PHYSICAL SAFETY

Physical safety refers to the quality of children's natural and built environments and the threats to their personal safety and well-being.

KEY INDICATORS:

- Air pollution
- Injury rates
- Crime rates

Just as children need consistent, loving relationships with their family and friends, they also need safe environments in which to grow and play. A safe environment includes having access to clean air, water, and land. It also includes protection from crime and violence, and measures to reduce the risk of injuries. Providing children with a safe environment is the responsibility of all Canadians – parents, schools, health-care providers, police, and community members.

In the following articles, we look at key factors that affect children's physical safety. We examine the quality of the air they breathe and harmful contaminants such as lead and pesticides that may be present in their communities. We discuss water quality – another basic need for physical safety. And we present the latest statistics on crime in Canada, along with youth perceptions of their neighbourhood safety.

The leading causes of injury deaths for young people over the age of one occur on our roads and highways. We therefore examine trends in road crashes, the risks posed by drinking and driving, and the use of protective devices like seat belts and bicycle helmets.

ENVIRONMENTAL HAZARDS

Outdoor air quality

Poor air quality presents a serious threat to children's physical health and safety. Many regions of Canada have unacceptable air quality, particularly in the summer. European and North American research demonstrates that exposure to air pollution harms children's development. It puts them at risk of life-threatening health complications and diseases, and the damage may begin as early as in the womb.

Traffic-related air pollution is a particularly serious threat to children's health and safety, and much of Canada's air pollution comes from traffic. According to Pollution Probe, transportation is the largest single human-produced source of outdoor air pollution in Canada.

What is smog?

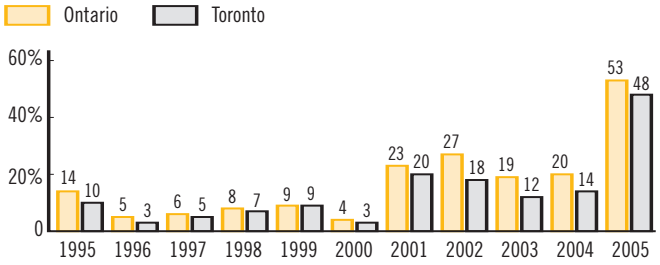
Smog is a mixture of airborne chemicals produced by motor vehicles and industrial pollution. Sunlight causes the pollutants to react, creating smog. It is a particular concern in urban centres, but smog travels with the wind, so it also affects less populated areas.

There are no safe levels for human exposure to the primary components of smog – ground-level ozone and airborne particles known as particulate matter. These pollutants adversely affect human health even at very low levels, and long-term exposure to low levels may be even more damaging than short-term exposure to high levels.

Short-term exposure to smog irritates the eyes, nose and throat, and decreases lung functioning. Heart and lung diseases can be aggravated. In some cases, smog can cause premature death. On days with high levels of smog, the number of doctor visits and hospital admissions due to respiratory problems rise.

In Ontario, the number of smog advisory days rose from 14 in 1995, to 20 by 2004. According to the Ontario Ministry of the Environment, between 1995 and 2004, Ontario had the lowest number of smog advisory days in 2000 (4) and the highest number in 2002 (27).

SMOG ADVISORY DAYS IN ONTARIO & TORONTO



Source: Ontario Ministry of the Environment, Air Quality Ontario, *and Toronto Environmental Alliance,* Toronto Smog Report Card, *2005.*

Lung functioning

Recent research in southern California revealed that exposure to high levels of air pollution, primarily from motor vehicles, impairs children's lung development. Researchers studying youth aged 10 to 18 over an eight-year period found that those who lived in smoggy communities were nearly five times more likely to have clinically low lung function, compared to teens living in low-pollution areas. Scientists believe that these findings can be generalized to other areas with similar pollutants.

Lung damage has both short- and long-term consequences. In the short-term, young adults may be at higher risk of developing respiratory conditions. In the long-term, they face a greater risk of serious health problems and premature death. The lung development deficits observed in this study are likely irreversible.

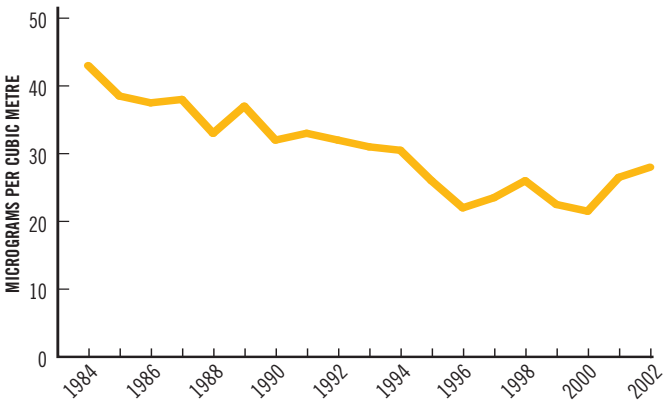
European research has also found a link between exposure to air pollution and decreased lung functioning and growth rates in children. A review of this research by the World Health Organization concurred that children's health is being adversely affected by air pollution. They strongly recommended a reduction in children's exposure to air pollutants, especially from traffic.

Effects on the unborn child

There is also evidence that air pollution affects fetal development, pregnancy outcomes, and infant heath. A recent study in New York City found that pregnant mothers exposed to air pollution gave birth to infants with damaged chromosomes. These mothers lived in densely populated neighbourhoods with varying levels of a carcinogenic pollutant from motor vehicles, diesel bus

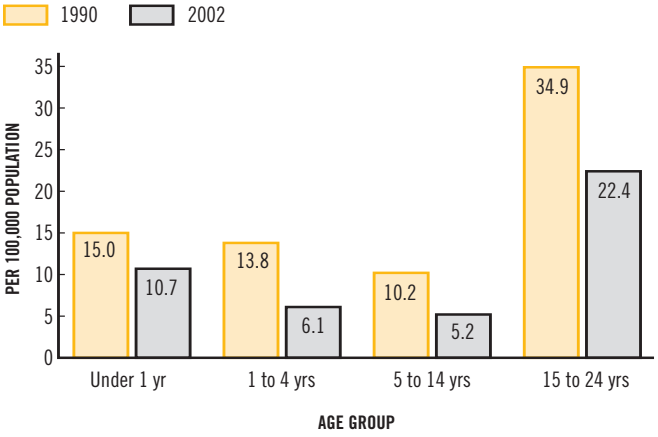
KEY INDICATORS

AIR POLLUTION: PEAK LEVELS OF FINE PARTICULATE MATTER ($PM_{2.5}$) IN SELECT CANADIAN CITIES



Source: Children's Health and the Environment in North America: A First Report on Available Measures and Indicators – Country Reports. *Public Review Draft, September 2005.*

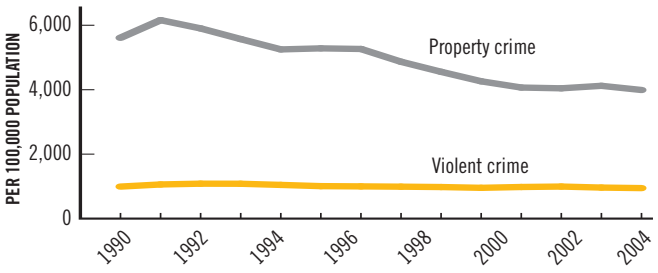
DEATH RATES FROM UNINTENTIONAL INJURIES



Source: Calculations by the Canadian Council on Social Development using data from the World Health Organization's Statistical Information Mortality Database and Statistics Canada's CANSIM Table 102-0540.

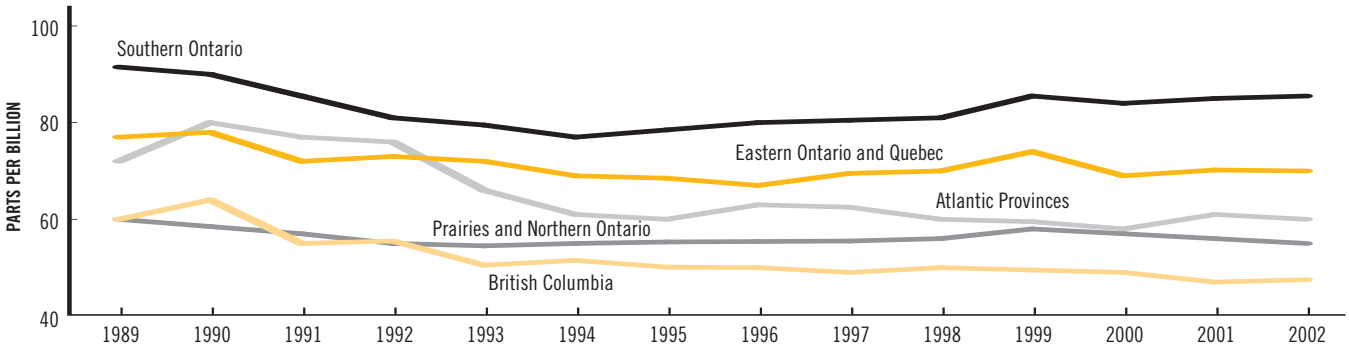
CRIME RATES

OVERALL CANADIAN POPULATION



Source: Statistics Canada, "Crime Statistics 2004," in The Daily, *July 21, 2005 and* Canadian Crime Statistics 2000, *Catalogue 85-205.*

PEAK GROUND-LEVEL OZONE IN CANADIAN REGIONS



Note: Ground-level ozone levels are heavily dependent on the weather, with the highest levels occurring in the warmer months.
Source: Children's Health and the Environment in North America: A First Report on Available Measures and Indicators – Country Reports. *Public Review Draft, September 2005.*

depots, and residential heating sources. Other studies have linked exposure to these air pollutants and the resulting chromosomal damage with an increased risk of developing cancer. Again, these research findings are relevant to other populations with similar concentrations of air pollutants.

Ground-level ozone

Ground-level ozone is formed when two common air pollutants – nitrogen oxides (NOx) and volatile organic compounds (VOCs) – react together as the sun heats up the air. It is one of the primary components of smog.

According to Environment Canada, more than half of all Canadians live in areas where ground-level ozone reaches unacceptably high levels in summer. Although these levels fluctuate from year to year, they have not improved significantly over the last 13 years in the Prairies, Ontario, or Quebec. The corridor from Windsor to Quebec City has higher ozone levels more often and for longer periods of time than other areas of Canada. About 50% of the air pollution in that corridor comes from the United States. The Lower Fraser Valley in B.C. and the southern Atlantic region are also prone to problems with ground-level ozone.

Fine particulate matter

The other major component of smog – fine particulate matter – comes from burning fuels for transportation, industry, and residential heating. The airborne particles can be in solid or liquid form. Fine particulate matter ($PM_{2.5}$) consists of the smallest particles, with diameters of 2.5 micrometers or less. They pose the greatest risks to human health because they can penetrate deep into the lungs.

With better monitoring techniques, it is now possible to track trends in fine particulate matter. Historical data from 10 to 15 urban centres show an overall decline in peak levels of $PM_{2.5}$ from the mid-1980s to the mid-1990s. After that, improvements seem to have stalled.

Tracking data from 1998 to 2000 showed that Toronto and Edmonton had the highest average concentrations of fine particulate matter. In Edmonton, there was a significant decrease in the level of fine particulate matter, but its average remained high. In the other cities examined – Vancouver, Montreal, and Saint John – the concentrations of fine particulate matter generally held constant.

Emissions

While emissions of many air pollutants have declined or remained stable over the last decade in Canada, the rates remain unacceptably high. Between 1990 and 2001, emissions of sulphur dioxide (SO_2) decreased significantly, and emissions of nitrogen oxides and volatile organic compounds were moderately reduced.

Internationally, Canada remains a major air polluter. According to a recent United Nations report, Canada has one of the worst records for greenhouse gas emissions among industrialized countries. Greenhouse gas emissions include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. And while Canada has pledged to cut emissions by 6% from its 1990 level over the period 2008 to 2012, our emissions were up 24% by the end of 2003.

Why are children at particular risk from air pollution?

- Their systems are still in the process of developing.
- Their lungs and airways are not yet mature, so they are more susceptible to the effects of air pollution.
- The surface area of their lungs is comparatively large and absorbs pollutants easily.
- Children breathe more rapidly and more deeply than adults, inhaling more air and proportionately more pollutants.
- They often breathe through their mouths which allows more polluted air to enter directly into the lungs.
- They spend more time outside being physically active.
- Because of their smaller size, they are closer to vehicle tailpipes where harmful pollutants are concentrated.

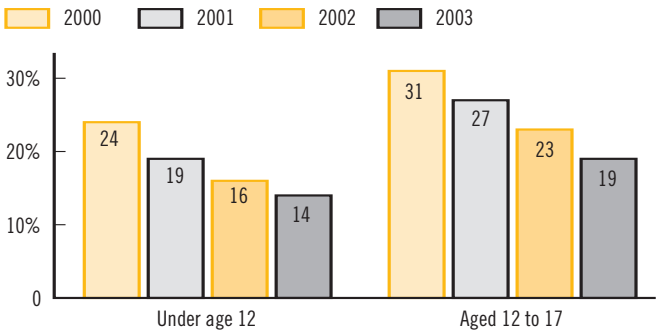
INDOOR AIR QUALITY

Children exposed to environmental tobacco smoke (second-hand smoke) are at increased risk of bronchitis, pneumonia, lower respiratory tract infections, chronic ear infections, and sudden infant death syndrome.

According to the Canadian Tobacco Use Monitoring Survey, 16% of children under 18 were regularly exposed to second-hand smoke at home in 2003. The proportion was higher among youth aged 12 to 17 (19%), than among children under age 12 (14%).

Fortunately, the proportion of children and youth who are regularly exposed to second-hand smoke at home has been declining since 2000.

EXPOSURE TO SECOND-HAND SMOKE IN THE HOME



Source: Canadian Tobacco Use Monitoring Survey, *Household Component, February to December, 2000, 2001, 2002, 2003.*

LEAD

Moderate or low-level exposure to lead in early childhood can cause adverse and persistent neuro-behavioural effects, including cognitive deficits. Studies suggest that children are most susceptible to the damaging neurological effects of lead during the first three years of life as brain development is taking place.

The U.S. Centers for Disease Control and Prevention (CDCP) define the threshold blood lead level that should trigger intervention as 0.48 umol/L – well below the 1.45 threshold that existed in 1975.

There is no Canada-wide assessment of blood lead levels in children. The majority of studies have evaluated the impact of specific sources of lead pollution, such as from smelters or metal reclamation plants. In 1994, it was estimated that more than 66,000 Canadian children might have blood lead levels greater than the CDCP standard.

Serious cases of lead poisoning in Canadian children are rare, largely due to public health efforts to remove lead from gasoline and paint, and control emissions from industrial sources. But recent research suggests that children's physical health may be at risk from new and persistent sources of lead exposure.

Canadian researchers Tsekrekos and Buka say a growing body of evidence suggests there is *no* acceptable threshold for the adverse effects of lead on developing central nervous systems. And they warn that lead exposure may be so prevalent, the effects are not easily recognized. In fact, understanding the role that low-level lead exposure may play in neuro-developmental disorders is still in its infancy.

New sources of lead exposure from consumer products – many of which are intended for children's use – are being discovered on the commercial market. As well, old sources of lead exposure persist. For example, lead dust can be generated in homes where lead-based paints have been used, particularly homes built prior to 1960. This is especially dangerous for babies and crawling children, because their breathing zone is closer to the floor, thus increasing their exposure to lead dust. Older dwellings may also have lead pipes that leach into the drinking water. In 2001, 24% of children under age five lived in housing built before 1960.

PESTICIDES

While the long-term effects of some pesticides are not yet known, others have been linked to increased risk of cancer, disruptions to endocrine systems, and negative effects on reproductive systems. When young developing brains are exposed to pesticides, it can result in intellectual deficits and neuro-behavioural problems such as ADHD.

Children are at particular risk from exposure to pesticides because their bodies are in a rapid growth state, with cells dividing and systems developing. Some organ systems mature early in life, while others are not fully developed until adulthood. And because children eat more food and drink more liquids than adults, on a weight for weight basis, they are exposed to proportionately more pesticide residues.

The Ontario College of Family Physicians recently sounded the alarm about pesticide use, particularly in relation to children's health.

The College was concerned that government approval of pesticides has been based on studies that were not adequately comprehensive or systematic, and many were poorly constructed. Following its own comprehensive review, the College concluded that exposure to *all* commonly used pesticides is associated with adverse health effects.

These findings have particular importance for children. They absorb, metabolize and excrete chemicals differently than adults, thus increasing their susceptibility. Children also have greater exposure because their diets are more heavily concentrated in specific foods and they have more hand-to-mouth behaviour, including eating soil. Small children spend hours on the ground – areas with the highest concentrations of pesticides.

All three levels of government are involved in the regulation of pesticides. The federal government is responsible for product safety, approval, and labelling requirements; provincial governments control the sale and handling of products and licensing applications; and municipalities oversee the development of by-laws regulating pesticide use on public and private lands.

In 1991, the small town of Hudson, Quebec became the first Canadian jurisdiction to ban the use of cosmetic pesticides on both public and private property. Over the last decade, municipalities of all sizes have followed suit. Today, about 70 municipalities have adopted pesticide by-laws in some form, with the largest being the City of Toronto (population 2.5 million) and the smallest being Saint-Paule, Quebec, with a population under 200. When all the current regulations and by-laws come into full effect, it is estimated that over 11 million Canadians – approximately 35% of the population – will be protected from exposure to synthetic lawn and garden pesticides.

In 2002, the federal Pest Control Products Act was passed to amend the way pesticides are regulated in Canada. By the spring of 2006, the Act was still not in force.

ENVIRONMENTAL CONTAMINANTS IN NORTHERN CANADA

Scientists first discovered high levels of mercury and persistent organic pollutants (POPs) in the Arctic in the 1980s. Recent studies from the Northern Contaminants Program – involving the federal and territorial governments, regional health authorities, academics, and Aboriginal communities – found that Inuit mothers have higher levels of these contaminants in their bloodstreams than Dene, Métis or Caucasian mothers living in the same geographical areas.

The problem was traced to differences in traditional diets. High levels of contaminants were found in marine species such as seals, polar bears and beluga whales, which are important in the Inuit diet. Land-based animals such as caribou, artic hare and moose – traditional food sources for the Dene and Métis peoples – had relatively low concentrations of these contaminants.

Traditional foods offer significant nutritional, social, cultural, economic, and spiritual benefits to people of the North. They are also healthy alternatives to the limited range of foods imported from the South, which tend to have higher fat content. In fact, there is growing evidence that the increase in processed foods from the South is linked to rising rates of illnesses such as diabetes and cardiovascular diseases, not historically associated with Aboriginal peoples.

In collaboration with Aboriginal leaders, partners in the Northern Contaminants Program developed a response that preserved the traditional diet, while reducing the risks from pollutants. Northern communities were advised to lower or eliminate consumption of certain species of animals and to eat more of other species.

WATER QUALITY

Clean water is critical to human health. The quality of Canada's drinking water hit the headlines again in 2005, when families were evacuated from the First Nations community of Kashechewan in Northern Ontario because the local water supply was contaminated.

Unfortunately, water quality issues in First Nations communities are not new. In 2002, the National Aboriginal Health Organization stated: "For Canada's Aboriginal communities, contaminated water is repeatedly identified as a major source of concern and a perennial cause of illness." This statement was supported in the First Nations Regional Longitudinal Health Survey 2002/03 which found that:

- One-third of First Nations adults consider their household water unsafe to drink.
- Over 70% of all adults resorted to alternative sources for drinking water.
- While most (63%) get their water by pipe from a local source, about 17% use water from a well and 16% have it delivered by truck.
- Among those who said their water was unsafe to drink, over 90% resorted to other sources for drinking water.
- The most common alternate source was bottled water – 62% of all Aboriginal respondents, compared to 35% of Canadians who report drinking bottled water at least once a week.

Concerns about water quality are not limited to First Nations communities. In 1999, an estimated 23.7 million Canadians were on public water distribution systems. Most of these systems have processes designed to kill bacteria and other pathogens and reduce the concentration of various chemicals. Another 6.8 million Canadians depend on private water supplies, mostly groundwater wells. There is no national program to track how many private wells have water treatment or disinfection systems and how many may be contaminated.

UNINTENTIONAL INJURIES

Unintentional injuries are the leading cause of death for children and youth over the age of one. Youth are particularly at risk – in 2002, almost 1,000 young people aged 15 to 24 died as a result of unintentional injuries.

Fortunately the death rate has been declining. Between 1990 and 2002, the injury death rate declined by 44% among children aged one to four, by 49% among those aged 5 to 14, and by 36% for youth aged 15 to 24.

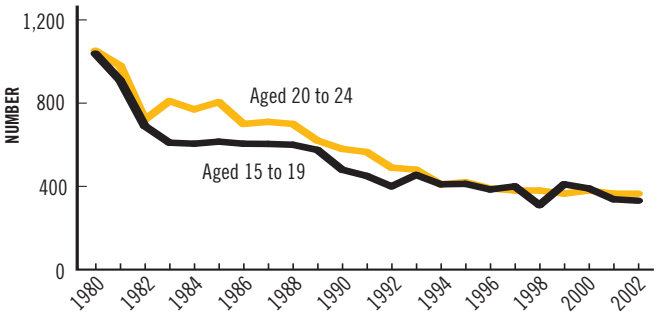
Road crashes

Motor vehicle crashes are the leading cause of death for young Canadians. They account for more than one-third (35%) of all deaths among 15- to 19-year-olds, and just under one-third (30%) of deaths for those aged 20 to 24. In 2002, 331 teenagers (15 to 19 years) and 365 young adults (aged 20 to 24) died in road crashes. A further 29,000 teenagers and 30,000 young adults were injured.

The highest fatality rates are found among teenaged drivers aged 16 to 19. Youth have higher fatality rates than older drivers, both in terms of the number of road deaths standardized by their proportion of the licensed driver population (per-driver fatality rate), and higher rates based on the amount they drive (standardized per-distance).

And while road crashes remain a significant threat, there have been substantial improvements over the last two decades. The rate of road fatalities among teens aged 15 to 19 declined by two-thirds between 1980 and 2002, and by 62% among those aged 20 to 24. Unfortunately, progress has stalled in recent years.

ROAD DEATHS AMONG CANADIAN YOUTH

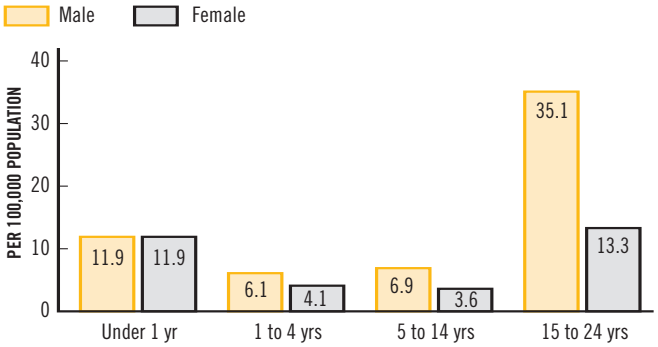


Source: Traffic Injury Research Foundation, Deaths and Injuries to Young Canadians from Road Crashes, *2004.*

Gender differences

At all ages above age one, boys are more likely than girls to die of injury-related causes. Male toddlers aged one to four are 1½ times more likely to die of unintentional injuries than female toddlers; school-aged boys are almost twice as likely (1.9 times), and young men aged 15 to 24 are 2.6 times more likely to die from unintentional injuries than females in their age groups.

INJURY DEATH RATE, 2000



Source: Calculations by the Canadian Council on Social Development using data from the World Health Organization's Statistical Information Mortality Database.

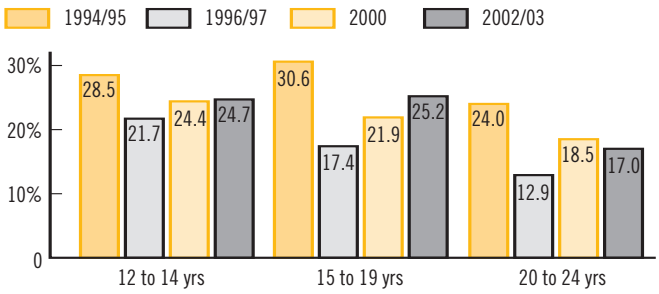
Young men are also more likely than women to be injured. In 2002/03, 28% of boys aged 12 to 14 were injured in the previous 12 months compared to 21% among girls. For those aged 15 to 19, 28% of boys and 18% of girls were injured. Among those aged 20 to 24, 21% of men and 13% of women were injured.

Injury rate

While there are year-to-year fluctuations, the overall injury rate is declining. In 2002/03, approximately 1.2 million youth aged 12 to 24 – representing 28% of the population – reported that they had been injured in the previous 12 months. The oldest group (those aged 20 to 24) had the lowest injury rate, but they also had the highest death rate from unintentional injuries.

YOUTH INJURY RATES

% INJURED IN PREVIOUS 12 MONTHS



Source: Calculations by the Canadian Council on Social Development using data from the National Population Health Survey *and the* Canadian Community Health Survey, *1994/95, 1996/97, 2000, & 2002/03.*

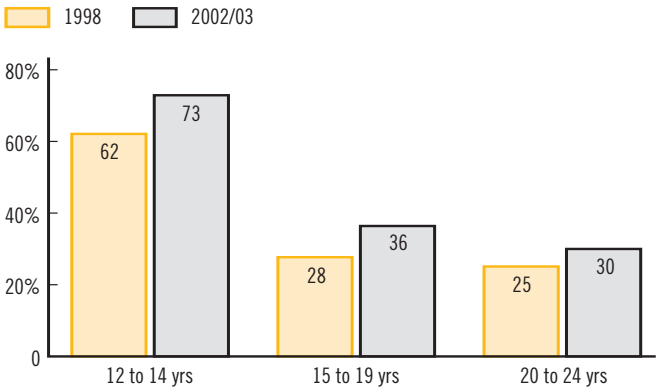
More than half (57%) of these unintentional injuries required treatment in a hospital emergency department. This was true for 63% of teens aged 12 to 14, 58% of youth aged 15 to 19, and 57% of those aged 20 to 24. Young men were more likely than women to sustain injuries which required emergency room treatment (61% compared to 55%).

Helmet use

Young people can take protective measures to prevent injuries. Using bicycle helmets and seat belts are two prime examples. The use of bike helmets among children and youth rose from 1998 to 2002/03, but usage declines with age.

There were no gender differences in the youngest age group (12 to 14 years), but there were among older groups. Only 33% of young men aged 15 to 19 used bicycle helmets most of the time or always, compared to 41% of women. By age 20 to 24, the gender gap had widened: 26% of men and 37% of women regularly used bike helmets.

USE BIKE HELMETS MOST OF THE TIME OR ALWAYS



Source: Calculations by the Canadian Council on Social Development using data from the National Population Health Survey *and the* Canadian Community Health Survey, *1994/95, 1996/97, 2000, & 2002/03.*

For car seatbelts, the vast majority of 12- and 13-year-olds (90% in 1996 and 92% in 2000) said they always or often wore a seatbelt. The percentages were virtually the same for boys and girls and for children living in low- and high-income families.

DRINKING AND DRIVING

According to researchers, young drivers are a serious traffic risk. Canadians tend to underestimate traffic dangers associated with young drivers and overestimate the danger of youth drinking and driving because of their inexperience and risky driving practices. But alcohol is less likely to be an issue in crashes involving teen drivers than among drivers in other age groups.

Between 1998 and 2005, the proportion of Canadians who said that in the past 30 days they had driven a vehicle within two hours of drinking decreased from 19% to 15%.

There were significant age differences in these self-reports. In 2004, less than 12% of drivers under age 20 said they had driven after consuming alcohol, compared to 22% of those aged 19 to 24, and 28% of those aged 25 to 34.

These age differences were consistent between 2001 and 2004. Over this four-year period, teenaged drivers and seniors (65+ years) were the least likely groups to report that they drove after drinking.

Over the limit

The proportion of Canadians over age 18 who said that during the previous year they had driven while over the legal blood alcohol limit declined from 9% in 1998 to 7% in 2005.

Those aged 20 to 24 had the highest proportion of driving while over the legal limit, and teens had the second highest. Researchers warn, however, that teens' perspectives may differ from that of other drivers because graduated licensing systems restrict them to a blood alcohol limit of zero. There may also be a link between youth drinking habits, such as binge drinking, and driving over the legal limit.

Alcohol-related deaths

There has been a decrease in alcohol-related deaths, both in numbers and as a proportion of total deaths. In 2002, 37% of vehicle deaths among youth were alcohol-related, down from 47% in 1998.

In 2002, 146 teen drivers (16 to 19 years) died in alcohol-related crashes, down from 187 deaths in 1999. (The lowest number was 134 recorded in 1998.) Among drivers aged 20 to 25, the number of fatally injured dropped from 282 in 1998 to 261 in 2002.

Over two-thirds (68%) of fatally injured teen drivers (16 to 19) in 2002 had not been drinking, slightly better than in 1998 (64%). Among those aged 20 to 25, 56% of the drivers fatally injured had no alcohol in their system, up from 49% in 1998.

GRADUATED DRIVERS LICENSES

Since 1994, 10 provinces and two territories have implemented some form of graduated licensing for new drivers. Nunavut is considering such a program. Although there are variations among the programs, all but two jurisdictions have adopted multi-phased licensing with learners and intermediate stages.

The implementation of these graduated licensing programs has contributed to the decline in road crash deaths among young people. Studies of the effectiveness of programs implemented in Ontario and Nova Scotia in 1994, Québec in 1997, and British Columbia in 1998 all reported that collisions were reduced among all age groups of novice drivers. For new drivers aged 16 to 19 licensed in Ontario in 1995, the overall collision rate under the graduated program was 31% lower than the rate among novice drivers in 1993, before the program was introduced. In Nova Scotia, the crash rate among 16-year-old drivers declined by 24%. And in Québec, a 5% reduction in fatalities and a 14% reduction in injuries were attributed to the graduated licensing program.

CRIME AND PERCEPTIONS OF SAFETY

The crime rate in a community is one indicator of the safety of our children and youth. While it is difficult to measure crime, the data indicate a decline in the number and rate of reported crimes. The statistics depend on the number of people reporting crimes, the diligence of police in making arrests, and the reporting methods.

Crime rates decline

Other than an increase in 2003, the overall crime rate has generally been falling since it peaked in 1991. Police reported about 2.6 million offences in 2004, resulting in a crime rate that was 12% lower than a decade earlier.

In total, about 300,000 violent crimes were reported to police in 2004, the majority being common assaults. The violent crime rate was down 10% over the decade, but 35% higher than 20 years ago.

Police reported nearly 1.3 million property crimes in 2004. Property crime has generally been declining since 1991, except for a notable increase in 2003. The rate of break-ins fell 4% between 2003 and 2004, to just under 275,000 – 36% lower than a decade ago. More than half (56%) of break-ins were residential.

Youth feel less safe

Between 1998 and 2002, fewer youth aged 16 to 24 considered their neighbourhoods to be very safe places to live. In 2002, 72% of youth felt their neighbourhoods were very safe from violent crime, a decrease from 1998 (78%). Similarly, 68% felt very safe from exposure to property crime in 2002, also down from 1998 (73%).

Among young children, their perceptions of safety at school are a good indication of how safe they feel. In 2000, just over half (57%) of 10- and 11-year-olds felt safe at school all of the time, up slightly from 1994 (53%). A further 35% felt safe at school most of the time. Among this age group, 62% felt safe going to and from school all of the time, up slightly from 1994 (60%). A further 27% felt this way most of the time.

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