Obesity

Males

The factors that most strongly decreased the chance of being obese for boys were:

- Rating themselves as being in good/excellent health: These boys were only a quarter as likely to be obese as those in poor/fair health.
- Participating in sports activities with or without a coach: The odds of being obese were decreased by as much as a third depending on the level of participation.
- Exercising or being physically active every day: Boys who exercised every day were almost three-quarters as likely to be obese as those who did not exercise daily.

The factors most strongly associated with higher odds of being obese were:

- Dieting: Boys who dieted were six times more likely to be obese than those who did not diet.
- More than four hours of screen time on weekdays: Boys with more than four hours of screen time were 1.4 times more likely to be obese, compared to those with two hours or less of screen time.

Females

For girls, the factors most strongly associated with decreased odds of being obese, when the other factors were taken into account, include:

- Rating themselves as being in good/excellent health: These girls were only a quarter as likely to be obese, compared to those in poor/fair health.
- Being a smoker: Smokers were half as likely to be obese compared to non-smokers. One possible explanation is that smokers use tobacco as a weight management strategy.
- Binge drinking in the past month: Girls who binge drank were half as likely to be obese as those who did not.

Top risk and protective factors for being obese

	Male	Female
Good/excellent health	↓	↓
Sports with a coach	↓	↓
Sports without a coach	↓	NA
Daily exercise	↓	NA
Dance or aerobic lessons	NA	↓
Smoking	NA	↓
Binge drinking	NA	↓
> 2 hours screen time	↑	↑
Dieted	↑	↑
Worry about family income	NA	↑

↓ decrease odds of being obese (protective factor)

↑ increase odds of being obese (risk factor)

NA: factor not included in analysis

- Involvement in sports with a coach or dance or aerobic classes: Girls who took part in these activities decreased the odds of being obese by a third to a half, depending on the level of participation.

The factors still most strongly associated with greater odds of being obese:

- Dieting: Girls who dieted were three times more likely to be obese.
- Worrying about family having enough food/money: These girls were nearly twice as likely to be obese, compared to youth who did not worry.
- More than two hours of screen time on weekdays: These girls were 1.3 to 1.4 times more likely to be obese than those with less than two hours of screen time.

Smoking

Males

For boys, the factors most strongly associated with lower odds of being a smoker were:

- Participating in sports with a coach: Boys who participated were a third as likely to be smokers as those who did not participate.
- Being connected to family and school: Boys who were the most highly connected to family or school were nearly half as likely to be smokers as those with the lowest connections.
- Rating themselves as being in good/excellent health: These boys were only four-tenths as likely to be smokers as those in poor/fair health.

The factors most strongly associated with being a current smoker were:

- Engaging in other risk behaviours such as:
  - » Using marijuana in the past month (seven times more likely to be a current smoker).
  - » Binge drinking in the past month (four times more likely).
  - » Ever having sex (four times more likely).

Females

The factors most strongly associated with lower odds of being a smoker for girls were:

- Participating in sports with a coach: Girls who participated four or more times a week were a third as likely as those who did not participate, to be smokers.
- Connected to school: Girls with the highest possible connection to school were a third as likely to be smokers as those with the lowest possible connections.

Top risk and protective factors for being a smoker

	Male	Female
Sports with a coach	↓	↓
Good/excellent health	↓	↓
Connected to family	↓	–
Connected to school	↓	↓
Marijuana use	↑	↑
Binge drinking	↑	↑
Ever had sex	↑	↑
Physical fights	–	↑
In government care	–	↑

↓ decrease odds of being a smoker (protective factor)

↑ increase odds of being a smoker (risk factor)

– Neither a top protective nor a top risk factor

- Rating themselves as being in good/excellent health: These girls were nearly half as likely to be smokers as those in poor/fair health.

Factors most strongly associated with higher odds of being a smoker included:

- Being in government care (a foster or group home) in the past year: Girls in care were seven times more likely to be smokers than girls not in care.
- Engaging in other risky behaviours such as:
  - Using marijuana in the past month (six times more likely to be a current smoker).
  - Binge drinking in the past month (four times more likely).
  - Ever having sex (four times more likely).
  - Involved in physical fights (2.5 times more likely).

Youth who participate in sports with a coach were less likely to be smokers

Step 4

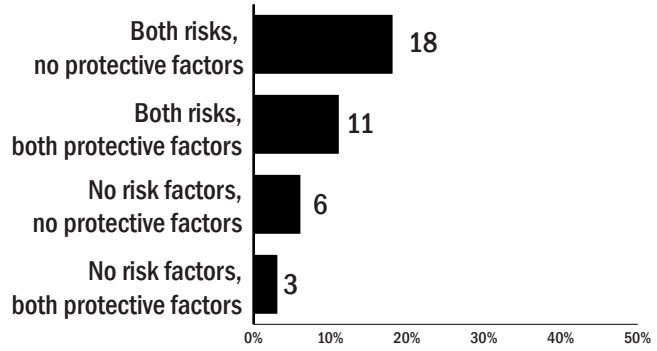
Combining risk and protective factors can alter the chances a student will belong to a group at risk for poor health outcomes. We tested the chances of being underweight, obese or a current smoker for different combinations of risk and protective factors. We chose the top two to three risk factors and the strongest two or three protective factors from Step 2, and combined them. We chose only the protective factors that youth, their families or their communities have the ability to change. For example, young people cannot change their family composition, but can change their activity levels.

The likelihood a student has for each outcome—being underweight, obese or a current smoker—with any particular combination of these top risk and protective factors is shown below.

Being underweight

There were just two top risk factors for boys being underweight: being a recent immigrant and vomiting on purpose after meals, a behaviour that is strongly linked to eating disorders. For girls, the top two risk factors were being a recent immigrant and having their parents present at dinner on school nights (which may be linked to eating disordered behaviour). The top two protective factors for both boys and girls were weekly sports with a coach and having high family connectedness.

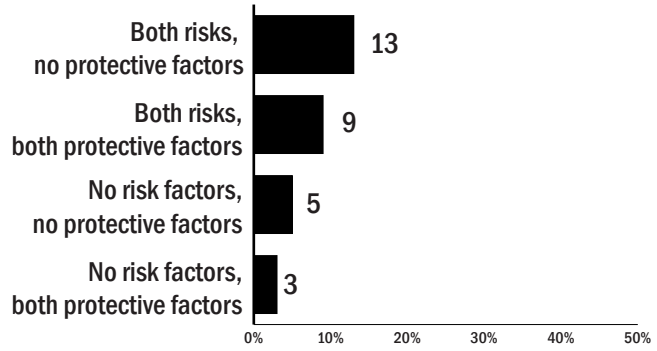
Chances of being underweight among males



2 risk factors:
- Recent immigrant
- Vomiting on purpose after eating

2 protective factors:
- Weekly sports with a coach
- Family connectedness

Chances of being underweight among females



2 risk factors:
- Recent immigrant
- Parent(s) present at dinner

2 protective factors:
- Weekly sports with a coach
- Family connectedness

As the graph above shows, with both protective factors and no risk factors, the chances of being underweight are 3%. Conversely, with both risk factors and no protective factors, the chance increases to 13% for girls and 18% for boys. But even when boys and girls have both risk factors for their gender, the likelihood of being underweight drops to 9% for girls and 11% for boys, if they have the protective factors of high family connectedness and involvement in organized sports.

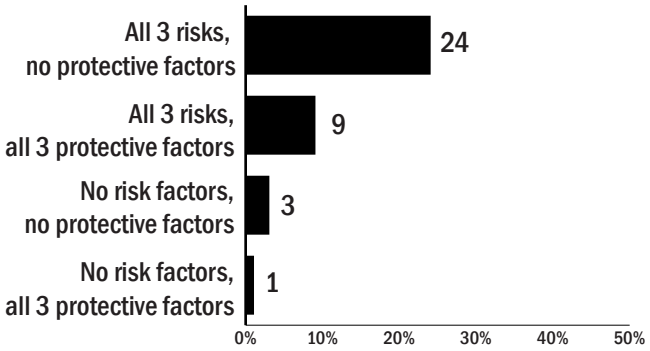
Being obese

For boys, the three top protective factors that youth can change were eating breakfast every school day, being physically active for 20 minutes or more every day, and engaging in weekly sports without a coach. When all risk factors were examined together, the top three risks were dieting, binge eating, and more than four hours of screen time on school days.

For girls, the top three protective factors were weekly dance or aerobic classes, eating breakfast every school day, and having high connectedness to school. The top risk factors for girls were dieting, more than four hours of screen time, and worrying about their family not having enough food or money.

The graph below illustrates the impact of protective factors for boys and girls: when boys or girls have all three protective factors and none of the risk factors, their chance of being in the obese group is very low, 1% or less. With neither risk nor protective factors, their chance of being in the obese group is still only 2-3%. If students have all three risk factors and none of the protective factors, their chances of being obese increase eight-fold, to nearly one in four for boys, and one in five for girls. However, if youth have even one protective factor along with the risk factors, the chances drop, and if they have all three protective factors along with the risk factors, their likelihood of being obese drops from 24% to 9% for boys, and 17% to 7% for girls.

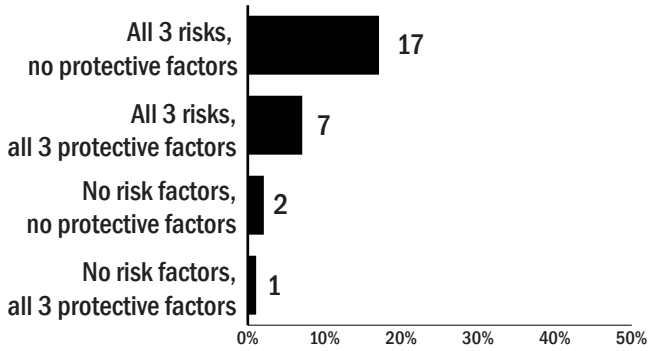
Chances of being obese among males



3 risk factors:
- Dieting
- Binge eating
- More than 4 hours of screen time a day

3 protective factors:
- Weekly sports without a coach
- Eating breakfast on school days
- Daily physical activity/exercise

Chances of being obese among females



3 risk factors:
- Dieting
- More than 4 hours of screen time a day
- Worry about family having enough food or money

3 protective factors:
- Weekly dance/aerobic classes
- Eating breakfast on school days
- School connectedness

Being a current smoker

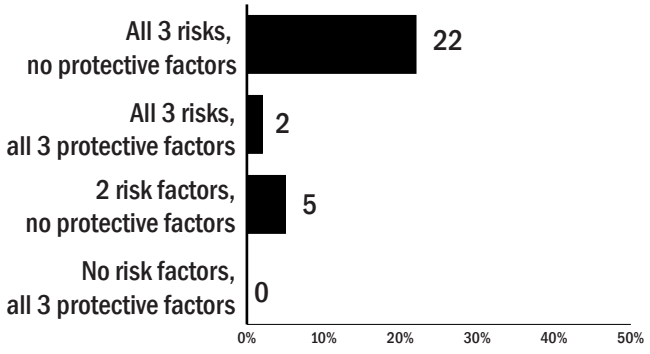
Few students are current smokers: only 7% of the entire school population in B.C., so the chance of any one student being a current smoker is very small. However, certain strong risk and protective factors alter the odds for girls, showing how protective factors can work to diminish risk, even in the presence of highly predictive risk factors like being in government care or using marijuana.

The top three risk factors for girls being current smokers are being in government care, recent marijuana use, and being sexually experienced. The top three protective factors are weekly sports with a coach, high family connectedness, and high school connectedness.

When all three protective factors are present without the risk factors, there is almost zero chance a girl will be a current smoker. When all three risk factors are present without protective factors, the likelihood rises to more than one in five, or 22%. But the likelihood of being a current smoker drops to just 2%, even for girls in government care who are sexually experienced and have used marijuana recently, if they are also involved in sports with a coach and are connected to school and their families.

Note: Insufficient data were available for boys.

Chances of being a current smoker among girls



3 risk factors:

- in government care
- used marijuana in previous month
- have had sex

3 protective factors:

- weekly sports with a coach
- family connectedness
- school connectedness

Summary

A number of factors consistently demonstrated associations with being physically active; being underweight, overweight, or obese; or being a current smoker, even when all the other factors were taken into account.

Self-rated health status

- Youth rating their health as good or excellent was associated with each healthy outcome: youth who felt healthy were more likely to be physically active, a healthy weight, and a non-smoker. However, engaging in these healthy behaviours may lead to feeling healthy, rather than healthy feelings being predictive of healthy behaviour.

Activity level

- Our research results support the importance of being more active and reducing sedentary activities like watching TV or playing games on the computer. Participation in extracurricular sports may be protective, and more screen time may be a risk for potential health problems associated with smoking and an unhealthy weight.

Connectedness to family and school

- Being connected to family was associated with higher odds of being active and lower odds of being underweight.
- Being connected to family and school was associated with lower odds of being a smoker.

Eating behaviours

- Dieting and/or binge eating were associated with being underweight, overweight or obese.
- Vomiting on purpose after eating was associated with smoking.

Risky behaviours

- Engaging in risky behaviours such as binge drinking, using marijuana, having sex, and fighting were associated with smoking, supporting the notion that these behaviours often form a cluster of riskier behaviours youth engage in.

Comparisons With Other Jurisdictions

This section of *Promoting Healthy Bodies* provides comparative data on the key indicators related to physical activity, weight, and tobacco use. Comparative statements made here are observations only and differences have not been tested for statistical significance.

Sources

International and national

The main source for comparative data is the *Health Behaviour in School-Aged Children Survey* (HBSC) 2001/02:

- HBSC is part of a cross-national study carried out in partnership with the World Health Organization to target 11, 13, and 15-year-old students in 35 countries.
- In Canada, the sample is nationally representative of grade six to 10 students.
- The survey asked about health, health behaviour and related factors.
- The survey findings provide a basis for national comparisons among grade seven to 10 students, and international comparisons for 13 and 15-year-olds.

Another source for national comparisons is the *Canadian Community Health Survey* (CCHS) 2000/01 and 2003:

- CCHS was administered by Statistics Canada to a nationally representative sample of household residents aged 12 and older.
- The survey assessed health determinants, health status and health system utilization.

Provincial

In addition, two provincial surveys were used to make comparisons:

- *Ontario Student Drug Use Survey* (OSDUS) 2003
  - » 6,616 Ontario students in grades seven to 12 were surveyed about health issues including drug use, mental health, physical activity, and risky behaviour.
- *The Alberta Youth Experience Survey* (TAYES) 2002
  - » In Alberta, 3,394 youth in grades seven to 12 were surveyed about alcohol, tobacco, other drugs, and gambling.

Physical Activity

Exercise in the past week

Survey	Question
Adolescent Health Survey (AHS) 2003	On how many of the past seven days did you exercise or participate in physical activities for at least 20 minutes that made you sweat and breathe hard, such as soccer, jogging, dancing, swimming, tennis, bicycling, or similar aerobic activities?
Ontario Student Drug Use Survey (OSDUS) 2003	On how many of the last seven days did you exercise or participate in sports activities for at least 20 minutes that made you sweat and breathe hard? Please include activities such as basketball, jogging, fast dancing, swimming laps, tennis, fast bicycling, or similar aerobic activities (include both school and non-school activities)?
Health Behaviour in School-Aged Children Survey (HBSC) 2001/02	1. Over the past seven days, on how many days were you physically active for a total of at least 60 minutes per day? 2. Over a typical or usual week, on how many days are you physically active for a total of at least 60 minutes per day? *Physical activity is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, school activities, playing with friends, or walking to school. Some examples of physical activity are running, brisk walking, roller blading, biking, dancing, skateboarding, swimming, soccer, basketball, football and surfing*

Ontario Student Drug Use Survey comparison

OSDUS asked essentially the same question as the AHS. Based on a comparison of the results, fewer B.C. youth were inactive. However, a comparable percentage of Ontario and B.C. youth exercised daily:

- *No exercise in the past week* ~ 16% of Ontario youth (16% of males and 17% of females) did not exercise in the week before the survey, compared to 9% of B.C. youth (7% of males and 11% of females).
- *Seven days of exercise in the past week* ~ 18% of Ontario youth (23% of males and 13% of females) exercised daily in the week before the survey, compared to 18% of B.C. youth (24% of males and 11% of females).

OSDUS Source: Adlaf, E. M., Paglia-Boak, A., Beitchman, J. H., & Wolfe, D. (2004). *The Mental Health and Well-Being of Ontario Students 1991 - 2003: Detailed OSDUS Findings*, Toronto, ON: Centre for Addiction and Mental Health.

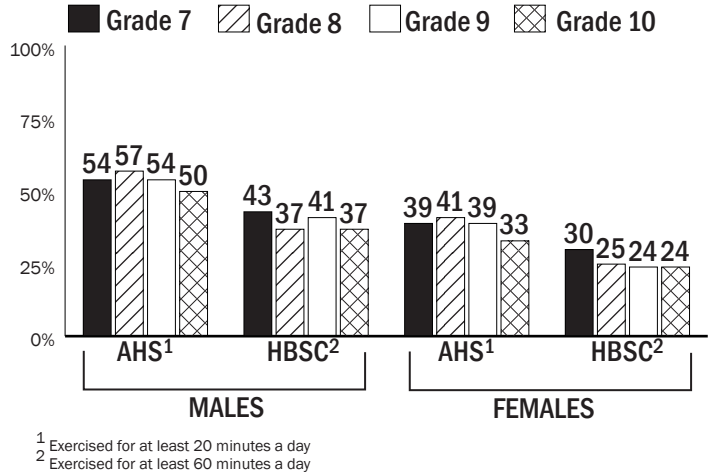
Health Behaviour in School-Aged Children Survey comparison

It is important to note a major difference between the *Health Behaviour in School-Aged Children Survey* and the *Adolescent Health Survey*: the HBSC asks if youth exercised for 60 minutes, while the AHS asks about exercising for 20 minutes. As a result, any differences cannot necessarily be attributed to a regional variance in activity levels, as they might simply be due to the difference in time specified in the survey question.

National comparisons

B.C. youth activity rates appear to be higher; however, keep in mind that the length of activity specified in the question differs.

Youth who were physically active five days or more in the past week



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being.* Ottawa, ON: Health Canada.

Youth who were physically active five days or more†

	AHS[1]	HBSC[2]				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	56%	50%	57%	52%	34%	31%
15 years	54%	48%	57%	48%	23%	33%
FEMALES						
13 years	41%	38%	44%	31%	21%	30%
15 years	34%	38%	42%	29%	18%	26%

† For AHS data, this is for the past week; for HBSC data, this is an average of the past week and a typical week.

1 Exercised for at least 20 minutes per day

2 Exercised for at least 60 minutes per day

HBSC source: Roberts, C., Tynjälä, J., & Komkov, A. (2004). Physical activity. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children* (HBSC) *study: International report from the 2001/2002 survey* (pp. 90-97). Denmark: World Health Organization.

International comparisons

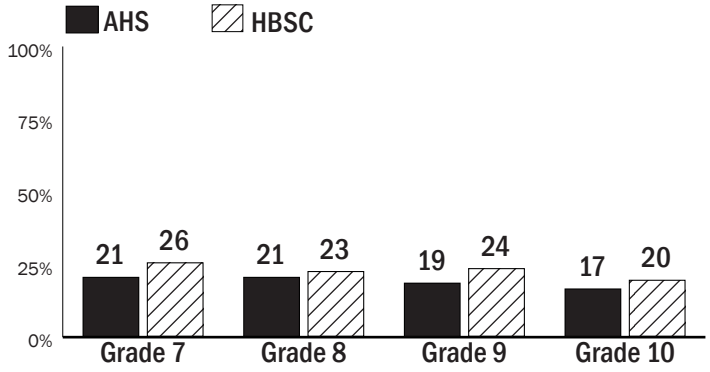
Again, keeping in mind the difference in the amount of exercise specified in the survey questions, a comparable percentage of B.C. and U.S. youth report exercising. B.C. rates for youth exercise are slightly higher than those in England, and substantially higher than in Italy or Sweden.

Note: No data was available to compare participation in organized physical activities such as sports with a coach and dance or aerobic classes.

Screen time

Survey	Question
AHS 2003	On an average school day, how many hours do you watch TV (including videos)?
HBSC 2001/02	On weekdays, about how many hours a day do you usually watch television (including videos) in your free time?

Youth who watch TV four or more hours a day on weekdays



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

National comparisons

A slightly lower percentage of B.C. youth watched TV for four or more hours on school days compared to the national sample.

International comparisons

The rates for B.C. youth who watch four or more hours of television on weekdays are lower than in the U.S. and England, and similar to Sweden. Boys' rates are similar, while girls' rates are lower, than in Italy.

Youth who watch TV four or more hours a day on weekdays

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	23%	27%	32%	32%	22%	19%
15 years	20%	25%	31%	31%	21%	24%
FEMALES						
13 years	20%	21%	28%	32%	29%	20%
15 years	17%	16%	27%	29%	27%	20%

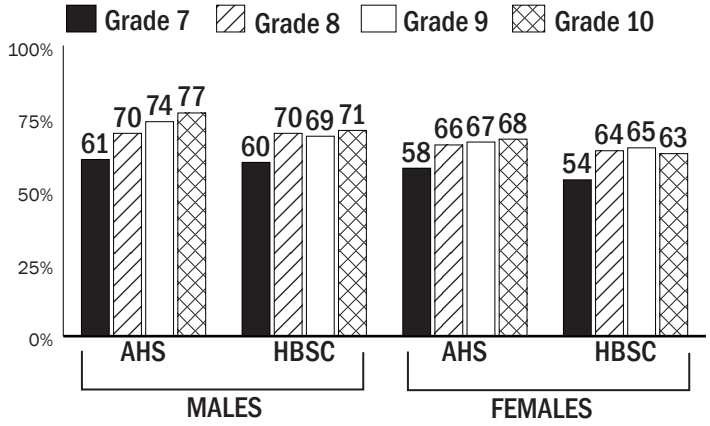
HBSC source: Todd, J., & Currie, D. (2004). Sedentary behaviour. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 98-109). Denmark: World Health Organization.

Survey	Question
AHS 2003	On an average school day, how many hours do you use a computer for playing games, emailing, chatting and surfing the Internet?
HBSC 2001/02	On weekdays, about how many hours a day do you usually use a computer (for playing games, emailing, chatting or surfing the Internet) in your free time?

National comparisons

The rates of computer use on weekdays are generally comparable for B.C. students and youth in the rest of Canada, with the greatest difference seen in grade 10, when B.C. youth have a higher rate than the national rate.

Youth who spend one or more hours using the computer for recreational purposes on weekdays



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

Youth who spend three or more hours using the computer for recreational purposes on weekdays

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	27%	26%	19%	NA	10%	31%
15 years	35%	28%	24%	NA	14%	32%
FEMALES						
13 years	25%	20%	17%	NA	5%	9%
15 years	28%	20%	17%	NA	5%	9%

HBSC source: Todd, J., & Currie, D. (2004). Sedentary behaviour. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 98-109). Denmark: World Health Organization.

International comparisons

Rates of computer use among B.C. youth are substantially higher than for youth in the U.S. and Italy for both males and females, and girls in B.C. use the computer considerably more than girls in Sweden.

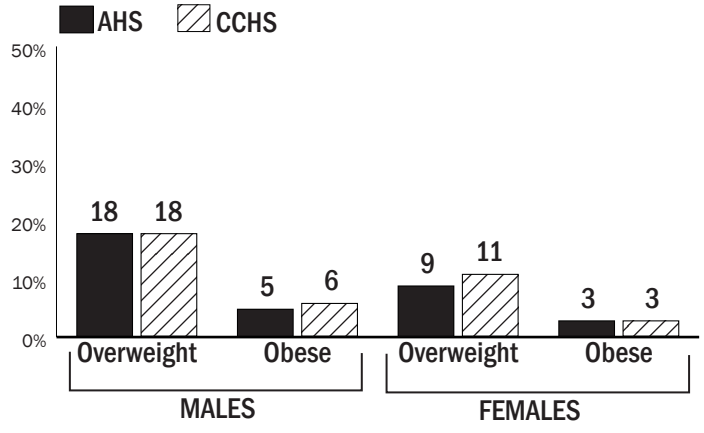
Weight

Overweight and obesity

Survey	Question
AHS 2003	How much do you weigh? How tall are you?
HBSC 2001/02	How much do you weigh without clothes? How tall are you without shoes?

We identified overweight and obese youth based on their BMIs, which were calculated using self-reported weight and height.

Overweight and obese youth



CCHS source: Tjepkema, M., & Shields, M. (2005). *Measured obesity: Overweight Canadian children & adolescents.* Ottawa, ON: Statistics Canada.

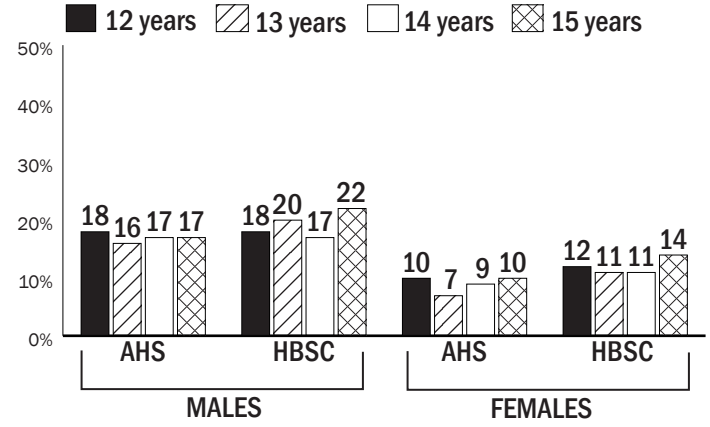
CCHS national comparisons

The percentage of boys and girls who are overweight and obese was comparable across the *Adolescent Health Survey* (AHS) and *Canadian Community Health Survey* (CCHS).

HBSC national comparisons

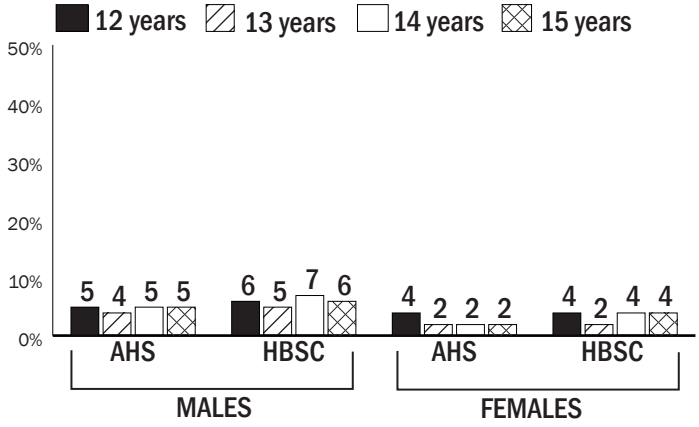
Rates for being overweight and obese among B.C. youth are generally at or slightly below national rates.

Overweight youth



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

Obese youth



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

The percentage of overweight and obese B.C. youth is slightly lower than national rates

Overweight youth

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	16%	18%	19%	13%	18%	11%
15 years	17%	21%	24%	12%	17%	13%
FEMALES						
13 years	7%	10%	15%	13%	11%	7%
15 years	10%	13%	15%	10%	7%	6%

HBSC source: Mulvihill, C., Németh, Á., & Vereecken, C. (2004). Body image, weight control and body weight. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 120-129). Denmark: World Health Organization.

Obese youth

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	4%	5%	8%	4%	3%	1%
15 years	5%	4%	11%	5%	3%	2%
FEMALES						
13 years	2%	2%	4%	3%	2%	2%
15 years	2%	5%	5%	3%	1%	1%

HBSC source: Mulvihill, C., Németh, Á., & Vereecken, C. (2004). Body image, weight control and body weight. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 120-129). Denmark: World Health Organization.

International comparisons

Overweight males ~ The percentage of overweight males in B.C. is most similar to Italy, lower than in the U.S., and higher than in England and Sweden.

Overweight females ~ The percentage of overweight 13-year-old girls in B.C. is the same as in Sweden and lower than other countries. The same percentage of 15-year-old girls in B.C. and England are overweight; B.C. rates are lower than in the U.S., and higher than in Italy and Sweden.

Obesity among males ~ The percentage of B.C. males who are obese is the same as in England, lower than the U.S., and higher than in Italy and Sweden.

Obesity among females ~ The percentage of obese females in B.C. is lower than in the U.S. or England. The obesity rates for 13 year-old-girls in B.C. is the same as in Italy and Sweden, but higher than Italy and Sweden for 15-year-olds.

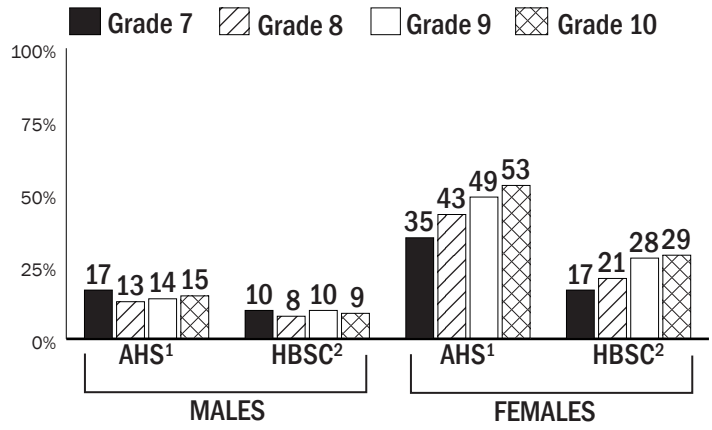
Dieting to lose weight

Survey	Question
AHS 2003	During the past year, how often have you gone on a diet to lose weight? (Diet means changing the way you eat to lose weight)
HBSC 2001/02	At present are you on a diet or doing something to lose weight?

National comparison

Since the time period for the survey questions differs, the rates of dieting for B.C. youth and the national sample cannot be directly compared.

Youth who dieted



[1] dieted in the past year

[2] presently on a diet

HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

International comparisons

Again, since the time period in the survey items differs, rates of dieting cannot be compared.

Youth who dieted

	AHS[1]	HBSC[2]				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	15%	8%	15%	11%	8%	6%
15 years	14%	10%	21%	9%	7%	5%
FEMALES						
13 years	40%	22%	25%	22%	19%	15%
15 years	53%	29%	30%	25%	27%	15%

[1] dieted in the past year

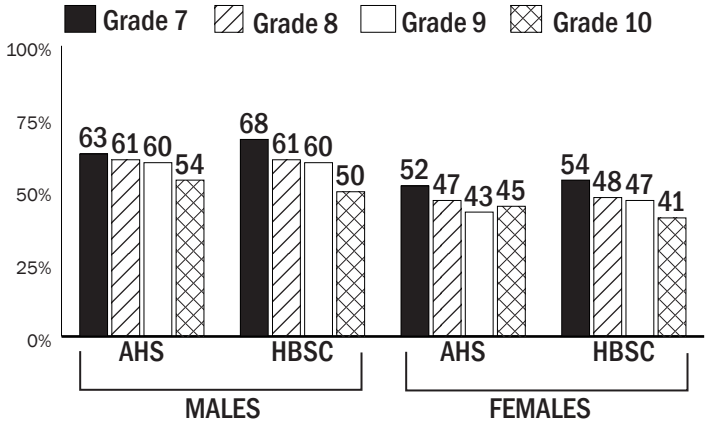
[2] presently on a diet

HBSC source: Mulvihill, C., Németh, Á., & Vereecken, C. (2004). Body image, weight control and body weight. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 120-129). Denmark: World Health Organization.

Eating breakfast on school days

Survey	Question
AHS 2003	How often do you eat breakfast on school days?
HBSC 2001/02	How often do you usually have breakfast (more than a glass of milk or fruit juice) on weekdays?

Youth who eat breakfast every school day



HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

National comparisons

Generally, the overall rates of youth who always eat breakfast on school days are very similar between B.C. and Canada.

Youth who eat breakfast every school day

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	62%	62%	55%	62%	65%	76%
15 years	57%	53%	41%	62%	64%	72%
FEMALES						
13 years	49%	50%	40%	46%	55%	64%
15 years	44%	42%	29%	40%	51%	60%

HBSC source: Vereecken, C., Ojala, K., Jordan, M. D. (2004). Eating habits. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 110-119). Denmark: World Health Organization.

International comparisons

Rates for always eating breakfast on school days are higher for B.C. youth than in the U.S., but lower than in Sweden.

Tobacco Use

Ever tried smoking

Survey	Question
AHS 2003	Have you ever tried cigarette smoking, even one or two puffs?
HBSC 2001/02	Have you ever smoked tobacco (at least one cigarette, cigar or pipe)?

International comparisons

Fewer B.C. youth have ever smoked than in the U.S., England, Italy and Sweden.

Youth who have ever smoked

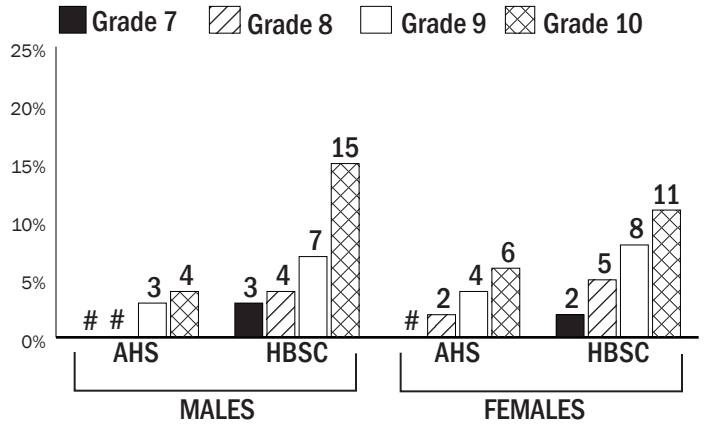
	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	10%	26%	27%	46%	37%	40%
15 years	21%	49%	55%	64%	55%	60%
FEMALES						
13 years	13%	31%	24%	53%	31%	34%
15 years	31%	50%	43%	70%	58%	56%

HBSC source: Godeau, E., Rahav, G., & Hublet, A. (2004). Tobacco smoking. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 63-72). Denmark: World Health Organization.

Current smokers

Survey	Question
AHS 2003	At the present time, do you smoke cigarettes every day, occasionally or not at all?
HBSC 2001/02	How often do you smoke tobacco at present?

Youth who smoke every day



Insufficient data to make an accurate estimate

HBSC source: Boyce, W. (2004). *Young people in Canada: Their health and well-being*. Ottawa, ON: Health Canada.

National comparisons

Significantly fewer B.C. youth smoke than in the rest of Canada.

Youth who smoke every day

	AHS	HBSC				
		Canada	U.S.	England	Italy	Sweden
MALES						
13 years	#	4%	4%	7%	3%	3%
15 years	3%	13%	12%	16%	16%	6%
FEMALES						
13 years	#	5%	2%	9%	3%	4%
15 years	5%	11%	8%	20%	16%	14%

Insufficient data to make an accurate estimate

HBSC source: Godeau, E., Rahav, G., & Hublet, A. (2004). Tobacco smoking. In C. Currie, C. Roberts, A. Morgan, R. Smith, W. Settertobulte, O. Samdal, et al. (Eds.)., *Young people's health in context. Health Behaviour in School Aged Children (HBSC) study: International report from the 2001/2002 survey* (pp. 63-72). Denmark: World Health Organization.

International comparisons

Fewer 13 and 15-year-old males and females smoke in B.C. than in the U.S., England, Italy or Sweden.

Canadian Community Health Survey comparision

According to this survey:

- 14% of 15 to 17-year-olds in Canada were daily smokers compared to 6% of B.C. youth.
- The percentage of Canadian girls who smoked (15%) was slightly higher than for boys (13%), versus 7% of B.C. girls and 5% of B.C. boys.

CCHS source: Statistics Canada (2003). *How healthy are Canadians?* Ottawa, ON: Minister of Industry.

Alberta Youth Experience Survey comparison

According to this survey, a comparable number of Alberta students smoke as youth in B.C.:

- 14% of Alberta youth in grades seven to 12 smoked everyday or occasionally at the time of the survey, compared to 12% of B.C. youth who did the same.

TAYES source: Marko, J., McKinnon, A., & Dyer, A. (2004). *Youth smoking and access to tobacco in Alberta: The Alberta Youth Experience Survey 2002*. Edmonton, AB: Alberta Alcohol and Drug Abuse Commission.

Significantly fewer B.C. youth smoke than in the rest of Canada

Appendices

Appendix A: Description of statistical analyses for risk and protective factors

Step 1: Bivariate logistic regression

The first step of analysis involved bivariate logistic regression to determine whether each individual factor was associated with the outcome variable of interest. For categorical predictor variables, a reference category was chosen and all other levels were compared to this referent point. For example, in the case of eating breakfast on school days, the response category of "never" was defined as the reference category. For each outcome the "sometimes" and "always" groups were compared to the "never" group to assess whether they were more, less, or equally likely to have the outcome characteristic (i.e., being under-active as opposed to active enough; being underweight, overweight, or obese as opposed to a healthy weight; and being a current smoker as opposed to a non-smoker). This comparative likelihood is described by the odds ratio (and the 95% confidence interval). For continuous predictor variables, odds ratios are associated with unit increases in levels of the factor. For example, in the case of family connectedness, which is scored on a three-point scale, the odds ratio reflects the relative increase or decrease in likelihood of having the outcome characteristic as the connectedness score increases by one unit. All odds ratios were adjusted for age. All analyses were performed separately for boys and girls.

Step 2: Separate multivariate logistic regressions for risk factors and for protective factors

The next step in the analysis involved multivariate logistic regression analyses. These analyses were adjusted for age as well as for all other factors in the analysis. The factors included in these analyses were those that were considered to be at least moderately associated with the outcome of

interest (i.e., those that had an odds ratio of 1.5 or higher or .67 or lower in bivariate analyses). For each outcome, one regression analysis was performed with protective factors and a separate analysis was performed for risk factors.

Step 3: Multivariate logistic regression with combined risk and protective factors

For each outcome, the significant predictors from the separate models of risk factors only and protective factors only (described in Step 2) were then combined in a multivariate logistic regression model. The resulting models indicate which risk and protective factors are independently related to the outcome variable of interest, after the other factors are taken into account. Again, these analyses controlled for both age and gender.

Step 4: Probability profiles for being underweight, being obese, and being a current smoker

The final step of analysis involved the creation of probability profiles for three outcomes: being underweight, being obese, and being a current smoker. These profiles indicate the chances of being underweight, obese, or a current smoker for different combinations of risk and protective factors. This was achieved by choosing the top two to three risk factors and top two to three protective factors from Step 2, and combining them in a multivariate logistic regression model, controlling for age, and performed separately for boys and girls. For these profiles, only the protective factors that were amenable to change were chosen. For example, family composition cannot be changed, but activity level can be changed. The probability of being in the at-risk group, that is, being underweight, being obese, or being a current smoker, was calculated using the regression equation, specifically:

$$p = \frac{1}{(1 + \exp(-bx))}$$

where

p = probability of being in the at-risk group

bx = constant + coefficient$_1$(variable$_1$) + coefficient$_2$(variable$_2$) + ... + coefficient$_z$(variable$_z$)

The variable values for continuous interval level variables (i.e., family connectedness and school connectedness) are included in the regression equation as "high" and "low" levels based on the 90th and 10th percentile values, respectively; while the dichotomous variables (e.g., dieting, weekly sports with a coach, etc.) are included as present or absent, 1 or 0, respectively.

Appendix B: Bivariate odds ratios for risk and protective factors

FACTOR	RESPONSE CATEGORIES	OUTCOME									
		ACTIVE		UNDERWEIGHT		OVERWEIGHT		OBESE		SMOKER	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Eating habits and weight control strategies											
Eat breakfast on school days	Never	REF	REF	REF	REF	REF	REF	REF	REF		
	Sometimes	NS	NS	1.440	1.126	NS	NS	.737	.782	—	—
	Always	1.071	1.212	1.290	1.307	.690	.865	.558	.536		
Parent(s) in room while ate evening meal on past 5 school days	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	1.232	1.079	1.247	1.630	1.055	.846	NS	.780	.425	.409
Dieted to lose weight in past year	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	.939	.875	.354	.311	3.575	2.738	7.218	3.966	.819	1.964
Binge eat	No	REF	REF	REF	REF	REF	REF	REF	REF	—	—
	Yes	.870	.829	.914	.600	1.485	1.825	2.017	2.013		
Vomit on purpose after eating	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	.873	1.427	1.878	.874	NS	1.704	2.202	1.353	2.355	4.573
Trying to do something about weight	Nothing	REF	REF							REF	REF
	Lose weight	.915	.810							1.238	1.942
	Gain weight	1.441	NS	—	—	—	—	—	—	1.633	1.442
	Stay the same weight	1.107	NS							.892	.861
Body image											
Look younger or older compared to same-aged peers	The same age	REF	REF							REF	REF
	Younger	.920	1.101	—	—	—	—	—	—	NS	.739
	Older	1.170	1.183							1.751	2.757
Satisfied with how body looks	Not satisfied/ neutral	REF	REF	—	—	—	—	—	—	—	—
	Satisfied	1.637	1.466								
Think of body as underweight or overweight	The right weight	REF	REF							REF	REF
	Underweight	.796	NS	—	—	—	—	—	—	NS	1.126
	Overweight	.635	.735							NS	1.797
Unhealthy weight according to BMI classification	Healthy weight	REF	REF								
	Underweight	.592	1.139	—	—	—	—	—	—	—	—
	Overweight	.917	.665								
	Obese	.507	.776								

FACTOR	RESPONSE CATEGORIES	OUTCOME									
		ACTIVE		UNDERWEIGHT		OVERWEIGHT		OBESE		SMOKER	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Activity level											
Daily exercise or physical activity in past week	No	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Yes			.597	1.148	.916	.668	.508	.782	1.185	.700
Participated in sports or physical activities without a coach in past year	Never	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Less than weekly			.567	.786	.843	.891	.705	NS	NS	NS
	1-3 times a week			.570	.522	.853	.892	.567	.823	.910	.766
	4+ times a week			.469	.566	.816	.804	.399	.836	NS	.706
Participated in sports with a coach in past year	Never	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Less than weekly			.456	.680	.753	.904	.610	.576	.699	.806
	1-3 times a week			.686	.568	.807	.797	.654	.637	.612	.635
	4+ times a week			.378	.461	NS	.819	.672	.489	.571	.342
Participated in dance or aerobic classes in past year	Never	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Less than weekly			.763	.636	NS	.907	.786	.540	NS	1.185
	1-3 times a week			1.168	.904	NS	.686	NS	.533	1.202	.876
	4+ times a week			NS	.765	NS	.509	.790	.663	1.374	.787
Screen time on average school day	0-2 hours	REF	REF	REF	REF	REF	REF	REF	REF		
	2.5 - 4 hours	.796	.666	.764	.819	1.177	1.291	1.457	1.750	—	—
	Over 4 hours	.740	.676	1.115	1.241	1.386	1.356	1.907	2.267		
Mental and physical health											
Emotionally distressed in past month	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	1.112	1.300	NS	1.119	.886	1.376	NS	2.200	2.723	3.160
Sexually abused and/ or forced to have sex	No	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Yes			1.298	.707	NS	1.403	.710	1.569	2.998	4.441
Physically abused	No	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Yes			NS	.873	.909	1.105	NS	1.511	1.708	4.461
Sexually harassed in past year	No	—	—	REF	REF	REF	REF	REF	REF	REF	REF
	Yes			.880	.650	.871	1.043	NS	.753	1.606	4.723
Health complaints during past six months (headache, stomachache, backache, dizziness)	0 to 2 complaints	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	3 to 4 complaints	.908	NS	.896	.727	1.094	1.333	1.211	1.500	2.665	2.880
Self-rated health status	Poor/fair	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Good/ excellent	2.347	1.748	.536	.781	.478	.542	.189	.193	.321	.256

FACTOR	RESPONSE CATEGORIES	OUTCOME									
		ACTIVE		UNDERWEIGHT		OVERWEIGHT		OBESE		SMOKER	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Chronic illness, physical disability, or mental illness that limits activities	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	NS	1.255	1.118	NS	NS	1.588	1.536	1.690	2.032	1.686
Chronic weight condition that limits activities	No	REF	REF							REF	REF
	Yes	.839	.765	—	—	—	—	—	—	3.001	1.702
Family											
Connected to family	Continuous scale ranging from 1-3	1.299	1.256	.785	1.378	1.083	.741	.716	.573	.276	.204
In government care (foster or group home) in past year	No									REF	REF
	Yes	—	—	—	—	—	—	—	—	3.230	8.289
Recent immigrant	No, lived here more than 5 years	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes, lived here 5 years or less	.763	.583	2.200	2.313	.782	.875	1.112	NS	.556	.354
Worry about family having enough food or money	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	.890	.909	1.408	1.246	1.053	1.164	1.386	2.680	1.116	1.163
School											
Connected to school	Continuous scale ranging from 1-5	1.029	1.100	NS	1.136	.978	.922	.836	.657	.394	.294
Like school	No	REF	REF							REF	REF
	Yes	NS	1.136	—	—	—	—	—	—	.260	.271
Risky behaviours											
Current smoker	No	REF	REF	REF	REF	REF	REF	REF	REF	—	—
	Yes	1.196	.700	.432	.487	1.108	1.188	NS	.647		
Binge drank in past month	No	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
	Yes	1.361	1.193	.378	.425	1.089	.829	.909	.625	13.965	19.521
Used marijuana in past month	No	REF	REF							REF	REF
	Yes	1.179	.893	—	—	—	—	—	—	18.298	29.570
Ever had sex	No									REF	REF
	Yes	—	—	—	—	—	—	—	—	11.998	21.170
Involved in physical fights in past year	No									REF	REF
	Yes	—	—	—	—	—	—	—	—	4.446	7.356
Exposed to tobacco smoke in home	No									REF	REF
	Yes	—	—	—	—	—	—	—	—	4.029	5.002

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age.

Note: The odds ratio may be interpreted as follows: In the case of eating breakfast on school days, for example, females who always ate breakfast were half (.536) as likely as those who never ate breakfast to be obese, controlling for age.

Note: All odds ratios are statistically significant at the 95% confidence level, unless otherwise denoted by 'NS'.

NS: Non-significant odds ratio at the 95% confidence level.

REF: Reference category.

—: Factor not considered as potential protective or risk factor for outcome.

Appendix C: Results tables for multivariate analyses for risk and protective factors

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with physical activity for males and females

ACTIVE MALES

Factor	OR (95% C.I.)
Family Connectedness	
Scale range 1-3	NS
Self-Rated Health Status	
Poor/fair	Reference
Good/excellent	1.94 (1.82 - 2.06)
Satisfied With How Body Looks	
Not satisfied/neutral	Reference
Satisfied	1.40 (1.36 - 1.45)
How Think Of Body	
The right weight	Reference
Underweight	0.95 (0.91 - 0.99)
Overweight	0.77 (0.73 - 0.82)
Weight Classification According To BMI	
Healthy weight	Reference
Underweight	0.63 (0.58 - 0.68)
Overweight	1.07 (1.03 - 1.11)
Obese	0.76 (0.70 - 0.82)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, males who rated their health as good/excellent were twice (1.94 times) as likely as those who rated their health as poor/fair to be active, controlling for age and all other variables in the analysis.

ACTIVE FEMALES

Factor	OR (95% C.I.)
Family Connectedness	
Scale range 1-3	1.13 (1.08 - 1.19)
Self-Rated Health	
Poor/fair	Reference
Good/excellent	1.58 (1.48 - 1.68)
Weight Classification According To BMI	
Healthy weight	Reference
Underweight	1.18 (1.09 - 1.29)
Overweight	0.73 (0.68 - 0.78)
Obese	NS
Screen Time	
0 to 2 hours	Reference
2.5 to 4 hours	0.64 (0.62 - 0.67)
More than 4 hours	0.65 (0.62 - 0.68)
Recent Immigrant	
No, lived here more than 5 years	Reference
Yes, lived here 5 years or less	0.57 (0.52 - 0.63)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, females who rated their health as good/excellent were one and a half (1.58) times more likely than those who rated their health as poor/fair to be active, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with being underweight for males and females

UNDERWEIGHT MALES

Factor	OR (95% C.I.)
Dieted To Lose Weight In Past Year	
No	Reference
Yes	0.29 (0.24 - 0.34)
Participated In Sports or Physical Activities Without a Coach In Past Year	
Never	Reference
Less than weekly	0.69 (0.60 - 0.79)
1 to 3 times a week	0.80 (0.71 - 0.90)
4 or more times a week	0.78 (0.69 - 0.88)
Participated In Sports With a Coach In Past Year	
Never	Reference
Less than weekly	0.49 (0.43 - 0.55)
1 to 3 times a week	0.72 (0.67 - 0.78)
4 or more times a week	0.46 (0.42 - 0.50)
Smoking Status	
Non-smoker	Reference
Current smoker	0.49 (0.42 - 0.59)
Binge Drank In Past Month	
No	Reference
Yes	0.53 (0.48 - 0.58)
Daily Exercise Or Physical Activity In Past Week	
No	Reference
Yes	0.76 (0.69 - 0.83)
Self-Rated Health	
Poor/fair	Reference
Good/excellent	0.60 (0.54 - 0.67)
Family Connectedness	
Scale range 1-3	0.71 (0.66 - 0.78)
Recent Immigrant	
No, lived here more than 5 years	Reference
Yes, lived here 5 years or less	1.68 (1.52 - 1.85)
Vomit On Purpose After Eating	
No	Reference
Yes	2.03 (1.72 - 2.39)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of dieting, for example, males who dieted were three-tenths (.29 times) as likely as those who did not diet to be underweight, controlling for age and all other variables in the analysis.

UNDERWEIGHT FEMALES

Factor	OR (95% C.I.)
Dieted To Lose Weight In Past Year	
No	Reference
Yes	0.36 (0.33 - 0.39)
Participated In Sports With a Coach In Past Year	
Never	Reference
Less than weekly	0.76 (0.68 - 0.84)
1 to 3 times a week	0.60 (0.56 - 0.65)
4 or more times a week	0.49 (0.45 - 0.53)
Family Connectedness	
Scale range 1-3	0.87 (0.80 - 0.95)
Smoking Status	
Non-smoker	Reference
Current smoker	0.72 (0.62 - 0.83)
Binge Drank In Past Month	
No	Reference
Yes	0.63 (0.58 - 0.69)
Binge Eat	
No	Reference
Yes	0.85 (0.79 - 0.91)
Participated In Sports or Physical Activities Without A Coach In Past Year	
Never	Reference
Less than weekly	0.91 (0.82 - 1.00)
1 to 3 times a week	0.68 (0.61 - 0.75)
4 or more times a week	0.77 (0.69 - 0.85)
Participated In Dance Or Aerobic Classes In Past Year	
Never	Reference
Less than weekly	0.84 (0.76 - 0.92)
1 to 3 times a week	1.18 (1.10 - 1.28)
4 or more times a week	1.17 (1.05 - 1.31)
Sexually Harassed In Past Year	
No	Reference
Yes	NS
Recent Immigrant	
No, lived here more than 5 years	Reference
Yes, lived here 5 years or less	1.82 (1.65 - 2.01)
Parent(s) In Room While Ate Evening Meal On Past 5 School Days	
No	Reference
Yes, all 5 days	1.42 (1.33 - 1.52)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of dieting, for example, females who dieted were a third (.36 times) as likely as those who did not diet to be underweight, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with being overweight for males and females

OVERWEIGHT MALES

Factor	OR (95% C.I.)
Self-Rated Health	
Poor/fair	Reference
Good/excellent	0.53 (0.50 - 0.55)
Dieted To Lose Weight In Past Year	
No	Reference
Yes	3.47 (3.34 - 3.61)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, males who rated their health as good/excellent were about half (.53 times) as likely as those who rated their health as poor/fair to be overweight, controlling for age and all other variables in the analysis.

OVERWEIGHT FEMALES

Factor	OR (95% C.I.)
Participated In Dance Or Aerobic Classes In Past Year	
Never	Reference
Less than weekly	0.85 (0.80 - 0.90)
1 to 3 times a week	0.65 (0.61 - 0.69)
4 or more times a week	0.47 (0.43 - 0.51)
Self-Rated Health	
Poor/fair	Reference
Good/excellent	0.65 (0.62 - 0.69)
Family Connectedness	
Scale range 1-3	1.18 (1.11 - 1.24)
Dieted To Lose Weight In Past Year	
No	Reference
Yes	2.58 (2.45 - 2.70)
Binge-Eat	
No	Reference
Yes	1.32 (1.27 - 1.38)
Vomit On Purpose After Eating	
No	Reference
Yes	1.11 (1.04 - 1.19)
Chronic Illness, Physical Disability, Or Mental Illness That Limits Activities	
No	Reference
Yes	1.33 (1.25 - 1.41)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of dance or aerobic classes, for example, females who participated 4 or more times a week were half (.47 times) as likely as those who did not participate to be overweight, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with being obese for males			
Factor	**OR (95% C.I.)**	**Factor**	**OR (95% C.I.)**
Participated In Sports or Physical Activities Without a Coach In Past Year		**Dieted To Lose Weight In Past Year**	
Never	Reference	No	Reference
Less than weekly	0.64 (0.57 - 0.73)	Yes	5.91 (5.55 - 6.29)
1 to 3 times a week	0.74 (0.67 - 0.83)	**Binge Eat**	
4 or more times a week	0.65 (0.58 - 0.72)	No	Reference
Self-Rated Health		Yes	1.22 (1.14 - 1.31)
Poor/fair	Reference	**Vomit On Purpose After Eating**	
Good/excellent	0.25 (0.23 - 0.27)	No	Reference
Eat Breakfast On School Days		Yes	NS
Never	Reference	**Screen Time**	
Sometimes	NS	0 to 2 hours	Reference
Always	0.89 (0.82 - 0.96)	2.5 to 4 hours	1.26 (1.15 - 1.37)
Daily Exercise Or Physical Activity In Past Week		More than 4 hours	1.38 (1.27 - 1.50)
No	Reference	**Chronic Illness, Physical Disability, Or Mental Illness That Limits Activities**	
Yes	0.69 (0.63 - 0.75)	No	Reference
Participated In Sports With a Coach In Past Year		Yes	NS
Never	Reference		
Less than weekly	0.65 (0.58 - 0.72)		
1 to 3 times a week	0.85 (0.79 - 0.92)		
4 or more times a week	0.92 (0.85 - 0.99)		

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, males who rated their health as good/excellent were a quarter (.25 times) as likely as those who rated their health as poor/fair to be obese, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with being obese for females			
Factor	**OR (95% C.I.)**	**Factor**	**OR (95% C.I.)**
Participated In Sports With a Coach In Past Year		**Binge Drank In Past Month**	
Never	Reference	No	Reference
Less than weekly	0.67 (0.57 - 0.79)	Yes	0.56 (0.50 - 0.62)
1 to 3 times a week	NS	**Dieted To Lose Weight In Past Year**	
4 or more times a week	0.69 (0.61 - 0.78)	No	Reference
Self-Rated Health		Yes	3.07 (2.78 - 3.39)
Poor/fair	Reference	**Binge Eat**	
Good/excellent	0.26 (0.24 - 0.29)	No	Reference
Eat Breakfast On School Days		Yes	1.28 (1.17 - 1.39)
Never	Reference	**Screen Time**	
Sometimes	NS	0 to 2 hours	Reference
Always	0.81 (0.72 - 0.91)	2.5 to 4 hours	1.42 (1.27 - 1.59)
Participated In Dance Or Aerobic Classes In Past Year		More than 4 hours	1.33 (1.19 - 1.50)
Never	Reference	**Emotionally Distressed In Past Month**	
Less than weekly	0.54 (0.47 - 0.62)	No	Reference
1 to 3 times a week	0.60 (0.53 - 0.68)	Yes	NS
4 or more times a week	0.66 (0.56 - 0.77)	**Worry About Family Having Enough Food Or Money**	
School Connectedness		No	Reference
Scale range 1-5	NS	Yes	1.96 (1.79 - 2.14)
Smoking Status		**Chronic Illness, Physical Disability, Or Mental Illness That Limits Activities**	
Non-smoker	Reference	No	Reference
Current smoker	0.45 (0.37 - 0.55)	Yes	NS

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, females who rated their health as good/excellent were a quarter (.26 times) as likely as those who rated their health as poor/fair to be obese, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with smoking for males			
Factor	**OR (95% C.I.)**	**Factor**	**OR (95% C.I.)**
Parent(s) In Room While Ate Evening Meal On Past 5 School Days		**Chronic Weight Condition That Limits Activities**	
No	Reference	No	Reference
Yes, all 5 days	0.90 (0.83 - 0.96)	Yes	1.85 (1.46 - 2.35)
Self-Rated Health		**In Government Care (Foster Or Group Home) In Past Year**	
Poor/fair	Reference	No	Reference
Good/excellent	0.41 (0.37 - 0.44)	Yes	1.30 (1.04 - 1.61)
Family Connectedness		**Binge Drank In Past Month**	
Scale range 1-3	0.72 (0.66 - 0.80)	No	Reference
School Connectedness		Yes	3.93 (3.60 - 4.29)
Scale range 1-5	0.87 (0.82 - 0.92)	**Used Marijuana In Past Month**	
Participated In Sports With a Coach In Past Year		No	Reference
Never	Reference	Yes	6.94 (6.39 - 7.52)
Less than weekly	0.38 (0.34 - 0.43)	**Ever Had Sex**	
1 to 3 times a week	0.33 (0.30 - 0.36)	No	Reference
4 or more times a week	0.32 (0.29 - 0.35)	Yes	4.37 (4.05 - 4.71)
Recent Immigrant		**Involved In Physical Fights In Past Year**	
No, lived here more than 5 years	Reference	No	Reference
Yes, lived here 5 years or less	2.86 (2.53 - 3.23)	Yes	1.57 (1.46 - 1.69)
Vomit On Purpose After Eating		**Exposed To Tobacco Smoke In Home**	
No	Reference	No	Reference
Yes	1.45 (1.22 - 1.73)	Yes	2.46 (2.29 - 2.64)
Emotionally Distressed In Past Month		**Trying To Do Something About Weight**	
No	Reference	Nothing	Reference
Yes	1.28 (1.13 - 1.45)	Lose weight	1.27 (1.15 - 1.41)
Sexually Abused And/Or Forced To Have Sex		Gain weight	1.56 (1.43 - 1.70)
No	Reference	Stay the same weight	NS
Yes	1.31 (1.14 - 1.52)	**How Look Compared To Same Aged Peers**	
Health Complaints During Past 6 Months		The same age	Reference
0 to 2 complaints	Reference	Younger	NS
3 to 4 complaints	1.35 (1.26 - 1.45)	Older	1.33 (1.24 - 1.44)
Chronic Illness, Physical Disability, Or Mental Illness That Limits Activities		**Sexually Harassed In Past Year**	
No	Reference	No	Reference
Yes	2.02 (1.80 - 2.27)	Yes	0.80 (0.74 - 0.86)

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, males who rated their health as good/excellent were four-tenths (.41 times) as likely as those who rated their health as poor/fair to be smokers, controlling for age and all other variables in the analysis.

Odds ratios (and 95% confidence intervals) for protective and risk factors associated with smoking for females			
Factor	**OR (95% C.I.)**	**Factor**	**OR (95% C.I.)**
Parent(s) In Room While Ate Evening Meal On Past 5 School Days		**Sexually Harassed in Past Year**	
No	Reference	No	Reference
Yes, all 5 days	NS	Yes	1.33 (1.22 - 1.45)
Participated In Sports With a Coach In Past Year		**Health Complaints During Past 6 Months**	
Never	Reference	0 to 2 complaints	Reference
Less than weekly	0.83 (0.75 - 0.93)	3 to 4 complaints	1.32 (1.22 - 1.43)
1 to 3 times a week	0.70 (0.64 - 0.76)	**In Government Care (Foster Or Group Home) In Past Year**	
4 or more times a week	0.31 (0.28 - 0.34)	No	Reference
Self-Rated Health		Yes	6.76 (5.47 - 8.36)
Poor/fair	Reference	**Binge Drank In Past Month**	
Good/excellent	0.44 (0.41 - 0.48)	No	Reference
Family Connectedness		Yes	4.20 (3.89 - 4.53)
Scale range 1-3	NS	**Used Marijuana In Past Month**	
Recent Immigrant		No	Reference
No, lived here more than 5 years	Reference	Yes	6.39 (5.94 - 6.87)
Yes, lived here 5 years or less	1.43 (1.25 - 1.65)	**Ever Had Sex**	
School Connectedness		No	Reference
Scale range 1-5	0.76 (0.71 - 0.80)	Yes	4.40 (4.09 - 4.74)
Vomit On Purpose After Eating		**Involved In Physical Fights In Past Year**	
No	Reference	No	Reference
Yes	1.45 (1.31 - 1.61)	Yes	2.50 (2.31 - 2.71)
How Look Compared To Same Aged Peers		**Exposed To Tobacco Smoke In Home**	
The same age	Reference	No	Reference
Younger	1.12 (1.01 - 1.24)	Yes	2.42 (2.26 - 2.59)
Older	1.91 (1.78 - 2.05)	**How Think Of Body**	
Emotionally Distressed In Past Month		The right weight	Reference
No	Reference	Underweight	1.28 (1.10 - 1.49)
Yes	NS	Overweight	1.25 (1.16 - 1.34)
Sexually Abused And/Or Forced To Have Sex		**Chronic Illness, Physical Disability, Or Mental Illness That Limits Activities**	
No	Reference	No	Reference
Yes	1.10 (1.01 - 1.19)	Yes	0.68 (0.62 - 0.75)
Physically Abused			
No	Reference		
Yes	1.50 (1.38 - 1.63)		

Note: The size of all odds ratios are relative to the reference category only, and are adjusted for age and all other factors in the analysis.

Note: The odds ratios may be interpreted as follows: In the case of self-rated health status, for example, females who rated their health as good/excellent were nearly half (.44 times) as likely as those who rated their health as poor/fair to be smokers, controlling for age and all other variables in the analysis.

Probability profile for being an underweight male

RISK FACTORS PRESENT		PROTECTIVE FACTORS		Probability of being underweight
		Weekly sports with a coach	Connected to family	
Zero:		Yes	Yes	0.034
		Yes	No	0.041
		No	Yes	0.052
		No	No	0.062
One:	**Recent immigrant**	Yes	Yes	0.063
		Yes	No	0.075
		No	Yes	0.094
		No	No	0.113
	Vomiting on purpose after eating	Yes	Yes	0.058
		Yes	No	0.069
		No	Yes	0.087
		No	No	0.104
Two:	**Recent immigrant and vomiting on purpose after eating**	Yes	Yes	0.105
		Yes	No	0.125
		No	Yes	0.155
		No	No	0.182

Note: 'Yes' indicates presence of protective factor. 'No' indicates absence of protective factor.

Note: Sample interpretation: For males who have the risk factor of being a recent immigrant and both protective factors of being involved in weekly sports with a coach and being highly connected to their family, the probability of being underweight is 0.063 or 6.3%.

Probability profile for being an underweight female

RISK FACTORS PRESENT		PROTECTIVE FACTORS		Probability of being underweight
		Weekly sports with a coach	Connected to family	
Zero:		Yes	Yes	0.032
		Yes	No	0.027
		No	Yes	0.055
		No	No	0.047
One:	Recent immigrant	Yes	Yes	0.059
		Yes	No	0.051
		No	Yes	0.098
		No	No	0.085
	Parent(s) present at evening meal	Yes	Yes	0.050
		Yes	No	0.032
		No	Yes	0.085
		No	No	0.073
Two:	Recent immigrant and parent(s) present at evening meal	Yes	Yes	0.091
		Yes	No	0.079
		No	Yes	0.149
		No	No	0.130

Note: 'Yes' indicates presence of protective factor. 'No' indicates absence of protective factor.

Note: Sample interpretation: For females who have the risk factor of being a recent immigrant and both protective factors of being involved in weekly sports with a coach and being highly connected to their family, the probability of being underweight is 0.059 or 5.9%.

Probability profile for being an obese male					
RISK FACTORS PRESENT		PROTECTIVE FACTORS			
		Weekly sports without a coach	Eating breakfast	Daily exercise	Probability of being obese
Zero:		Yes	Yes	Yes	0.010
		Yes	Yes	No	0.018
		Yes	No	Yes	0.012
		No	Yes	Yes	0.015
		No	No	Yes	0.018
		No	Yes	No	0.025
		Yes	No	No	0.022
		No	No	No	0.031
One:	**Dieting**	Yes	Yes	Yes	0.061
		Yes	Yes	No	0.102
		Yes	No	Yes	0.074
		No	Yes	Yes	0.086
		No	No	Yes	0.104
		No	Yes	No	0.141
		Yes	No	No	0.123
		No	No	No	0.168
	Binge eating	Yes	Yes	Yes	0.012
		Yes	Yes	No	0.022
		Yes	No	Yes	0.015
		No	Yes	Yes	0.018
		No	No	Yes	0.022
		No	Yes	No	0.031
		Yes	No	No	0.026
		No	No	No	0.037
	More than 4 hours of daily screen time	Yes	Yes	Yes	0.013
		Yes	Yes	No	0.022
		Yes	No	Yes	0.016
		No	Yes	Yes	0.018
		No	No	Yes	0.022
		No	Yes	No	0.032
		Yes	No	No	0.027
		No	No	No	0.038

continued...

Probability profile for being an obese male continued

RISK FACTORS PRESENT		PROTECTIVE FACTORS			Probability of being obese
		Weekly sports without a coach	Eating breakfast	Daily exercise	
Two:	Dieting and binge eating	Yes	Yes	Yes	0.074
		Yes	Yes	No	0.123
		Yes	No	Yes	0.090
		No	Yes	Yes	0.104
		No	No	Yes	0.124
		No	Yes	No	0.168
		Yes	No	No	0.146
		No	No	No	0.198
	Dieting and more than 4 hours of daily screen time	Yes	Yes	Yes	0.076
		Yes	Yes	No	0.125
		Yes	No	Yes	0.092
		No	Yes	Yes	0.106
		No	No	Yes	0.127
		No	Yes	No	0.171
		Yes	No	No	0.150
		No	No	No	0.202
	Binge eating and more than 4 hours of daily screen time	Yes	Yes	Yes	0.016
		Yes	Yes	No	0.027
		Yes	No	Yes	0.019
		No	Yes	Yes	0.022
		No	No	Yes	0.027
		No	Yes	No	0.038
		Yes	No	No	0.033
		No	No	No	0.047
Three:	Dieting, binge eating, and more than 4 hours of daily screen time	Yes	Yes	Yes	0.092
		Yes	Yes	No	0.150
		Yes	No	Yes	0.110
		No	Yes	Yes	0.127
		No	No	Yes	0.152
		No	Yes	No	0.202
		Yes	No	No	0.178
		No	No	No	0.238

Note: 'Yes' indicates presence of protective factor. 'No' indicates absence of protective factor.

Note: Sample interpretation: For males who have the two risk factors of dieting and binge eating and none of the protective factors, the probability of being obese is 0.198 or 19.8%.

Probability profile for being an obese female

RISK FACTORS PRESENT		PROTECTIVE FACTORS			Probability of being obese
		Eating breakfast	Weekly dance/ aerobic classes	Connected to school	
Zero:		Yes	Yes	Yes	0.006
		Yes	Yes	No	0.009
		Yes	No	Yes	0.011
		No	Yes	Yes	0.008
		No	No	Yes	0.014
		No	Yes	No	0.011
		Yes	No	No	0.015
		No	No	No	0.019
One:	**Dieting**	Yes	Yes	Yes	0.023
		Yes	Yes	No	0.030
		Yes	No	Yes	0.039
		No	Yes	Yes	0.029
		No	No	Yes	0.049
		No	Yes	No	0.038
		Yes	No	No	0.051
		No	No	No	0.064
	More than 4 hours of daily screen time	Yes	Yes	Yes	0.008
		Yes	Yes	No	0.011
		Yes	No	Yes	0.014
		No	Yes	Yes	0.011
		No	No	Yes	0.018
		No	Yes	No	0.014
		Yes	No	No	0.019
		No	No	No	0.024
	Worry about family having enough food or money	Yes	Yes	Yes	0.015
		Yes	Yes	No	0.019
		Yes	No	Yes	0.025
		No	Yes	Yes	0.019
		No	No	Yes	0.032
		No	Yes	No	0.025
		Yes	No	No	0.033
		No	No	No	0.042

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Probability profile for being an obese female continued

RISK FACTORS PRESENT		PROTECTIVE FACTORS			Probability of being obese
		Eating breakfast	Weekly dance/ aerobic classes	Connected to school	
Two:	Dieting and more than 4 hours of daily screen time	Yes	Yes	Yes	0.029
		Yes	Yes	No	0.038
		Yes	No	Yes	0.050
		No	Yes	Yes	0.037
		No	No	Yes	0.062
		No	Yes	No	0.048
		Yes	No	No	0.065
		No	No	No	0.081
	Dieting and worry about family having enough food or money	Yes	Yes	Yes	0.051
		Yes	Yes	No	0.067
		Yes	No	Yes	0.086
		No	Yes	Yes	0.064
		No	No	Yes	0.106
		No	Yes	No	0.083
		Yes	No	No	0.110
		No	No	No	0.136
	More than 4 hours of daily screen time and worry about family having enough food or money	Yes	Yes	Yes	0.019
		Yes	Yes	No	0.025
		Yes	No	Yes	0.032
		No	Yes	Yes	0.024
		No	No	Yes	0.041
		No	Yes	No	0.031
		Yes	No	No	0.042
		No	No	No	0.053
Three:	Dieting, more than 4 hours of daily screen time, and worry about family having enough food or money	Yes	Yes	Yes	0.065
		Yes	Yes	No	0.084
		Yes	No	Yes	0.108
		No	Yes	Yes	0.081
		No	No	Yes	0.133
		No	Yes	No	0.104
		Yes	No	No	0.137
		No	No	No	0.168

Note: 'Yes' indicates presence of protective factor. 'No' indicates absence of protective factor.

Note: Sample interpretation: For females who have the two risk factors of dieting and worrying about their family having enough food or money and none of the protective factors, the probability of being obese is 0.136 or 13.6%.

Probability profile for being a female current smoker					
RISK FACTORS PRESENT		PROTECTIVE FACTORS			Probability of being smoker
		Weekly sports with a coach	Connected to family	Connected to school	
Zero:		Yes	Yes	Yes	0.000
		Yes	Yes	No	0.000
		Yes	No	Yes	0.000
		No	Yes	Yes	0.000
		No	No	Yes	0.000
		No	Yes	No	0.000
		Yes	No	No	0.000
		No	No	No	0.001
One:	**In government care**	Yes	Yes	Yes	0.000
		Yes	Yes	No	0.001
		Yes	No	Yes	0.000
		No	Yes	Yes	0.000
		No	No	Yes	0.001
		No	Yes	No	0.002
		Yes	No	No	0.002
		No	No	No	0.003
	Used marijuana in past month	Yes	Yes	Yes	0.001
		Yes	Yes	No	0.002
		Yes	No	Yes	0.001
		No	Yes	Yes	0.001
		No	No	Yes	0.002
		No	Yes	No	0.004
		Yes	No	No	0.004
		No	No	No	0.007
	Ever had sex	Yes	Yes	Yes	0.000
		Yes	Yes	No	0.001
		Yes	No	Yes	0.001
		No	Yes	Yes	0.001
		No	No	Yes	0.001
		No	Yes	No	0.002
		Yes	No	No	0.002
		No	No	No	0.004

continued...

Probability profile for being a female current smoker continued

RISK FACTORS PRESENT		PROTECTIVE FACTORS			Probability of being smoker
		Weekly sports with a coach	Connected to family	Connected to school	
Two:	In government care and used marijuana in past month	Yes	Yes	Yes	0.004
		Yes	Yes	No	0.011
		Yes	No	Yes	0.006
		No	Yes	Yes	0.007
		No	No	Yes	0.012
		No	Yes	No	0.021
		Yes	No	No	0.021
		No	No	No	0.038
	In government care and ever had sex	Yes	Yes	Yes	0.002
		Yes	Yes	No	0.006
		Yes	No	Yes	0.003
		No	Yes	Yes	0.003
		No	No	Yes	0.006
		No	Yes	No	0.011
		Yes	No	No	0.011
		No	No	No	0.020
	Used marijuana in past month and ever had sex	Yes	Yes	Yes	0.004
		Yes	Yes	No	0.014
		Yes	No	Yes	0.008
		No	Yes	Yes	0.008
		No	No	Yes	0.015
		No	Yes	No	0.026
		Yes	No	No	0.026
		No	No	No	0.046
Three:	In government care, used marijuana in past month, and ever had sex	Yes	Yes	Yes	0.024
		Yes	Yes	No	0.076
		Yes	No	Yes	0.043
		No	Yes	Yes	0.044
		No	No	Yes	0.077
		No	Yes	No	0.131
		Yes	No	No	0.129
		No	No	No	0.215

Note: 'Yes' indicates presence of protective factor. 'No' indicates absence of protective factor.

Note: Sample interpretation: For females who have all three risk factors (being in government care, using marijuana in the past month, and having had sex) and the one protective factor of being highly connected to their family, the probability of being a current smoker is 0.131 or 13.1%.

Adolescent Health Survey Publications

Reports for AHS III

Healthy Youth Development: Highlights from the 2003 Adolescent Health Survey III (2004)

Adolescent Health Survey III Regional Reports for: Northwest; Northern Interior; Thompson Cariboo Shuswap; Okanagan; Coast Garibaldi/North Shore; Kootenay Boundary; East Kootenay; North Vancouver Island; Central Vancouver Island; South Vancouver Island; Vancouver; Richmond; Fraser; and Fraser North. (2004)

Reports for AHS II

Healthy Connections: Listening to BC Youth (1999)

Adolescent Health Survey II: Regional Reports for: Kootenays Region; Okanagan Region; Thompson/Cariboo Region; Upper Fraser Valley Region; South Fraser Region; Simon Fraser/Burnaby Region; Coast Garibaldi/North Shore Region; Central/Upper Island Region; North Region; Vancouver/Richmond Region; Capital Region; East Kootenay Region; Kootenay Boundary Region; North Okanagan Region; Okanagan Similkameen Region; Thompson Region; Cariboo Region; Coast Garibaldi Region; Central Vancouver Island Region; Upper Island/ Central Coast Region; North West Region; Peace Liard Region (2000)

Reports for AHS I

Adolescent Health Survey: Province of British Columbia (1993)

Adolescent Health Survey: Regional Reports for: Greater Vancouver Region; Fraser Valley Region; Interior Region; Kootenay Region; Northeast Region; Northwest Region; Upper Island Region; and Capital Region (1993)

Special group surveys and topic reports

Time Out II: A Profile of BC Youth in Custody (2005)

Raven's Children II: Aboriginal Youth Health in BC (2005)

British Columbia Youth Health Trends: A Retrospective, 1992-2003 (2005)

Healthy Youth Development: The Opportunity of Early Adolescence (2003)

Accenting the Positive: A developmental framework for reducing risk and promoting positive outcomes among BC youth (2002)

Violated Boundaries: A health profile of adolescents who have been abused (2002)

Violence in adolescence: Injury, suicide, and criminal violence in the lives of BC youth (2002)

Between the Cracks: Homeless youth in Vancouver (2002)

Homeless youth: An annotated bibliography (2002)

Time Out: A profile of BC youth in custody (2001)

The Girls' Report: The Health of Girls in BC (2001)

No Place to Call Home: A Profile of Street Youth in British Columbia (2001)

Making Choices: Sex, Ethnicity, and BC Youth (2000)

Raven's Children: Aboriginal Youth Health in BC (2000)

Lighting Up: Tobacco use among BC youth (2000)

Silk Road to Health: A Journey to Understanding Chinese Youth in BC (2000)

Mirror Images: Weight Issues Among BC Youth (2000)

Being Out-Lesbian, Gay, Bisexual & Transgender Youth in BC: An Adolescent Health Survey (1999)

Our Kids Too-Sexually Exploited Youth in British Columbia: An Adolescent Health Survey (1999)

Adolescent Health Survey: AIDS-Related Risk Behaviour in BC Youth - A Multicultural Perspective (1997)

Adolescent Health Survey: Youth & AIDS in British Columbia (1994)

Adolescent Health Survey: Chronic Illness & Disability Among Youth in BC (1994)

Adolescent Health Survey: Street Youth in Vancouver (1994)

AHS III fact sheets

Physical Fitness Among BC Youth
Body Weight Issues Among BC Youth
Alcohol Use Among BC Youth
Illegal Drug Use Among BC Youth
Marijuana Use Among BC Youth
Tobacco Use Among BC Youth

AHS III youth fact sheets

Facts About Mental Health
Facts About Physical Health
Facts About Substance Use
Facts About Sexual Health
Facts About Smoking

Next Step

The Next Steps: A Workshop Toolkit to Engage Youth in Community Action. A project of the Adolescent Health Survey III (2005)

The Aboriginal Next Step: Results from Community Youth Health Workshops (2001)

Our Communities – Our Health: Young People Discuss Solutions To Their Health Issues. The Next Step Report (2001)

Adolescent Health Survey: Next Step - Community Health Action By Youth. Results from 1994 Youth Health Seminars in British Columbia (1995)