

ENHANCED EPIDEMIOLOGICAL SUMMARY

Sleep Indicators using Data from the Canadian Health Survey on Children and Youth

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Highlights

- In Ontario, 87.5% (95% CI: 85.9-89.2) of children ages 3-4 years, 85.4% (95% CI: 84.4-86.4) of children ages 5-11 years, and 62.0% (95% CI: 60.4-63.5) of youth ages 12-17 years adhered to sleep guidelines, sleeping for an average of 10.8, 10.2, and 8.6 hours per night respectively.
- There were significant differences in sleep duration and adherence to sleep guidelines by sex at birth, parental education, household income, race and ethnic origin, and immigration status. Not all differences were observed in each age group.
- There were also significant differences in sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group, geographic region, and public health unit. Respondents with the longest sleep durations and those adhering to sleep guidelines were generally observed in mainly rural and sparsely populated urban-rural mixed regions. The shortest sleep durations and lowest proportion adhering to sleep guidelines were observed in large urban areas.

Introduction

This report provides an overview of sleep indicators in children and youth 3-17 years as measured by the 2019 Canadian Health Survey on Children and Youth (CHSCY). Nightly sleep duration averaged over the past week and prevalence of meeting sleep recommendations based on the Canadian 24-hour movement guidelines (24-HMG) are described, as well as reported by socio-demographic characteristics. Sleep indicators were also examined by Statistics Canada Peer Group, geographic region, and public health unit. For more information about the CHSCY data and population characteristics, please see the [CHSCY Technical Report](#).

Sleep is crucial for mental and physical health. In the early years (ages 0-4 years), poor sleep is associated with adiposity, worse emotional regulation, unhealthy growth, increased screen time, and injury risk.¹ In children and youth ages 5-17, poor sleep is adversely associated with increased adiposity, reduced emotional regulation, worse cognition and academic performance, and reduced quality of life.² Promoting healthy sleep is therefore essential for supporting children and youth's growth and development.

The Canadian 24-HMGs provide time and intensity targets for physical activity, sedentary behaviour, and sleep. Specific to sleep, recommendations for children ages 3-4 years is 10-13 hours daily,³ for children and youth ages 5-13 years, 9-11 hours nightly,⁴ and for youth ages 14-17 years, 8-10 hours nightly.⁴ Prior to the COVID-19 pandemic, data from the 2014-2015 Canadian Health Measures Survey (CHMS) suggested that 70.7% of children and youth ages 5-17 years adhered to sleep guidelines.⁵ During COVID-

19, changes to sleep patterns were variable, with most studies reporting increased rates of sleep disturbances in children and youth, but differing results in terms of sleep duration and sleep guideline adherence.⁶

In CHSCY, sleep indicators are measured starting at 3 years, and because of changes in measurement, age sampling stratification, and differing sleep patterns across age groups, these estimates were reported by age groups (3-4 years, 5-11 years, and 12-17 years). Two sleep indicators were analyzed in this summary, nightly sleep duration (averaged from total sleep time during the past week) and adherence to sleep guidelines (derived from nightly sleep duration and the Canadian sleep guidelines). For children ages 3-11 years the person most knowledgeable (PMK) answered sleep/wake questions, and youth 12-17 years self-reported sleep/wake times. These indicators can be used to surveil the adequacy of sleep in the population.

There is a paucity of provincially representative sleep data on children younger than 12 years. Understanding socio-demographic and geographic factors related to healthy sleep during childhood will help public health practitioners and their community partners target interventions towards disproportionately affected Ontarians. Furthermore, this report can provide baseline descriptions of sleep indicators prior to the COVID-19 pandemic and will assist in post-pandemic investigations using subsequent cycles of CHSCY.

Race-based and Indigenous Identity Data

The CHSCY utilizes the following socio-demographic terms to describe its variables: “Population Group”, “Visible Minority”, and “Aboriginal Identity”. To stay current with health equity language preferred by impacted communities and to reduce unintentional harms when discussing and utilizing findings of the CHSCY, we have replaced the CHSCY terminology with the following terms in this report, where possible: “race and ethnic origin”, “racialized groups”, and “Indigenous”.

‘Race’ is a social construct without a biological basis and created to categorize people into different groups based on visual traits in ways that create and maintain power differentials within society (Government of Ontario). Ethnic origin refers to communities’ learned or adopted characteristics such as language, practices, and beliefs. (Iwamoto; OAHPP). Note that the categorization of people as Indigenous, Black, and other racial categories has been historically and currently used to mark certain groups for exclusion, discrimination, and oppression. Racism, racial categorization and racial discrimination; therefore, continue to shape the lives and opportunities of those who are categorized as “racialized people”.(OAHPP) For more information on socio-demographic terminology and the appropriate interpretation and use of socio-demographic data, please refer to the [Technical Notes](#) and the [CHSCY Technical Report](#).

Race-based and Indigenous identity data are vital for the identification and monitoring of health inequities that stem from colonialism, racism, bias and discrimination (REF: CIHI) and to inform the design of programs and services to promote the health and well-being of Indigenous peoples. PHO includes data and analyses on Indigenous peoples to advance understanding and support action to enhance Indigenous people’s health.

PHO recognizes the importance of Indigenous data sovereignty and the First Nations principles of Ownership, Control, Access and Possession (OCAP) and Métis Principles of Ownership, Control, Access and Stewardship (OCAS). We continue to strive to build processes and relationships to respectfully and meaningfully analyze and report on Indigenous data.

Results

- Results for the two main sleep indicators (duration and adherence) are organized by age group and by sociodemographic indicators. Selected significant differences across sociodemographic indicators are presented in Figures as well as Tables.
- Both sleep duration and adherence to sleep guidelines significantly differed across age groups and decreased as age increased (Figure 1; Table 1).

Figure 1: Sleep duration and adherence to sleep guidelines by age group in children and youth ages 3-17 years; Ontario, 2019

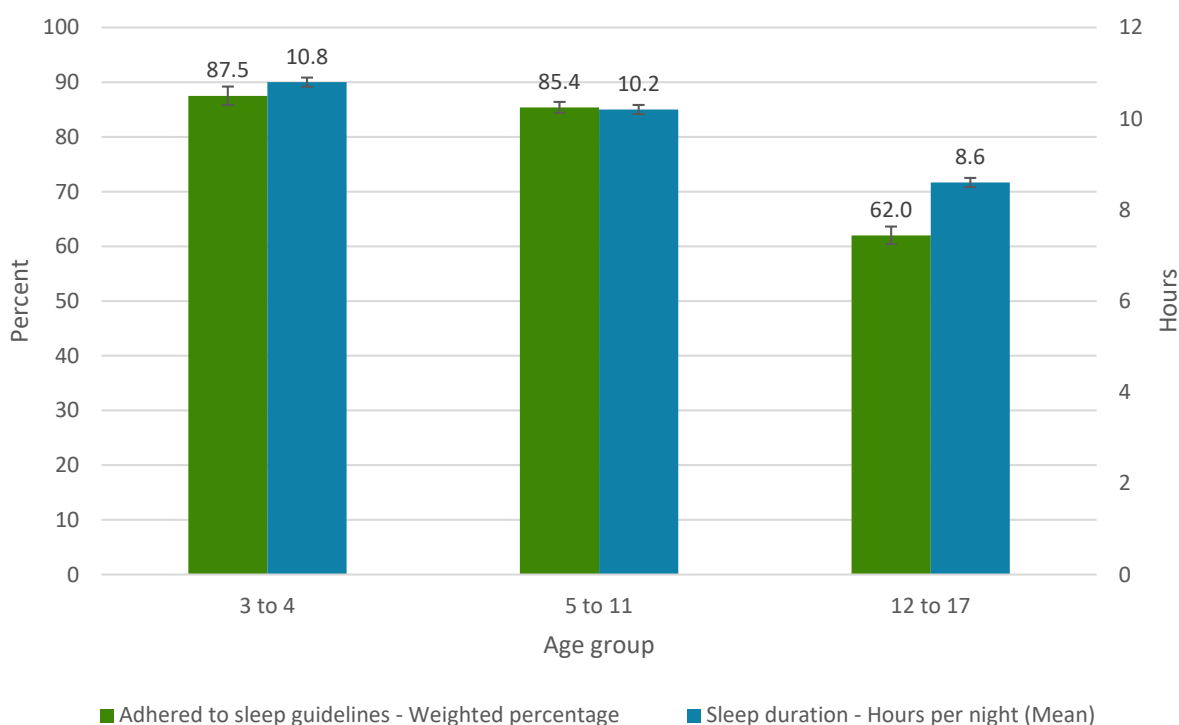


Table 1: Sleep duration and adherence to sleep guidelines by age in children and youth ages 3-17 years; Ontario, 2019

| Age | Sleep duration – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Weighted percentage (95% CI) |
|-------|---|--|
| 3-4 | 10.8 (10.7-10.8)€ | 87.5 (85.9-89.2) |
| 5-11 | 10.2 (10.2-10.2)€ | 85.4 (84.4-86.4)* |
| 12-17 | 8.6 (8.6-8.6)€ | 62.0 (60.4-63.5)* |

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test $p < 0.05$)
 € indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

Children ages 3-4 years

- In children ages 3-4 years, sleep duration and adherence to sleep guidelines significantly differed across the low income cut-off, race and ethnic origin, immigration status, Statistics Canada Peer Group, and geographic region. Additionally, adherence to sleep guidelines significantly differed across income categories.
- Most children, 87.5% (95% CI: 85.9-89.2) adhered to sleep guidelines and slept on average 10.8 hours (95% CI: 10.7-10.8) hours daily.

HIGHEST PARENTAL EDUCATIONAL ATTAINMENT, HOUSEHOLD INCOME, AND LOW INCOME CUT-OFF (LICO)

- In children ages 3-4 years, adherence to sleep guidelines significantly differed across income category and an adjusted low income cut-off. Generally, adherence increased with increased income (Figure 2, 3; Table 2). Additionally, sleep duration was significantly greater for children that lived in households above the LICO than below the LICO (Figure 2; Table 2).

Figure 2: Sleep duration and adherence to sleep guidelines by low income cut-off in children ages 3-4 years; Ontario, 2019

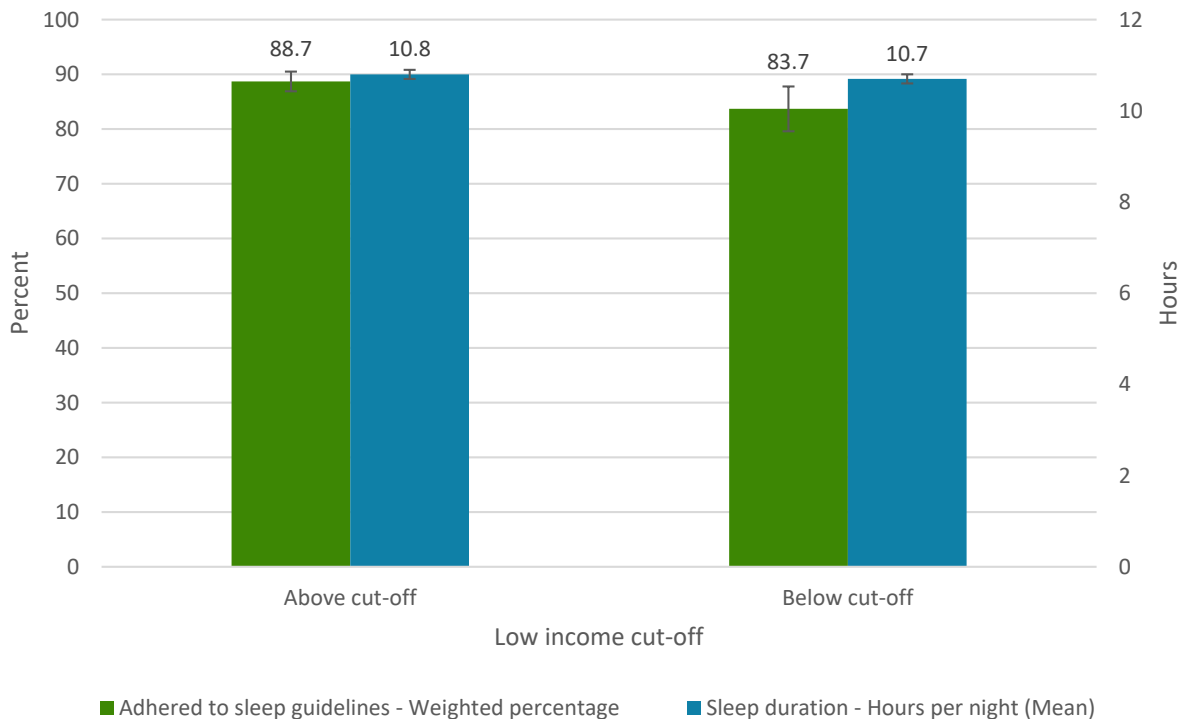


Figure 3: Adherence to sleep guidelines by household income in children ages 3-4 years; Ontario, 2019

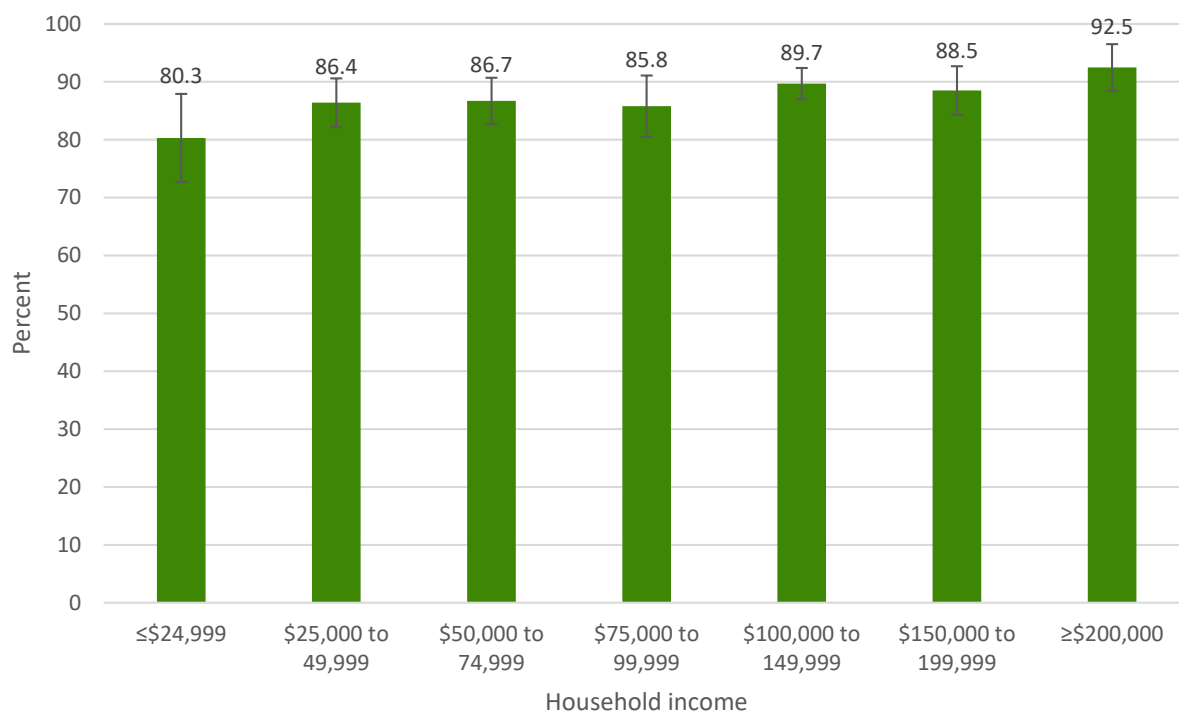


Table 2: Sleep duration and adherence to sleep guidelines by parental education and income in children ages 3-4 years; Ontario, 2019

| Socioeconomic Indicators | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|-----------------------------------|---|--|
| Highest parental education | | |
| High school or less | 10.8 (10.7-10.9) | 86.7 (81.8-91.5) |
| College/Trades | 10.8 (10.7-10.8) | 88.7 (86.0-91.4) |
| University or more | 10.7 (10.7-10.8) | 87.0 (84.7-89.3) |
| Household Income | | |
| <\$24,999 | 10.6 (10.4-10.8) | 80.3 (72.7-87.8)* |
| \$25,000 to 49,999 | 10.8 (10.7-10.9) | 86.4 (82.2-90.6)* |
| \$50,000 to 74,999 | 10.8 (10.7-10.9) | 86.7 (82.7-90.7)* |
| \$75,000 to 99,999 | 10.8 (10.7-10.8) | 85.8 (80.5-91.1)* |
| \$100,000 to 149,999 | 10.8 (10.7-10.9) | 89.7 (87.0-92.4)* |

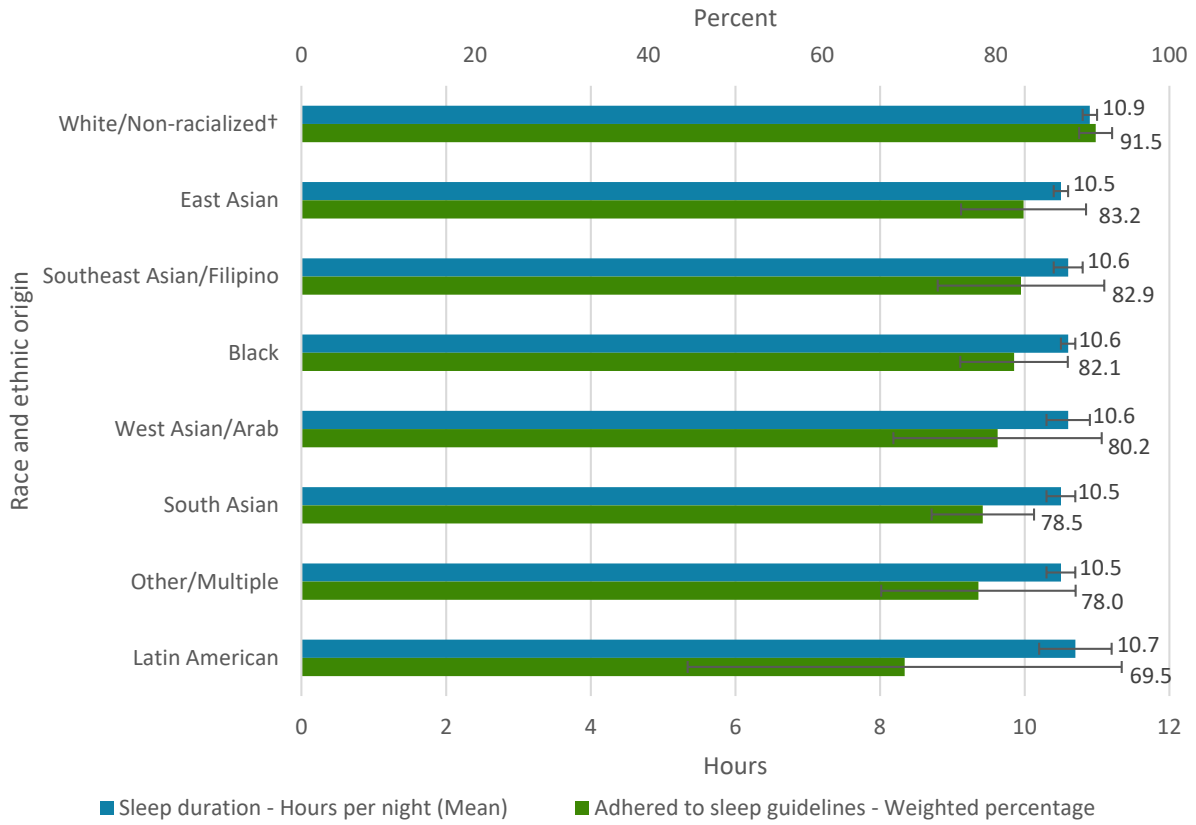
| Socioeconomic Indicators | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|----------------------------------|---|--|
| \$150,000 to 199,999 | 10.8 (10.7-10.9) | 88.5 (84.3-92.7)* |
| \$200,000 and higher | 10.8 (10.7-10.9) | 92.5 (88.6-96.5)* |
| Income Quintiles | | |
| Q1 | 10.7 (10.6-10.8) | 84.9 (80.7-89.2) |
| Q2 | 10.7 (10.7-10.8) | 85.5 (81.8-89.2) |
| Q3 | 10.8 (10.7-10.9) | 88.1 (84.3-92.0) |
| Q4 | 10.8 (10.7-10.9) | 88.1 (85.0-91.3) |
| Q5 | 10.8 (10.7-10.8) | 91.0 (87.9-94.2) |
| Low Income Cut-Off (LICO) | | |
| Above cut-off | 10.8 (10.7-10.8)€ | 88.7 (86.9-90.4)* |
| Below cut-off | 10.7 (10.6-10.8)€ | 83.7 (79.6-87.8)* |

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test $p < 0.05$)
€ indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

SEX AT BIRTH, RACE AND ETHNIC ORIGIN, INDIGENOUS IDENTITY, AND IMMIGRATION STATUS

- There was no difference in sleep duration or adherence to guidelines by sex at birth (Table 3).
- In children ages 3-4 years, sleep duration and adherence to sleep guidelines significantly differed across race and ethnic origins. The greatest duration and adherence was observed in children who identified as White/Non-racialized (Figure 4, Table 3).
- In children ages 3-4 years, sleep duration and adherence to sleep guidelines significantly differed across immigration status. Children identified as non-immigrants slept for longer and had greater adherence to sleep guidelines than children identified as immigrants (Figure 5, Table 3).

Figure 4: Sleep duration and adherence to sleep guidelines by race and ethnic origin in children ages 3-4 years; Ontario, 2019



†Excludes those identifying as Indigenous

Figure 5: Sleep duration and adherence to sleep guidelines by immigration status in children ages 3-4 years; Ontario, 2019

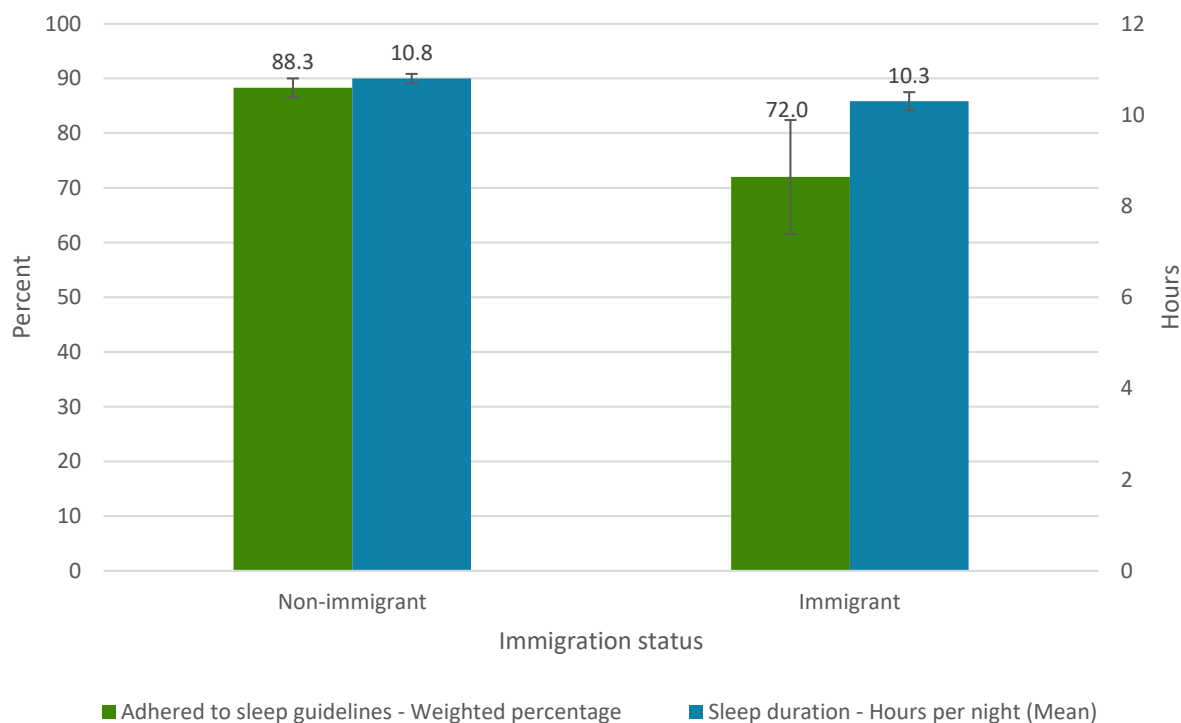


Table 3: Sleep duration and adherence to sleep guidelines by sex at birth, race and ethnic origin, Indigenous identity, and immigration status in children ages 3-4 years; Ontario, 2019

| Sociodemographic Indicators | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|-------------------------------|---|--|
| Sex at birth | | |
| Male | 10.7 (10.7-10.8) | 87.3 (85.1-89.4) |
| Female | 10.8 (10.7-10.8) | 87.8 (85.3-90.3) |
| Race and ethnic origin | | |
| White/Non-racialized† | 10.9 (10.8-10.9)€ | 91.5 (89.7-93.4)* |
| Black | 10.6 (10.5-10.7)€ | 82.1 (75.9-88.3)* |
| East Asian | 10.5 (10.4-10.6)€ | 83.2 (76.0-90.4)* |
| Southeast Asian/Filipino | 10.6 (10.4-10.8)€ | 82.9 (73.4-92.5)* |
| South Asian | 10.5 (10.4-10.7)€ | 78.5 (72.6-84.3)* |

| Sociodemographic Indicators | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|------------------------------------|--|---|
| Latin American | 10.7 (10.2-11.2)€ | 69.5 ^c (44.6-94.5)* |
| West Asian/Arab | 10.6 (10.3-10.9)€ | 80.2 (68.2-92.2)* |
| Other/Multiple | 10.5 (10.3-10.7)€ | 78.0 (66.8-89.2)* |
| Indigenous identity | | |
| Indigenous | 10.8 (10.6-10.9) | 92.7 (87.7-97.7) |
| Not Indigenous | 10.8 (10.7-10.8) | 87.4 (85.7-89.0) |
| Immigration status – Child | | |
| Non-immigrant | 10.8 (10.7-10.8)€ | 88.3 (86.7-90.0)* |
| Immigrant | 10.3 (10.1-10.5)€ | 72.0 (61.6-82.4)* |
| Non-permanent resident | NR | NR |

†Excludes those identifying as Indigenous

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test $p < 0.05$)

€ indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

NR – This estimate could not be released as per Statistics Canada guidelines on unacceptable estimate quality (E)

PEER GROUP

- In children ages 3-4 years, sleep duration and adherence to sleep guidelines significantly differed across Statistics Canada Peer Group. Mean sleep duration was shortest and adherence was lowest for children living in Peer Group G&H. Children living in Peer Groups C and D had the greatest mean sleep durations and adherence to sleep guidelines (Figure 6; Table 4).

Figure 6: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in children ages 3-4 years; Ontario, 2019

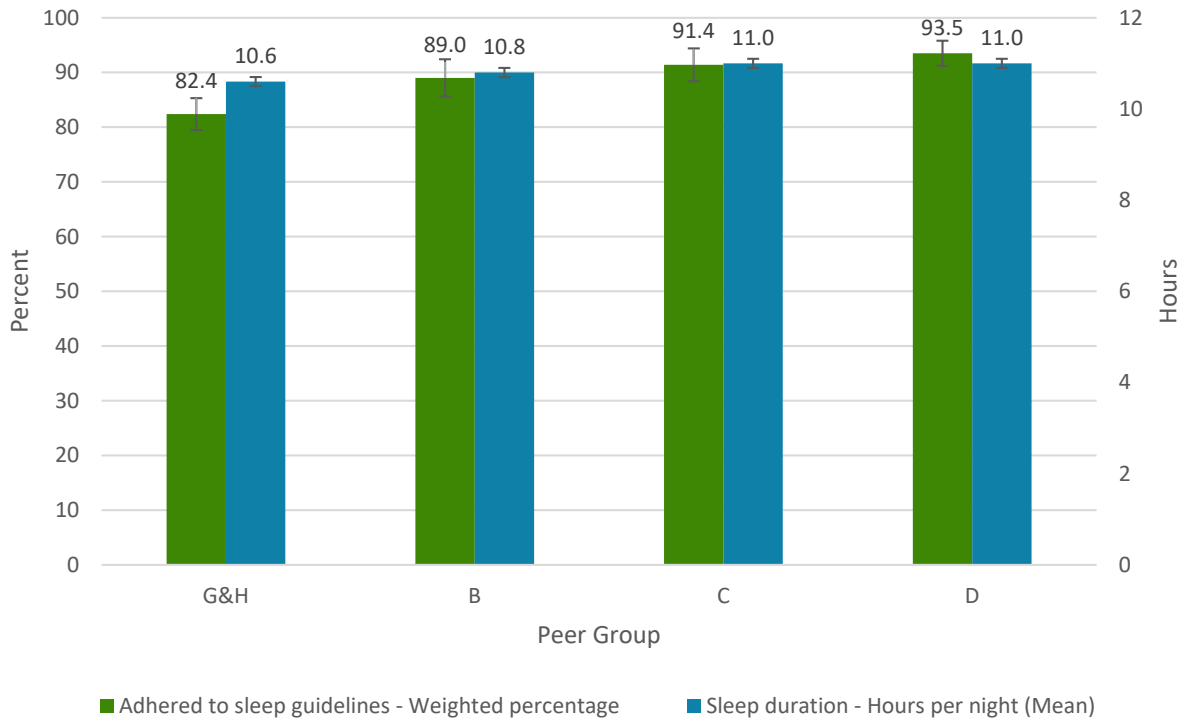


Table 4: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in children ages 3-4 years; Ontario, 2019

| Peer Group | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|------------|---|--|
| G & H | 10.6 (10.5-10.6)€ | 82.4 (79.5-85.2)* |
| B | 10.8 (10.7-10.8)€ | 89.0 (85.6-92.3)* |
| C | 11.0 (10.9-11.0)€ | 91.4 (88.4-94.3)* |
| D | 11.0 (10.9-11.1)€ | 93.5 (91.3-95.8)* |

*indicates a significant difference across Statistics Canada Peer Groups (Rao-Scott Chi-Square Test $p < 0.05$)
 € indicates a significantly different mean in at least one Statistics Canada Peer Group (ANOVA $p < 0.05$)

GEOGRAPHIC REGION

- In children ages 3-4 years, sleep duration and adherence to sleep guidelines significantly differed across geographic regions. The shortest mean sleep duration was 10.6 hours observed in Toronto, the greatest mean sleep duration was 10.9 hours observed in the North West and North East. Adherence to sleep guidelines was lower for children living in Toronto and the Central East compared to the North West, North East, Eastern, Central West, and South West regions (Figure 7; Table 5).

Figure 7: Sleep duration and adherence to sleep guidelines by geographic region in children ages 3-4 years; Ontario, 2019

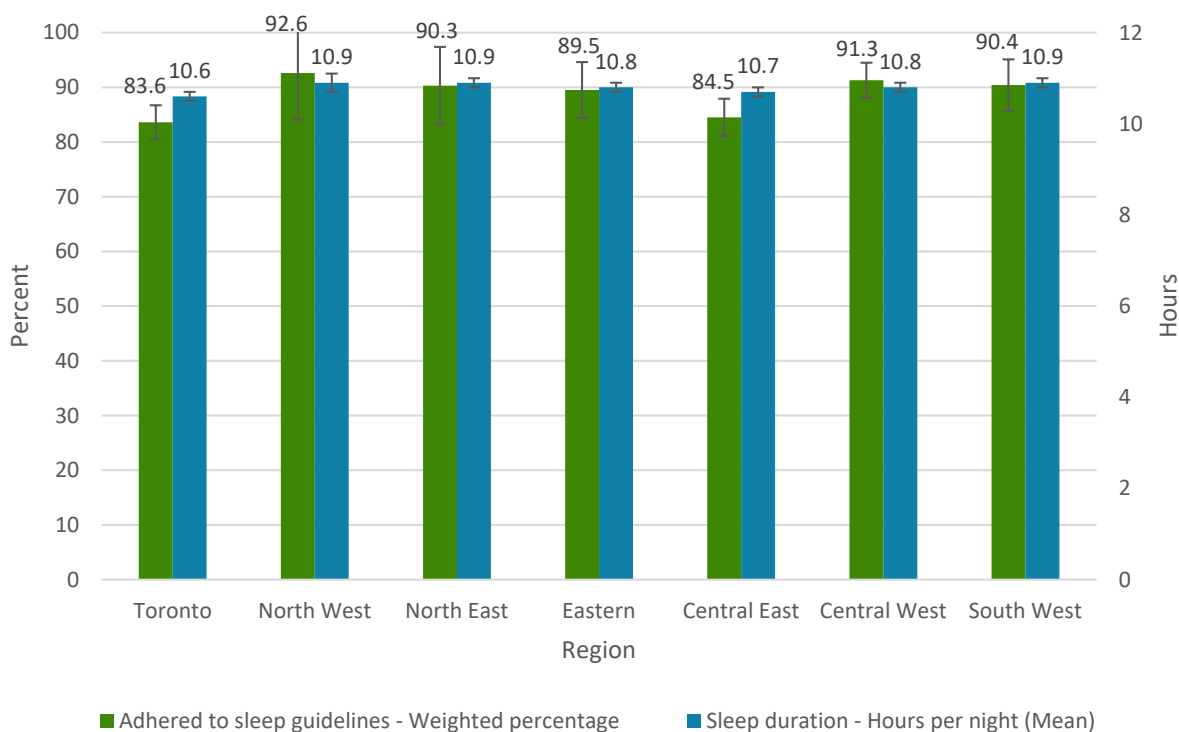


Table 5: Sleep duration and adherence to sleep guidelines by geographic region in children ages 3-4 years; Ontario, 2019

| Geographic region | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|-------------------|---|--|
| Toronto | 10.6 (10.5-10.7)€ | 83.6 (80.5-86.7)* |
| North West | 10.9 (10.7-11.1)€ | 92.6 (84.1-100.0)* |
| North East | 10.9 (10.8-11.0)€ | 90.3 (83.2-97.3)* |
| Eastern | 10.8 (10.7-10.9)€ | 89.5 (84.5-94.6)* |
| Central East | 10.7 (10.6-10.7)€ | 84.5 (81.1-87.9)* |

| Geographic region | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|-------------------|---|--|
| Central West | 10.8 (10.8-10.9)€ | 91.3 (88.2-94.5)* |
| South West | 10.9 (10.8-11.0)€ | 90.4 (85.7-95.1)* |

*indicates a significant difference across geographic regions (Rao-Scott Chi-Square Test p<0.05)

€ indicates a significantly different mean in at least one geographic region (ANOVA p<0.05)

PUBLIC HEALTH UNITS

- In children ages 3-4 years, sleep duration significantly differed across public health units (Table 6).

Table 6: Sleep duration and adherence to sleep guidelines by Public Health Unit in children ages 3-4 years; Ontario, 2019

| Public Health Unit | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|--|---|--|
| District of Algoma Health Unit | 11.0 (10.8-11.3)€ | 89.65 (78.98-100.0) |
| Brant County Health Unit | 11.1 (10.8-11.4)€ | 96.1 (90.33-100.0) |
| Durham Regional Health Unit | 10.7 (10.5-10.8)€ | 86.2 (77.1-95.2) |
| Grey Bruce Health Unit | 11.2 (10.9-11.4)€ | 93.4 (84.7-100.0) |
| Haldimand-Norfolk Health Unit | 10.9 (10.7-11.2)€ | 93.9 (85.0-100.0) |
| Haliburton, Kawartha, Pine Ridge District Health Unit | 11.0 (10.7-11.2)€ | 92.5 (85.5-99.4) |
| Halton Regional Health Unit | 10.7 (10.6-10.8)€ | 88.4 (81.8-95.0) |
| City of Hamilton Health Unit | 10.7 (10.4-11.1)€ | 87.3 (76.4-98.2) |
| Hastings and Prince Edward Counties Health Unit | 11.1 (10.7-11.4)€ | 90.1 (78.8-100.0) |
| Chatham-Kent Health Unit | 10.9 (10.8-11.1)€ | 93.5 (86.7-100.0) |
| Kingston, Frontenac and Lennox and Addington Health Unit | 10.9 (10.7-11.1)€ | 92.5 (82.4-100.0) |
| Lambton Health Unit | 11.0 (10.5-11.4)€ | 84.0 (67.8-100.0) |
| Leeds, Grenville and Lanark District Health Unit | 11.1 (11.0-11.3)€ | 98.4 (94.9-100.0) |

| Public Health Unit | Sleep duration – Ages 3 to 4 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 3 to 4 years – Weighted percentage (95% CI) |
|--|---|--|
| Middlesex-London Health Unit | 10.8 (10.5-11.0)€ | 87.0 (74.9-99.0) |
| Niagara Regional Area Health Unit | 11.1 (10.9-11.3)€ | 95.5 (90.3-100.0) |
| North Bay Parry Sound District Health Unit | 11.0 (10.8-11.1)€ | 97.6 (93.9-100.0) |
| Northwestern Health Unit | 10.9 (10.7-11.1)€ | 95.8 (90.4-100.0) |
| Huron Perth Health Unit | 11.2 (10.9-11.5)€ | 94.8 (85.3-100.0) |
| City of Ottawa Health Unit | 10.8 (10.6-10.9)€ | 88.2 (80.4-96.1) |
| Peel Regional Health Unit | 10.5 (10.4-10.7)€ | 77.4 (71.5-83.2) |
| Peterborough County-City Health Unit | 11.1 (10.8-11.4)€ | 90.3 (79.8-100.0) |
| Porcupine Health Unit | 11.2 (11.0-11.4)€ | 94.8 (86.9-100.0) |
| Renfrew County and District Health Unit | 10.9 (10.7-11.2)€ | 96.0 (87.7-100.0) |
| Eastern Ontario Health Unit | 10.7 (10.5-11.0)€ | 84.3 (70.9-97.6) |
| Simcoe Muskoka Health Unit | 11.0 (10.8-11.1)€ | 93.9 (90.5-97.2) |
| Sudbury and District Health Unit | 10.7 (10.4-11.0)€ | 83.4 (66.9-99.9) |
| Thunder Bay District Health Unit | 10.9 (10.6-11.1)€ | 91.4 (79.9-100.0) |
| Timiskaming Health Unit | 11.1 (10.7-11.6)€ | NR |
| Waterloo Health Unit | 10.9 (10.8-11.1)€ | 96.5 (93.2-99.9) |
| Wellington-Dufferin-Guelph Health Unit | 10.7 (10.6-10.9)€ | 85.8 (77.3-94.3) |
| Windsor-Essex County Health Unit | 10.8 (10.6-11.0)€ | 89.2 (80.7-97.8) |
| York Regional Health Unit | 10.6 (10.4-10.7)€ | 86.5 (78.4-94.6) |
| Southwestern Public Health | 11.1 (11.0-11.2)€ | 97.2 (94.0-100.0) |
| City of Toronto Health Unit | 10.6 (10.5-10.7)€ | 83.6 (80.5-86.7) |

Note: Rao-Scott Chi-square could not be conducted due to inadequate cell size

€ indicates a significantly different mean in at least one public health unit (ANOVA $p < 0.05$)

NR – This estimate could not be released as per Statistics Canada guidelines on unacceptable estimate quality (E)

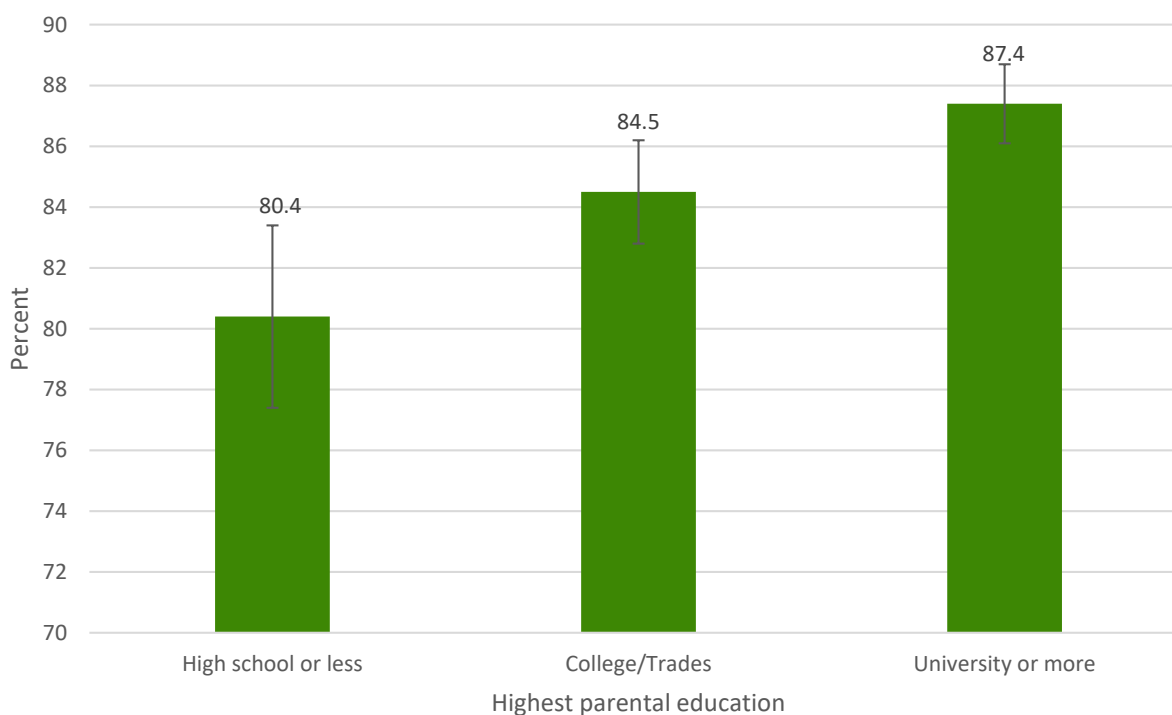
Children ages 5-11 years

- In children ages 5-11 years, sleep duration and adherence to sleep guidelines both significantly differed across Statistics Canada Peer Groups and geographic regions. Duration significantly differed across sex at birth, race and ethnic origin, and immigration status. Adherence to sleep guidelines significantly differed across highest parental educational attainment, income categories, and income quintiles (Tables 7-11).
- Most children ages 5-11 years, 85.4% (95% CI: 84.4-86.4), adhered to sleep guidelines and slept on average 10.2 (95% CI: 10.2-10.2) hours nightly (Table 1).

HIGHEST PARENTAL EDUCATIONAL ATTAINMENT, HOUSEHOLD INCOME, AND LOW INCOME CUT-OFF (LICO)

- In children ages 5-11 years, adherence to sleep guidelines significantly differed across education, such that adherence increased with increased education. There were no significant differences in average sleep duration across education (Figure 8; Table 7).

Figure 8: Adherence to sleep guidelines by highest parental education level in children ages 5-11 years; Ontario, 2019



- In children ages 5-11 years, adherence to sleep guidelines significantly differed across income categories and quintiles, with trends of increased adherence as income increased. There were no significant differences in average sleep duration across income (Figure 9; Table 7).

Figure 9: Adherence to sleep guidelines by household income in children ages 5-11 years; Ontario, 2019

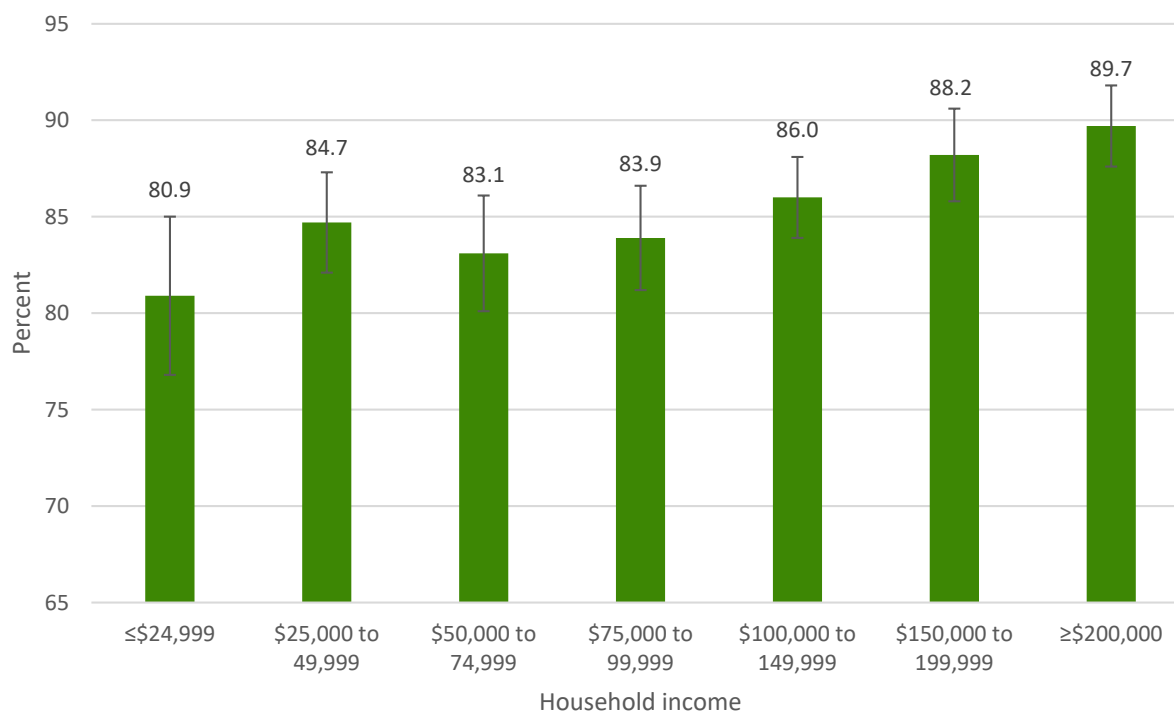


Table 7: Sleep duration and adherence to sleep guidelines by parental education and income in children ages 5-11 years; Ontario, 2019

| Socioeconomic Indicators | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|-----------------------------------|--|---|
| Highest parental education | | |
| High school or less | 10.2 (10.2-10.3) | 80.4 (77.4-83.4)* |
| College/Trades | 10.2 (10.2-10.3) | 84.5 (82.9-86.2)* |
| University or more | 10.2 (10.2-10.2) | 87.4 (86.1-88.7)* |
| Household Income | | |
| <\$24,999 | 10.3 (10.2-10.4) | 80.9 (76.9-85.0)* |
| \$25,000 to 49,999 | 10.2 (10.1-10.3) | 84.7 (82.2-87.3)* |
| \$50,000 to 74,999 | 10.2 (10.1-10.3) | 83.1 (80.2-86.1)* |
| \$75,000 to 99,999 | 10.2 (10.2-10.3) | 83.9 (81.2-86.6)* |

| Socioeconomic Indicators | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|----------------------------------|--|---|
| \$100,000 to 149,999 | 10.2 (10.1-10.2) | 86.0 (83.9-88.1)* |
| \$150,000 to 199,999 | 10.2 (10.2-10.3) | 88.2 (85.8-90.5)* |
| \$200,000 and higher | 10.2 (10.2-10.3) | 89.7 (87.6-91.8)* |
| Income Quintiles | | |
| Q1 | 10.2 (10.2-10.3) | 82.0 (79.4-84.6)* |
| Q2 | 10.2 (10.1-10.2) | 84.4 (82.1-86.8)* |
| Q3 | 10.3 (10.2-10.3) | 83.5 (81.2-85.8)* |
| Q4 | 10.2 (10.1-10.2) | 87.2 (85.1-89.2)* |
| Q5 | 10.2 (10.2-10.3) | 89.5 (87.9-91.0)* |
| Low Income Cut-Off (LICO) | | |
| Above cut-off | 10.2 (10.2-10.2) | 85.9 (84.8-87.0) |
| Below cut-off | 10.2 (10.2-10.3) | 83.6 (81.3-85.8) |

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test p<0.05)

SEX AT BIRTH, RACE AND ETHNIC ORIGIN, INDIGENOUS IDENTITY, AND IMMIGRATION STATUS

- In children ages 5-11 years, sleep duration significantly differed between boys and girls. Girls slept on average 0.1 hours or 6 minutes per night more than boys (Table 8). However there was no statistically significant difference in adherence to sleep guidelines.
- Sleep duration significantly differed across race and ethnic origins. The longest duration was observed in children who identified as White/Non-racialized and the shortest durations were observed in children who identified as East Asian, South Asian, and West Asian/Arab (Table 8).
- Sleep duration significantly differed across immigration status. Children who identified as non-immigrants or non-permanent residents had greater sleep duration than children who identified as immigrants (Table 8).

Table 8: Sleep duration and adherence to sleep guidelines by sex at birth, race and ethnic origin, Indigenous identity, and immigration status in children ages 5-11 years; Ontario, 2019

| Sociodemographic Indicators | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|------------------------------------|---|--|
| Sex at birth | | |
| Male | 10.2 (10.1-10.2)€ | 86.0 (84.6-87.3) |
| Female | 10.3 (10.2-10.3)€ | 84.8 (83.3-86.2) |
| Race and ethnic origin | | |
| White/Non-racialized† | 10.3 (10.3-10.3)€ | 84.8 (83.5-86.0) |
| Black | 10.2 (10.1-10.3)€ | 82.0 (77.7-86.4) |
| East Asian | 10.0 (10.0-10.1)€ | 89.4 (86.2-92.6) |
| Southeast Asian/Filipino | 10.1 (10.0-10.2)€ | 83.7 (78.5-89.0) |
| South Asian | 10.0 (9.9-10.1)€ | 87.4 (84.5-90.3) |
| Latin American | 10.2 (10.0-10.5)€ | 84.0 (75.2-92.8) |
| West Asian/Arab | 10.0 (9.9-10.2)€ | 86.2 (80.4-92.1) |
| Other/Multiple | 10.2 (10.1-10.3)€ | 90.9 (86.0-95.9) |
| Indigenous identity | | |
| Indigenous | 10.2 (10.1-10.3) | 84.3 (79.6-89.0) |
| Not Indigenous | 10.2 (10.2-10.2) | 85.4 (84.4-86.4) |
| Immigration status – Child | | |
| Non-immigrant | 10.2 (10.2-10.3)€ | 85.5 (84.4-86.5) |
| Immigrant | 10.0 (10.0-10.1)€ | 84.8 (80.8-88.7) |
| Non-permanent resident | 10.3 (10.1-10.6)€ | 92.4 (83.6-100.0) |

†Excludes those identifying as Indigenous

€ indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

PEER GROUP

- In children ages 5-11, sleep duration and adherence to sleep guidelines significantly differed across Statistics Canada Peer Groups. The size of the sleep duration differences were relatively small. Adherence to sleep guidelines was greatest in Peer Group G&H and lowest in Peer Group C (Figure 10; Table 9).

Figure 10: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in children ages 5-11 years; Ontario, 2019

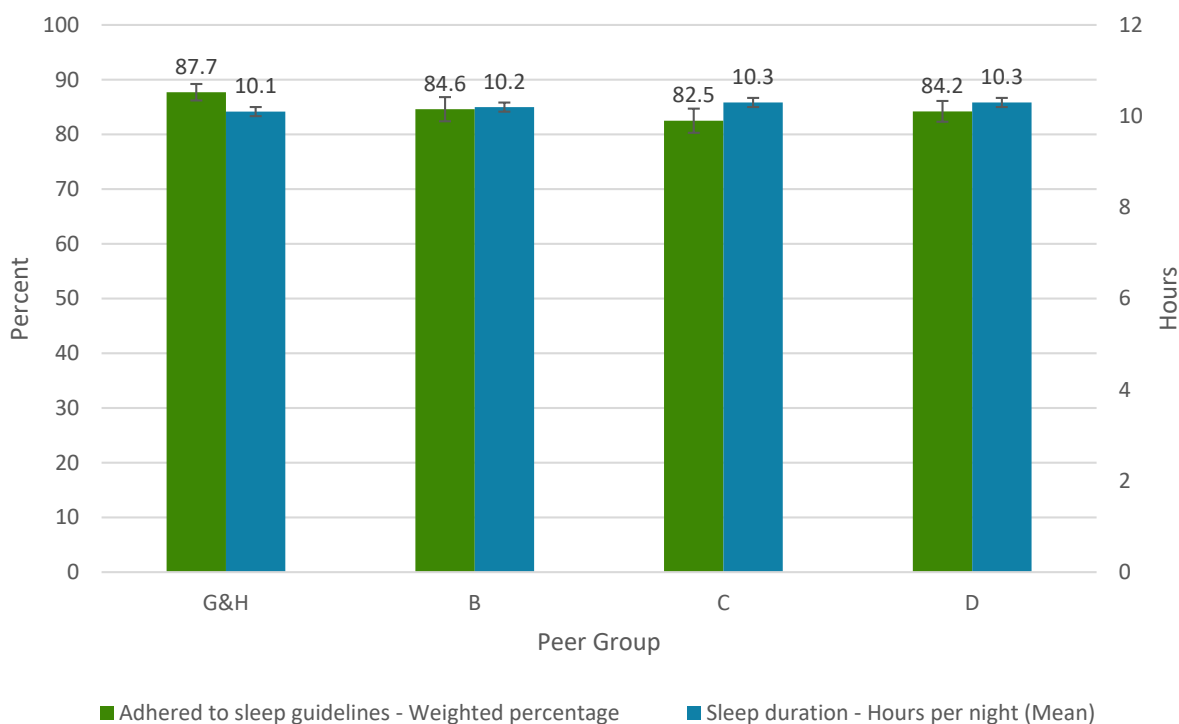


Table 9: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in children ages 5-11 years; Ontario, 2019

| Peer Group | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|------------|--|---|
| G & H | 10.1 (10.1-10.1)€ | 87.7 (86.3-89.2)* |
| B | 10.2 (10.2-10.3)€ | 84.6 (82.4-86.7)* |
| C | 10.3 (10.3-10.4)€ | 82.5 (80.3-84.7)* |
| D | 10.3 (10.3-10.4)€ | 84.2 (82.3-86.1)* |

*indicates a significant difference across Statistics Canada Peer Groups (Rao-Scott Chi-Square Test $p < 0.05$)
 € indicates a significantly different mean in at least one Statistics Canada Peer Group (ANOVA $p < 0.05$)

GEOGRAPHIC REGION

- In children ages 5-11 years, sleep duration and adherence to sleep guidelines significantly differed across geographic regions in Ontario. The greatest duration was observed in the South West and the shortest was observed in the Central East, however differences were small at about 12 minutes. The greatest sleep guideline adherence was observed in Toronto and the lowest adherence was observed in the South West (Figure 11; Table 10).

Figure 11: Sleep duration and adherence to sleep guidelines by geographic region in children ages 5-11 years; Ontario, 2019

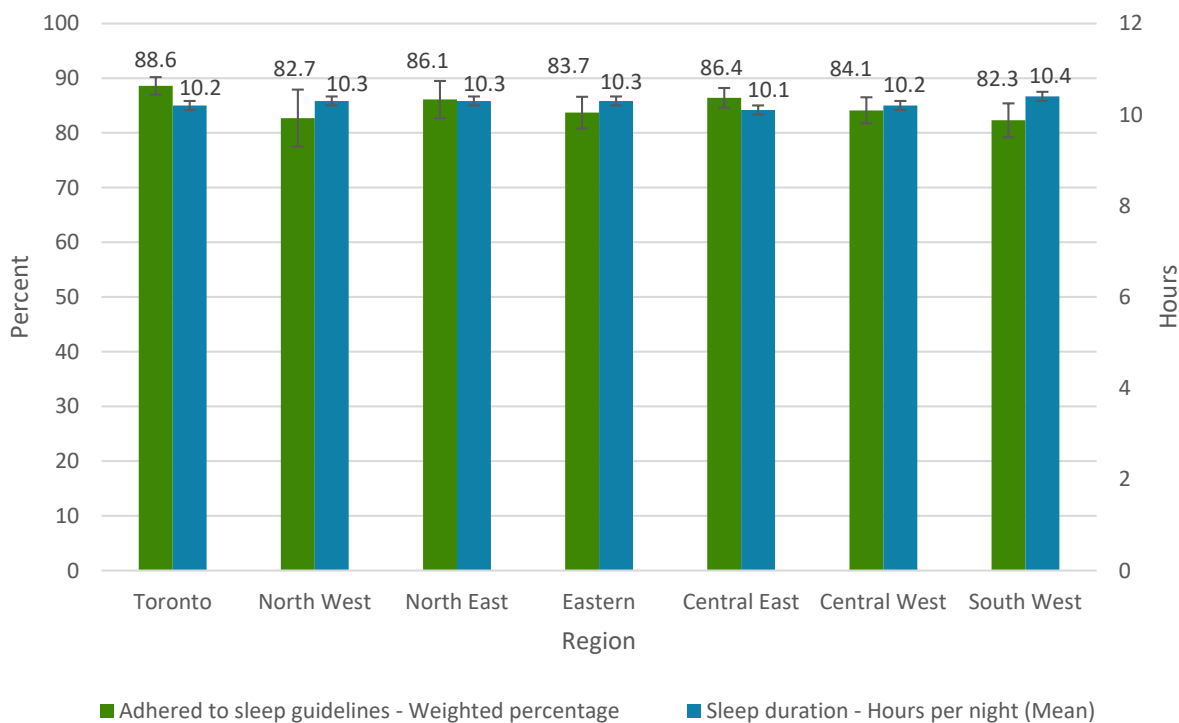


Table 10: Sleep duration and adherence to sleep guidelines by geographic region in children ages 5-11 years; Ontario, 2019

| Geographic region | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|-------------------|--|---|
| Toronto | 10.2 (10.2-10.2)€ | 88.6 (87.0-90.1)* |
| North West | 10.3 (10.2-10.4)€ | 82.7 (77.5-87.8)* |
| North East | 10.3 (10.2-10.4)€ | 86.1 (82.8-89.5)* |
| Eastern | 10.3 (10.2-10.3)€ | 83.7 (80.8-86.5)* |
| Central East | 10.1 (10.1-10.2)€ | 86.4 (84.6-88.2)* |
| Central West | 10.2 (10.2-10.3)€ | 84.1 (81.7-86.5)* |
| South West | 10.4 (10.3-10.4)€ | 82.3 (79.2-85.3)* |

*indicates a significant difference across geographic regions (Rao-Scott Chi-Square Test $p < 0.05$)

€ indicates a significantly different mean in at least one geographic region (ANOVA $p < 0.05$)

PUBLIC HEALTH UNITS

- In children ages 5-11 years, sleep duration and adherence to sleep guidelines significantly differed across public health units (Table 11).

Table 11: Sleep duration and adherence to sleep guidelines by public health unit in children ages 5-11 years; Ontario, 2019

| Public Health Unit | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|--|--|---|
| District of Algoma Health Unit | 10.3 (10.2-10.5)€ | 80.5 (72.9-88.1)* |
| Brant County Health Unit | 10.3 (10.2-10.5)€ | 85.9 (78.8-93.1)* |
| Durham Regional Health Unit | 10.1 (10.0-10.2)€ | 85.5 (80.2-90.9)* |
| Grey Bruce Health Unit | 10.4 (10.3-10.5)€ | 78.5 (71.1-85.9)* |
| Haldimand-Norfolk Health Unit | 10.3 (10.1-10.4)€ | 81.3 (73.1-89.4)* |
| Haliburton, Kawartha, Pine Ridge District Health Unit | 10.3 (10.2-10.4)€ | 83.9 (78.3-89.5)* |
| Halton Regional Health Unit | 10.2 (10.1-10.2)€ | 88.0 (84.8-91.3)* |
| City of Hamilton Health Unit | 10.1 (10.0-10.2)€ | 85.1 (77.9-92.4)* |
| Hastings and Prince Edward Counties Health Unit | 10.3 (10.2-10.4)€ | 84.5 (78.5-90.5)* |
| Chatham-Kent Health Unit | 10.4 (10.3-10.5)€ | 81.1 (75.4-86.8)* |
| Kingston, Frontenac and Lennox and Addington Health Unit | 10.4 (10.3-10.5)€ | 79.5 (73.0-86.1)* |
| Lambton Health Unit | 10.4 (10.2-10.5)€ | 83.7 (76.9-90.6)* |
| Leeds, Grenville and Lanark District Health Unit | 10.3 (10.1-10.4)€ | 81.6 (74.5-88.6)* |
| Middlesex-London Health Unit | 10.4 (10.3-10.6)€ | 83.7 (75.6-91.8)* |
| Niagara Regional Area Health Unit | 10.3 (10.1-10.5)€ | 75.2 (66.8-83.6)* |
| North Bay Parry Sound District Health Unit | 10.3 (10.2-10.4)€ | 86.1 (78.0-94.3)* |
| Northwestern Health Unit | 10.2 (10.1-10.3)€ | 88.7 (84.5-93.0)* |
| Huron Perth Health Unit | 10.3 (10.1-10.4)€ | 85.0 (78.3-91.7)* |
| City of Ottawa Health Unit | 10.2 (10.2-10.3)€ | 84.3 (79.9-88.7)* |

| Public Health Unit | Sleep duration – Ages 5 to 11 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 5 to 11 years – Weighted percentage (95% CI) |
|---|--|---|
| Peel Regional Health Unit | 10.1 (10.0-10.1)€ | 86.3 (83.6-88.9)* |
| Peterborough County-City Health Unit | 10.3 (10.1-10.5)€ | 83.4 (75.2-91.6)* |
| Porcupine Health Unit | 10.2 (10.1-10.3)€ | 87.0 (81.2-92.9)* |
| Renfrew County and District Health Unit | 10.4 (10.2-10.6)€ | 80.1 (69.0-91.1)* |
| Eastern Ontario Health Unit | 10.4 (10.3-10.5)€ | 86.5 (79.9-93.1)* |
| Simcoe Muskoka Health Unit | 10.3 (10.3-10.4)€ | 85.6 (82.3-88.9)* |
| Sudbury and District Health Unit | 10.3 (10.2-10.4)€ | 89.9 (83.9-95.9)* |
| Thunder Bay District Health Unit | 10.4 (10.2-10.5)€ | 79.9 (72.6-95.9)* |
| Timiskaming Health Unit | 10.4 (10.1-10.7)€ | 80.3 (65.7-94.9)* |
| Waterloo Health Unit | 10.3 (10.2-10.4)€ | 84.1 (78.2-90.0)* |
| Wellington-Dufferin-Guelph Health Unit | 10.3 (10.2-10.4)€ | 85.3 (81.1-89.4)* |
| Windsor-Essex County Health Unit | 10.3 (10.2-10.4)€ | 78.6 (72.9-84.2)* |
| York Regional Health Unit | 10.0 (9.9-10.1)€ | 88.0 (83.9-92.1)* |
| Southwestern Public Health | 10.4 (10.3-10.4)€ | 86.2 (81.5-90.9)* |
| City of Toronto Health Unit | 10.2 (10.2-10.2)€ | 88.6 (87.0-90.1)* |

*indicates a significant difference across Public Health Units (Rao-Scott Chi-Square Test $p < 0.05$)

€ indicates a significantly different mean in at least one Public Health Unit (ANOVA $p < 0.05$)

Youth ages 12-17 years

- In youth ages 12-17 years, sleep duration and adherence to sleep guidelines both significantly differed across race and ethnic origin, low income cut-off, and Statistics Canada Peer Group. Additionally, duration significantly differed across income categories and adherence significantly differed by sex at birth (Tables 12-15).
- Youth slept on average 8.6 hours (95% CI: 8.6-8.6) hours nightly and 62.0% (95% CI: 60.4-63.5) adhered to sleep guidelines (Table 1).

HIGHEST PARENTAL EDUCATIONAL ATTAINMENT, HOUSEHOLD INCOME, AND LOW INCOME CUT OFF (LICO)

- In youth ages 12-17, sleep duration significantly differed across income categories and the LICO, although the size of the differences were relatively small. Adherence to sleep guidelines significantly differed by the LICO such that a greater percentage of children living in households above the LICO adhered to sleep guidelines compared to children living in households below the LICO (Figure 12; Table 12).

Figure 12: Sleep duration and adherence to sleep guidelines by low income cut-off in youth ages 12-17 years; Ontario, 2019

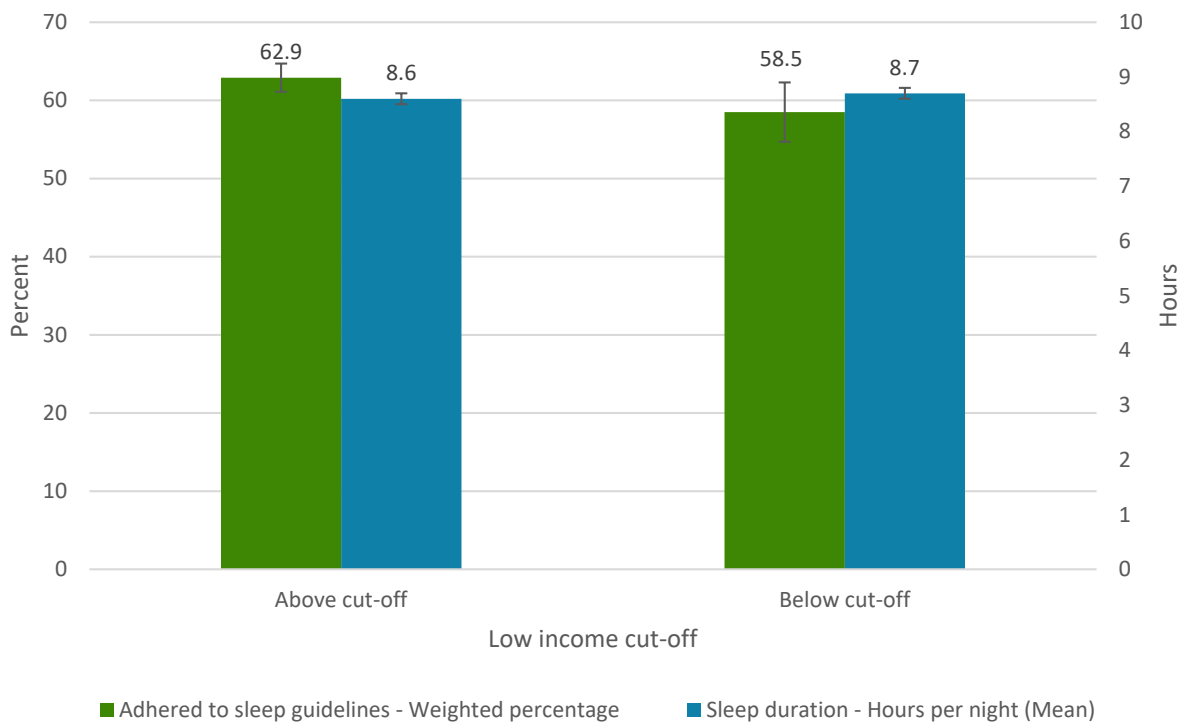


Table 12: Sleep duration and adherence to sleep guidelines by parental education and income in youth ages 12-17; Ontario, 2019

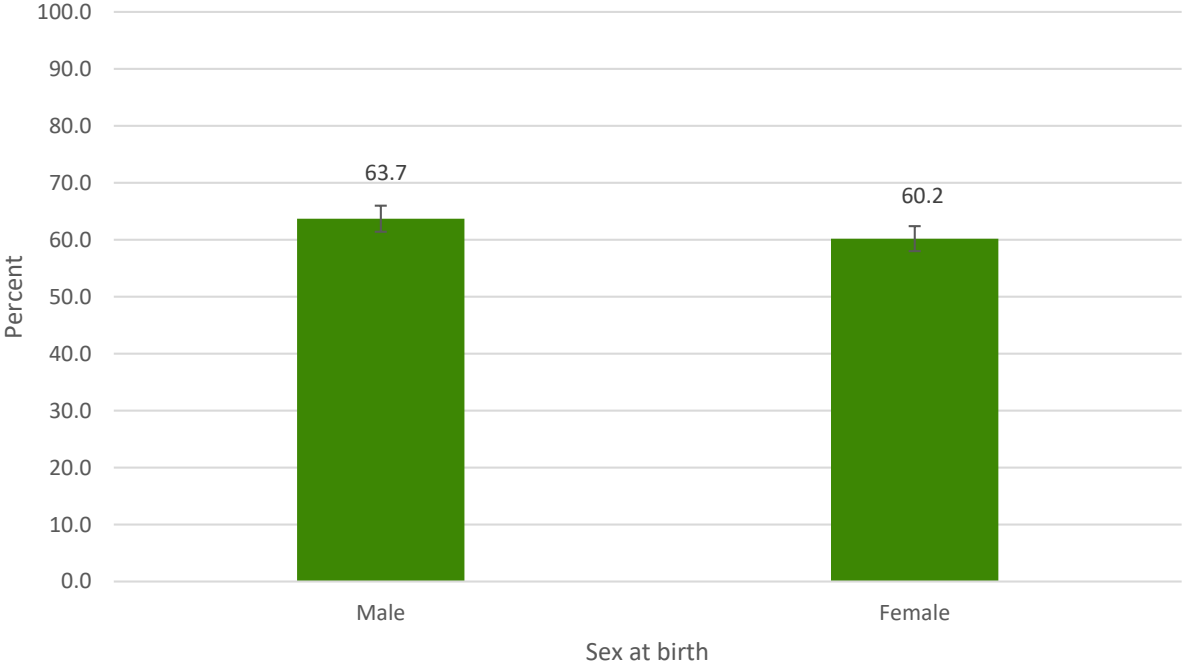
| Socioeconomic Indicators | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|--|---|--|
| Highest Parental Education Attained | | |
| High school or less | 8.6 (8.5-8.7) | 59.9 (55.6-64.2) |
| College/Trades | 8.6 (8.5-8.7) | 61.6 (59.1-64.2) |
| University or more | 8.6 (8.6-8.7) | 62.8 (60.6-65.0) |
| Household Income | | |
| <\$24,999 | 8.6 (8.5-8.8)€ | 55.3 (49.1-61.6) |
| \$25,000 to 49,999 | 8.7 (8.6-8.8)€ | 60.8 (56.6-65.1) |
| \$50,000 to 74,999 | 8.6 (8.5-8.7)€ | 63.5 (59.4-67.6) |
| \$75,000 to 99,999 | 8.6 (8.5-8.7)€ | 61.8 (57.6-66.0) |
| \$100,000 to 149,999 | 8.6 (8.5-8.7)€ | 63.1 (59.8-66.3) |
| \$150,000 to 199,999 | 8.5 (8.4-8.6)€ | 59.7 (55.4-64.0) |
| \$200,000 and higher | 8.6 (8.5-8.7)€ | 65.7 (61.8-69.6) |
| Income Quintiles | | |
| Q1 | 8.7 (8.6-8.8) | 59.7 (55.5-64.0) |
| Q2 | 8.6 (8.5-8.7) | 61.5 (58.0-65.1) |
| Q3 | 8.6 (8.5-8.7) | 62.5 (59.0-66.0) |
| Q4 | 8.6 (8.5-8.6) | 62.0 (58.5-65.6) |
| Q5 | 8.5 (8.5-8.6) | 63.4 (60.2-66.7) |
| Low Income Cut-Off (LICO) | | |
| Above cut-off | 8.6 (8.5-8.6)€ | 62.9 (61.1-64.6)* |
| Below cut-off | 8.7 (8.6-8.8)€ | 58.5 (54.8-62.3)* |

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test $p < 0.05$)
 € indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

SEX AT BIRTH, RACE AND ETHNIC ORIGIN, INDIGENOUS IDENTITY, AND IMMIGRATION STATUS

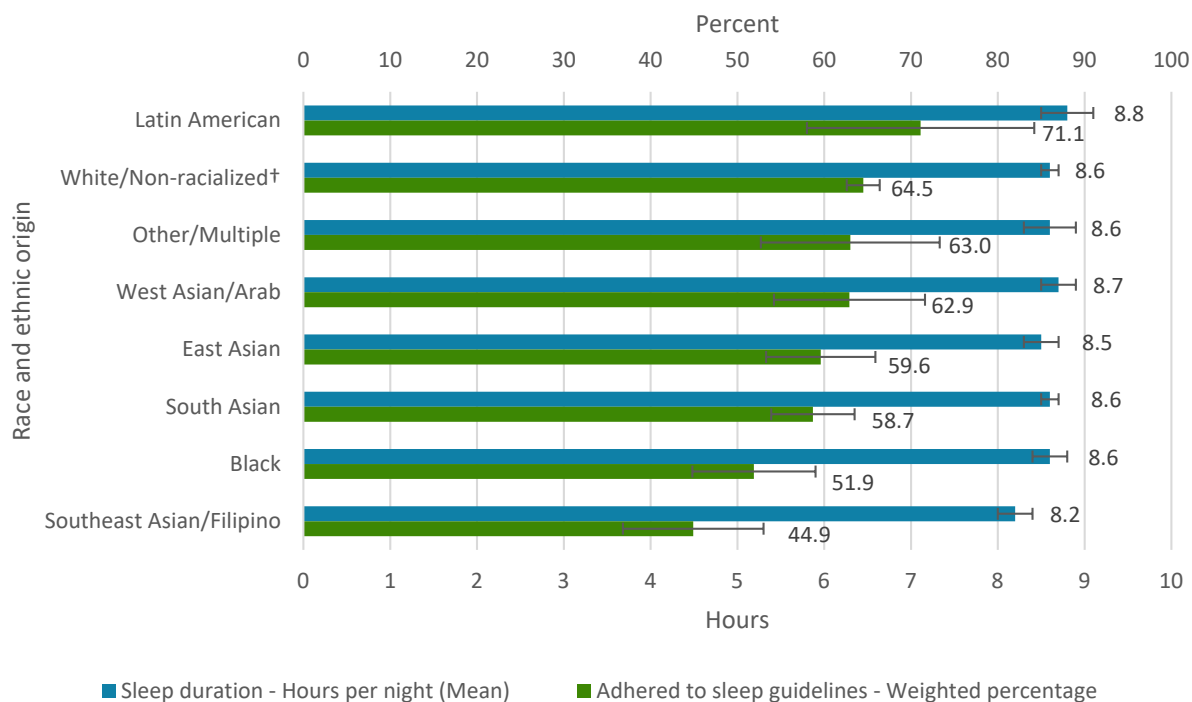
- In youth ages 12-17 years, adherence to sleep guidelines significantly differed by sex at birth. A greater percentage of boys adhered to sleep guidelines than girls (Figure 13; Table 13).

Figure 13: Adherence to sleep guidelines by sex at birth in youth ages 12-17 years; Ontario, 2019



- In youth ages 12-17 years, sleep duration and adherence to sleep guidelines significantly differed across race and ethnic origin. The greatest sleep duration and adherence to guidelines was observed in youth who identified as Latin American whereas the lowest was observed in youth who identified as Southeast Asian/Filipino (Figure 14; Table 13).

Figure 14: Sleep duration and adherence to sleep guidelines by race and ethnic origin in youth ages 12-17 years; Ontario, 2019



†Excludes those identifying as Indigenous

Table 13: Sleep duration and adherence to sleep guidelines by sex at birth, race and ethnic origin, Indigenous identity, and immigration status in youth ages 12-17; Ontario, 2019

| Sociodemographic Indicators | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|-------------------------------|---|--|
| Sex at birth | | |
| Male | 8.6 (8.6-8.7) | 63.7 (61.4-65.9)* |
| Female | 8.6 (8.5-8.6) | 60.2 (58.0-62.4)* |
| Race and ethnic origin | | |
| White/Non-racialized† | 8.6 (8.6-8.7)ε | 64.5 (62.6-66.4)* |
| Black | 8.6 (8.4-8.7)ε | 51.9 (44.8-59.0)* |
| East Asian | 8.5 (8.3-8.6)ε | 59.6 (53.4-65.9)* |
| Southeast Asian/Filipino | 8.2 (8.0-8.4)ε | 44.9 (36.8-52.9)* |

| Sociodemographic Indicators | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|------------------------------------|--|---|
| South Asian | 8.6 (8.5-8.7)€ | 58.7 (53.9-63.5)* |
| Latin American | 8.8 (8.5-9.1)€ | 71.1 (58.1-84.2)* |
| West Asian/Arab | 8.7 (8.5-8.8)€ | 62.9 (54.2-71.6)* |
| Other/Multiple | 8.6 (8.4-8.9)€ | 63.0 (52.7-73.3)* |
| Indigenous identity | | |
| Indigenous | 8.7 (8.6-8.9) | 65.9 (59.0-72.7) |
| Not Indigenous | 8.6 (8.6-8.6) | 61.8 (60.2-63.4) |
| Immigration status – Youth | | |
| Non-immigrant | 8.6 (8.6-8.7) | 62.4 (60.7-64.2) |
| Immigrant | 8.6 (8.5-8.7) | 60.3 (56.2-64.4) |
| Non-permanent resident | 8.4 (7.9-8.8) | NR |

†Excludes those identifying as Indigenous

*indicates a significant difference across socio-demographic variable levels (Rao-Scott Chi-Square Test $p < 0.05$)

€ indicates a significantly different mean in at least one subgroup (ANOVA $p < 0.05$ or T-Test $p < 0.05$ for socio-demographics with two levels)

NR – This estimate could not be released as per Statistics Canada guidelines on unacceptable estimate quality (E)

PEER GROUP

- In youth ages 12-17 years, sleep duration and adherence to sleep guidelines significantly differed across Statistics Canada Peer Groups. A smaller proportion of youth that lived in groups G&H and B adhered to sleep guidelines than in groups C and D (Figure 15; Table 14).

Figure 15: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in youth ages 12-17 years; Ontario, 2019

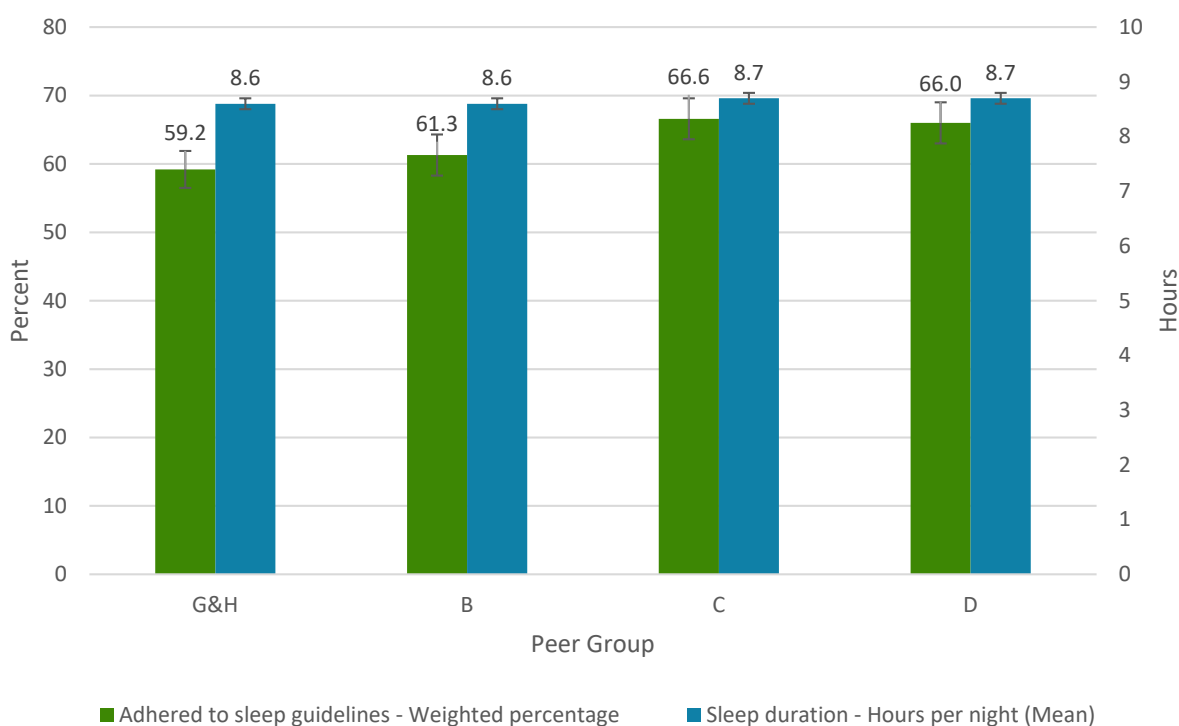


Table 14: Sleep duration and adherence to sleep guidelines by Statistics Canada Peer Group in youth ages 12-17 years; Ontario, 2019

| Peer Group | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|------------|---|--|
| G&H | 8.6 (8.5-8.6)€ | 59.2 (56.5-61.9)* |
| B | 8.6 (8.5-8.6)€ | 61.3 (58.4-64.3)* |
| C | 8.7 (8.6-8.8)€ | 66.6 (63.7-69.6)* |
| D | 8.7 (8.6-8.7)€ | 66.0 (63.0-68.9)* |

*indicates a significant difference across Statistics Canada Peer Groups (Rao-Scott Chi-Square Test $p < 0.05$)
 € indicates a significantly different mean in at least one Statistics Canada Peer Group (ANOVA $p < 0.05$)

GEOGRAPHIC REGION

- In youth ages 12-17, sleep duration and adherence to sleep guidelines did not significantly differ across geographic regions in Ontario (Table 15).

Table 15: Sleep duration and adherence to sleep guidelines by geographic region in youth ages 12-17 years; Ontario, 2019

| Geographic Region | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|-------------------|---|--|
| Toronto | 8.6 (8.5-8.7) | 59.4 (55.3-63.4) |
| North West | 8.6 (8.4-8.7) | 60.2 (52.6-67.8) |
| North East | 8.7 (8.6-8.9) | 66.6 (60.6-72.6) |
| Eastern | 8.7 (8.6-8.8) | 63.8 (59.7-67.9) |
| Central East | 8.6 (8.5-8.6) | 60.7 (57.9-63.6) |
| Central West | 8.6 (8.5-8.7) | 62.5 (59.0-66.1) |
| South West | 8.6 (8.5-8.7) | 65.0 (61.3-68.8) |

PUBLIC HEALTH UNITS

- In youth ages 12-17 years, sleep duration and adherence to sleep guidelines did not significantly differ across public health units (Table 16).

Table 16: Sleep duration and adherence to sleep guidelines across Public Health Units in youth ages 12-17 years; Ontario, 2019

| Public Health Unit | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|--------------------------------|---|--|
| District of Algoma Health Unit | 8.8 (8.6-9.0) | 75.2 (65.0-85.5) |
| Brant County Health Unit | 8.7 (8.5-8.9) | 75.1 (65.5-84.6) |
| Durham Regional Health Unit | 8.5 (8.3-8.7) | 59.9 (51.8-67.9) |
| Grey Bruce Health Unit | 8.8 (8.5-9.0) | 70.4 (60.6-80.2) |
| Haldimand-Norfolk Health Unit | 8.7 (8.4-8.9) | 68.3 (56.7-80.0) |

| Public Health Unit | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|--|--|---|
| Haliburton, Kawartha, Pine Ridge District Health Unit | 8.6 (8.4-8.8) | 64.9 (57.2-72.5) |
| Halton Regional Health Unit | 8.6 (8.5-8.7) | 62.3 (56.7-67.9) |
| City of Hamilton Health Unit | 8.6 (8.3-8.8) | 60.4 (48.8-72.0) |
| Hastings and Prince Edward Counties Health Unit | 8.8 (8.5-9.0) | 63.1 (53.5-72.7) |
| Chatham-Kent Health Unit | 8.5 (8.3-8.7) | 66.2 (57.8-74.7) |
| Kingston, Frontenac and Lennox and Addington Health Unit | 8.5 (8.3-8.7) | 62.8 (54.7-70.9) |
| Lambton Health Unit | 8.6 (8.3-8.9) | 60.6 (49.5-71.8) |
| Leeds, Grenville and Lanark District Health Unit | 8.6 (8.4-8.8) | 62.5 (53.2-71.7) |
| Middlesex-London Health Unit | 8.7 (8.4-8.9) | 63.7 (53.8-73.5) |
| Niagara Regional Area Health Unit | 8.7 (8.5-9.0) | 65.3 (55.8-74.8) |
| North Bay Parry Sound District Health Unit | 8.7 (8.4-9.0) | 68.9 (56.7-81.2) |
| Northwestern Health Unit | 8.6 (8.5-8.8) | 61.9 (52.6-71.2) |
| Huron Perth Health Unit | 8.8 (8.7-9.0) | 77.4 (67.3-87.5) |
| City of Ottawa Health Unit | 8.7 (8.5-8.8) | 62.4 (55.9-68.8) |
| Peel Regional Health Unit | 8.6 (8.5-8.7) | 59.0 (54.9-63.1) |
| Peterborough County-City Health Unit | 8.9 (8.6-9.1) | 70.7 (60.4-81.0) |
| Porcupine Health Unit | 8.7 (8.5-9.0) | 57.5 (45.7-69.4) |
| Renfrew County and District Health Unit | 8.6 (8.3-8.9) | 57.2 (42.9-71.5) |
| Eastern Ontario Health Unit | 8.8 (8.6-9.1) | 76.5 (67.1-85.9) |
| Simcoe Muskoka Health Unit | 8.6 (8.5-8.8) | 67.3 (61.4-73.2) |
| Sudbury and District Health Unit | 8.7 (8.4-8.9) | 62.5 (50.8-74.2) |
| Thunder Bay District Health Unit | 8.5 (8.3-8.7) | 59.5 (49.3-69.7) |
| Timiskaming Health Unit | 8.7 (8.4-9.1) | 77.8 (60.1-95.5) |

| Public Health Unit | Sleep duration – Ages 12 to 17 years – Hours per night – 7d – Mean (95% CI) | Adhered to sleep guidelines – Ages 12 to 17 years – Weighted percentage (95% CI) |
|--|---|--|
| Waterloo Health Unit | 8.5 (8.3-8.7) | 56.4 (48.3-64.4) |
| Wellington-Dufferin-Guelph Health Unit | 8.8 (8.6-8.9) | 66.6 (59.7-73.4) |
| Windsor-Essex County Health Unit | 8.6 (8.4-8.7) | 65.2 (58.4-71.9) |
| York Regional Health Unit | 8.5 (8.4-8.7) | 59.1 (52.8-65.4) |
| Southwestern Public Health | 8.4 (8.3-8.6) | 58.0 (49.7-66.3) |
| City of Toronto Health Unit | 8.6 (8.5-8.7) | 59.4 (55.3-63.4) |

€ indicates a significantly different mean in at least one Public Health Unit (ANOVA p<0.05)

Discussion

This summary presents child and youth sleep indicators and trends across socio-demographics, Statistics Canada Peer Groups, geographic region, and Public Health Units/Health Regions using a representative sample of children and youth in Ontario. The CHSCY data fills a gap for sleep data in children 3-11 years of age. Previously, the most recent representative data for this group was from the 2014-2015 Canadian Health Measures Survey (CHMS), although the sample of children under 12 years of age was small (approximately 500 in Ontario).⁷

The majority of children and youth ages 3-17 years got adequate sleep and adhered to sleep guidelines. There were some significant but relatively small differences in sleep duration across socio-demographics and geography. The largest observed difference was 30 minutes and most differences were around 12 minutes or less. The percentage of children ages 3-4 years that adhered to sleep guidelines was 87.5%, sleeping 10.8 hours nightly on average and this decreased to 74.5% meeting guidelines and sleeping an average of 9.5 hours a night in children and youth ages 5-17 years. Data from the 2014-2015 CHMS found 70.7% of Canadians ages 5-17 years adhered to sleep guidelines, sleeping 9.0 hours nightly on average.⁵ Differences between these two data sources are likely caused by measurement of sleep. The CHMS asked for the typical time slept in 24-hours⁸ whereas the CHSCY asked about sleep and wake times on school days and weekends.⁹

Sleep duration and adherence to sleep guidelines significantly differed across age groups (3-4 years, 5-11 years, and 12-17 years) such that both indicators decreased with increased age. This is consistent with a study using CHMS data which observed significant reductions in sleep duration and adherence to sleep guidelines as age increased.¹⁰ Social, biological, and psychological changes throughout development likely underlie these differences.¹¹ Changes in circadian rhythmicity with puberty are well characterized to result in later sleep times whereas wake times continue to be dictated by school start times.^{12,13} Social drivers may include increased autonomy, availability of electronics in the bedroom, and schoolwork demands with increased age.¹¹

Significant differences by sex at birth were observed in children ages 5-11 years and youth ages 12-17 years. Girls ages 5-11 years had significantly greater sleep duration than boys, however the difference was small at roughly 6 minutes. Conversely, more adolescent boys adhered to sleep guidelines

compared to girls. A study using CHMS found similar trends; however, their findings were not significant.⁸ Sleep duration differences could be caused by sex-specific differences in sleep hygiene and disturbances. For example, girls report worse sleep hygiene activities such as higher consumption of hot caffeinated beverages before bed and homework in bed.^{14,15}

There were significant trends in sleep duration and adherence to guidelines across income and parental education. Generally, sleep duration and adherence to guidelines increased as income or education increased. This is consistent with studies that observed increased sleep duration with increased socioeconomic status (SES),^{16,17} emphasizing that the determinants of sleep go beyond the individual and encompass broader social, economic, and structural influences. Those in lower SES households may disproportionately experience more simultaneous stressors, lower feelings of neighbourhood safety, social fragmentation, greater household size, noise, and lack of sleep hygiene knowledge, which may result in poorer sleep relative to children living in higher SES households.^{16,18}

Sleep duration and adherence to guidelines significantly differed across race and ethnic origin and immigration status. Children and youth who identified as White/non-racialized or Latin American had greater adherence to sleep guidelines compared to other groups and children who identified as non-immigrants had greater sleep duration compared to those who identified as immigrants. Larger sleep disparities across race and ethnic origin and immigration status were observed in younger children. One previous study that used data from the Cannabis, Obesity, Mental health, Physical activity, Alcohol use, Smoking, and Sedentary behaviour (COMPASS) study found that children who identified as White/non-racialized had lower odds of inadequate sleep duration compared to children who identified as Black, Asian, or other/mixed/missing.¹² Multiple mechanisms may underlie these findings including systemic differences in levels of stress, SES, and different cultural perspectives on sleep timing,²¹ as well as differences in homework, extracurriculars, and nightly activities.^{12,19}

There were several significant differences by geography. Sleep duration and adherence to sleep guidelines significantly differed across Statistics Canada Peer Groups in all age groups, across geographic region in children ages 3-11 years, and across Public Health Units in children ages 5-11 years. Children living in the largest metropolitan centers had shorter sleep duration and lower adherence to sleep guidelines than those living in urban-rural sparsely populated areas or mainly rural regions, consistent with studies that observed a negative relationship for sleep duration and urbanicity.^{12,22} Differing socio-economics, safety, noise/light pollution, and the built environment across different geographies may contribute to these differences.²³

Physical Activity and Sedentary Behaviours

This report can be examined with the reports on [physical activity](#) and [sedentary behaviour](#) for a snapshot of Ontario children and youth's adherence to Canadian 24-hour movement guidelines. In children ages 3-4 years, 54.1% adhered to screen time guidelines, 87.5% adhered to sleep guidelines, and 47.3% adhered to both guidelines. In children ages 5-11 years, 34.7% adhered to physical activity guidelines, 65.9% adhered to screen time guidelines, 85.4% adhered to sleep guidelines, and 16.6% adhered to all three. In youth, 26.4% adhered to physical activity guidelines, 51.5% adhered to screen time guidelines, 62.0% adhered to sleep guidelines, and 7.8% adhered to all three. These estimates can be compared to CHMS data where 9.5% of children and youth in Canada ages 5-17 years met all three movement guidelines and 70.7% met the sleep guidelines in the 2014-2015 cycle.⁵

Limitations

Several limitations must be considered. The cross-sectional design of CHSCY and bivariate analysis precluded the interpretation of causality for any significant relationships. Sleep duration and guideline adherence were measured retrospectively using PMK or youth-reported data which may result in

misclassification errors and likely overestimates sleep duration compared to objective measurement with actigraphy.^{24,25} Additionally, CHSCY does not use a previously validated sleep questionnaire. Future surveys should include actigraphically measured sleep which would facilitate objective sleep measurement and validation of the CHSCY sleep questionnaire. Sleep duration is only measured overnight in CHSCY.⁹ This excludes naps which may be an important aspect of sleep for some children 3-4 years.³ Additionally, many of the significant differences in sleep duration were relatively small and may not be clinically relevant. Other sleep indicators surrounding sleep quality and hygiene (bed-time rules, electronic use, consistency) can influence sleep²⁶ and should be analyzed to obtain a more nuanced overview. Finally, due to how movement behaviours are collected in CHSCY, exact adherence to the 24-hour movement guidelines is not possible with this dataset.

Conclusions

These data provide an overview of sleep duration and adherence to sleep guidelines by socio-demographics and geography, stratified by age group. Comprehensive interpretations will require more detailed analyses and collaboration with impacted communities to understand the aspects that drive these findings and minimize risks associated with the analysis and reporting of racial and ethnic data. Overall, while CHSCY may overestimate sleep duration and adherence to sleep guidelines compared to some more objective measures, it remains an important survey for understanding the relationship between sleep, socio-demographics, geography, and child health, particularly for younger children. Furthermore, comparisons of equivalent indicators can be conducted with subsequent cycles of CHSCY which would provide valuable information about relative changes in sleep duration and adherence to guidelines pre- to the peri-COVID period.

Technical notes

Data Source

This report examined the Ontario portion of the 2019 Canadian Health Survey on Children and Youth (CHSCY) which used the Canadian Child Tax Benefit (CCB) as the sampling frame to select children and youth between the ages of 1 to 17 years old as of January 31, 2019.

- Children living in private dwellings across 10 provinces and 3 territories were eligible.
- Children living on First Nation reserves or other Indigenous settlements were excluded from the survey. Further, children living in foster care and children and youth who were institutionalized were excluded.

Indicators

SLEEP VARIABLES

Adherence to sleep guidelines – ages 3 to 4 years – 7d (10 to 13 hours) (SLPDVSG1):

- Derived by Statistics Canada using average sleep duration (SLPDVSPD) and age.
- Adhered to guidelines if sleep duration ranged from 10 to 13 hours and age ranged from 3 to 4 years.

Adherence to sleep guidelines – ages 5 to 17 years – 7d (9 to 11 hours for ages 5 to 13 years, 8 to 10 hours for ages 14+ years) (SLPDVSG2):

- Adhered to guidelines if sleep duration ranged from 9 to 11 hours for children and youth ages 5 to 13 years or from 8 to 10 hours for youth 14 to 17 years.

Sleep duration – average per night – 7d – hours (SLPDVSPD)

- Derived by Statistics Canada by taking total sleep duration over the past 7 days/7 to get average per night.
- Analyzed with ANOVA directly.

SOCIO-DEMOGRAPHIC VARIABLES

The socio-demographic variables used in this analysis include age, sex at birth, household income, education of person most knowledgeable (PMK) of the child and their spouse, race and ethnic origin (including Indigenous identity), and immigration status. For more information on these socio-demographic variables and how they were recoded please see the full Technical Report.

- Age was categorized as 3-4 years, 5-11 years, and 12-17 years.
- Sex at birth was categorized as male or female.
- Household income was categorized into 7 levels: <\$24,999, \$25,000-\$49,999, \$50,000-\$74,999, \$75,000-\$99,999, \$100,000-\$149,999, \$150,000-\$199,999, and \$200,000+.
- Low income cut-off (LICO) measure is a dichotomous variable describing low or high income. It was calculated using Canadian 2019 before-tax income adjusted for community and household size.
- Highest Household Educational Attainment of the PMK or PMK Spouse was categorized into three groups (high-school or less, college/vocational/university certificate or diploma, and university or more).
- Race and ethnic origin were categorized as South Asian, Black, East Asian, Southeast Asian/Filipino, West Asian/Arab, White/Not a Racialized Group, Latin American, and other (or multiple).
- Indigenous identity (First Nations, Inuit or Métis) was defined as ‘Yes’ or ‘No’.
- Immigration status was categorized as non-immigrant, immigrant, and non-permanent residents.

GEOGRAPHIC VARIABLES

The proportion of children was categorized by Statistics Canada Peer Groups and by major geographic regions.

Statistics Canada Peer Groups are based on the following list:

- Group B – Mainly urban centres with moderate population density
 - Durham Region Health Department, Halton Region Public Health, City of Hamilton Public Health Services, Middlesex-London Health Unit, Ottawa Public Health, Region of Waterloo Public Health and Emergency Services, Windsor-Essex County Health Unit
- Group C – Sparsely populated urban-rural mix

- Algoma Public Health, Brant County Health Unit, Chatham-Kent Public Health, Eastern Ontario Health Unit, Haliburton, Kawartha, Pine Ridge District Health Unit, Hastings Prince Edward Public Health, Kingston, Frontenac and Lennox & Addington Public Health, Lambton Public Health, Niagara Region Public Health, North Bay Parry Sound District Health Unit, Porcupine Health Unit, Peterborough Public Health, Public Health Sudbury & Districts, Thunder Bay District Health Unit, Timiskaming Health Unit
- Group D – Mainly rural
 - Grey Bruce Health Unit, Haldimand-Norfolk Health Unit, Huron Perth Public Health, Leeds, Grenville & Lanark District Health Unit, Northwestern Health Unit, Renfrew County and District Health Unit, Simcoe Muskoka District Health Unit, Southwestern Public Health, Wellington-Dufferin-Guelph Public Health
- Group G&H – Largest population centres with high population density
 - City of Toronto, Peel Public Health, York Region Public Health
- The major **geographic regions** are the following:
 - North West – Northwestern Health Unit, Thunder Bay District Health Unit
 - North East – Porcupine Health Unit, Timiskaming Health Unit, Public Health Sudbury & Districts, Algoma Public Health, North Bay and Parry Sound District Health Unit
 - South West – Windsor-Essex County Health Unit, Chatham-Kent Public Health, Southwestern Public Health, Lambton Public Health, Middlesex-London Health Unit, Huron Perth Public Health, Grey Bruce Health Unit
 - Central West – Wellington-Dufferin-Guelph Public Health, Halton Region Public Health, City of Hamilton Public Health Services, Niagara Region Public Health, Region of Waterloo Public Health and Emergency Services, Haldimand-Norfolk Health Units, Brant County Health Unit
 - Toronto Public Health
 - Central East – Peel Public Health, York Region Public Health, Durham Region Health Department, Haliburton, Kawartha, Pine Ridge District Health Unit, Peterborough Public Health, Simcoe-Muskoka District Health Unit
 - East – Renfrew County and District Health Unit, Hastings Prince Edward Public Health, Kingston, Frontenac and Lennox & Addington Public Health, Leeds, Grenville & Lanark District Health Unit, Ottawa Public Health, Eastern Ontario Health Unit

Data Analysis

SAS 8.2 Enterprise Guide was used to conduct all statistical analysis. Bivariate analyses was conducted between the covariates and sleep indicators.

- PROC SURVEY commands were used with bootstrap replications (n=1,000) and bootstrap weights provided by Statistics Canada. Using these, point estimates and 95% confidence intervals were calculated.

- Statistics Canada approved guidelines were used to report outcomes, where estimates with coefficients of variation (CV) with less than 0.15% were reported without warnings.

References

1. Chaput J-P, Gray CE, Poitras VJ, Carson V, Gruber R, Birken CS, et al. Systematic review of the relationships between sleep duration and health indicators in the early years (0–4 years). *BMC Public Health*. 2017;17(5):855. Available from: <https://doi.org/10.1186/s12889-017-4850-2>
2. Chaput J-P, Gray CE, Poitras VJ, Carson V, Gruber R, Olds T, et al. Systematic review of the relationships between sleep duration and health indicators in school-aged children and youth. *Appl Physiol Nutr Metab*. 2016;41(6 (Suppl 3)):S266-82. Available from: <https://doi.org/10.1139/apnm-2015-0627>
3. ParticipACTION. Canadian 24-hour movement guidelines for the early years [Internet]. Toronto, ON: ParticipACTION; 2023 [cited 2023 Jun 27]. Available from: <https://www.participaction.com/the-science/benefits-and-guidelines/early-years-0-to-4/>
4. ParticipACTION. Canadian 24-hour movement guidelines for children and youth [Internet]. Toronto, ON: ParticipACTION; 2023 [cited 2023 Jul 12]. Available from: <https://www.participaction.com/the-science/benefits-and-guidelines/children-and-youth-age-5-to-17/>
5. Center for Surveillance and Applied Research, Public Health Agency of Canada. Physical Activity, Sedentary behaviour, and Sleep (PASS) indicators [Internet]. 2023 edition. Ottawa, ON: Government of Canada; 2023 [updated 2023 Jun 15]. Available from: <https://health-infobase.canada.ca/pass>
6. Stearns MA, Ievers-Landis CE, McCrae CS, Simon SL. Sleep across childhood during the COVID-19 pandemic: a narrative review of the literature and clinical case examples. *Children Health Care*. 2022;51(4):408-30. Available from: <https://doi.org/10.1080/02739615.2021.2016407>
7. Statistics Canada. Canadian Health Measures Survey (CHMS): detailed information for January 2014 to December 2015 (cycle 4) [Internet]. Ottawa, ON: Statistics Canada; 2014 [updated 2014 Apr 15; cited 2023 Jul 11]. Available from: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=148760>
8. Roberts KC, Yao X, Carson V, Chaput J-P, Janssen I, Tremblay MS. Meeting the Canadian 24-hour movement guidelines for children and youth [archived]. Ottawa, ON: Statistics Canada; 2017. Available from: <https://www150.statcan.gc.ca/n1/pub/82-003-x/2017010/article/54875-eng.pdf>
9. Statistics Canada. Canadian Health Survey on Children and Youth (CHSCY) [Internet]. Ottawa, ON: Statistics Canada; 2019 [updated 2019 Nov 2; cited 2023 Jun 27]. Available from: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1215270>
10. Chang VC, Chaput J-P, Roberts KC, Jayaraman G, Do MT. Factors associated with sleep duration across life stages: results from the Canadian Health Measures Survey. *Health Promot Chron Dis Prev Can*. 2018;38(11):404-18. Available from: <https://doi.org/10.24095/hpcdp.38.11.02>
11. Carskadon MA. Sleep in adolescents: the perfect storm. *Pediatr Clin North Am*. 2011;58(3):637-47. Available from: <https://doi.org/https://doi.org/10.1016/j.pcl.2011.03.003>
12. Patte KA, Qian W, Leatherdale ST. Sleep duration trends and trajectories among youth in the COMPASS study. *Sleep Health*. 2017;3(5):309-16. Available from: <https://doi.org/https://doi.org/10.1016/j.sleh.2017.06.006>
13. Tarokh L, Short M, Crowley SJ, Fontanellaz-Castiglione CEG, Carskadon MA. Sleep and circadian rhythms in adolescence. *Curr Sleep Med Rep*. 2019;5(4):181-92. Available from: <https://doi.org/10.1007/s40675-019-00155-w>

14. Galland BC, Gray AR, Penno J, Smith C, Lobb C, Taylor RW. Gender differences in sleep hygiene practices and sleep quality in New Zealand adolescents aged 15 to 17 years. *Sleep Health*. 2017;3(2):77-83. Available from: <https://doi.org/https://doi.org/10.1016/j.sleh.2017.02.001>
15. Li SH, Graham BM, Werner-Seidler A. Gender differences in adolescent sleep disturbance and treatment response to smartphone app-delivered cognitive behavioral therapy for insomnia: exploratory study. *JMIR Form Res*. 2021;5(3):e22498. Available from: <https://doi.org/10.2196/22498>
16. Jarrin DC, McGrath JJ, Quon EC. Objective and subjective socioeconomic gradients exist for sleep in children and adolescents. *Health Psychol*. 2014;33(3):301-5. Available from: <https://doi.org/10.1037/a0032924>
17. Etindele Sosso FA, Holmes SD, Weinstein AA. Influence of socioeconomic status on objective sleep measurement: a systematic review and meta-analysis of actigraphy studies. *Sleep Health*. 2021;7(4):417-28. Available from: <https://doi.org/https://doi.org/10.1016/j.sleh.2021.05.005>
18. Pabayo R, Molnar BE, Street N, Kawachi I. The relationship between social fragmentation and sleep among adolescents living in Boston, Massachusetts. *J Public Health*. 2014;36(4):587-98. Available from: <https://doi.org/10.1093/pubmed/fdu001>
19. Keyes KM, Maslowsky J, Hamilton A, Schulenberg J. The great sleep recession: changes in sleep duration among US adolescents, 1991–2012. *Pediatrics*. 2015;135(3):460-8. Available from: <https://doi.org/10.1542/peds.2014-2707>
20. Sano Y, Antabe R, Kyeremeh E, Kwon E, Amoyaw J. Immigration as a social determinant of troubled sleep in Canada: some evidence from the Canadian Community Health Survey-Mental Health. *Sleep Health*. 2019;5(2):135-40. Available from: <https://doi.org/10.1016/j.sleh.2018.11.008>
21. Costanian C, Abdullah P, Sawh N, Nagapatan A, Tamim H. Factors associated with shorter night-time sleep in toddlers: the survey of young Canadians. *Can J Public Health*. 2017;108(5):e571-e7. Available from: <https://doi.org/10.17269/CJPH.108.6236>
22. Paksarian D, Rudolph KE, He J-P, Merikangas KR. School start time and adolescent sleep patterns: results from the US National Comorbidity Survey—adolescent supplement. *Am J Public Health*. 2015;105(7):1351-7. Available from: <https://doi.org/10.2105/AJPH.2015.302619>
23. Mayne SL, Mitchell JA, Virudachalam S, Fiks AG, Williamson AA. Neighborhood environments and sleep among children and adolescents: a systematic review. *Sleep Med Rev*. 2021;57:101465. Available from: <https://doi.org/10.1016/j.smr.2021.101465>
24. Perpétuo C, Fernandes M, Veríssimo M. Comparison between actigraphy records and parental reports of child's sleep. *Front Pediatr*. 2020;8:567390. Available from: <https://doi.org/10.3389/fped.2020.567390>
25. Wallace ML, Kissel N, Hall MH, Germain A, Matthews KA, Troxel WM, et al. Age trends in actigraphy and self-report sleep across the life span: findings from the Pittsburgh Lifespan Sleep Databank. *Psychosom Med*. 2022;84(4). Available from: https://journals.lww.com/psychosomaticmedicine/abstract/2022/05000/age_trends_in_actigraphy_and_self_report_sleep.3.aspx
26. Ohayon M, Wickwire EM, Hirshkowitz M, Albert SM, Avidan A, Daly FJ, et al. National Sleep Foundation's sleep quality recommendations: first report. *Sleep Health*. 2017;3(1):6-19. Available from: <https://doi.org/https://doi.org/10.1016/j.sleh.2016.11.006>

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