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Portrait of youth in Canada: Data report

Chapter 5: Youth and the Environment

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Portrait of youth in Canada: Data report

Chapter 5: Youth and the environment

by Paula Arriagada and Lauren Pinault

Highlights

- Youth used sustainable transit and active transit on their way to work at a higher rate than older adults.
- In urban Canada, youth aged 18 or older tended to live in more walkable neighbourhoods, however, greenness around the home declined with increasing age among youth aged 15 to 28, reaching the lowest level at age 28.
- While Canadian youth aged 15 to 30 volunteered for environmental organizations as often as older age groups, they volunteered more hours and donated a slightly larger proportion of their charitable donations to environmental organizations.
- Youth satisfaction with their local environment was generally similar to that of older age groups.

Introduction

Youth in Canada have identified the environment as a priority, with climate change being identified as a top-five issue.¹ As a result, young people play an important role in promoting sustainable practices and engaging in environmental action.

Data from a global survey which included Canada and was conducted before and during the COVID-19 pandemic highlight the importance of environmental issues for millennials and Gen Zs, and the fact that many of them are changing their behaviour to protect the environment.² For example, in 2019, more than half of millennials (58%) and Gen Zs (55%) reported they were increasing their use of public transportation, or biking and walking more often. In addition, two-thirds (64%) of millennials reported that they were cutting back on single-use plastic and recycling more often, a higher proportion than Gen Zs (55%).³

Canadian public opinion polls can provide some perspective on the importance of climate change among youth.⁴ One such poll focused on Canadian youth identified climate change as a key issue, and found that a majority of youth (62%) agreed that Canada has an obligation to lead on initiatives to address climate change. Many youth seem to want to take action or be willing to spend money to make a difference. For example, another poll reported that Canadians aged 18 to 34 were the most likely age group to say they would spend an extra \$100 per year to help fight against climate change. Similarly, while a majority of Canadians aged 55 and over said they would not be willing to spend extra money per year to help fight climate change (62%), that proportion was only 35% among youth aged 18 to 34.

Based on these polls, young adults in Canada appear to be more concerned about environmental issues than older adults. This may be particularly true for youth who reside in regions that face greater consequences from climate change, such as in Canada's North.

Although the environment is a priority for youth, youth are also being challenged by issues of affordable housing, the COVID-19 pandemic, health care, and unemployment, all of which may influence their decisions and behaviours, such as their volunteering and purchasing decisions. This may be particularly true for certain groups such as youth in large and less affordable cities, Indigenous youth, and youth in low-income households.

Recognizing these limitations and competing priorities, this chapter first highlights the environmental engagement of Canadian youth, defined as those aged 15 to 30 years old.⁵ Indicators of volunteering on behalf of environmental organizations and environmental engagement at the household level are presented. It also examines the use of sustainable and active transport among youth in Canada.

The second part of the chapter takes a different approach to understanding relationships between youth and environment, and explores interactions between youth and the physical environment in which they live. An overview of Statistics Canada studies highlights inequalities among youth in terms of access to environmental benefits and possible exposures to hazards. The chapter also provides an overview of the built environment's features in the context of youth, including health benefits from living in walkable neighbourhoods.

Finally, this chapter discusses data limitations that affect our understanding of the relationships between youth and the environment, touching on current data gaps regarding climate change and the influence of the COVID-19 pandemic.

Part 1 - Youth environmental engagement

Youth spend more of their volunteer hours working with environmental organizations relative to older age groups

Volunteering can take many forms, involving a wide range of activities and benefiting a diverse range of groups and organizations.⁶ One way to examine how concerned and engaged youth are regarding the environment is to focus on the time spent volunteering for environmental organizations.

In 2018, about four Canadians in ten volunteered their time for charities, non-profits and community organizations. Youth born in 1996 or later had a higher formal volunteer rate than older adults, at 52%. However, Canadians are generally less likely to give their time to environmental organizations than to other types of organizations. According to data from the 2018 General Social Survey on Giving, Volunteering and Participating, 6% of Canadians volunteered their time to environmental organizations. That proportion did not vary by age: 6% of youth aged 15 to 30 volunteered their time on behalf of environmental organizations, compared with 7% of those aged 31 to 46 and 6% of those aged 47 and older.⁷

The hours spent volunteering also merit consideration. In 2018, youth spent proportionally more of their volunteer hours working with environmental organizations relative to older age groups. Specifically, 7% of all hours volunteered by youth aged 15 to 30 were spent volunteering for environmental organizations, which was higher than the proportion than among those aged 47 and older (3%).

Households with children were more likely to participate in environmental engagement activities

The Households and the Environment Survey (HES) assesses whether households (rather than individuals) participate in environmental engagement activities. In 2019, 22% of all Canadian households had engaged, without pay, in activities aimed at conservation or protection of the environment or wildlife in the past 12 months. However, households with youth present were not necessarily more likely to participate in such activities (22%) than households without youth (21%).

The participation rate of households with youth differed with the presence of other household members. Households led by youth (i.e., where a youth aged 15 to 30 was the oldest member of the household) had a volunteer rate of 19% and households with youth and older adults present (but no children less than 15 years old) had a volunteer rate of 22% for environmental engagement activities. Households with older adults, youth and children present had the highest volunteer rate for these activities, at 27%. Households comprising older adults and no youth or children had a slightly lower volunteer rate of 19%. Therefore, it appears that the presence of children, and to a lesser extent youth, may be associated with increased environmental engagement activities within a household.

Households containing youth also participated in cleaning up shorelines, beaches, rivers, lakes or roadsides, although not to any greater extent than households without youth. In 2019, the proportion of environmentally-engaged households participating in cleanups ranged from 35% among youth-led households to 45% among households containing older adults, youth, and children. For comparison, the overall percentage of environmentally-engaged households participating in these activities was 42%.

Youth donations to environmental organizations

In addition to contributing their time, Canadians also donate money to charitable and non-profit organizations—social services organizations and food banks, universities and hospitals to advance medical research, religious organizations, and environmental groups, among many others.⁸

According to the 2018 GSS, 68% of Canadians aged 15 and older were donors. There were, however, differences by age. Specifically, 53% of youth aged 15 to 30 were donors, significantly lower than the donor rate for those aged 31 to 46 (70%) and for those aged 47 and older (74%).

As for donations to environmental organizations, donors aged 15 to 30 gave an average of \$125. Those aged 31 to 46 gave an average of \$134 to environmental organizations, compared to \$151 from those aged 47 and older (Table 1). The lower proportion of donors and smaller donation amounts from youth compared to older Canadians may reflect lower average incomes among youth.

Table 1
Donations to environmental organizations by age groups, Canada, 2018

	Age group		
	15 to 30 years	31 to 46 years	47 years and older
Average donation	125	134	151
	dollars		
Proportion of total donations	5.2	2.5	2.4
	percent		

Source: Statistics Canada, General Social Survey on Giving, Volunteering and Participating, 2018.

Although youth donated less than those in other age groups to environmental causes, they devoted a greater proportion of their total donations to such organizations. Specifically, of all the money donated by youth aged 15 to 30 in 2018, 5% went towards environmental causes, while those aged 31 to 46 donated 3%, and those older than 46 donated 2% to such organizations (Table 1). This slightly higher proportion that youth give to environmental organizations is likely a reflection of greater concern for environmental causes relative to older ages.

Use of sustainable transportation

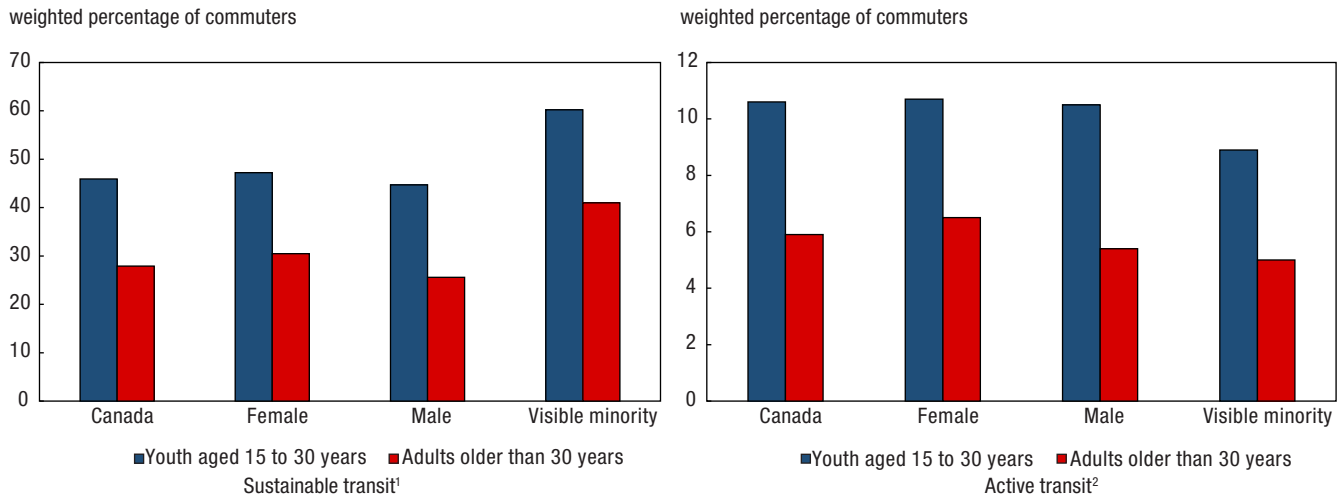
The choice of mode of transportation to work depends on many factors, including place of residence and place of work, individual preferences, and access to a vehicle. For some people, environmental considerations may also come into play. Another manner in which youth may signal their interest in environmental issues and also help to reduce the effects of air pollution is the use of sustainable or active transit to get to work.

According to the 2016 Census, 46% of youth aged 15 to 30 used a sustainable method of transit, which included public transit, walking, cycling, or carpooling (i.e., two or more passengers sharing a car). The most frequent users of sustainable transit were youth aged 15 to 19, with 63% adopting sustainable transit to get to work. By comparison, the proportion of adults aged 31 or older who used sustainable transit was 28%. Reliance on sustainable transit among youth may be due, in part, to concern about the environment. However, limited access to a private vehicle, as well as cost and efficiency of this mode of transit, may be even more important considerations in this decision. It is important to recognize that the findings discussed in this chapter predate the COVID-19 pandemic. One notable data limitation is how the COVID-19 pandemic might have influenced workplace commute among youth; however, this limitation is expected to be addressed by the results of the 2021 Census.

As of 2016, many youth used a method of sustainable transit to get to work, with most using public transit (19%), or carpooling (16%). Some youth opted for active transport, with 9% of youth walking and 2% using a bicycle to commute to work.

Examined across population characteristics, the use of sustainable transit and active transit was consistently higher among youth compared to older adults. However, youth in population groups designated as visible minorities were more frequent users of sustainable transportation (60%; Chart 1).

Chart 1
Sustainable transit users and active transit users by selected population characteristics, 2016 Census, youth aged 15 to 30 years and adults older than 30 years, adjusted for census weights



1. Sustainable transit users were defined as those who use any public transit, walking, cycling or carpooling as their primary mode of transit.

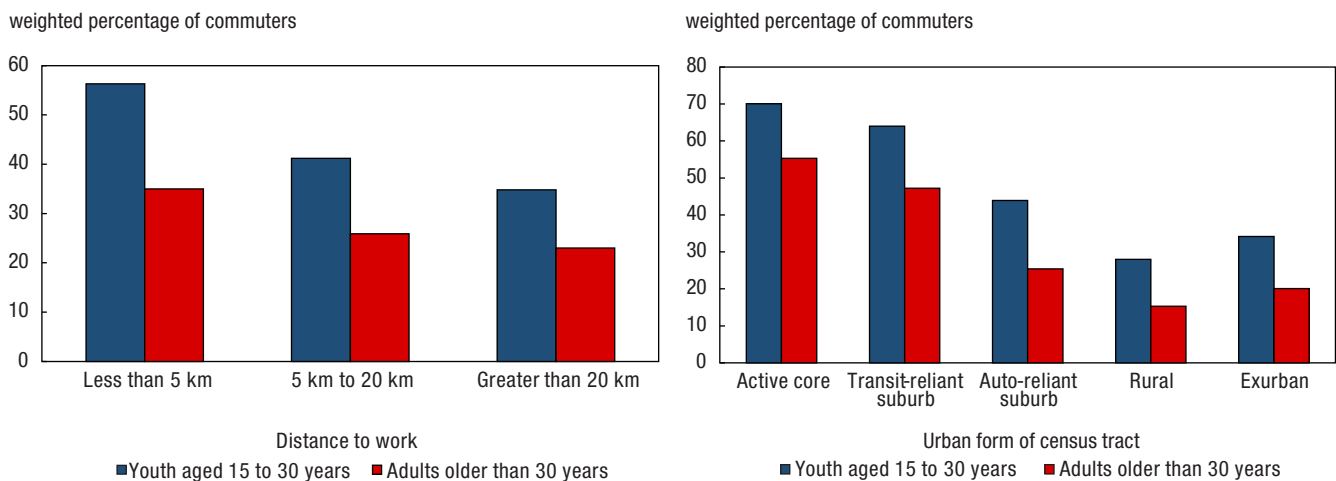
2. Active transit users were defined as those who use walking or cycling as their primary mode of transit.

Source: Statistics Canada, 2016 Census of Population.

Sustainable transportation, particularly public transportation, relies on availability of infrastructure and services that vary across the urban–rural continuum. A variable to define urban form (based on population density and traffic parameters, at the Census Tract scale) was derived for 2016 Census respondents.⁹ Urban form distinguishes neighbourhoods as being in the active core (high density, reliance on public transit and active transport), transit-reliant or auto-reliant suburbs, rural, or exurban. Across all urban form categories, a greater percentage of youth aged 15 to 30 used sustainable transport than older adults (Chart 2). The percentage of youth using sustainable transport was highest in the active core of cities (70%) and declined towards rural and exurban areas (28% to 34%) (Chart 2).

Similarly, the use of sustainable transportation also depends on distance to work. Regardless of the distance of commute, youth aged 15 to 30 relied on sustainable transportation more frequently than older adults (Chart 3). As expected, the proportion of youth using sustainable transportation also declined with increasing distance to the workplace. In general, access to efficient and affordable public transportation is associated with higher rates of public transit use, and has been observed more within Canada’s three largest cities.¹⁰

Chart 2
Sustainable transit users, by urban form and distance to work, 2016 Census, youth aged 15 to 30 years and adults older than 30 years, adjusted for census weights



Note: Sustainable transit users were defined as those who use any public transit, walking, cycling or carpooling as their primary mode of transit.

Sources: Statistics Canada, Census of Population, 2016; Gordon & Janzen, Urban form, 2013.

Part 2 – The physical environment of youth in Canada

Our understanding of the world around us and our environment is heavily influenced by our day-to-day activities and interactions with the physical environment. To that end, where youth live, as well as the associated benefits of that environment (i.e., access to parks and green spaces) as well as harms from the environment (i.e., excess noise, air pollution) can play a role in how much value youth place on the environment and its importance in their lives.

Environmental benefits

Satisfaction with the quality of the local environment

Where people live can affect many aspects of their lives, including health, social connections, mobility, and access to green space.¹¹ Data from the 2016 General Social Survey on Canadians at Work and Home highlight how satisfied Canadians are with the quality of their local environment (i.e., access to green space and air or water quality).

Most people seem satisfied with the quality of their local environment, with an average score of 8.1 on a 0-to-10 scale, and little difference in satisfaction across age groups. Specifically, the average satisfaction with their local environment among Canadian youth aged 15 to 30 was 8.1, compared to 8.0 for those aged 31 to 46 and 8.1 for those 47 and older. Among youth, men reported a slightly higher average satisfaction score than women (8.2 and 8.0, respectively).

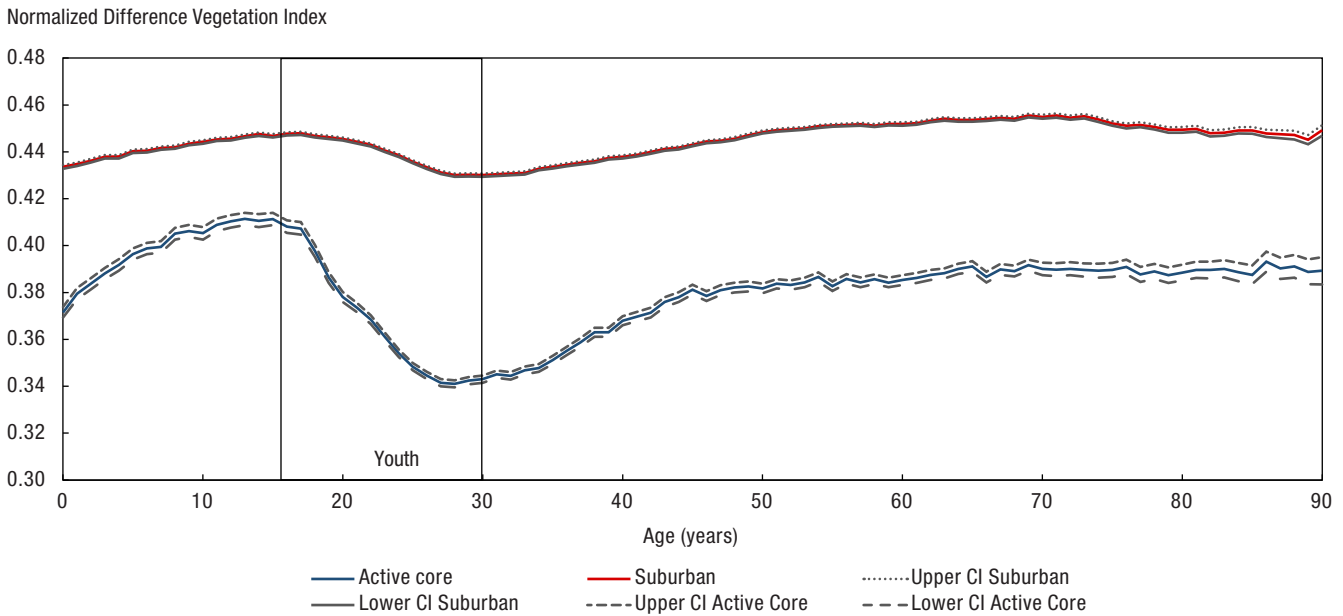
Furthermore, average satisfaction with quality of local environment varied modestly between those living in larger urban centres and those in smaller areas. In this case, youth who live in larger urban population centres (CMA/CA) reported an average satisfaction with local environment of 8.1, compared with 8.4 for those living in rural areas or small population centres.

Green spaces and greenness

Greener environments can positively influence health and well-being. Green spaces, particularly those with sports and recreational facilities, can promote recreation and physical activity,¹² affecting many aspects of health, such as cardiovascular fitness and obesity. Greener environments are known to promote psychological health,¹³ possibly by providing an aesthetic experience as well as an environment for social interactions. However, greenness is not equally available to all Canadians—and there is some evidence that youth have less exposure to greenness and less access to green spaces.

A recent study paired the normalized difference vegetation index (NDVI), a satellite-measured estimate of vegetation, with 2016 Census data within 500 m around a person's home.¹⁴ Among youth who lived in Canadian cities, it was observed that greenness exposure decreased with age between the ages of 15 and 28 years (Chart 3). This decrease was more pronounced for youth living in the active core of cities (i.e., areas of high density and reliance on public or active transit). Many young adults move into the cores of large cities or small towns to attend educational institutions or for employment opportunities.

Chart 3
Mean residential greenness exposure (range of 0 to 1) with 95% confidence intervals, by age, suburban or active core, household population aged 0 to 90 years, 2016



Note: CI = confidence interval.
Sources: Statistics Canada, census long-form questionnaire, 2016; Crouse et al., NDVI, 2017.

The Households and the Environment Survey also highlights several ways in which households with youth differ in terms of access to green spaces, either at home or within their neighbourhoods. Although most households reported access to a park or public green space close to their home (90%), there was some variation in the rates that households reported visiting these amenities. In general, parks were visited most often by households with children.

In the absence of a neighbourhood park or recreational area, or during a period of limited outdoor activity related to the COVID-19 pandemic, the presence of a lawn or garden might provide a similar environmental benefit for youth. However, households where youth (aged 15 to 30) were the oldest or only household members infrequently reported having a garden on their property (29%) relative to other households, in part because they more often lived in apartments.

Despite living in less green environments overall, younger Canadians may see health benefits from living in greener environments. Among adults aged 18 to 39, higher greenness within 500 metres of the home was protective against poor self-reported mental health.¹⁵ When considering overall health, another study of the association between NDVI and mortality found that greenness reduced the risk of non-accidental mortality among all adults.¹⁶ However, this association was not observed among adults aged 25 to 34 years, possibly because of the relatively smaller burden of chronic diseases among youth.

One key limitation is a lack of understanding of how green spaces influence the well-being of youth in the context of COVID-19 pandemic. During periods of intense isolation, being able to spend time outdoors in a green space may promote positive mental health, relieve stress, provide opportunities for social interaction, and improve resilience.¹⁷

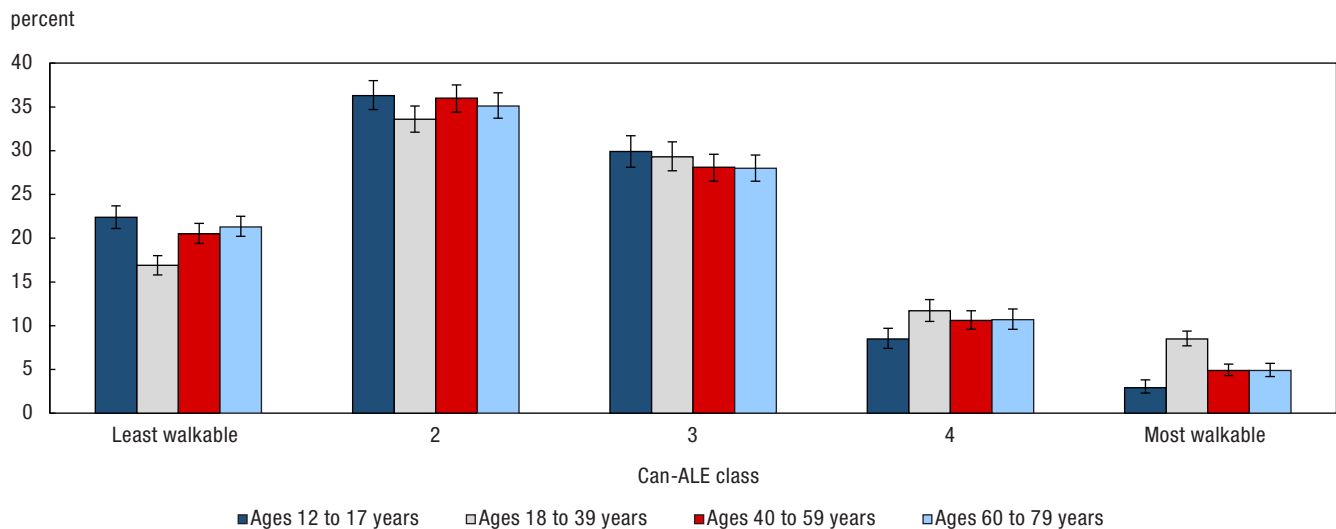
Walkable neighbourhoods

Although youth tended to live in less green neighbourhoods, many of these neighbourhoods, particularly in the core of major cities, were walkable. Living in a neighbourhood that is structured around walking and active transport can also provide an environmental benefit, as in addition to providing walkable amenities that reduce reliance on polluting vehicles, it also tends to be associated with higher rates of physical activity and better overall health among youth and adults.

The Canadian Active Living Environment (Can-ALE) was developed to characterize neighbourhoods that support active transit, using variables including street connectivity, neighbourhood density, and availability of walkable destinations and transit stops.¹⁸ A greater percentage of young adults aged 18 to 39 (20.2%) live in the most walkable neighbourhoods (Can-ALE classes 4 and 5) relative to younger youth (11.4% of those aged 12 to 17) and older adults, based on respondents from the Canadian Community Health Survey (CCHS), from 2015 to 2016 (Chart 4).¹⁹

Chart 4

Youth and older adult distribution across Canadian Active Living Environments Database classes among respondents to the Canadian Community Health Survey, 2015 to 2016 (n = 105,876)



Notes: Can-ALE = Canadian Active Living Environments Database. CI = confidence interval.

Sources: Data originally appeared in Colley et al. (2019a), Canadian Community Health Survey, 2015 to 2016.

There is growing evidence that youth who live in walkable neighbourhoods benefit from increased physical activity and improvements in overall health. In the CCHS, more walkable neighbourhoods were associated with a higher number of minutes of transportation-based physical activity among youth aged 12 to 17 and adults aged 18 to 39. However, living in more walkable neighbourhoods was not associated with any increase in recreational or total physical activity in these age groups, possibly because youth may participate in sports and recreational activities in parks and other facilities.²⁰ Similarly, more walkable neighbourhoods were associated with an increasing number of minutes of moderate-to-vigorous physical activity among adults aged 18 to 39, as measured by personal accelerometers in the Canadian Health Measures Survey.²¹

According to the CCHS, more walkable neighbourhoods also contained fewer adults aged 18 to 39 classified as overweight or obese. Adults in this age group within more walkable neighbourhoods also had lower general body mass index, smaller waist circumference measurements, and a higher proportion of individuals self-reporting very good or excellent general health.²² However, for youth aged 12 to 17, these health attributes were not associated with walkable neighbourhoods, possibly because other neighbourhood attributes may promote physical activity at younger ages.²³

Environmental Hazards

Interactions with the environment may not always be positive and confer benefits – youth also need to contend with environmental pollution that may have effects on their health and well-being.

Air pollution

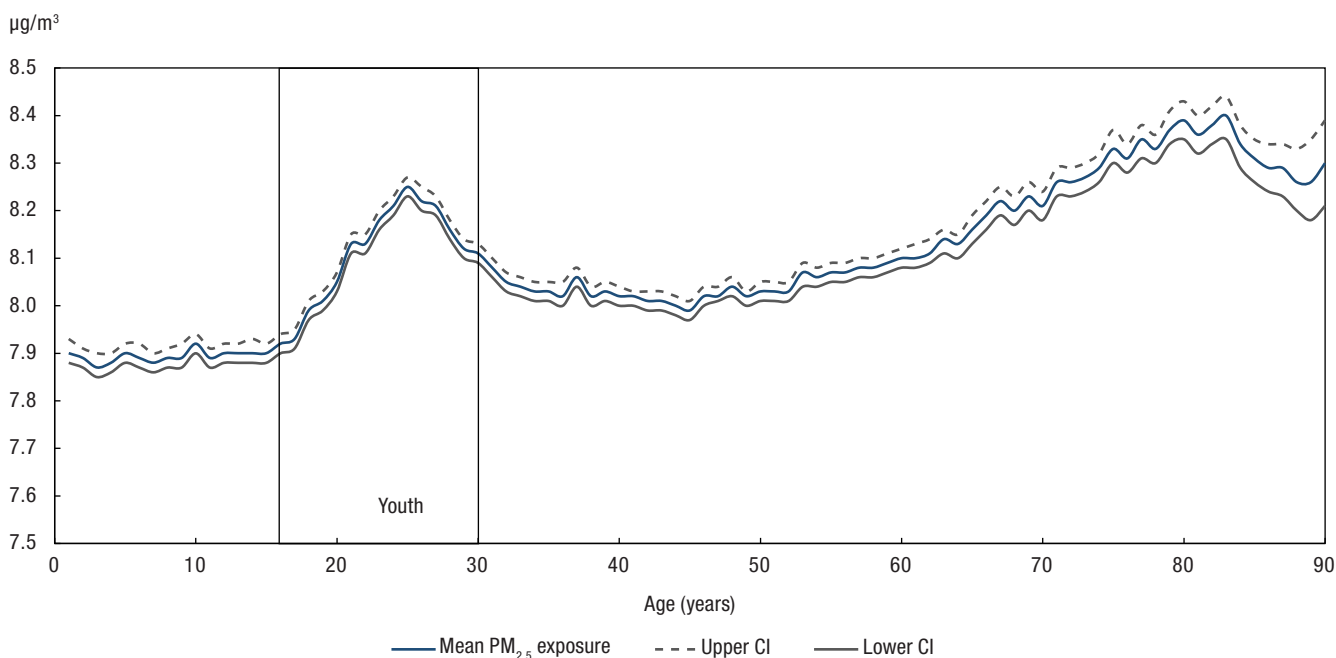
Exposure to air pollution varies across a person's lifespan, influenced by decisions to live in larger, denser cities and within the downtown core, where these concentrations tend to be higher. Traffic is generally the main source

of air pollution affecting populations in cities, and traffic-related pollutants include nitrogen dioxide (NO₂) and particulate matter less than 2.5 micrometres in aerodynamic matter (PM_{2.5}), among others. Among youth, exposure to higher levels of traffic-related air pollution is associated with an increased risk of asthma, wheeze, and reduced lung function.²⁴ Based on one such analysis of the Canadian Health Measures Survey (2007 to 2011), males aged 6 to 18 were found to have reduced lung function if they lived within 25 kilometres of an emission source of PM_{2.5}.²⁵

Youth in their mid-teens had relatively low exposures to ambient fine particulate matter (PM_{2.5}), but average exposure increased for adults into their mid-twenties, reaching a peak exposure at age 25 and declining thereafter throughout most of adulthood (Chart 5).²⁶ This observation is consistent with the migration of youth to more walkable and less green neighbourhoods (i.e., within city cores) for work and study opportunities.

In addition to age factors, higher exposures to traffic-related air pollution are associated with socioeconomic and demographic factors. For example, adolescents aged 13 to 17 in the three largest cities in Canada (Toronto, Vancouver, and Montreal) were exposed to higher levels of nitrogen dioxide (NO₂) if they lived in lower-income neighbourhoods.²⁷

Chart 5
Mean residential fine particulate matter (PM_{2.5}) exposure with 95% confidence intervals by age, urban core household population aged 0 to 90 years, Canada, 2006



Note: CI = confidence interval.

Sources: Statistics Canada, 2006 Census of Population; van Donkelaar et al. (2015).

Ultraviolet radiation (UVR)

Ultraviolet radiation (UVR) is a ubiquitous environmental hazard, particularly in the summer months in Canada, which can lead to sunburn, premature aging, and some forms of skin cancers. According to pooled cycles of the Canadian Community Health Survey (CCHS), youth aged 18 to 29 may be a higher-risk group for UVR exposure and skin damage. Relative to older Canadians, a greater percentage of youth aged 18 to 29 (23% vs. 19% or less) reported that they would spend at least four hours in the sun on a typical summer day off,²⁸ indicating a higher possible UVR exposure.

Although 33% of all adults reported a sunburn during the previous 12 months, youth were 35% more likely to have reported one than adults aged 30 to 39.²⁹ Risk of sunburn was even lower among older ages. Despite higher rates of sunburn, the risk of melanoma skin cancers was lowest among younger adults (ages 25 to 34) relative to older age groups, presumably due to differences in cumulative exposure over a lifetime.³⁰

Limitations

The findings in this chapter were limited to released datasets (i.e., Census or survey data) or analytical products (i.e., infographics, articles) available from Statistics Canada. However, there are several important data gaps in currently available information sources.

At the time of publication, there were no data to support analyses on attitudes, perceptions and knowledge related to youth and climate change, nor their current engagement with this issue. Climate change is a key consideration in a broader understanding of environmental processes, given how it amplifies existing environmental hazards and creates new risks for human and animal systems, particularly for disadvantaged people and communities.³¹ Exploring the use of existing data holdings and creating new datasets to examine the status of climate change in Canada would help fill this important data gap and understand the role of youth in mitigation and adaptation to climate change. The extent to which youth share concerns about environmental issues and how these influence choices and behaviours is also relatively poorly understood.

The effects of other environmental hazards on youth are unfortunately not well documented in Canada. For example, long-term drinking water advisories are tracked by Indigenous Services Canada.³² Drinking water contamination is an ongoing challenge in Indigenous communities, which demographically include a higher proportion of youth. It is therefore critical to examine these challenges further to understand the fuller picture of youth and the environment. Forthcoming data from the Census of Environment will allow Statistics Canada to examine these relationships between ecosystems, the economy, and society as a whole.³³

Further, the COVID-19 pandemic created an unprecedented situation that modified the relationship between humans and their environment, affecting commutes to workplaces and interactions with the environment within the community in unknown ways. Statistics Canada is working towards understanding how this pandemic has affected interactions with the environment, documenting structural changes to society, including youth, during and after the COVID-19 pandemic. The upcoming results from the 2021 Census, which was collected during the COVID-19 pandemic, is anticipated to assist us in addressing this data need.

Data sources, definitions and methods

Data sources

This chapter draws from numerous data sources and several published reports and articles, where data sources and methodologies are provided. In addition to these sources, the 2016 Census long-form questionnaire was used to inform the section on use of sustainable transportation; the General Social Survey was used to inform the sections on volunteering and donation and satisfaction with local environment; and the Households and the Environment Survey was used to determine household behaviours related to the environment.

The 2016 Census long-form questionnaire is a mandatory sample of 25% of Canadian households to determine information on the demographic, social, and economic situation across Canada. The long-form Census excluded usual residents of collective dwellings.

The chapter also uses data from the 2018 General Social Survey (GSS) on Giving, Volunteering and Participating and the 2016 GSS on Canadians at Work and Home. The target population for these surveys was all non-institutionalized people aged 15 and older living in the 10 provinces.

Data from the 2019 Households and the Environment Survey were included in this chapter. The target population consists of households in Canada, excluding households located in Yukon, the Northwest Territories and Nunavut, households located on reserves and in other Indigenous settlements in the provinces, and households consisting entirely of full-time members of the Canadian Armed Forces. Institutions and households in certain remote regions are also excluded.

Methodology

Estimates for the sustainable transport section were determined from all respondents to the 2016 Census long-form questionnaire aged 15 or older, using Census weights to derive estimates that represent the full population distribution of Canada. Any differences reported in the text were assessed using a Chi-square test and reported if significant ($p < 0.05$).

All estimates in this report using data from the 2018 and 2016 GSS are based on survey weights that account for sample-design, non-response, and known population totals. A bootstrapping technique was applied when calculating all estimates of variance.

Estimates from the Households and the Environment Survey from 2019 were derived using survey weights and t-tests to compare estimates among selected categories when reported in the text as different.

Notes

1. See Government of Canada (2021); IPSOS (2021).
2. In this survey, Millennials are those born between January 1983 and December 1995, while Gen Zs include those born between January 1995 and December 2002. For additional information, see Deloitte (2020).
3. See Deloitte (2020).
4. See Deloitte (2020); IPSOS (2021a); IPSOS (2021b).
5. Other, overlapping age ranges were sometimes used due to data limitations and the use of published reports.
6. See Hahmann (2021); Hahmann et al. (2020); and Sinha (2015). Formal volunteers refer to persons who did any activities without pay on behalf of a group or organization, at least once in the 12 months preceding the survey.
7. Young volunteers were most likely to give their time to social services (24%), education and research (22%), sports and recreation (18%) and religious organizations (16%). This is consistent with research which has found that these organizations are the ones where the greater proportion of people volunteer. For additional information, see Sinha (2015).
8. See Turcotte (2015).
9. See Gordon and Janzen (2013).
10. See Savage (2019).
11. See Ross et al. (2004).
12. See Grigsby-Toussaint et al. (2011); and Jennings and Gaither (2015).
13. See Crouse et al. (2021).
14. See Pinault et al. (2021).
15. See Crouse et al. (2021). Based on an odds ratio of 0.93, 95% confidence interval = 0.89 to 0.97 per increase of interquartile range = 0.12 units of NDVI, in models adjusting for individual covariates (sex, age, CCHS cycle, personal income quintile, employment status, marital status, educational attainment, immigrant status), neighbourhood-level covariates (urban form, four Canadian Marginalization variables).
16. See Crouse et al. (2017).
17. See Aerts et al. (2021).
18. See Herrmann et al. (2019).
19. See Colley et al. (2019a).
20. See Colley et al. (2019a).
21. See Colley et al. (2019a).
22. See Colley et al. (2019b).
23. See Colley et al. (2019b).
24. See Brauer et al. (2002) and Clark et al. (2010).
25. Emissions sources refer to those from the National Air Pollution Surveillance (NAPS) program, which includes emissions from power plants, oil refineries, industrial facilities, and factories. For additional information; see Wong et al. (2016).
26. See Pinault et al. (2017).
27. Models were constructed at the dissemination area scale, by attaching respondents to the 2016 Census long-form to land-use regression models for nitrogen dioxide. Models were adjusted for age, sex, household income, lone parent family, visible minority status, and spatial autocorrelation. See Pinault et al. (2016).
28. Respondents were asked how much time they would spend in the sun during a “typical” summer day off, between the highest UVR hours of 11:00 a.m. and 4:00 p.m. See Pinault and Fioletov (2017).

29. Based on an odds ratio of 0.65, 95% confidence interval = 0.64 to 0.65 for aged 30 to 39 relative to those aged 18 to 29, in models adjusted for age, sex, visible minority status, household income quintile, employment status, time in sun, and UVR z-score. See Pinault and Fioletov (2017).
30. See Pinault et al. (2017).
31. See IPCC et al. (2014).
32. See Indigenous Services Canada (2022).
33. See Statistics Canada (2022).

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