Centre for
Active Living

2019 ALBERTA SURVEY ON PHYSICAL ACTIVITY

Supported by: Alberta Government · University of Alberta

Report prepared by:

Soultana Macridis, PhD
Research Associate & Knowledge Translation Specialist
Centre for Active Living
Faculty of Kinesiology, Sport, and Recreation
University of Alberta

Nora Johnston, MA
Director
Centre for Active Living
Faculty of Kinesiology, Sport, and Recreation
University of Alberta

Published by:

Centre for
Active Living

2-131 University Hall, University of Alberta, Edmonton, Alberta, Canada T6G 2H9
780.492.4863 | active.living@ualberta.ca | www.centre4activeliving.ca
Twitter: @Centre4AL | Facebook: /Centre4AL | YouTube: Centre4ActiveLiving1

TABLE OF CONTENTS

INFOGRAPHIC 4

EXECUTIVE SUMMARY 5

Report Highlights

- Physical Activity in Alberta 6
- Walking in Alberta 7
- Sedentary Behaviour Time in Alberta 7
- Sleep Behaviour 8

Recommendations 9

FULL REPORT 13

Leisure-time Physical Activity Levels in Alberta 18

Factors Influencing Leisure-time Physical Activity

- Sociodemographic Factors 19
- Psychological Factors 21
- Environmental Factors 22

Predictors of Sufficient Physical Activity Levels

- Sociodemographic Predictors 23
- Psychological Predictors 24
- Environmental Predictors 24

Walking Behaviour 27

Sedentary Behaviour 31

Sleep Behaviour 35

Overall Summary 42

Appendix 52

References 57

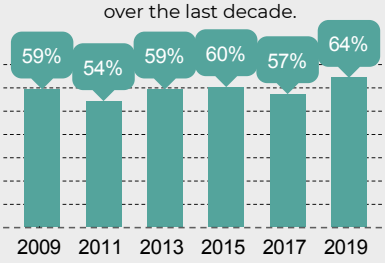
2019 Alberta Survey on Physical Activity, Sedentary Behaviour, and Sleep

The Alberta Survey on Physical Activity has reported on adult physical activity status and determinants of physical activity in the province since 1993. In 2019, sleep behaviour was examined. The main findings and recommendations are included in this infographic. See the full report for details.

Active living is a way of life that incorporates a combination of:
- 150 minutes of moderate-to-vigorous physical activity weekly,
- incidental physical activity every hour, and
- low levels of sedentary behaviour during waking hours.

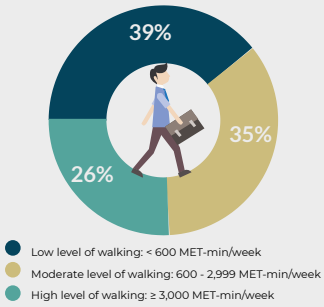
Overall Physical Activity Levels of Albertans 2009-2019

Although highest in 2019, physical activity levels have remained relatively consistent over the last decade.



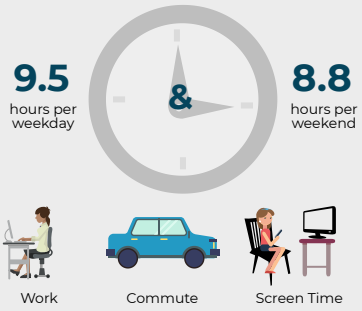
Overall Walking Levels

26% of Albertans achieve high levels of walking



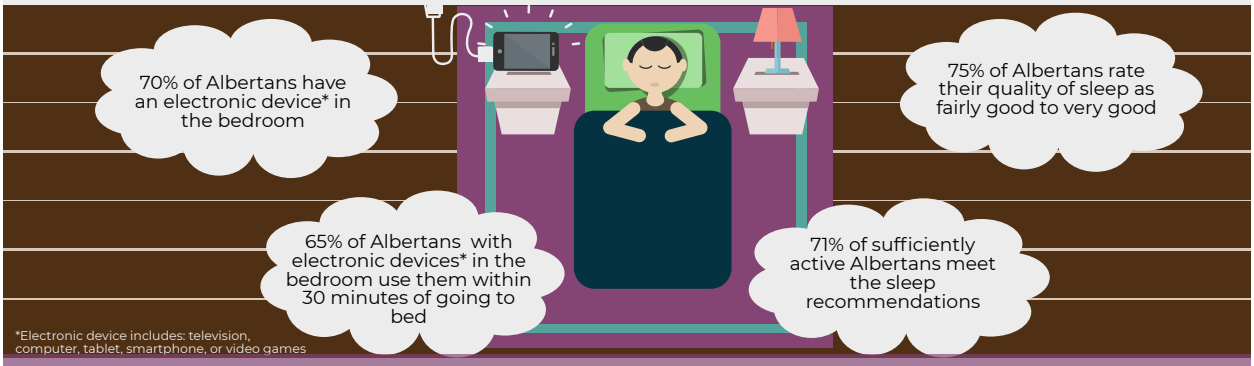
Sedentary Behaviour

During the week, Albertans sit for:



Sleep Behaviour

Albertans sleep an average of 7.6 hours per weekday and 8.3 hours per weekend day



Sleep Recommendations

- Adults, **18 to 64 years**, of age should achieve **7 to 9 hours** of sleep.
- Adults **≥ 65 years** should achieve **7 to 8 hours** of sleep.

Building Healthy Sleep Habits

- Make time for sleep.
- Maintain a regular sleep schedule.
- Limit distractions including light and sound.
- Avoid electronic devices at least 30 minutes before bed.
- Engage in regular physical activity mid-day or late afternoon to avoid sleep disruptions.
- Keep track of sleep patterns.

Full report available at www.centre4activeliving.ca

Centre for **Active Living**

EXECUTIVE SUMMARY

The Alberta Survey on Physical Activity has reported on the physical activity status and trends of adult Albertans biennially since 1993. This survey series is part of the Centre for Active Living's (CAL) strategy to provide credible and user-friendly physical activity information to researchers, practitioners, communities and decision-makers. This is the first year that the Alberta Survey on Physical Activity reports on sleep behaviour of Albertans.

Physical inactivity and sedentary behaviour are risk factors for many chronic physical and mental health conditions, such as premature mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes, depression, and anxiety.[1-4] The Canadian Physical Activity Guidelines recommend that adults engage in a minimum of 150 minutes of moderate-to-vigorous physical activity per week and should minimize the amount of sitting time to achieve health benefits.[5] Sedentary behaviour includes sitting or lounging activities during waking hours and requires very little energy expenditure.[6] Common sedentary behaviours include working on a computer, watching television, and driving or riding in a car.
A sedentary lifestyle has physiological effects that are independent and distinct from being physically inactive.[7]

In recent years, sleep behaviour has been examined in relation to physical activity and sedentary behaviour. Sleep behaviour is recognized as an important determinant of overall health and well-being,[8,9] and is important for neural development, learning, memory, emotional regulation, metabolic health, and cardiovascular health.[10] There is evidence to suggest that being physically active can support improvements in sleep. In fact, both regular and small bouts of physical activity can have benefits on overall sleep, sleep efficiency, sleep onset latency, sleep quality, and rapid eye movement sleep. In fact, increasing minutes of moderate-to-vigorous physical activity per session has shown to improve sleep onset latency — in other words, reduce the time it takes to fall asleep.

Sleep Terms[11]

- Sleep (onset) Latency: length of time between going to bed and falling asleep.
- Total Sleep: total time of actual sleep, which is the sum of all time spent in each of the stages of sleep.
- Sleep Efficiency: the percentage of time of actual sleep out of all the time sleeping and trying to sleep.
- Sleep Stages: sleep normally progresses through a series of four stages in repeated cycles of about 90 minutes.
- Non-rapid Eye Movement Light Sleep: progressively deepening sleep as determined by the brain wave activity and arousal thresholds.
- Non-rapid Eye Movement Slow Wave Sleep: deep sleep, characterized by slow brain wave activity and is associated with memory consolidation. Slow wave sleep declines with age.
- Rapid Eye Movement Sleep: episodes of rapid eye movements, brain wave activation, lack of tone in skeletal muscles, and dreaming.

Report Highlights

Physical Activity in Alberta

64% of Albertans get enough physical activity to achieve health benefits

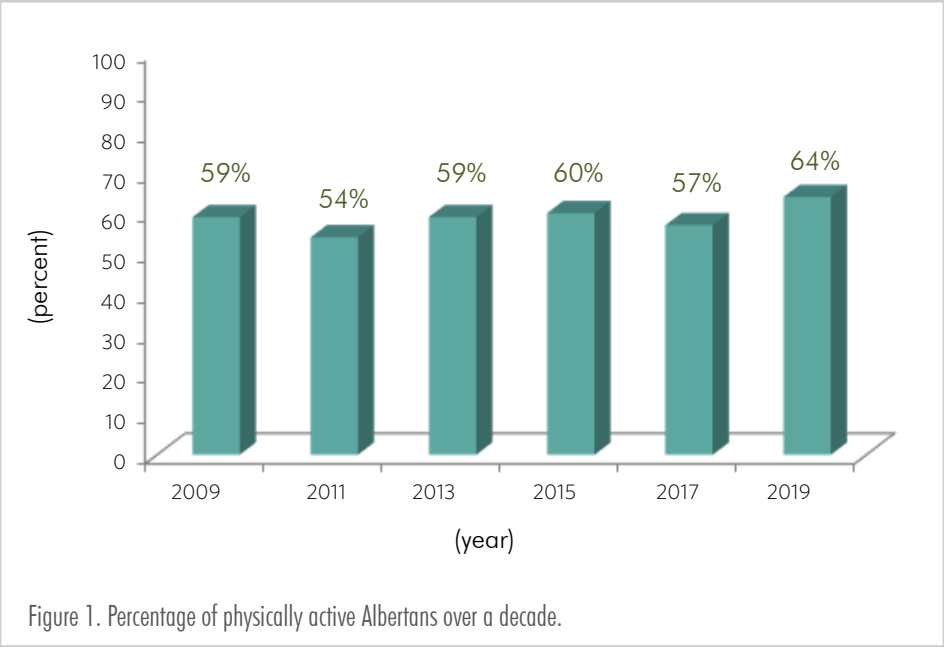


Figure 1. Percentage of physically active Albertans over a decade.

Although this number is slightly higher than the 2017 survey report, physical activity levels have remained relatively consistent over the last decade.

Walking in Alberta

Walking is the most popular physical activity among Albertans,[12] with 26% of Albertans achieving high levels of walking (which is equivalent to approximately 12,500 steps per day) and 35% of Albertans achieving moderate levels of walking (approximately 2,500 to < 12,500 steps).

26% of Albertans achieve high levels of walking

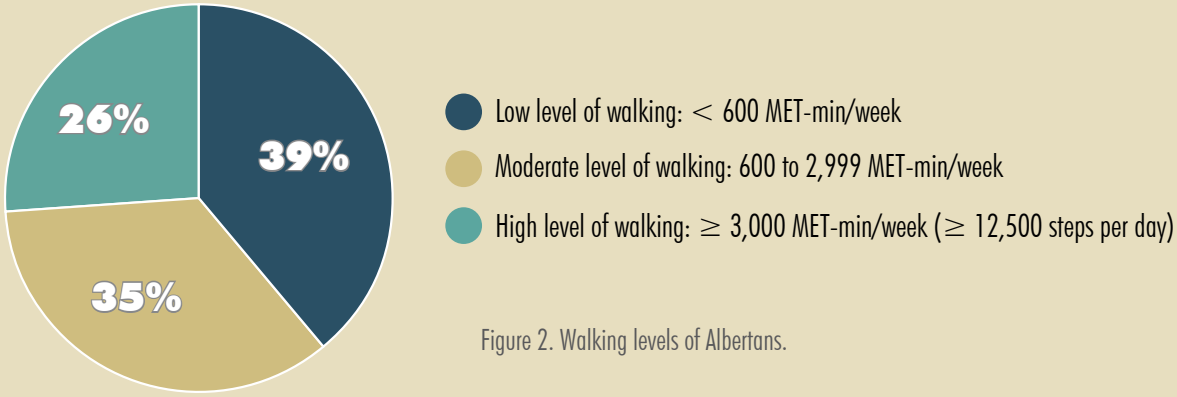


Figure 2. Walking levels of Albertans.

Sedentary Behaviour Time in Alberta

Albertans spend an average of 9.5 hours per weekday and 8.8 hours per weekend day in sedentary activities. These numbers are similar to those found in the previous two survey reports found on the CAL website: www.centre4activeliving.ca/our-work/alberta-survey-physical-activity/

Albertans were categorized into tertiles according to their level of sedentary behaviour time during waking hours. Thirty-seven percent of Albertans are sedentary for more than 10 hours per day.

37% of Albertans are sedentary > 10 hours per day

Sleep Behaviour

Albertans sleep an average of **7.6 hours per weekday** and **8.3 hours per weekend day**.

Table 1. Average Weekly Sleep Time Among Albertans

	Sleep Time (%)		
	Below Recommendations[a]	Meet Recommendations [b]	Above Recommendations[c]
Adults, 18 to 64 years of age (n = 963)	14	74	12
Adults, ≥ 65 years of age (n = 164)	12	44	44
All adults (n = 1,127)	14	70	16

Notes:

[a] *Below recommendations* is < 7 hours per day.

[b] *Meeting recommendations* are ≥ 7 to ≤ 9 hours per day for adults, 18 to 64 years, and ≥ 7 to ≤ 8 hours per day for adults, 65 years or greater.

[c] *Above recommendations* are > 9 hours for adults, 18 to 64 years, and > 8 hours for adults, 65 years or greater.

- Of Albertans, 18 to 64 years of age, 74% meet the recommendations of 7 to 9 hours of sleep per day.
- Of Albertans, 65 years of age or older, 44% meet the recommendations of 7 to 8 hours of sleep per day.
- 75% of Albertans rate their quality of sleep as good or very good.
- 55% of Albertans use an electronic device within 30 minutes of going to sleep.

When examining physical activity levels and sleep behaviour, 71% of sufficiently active Albertans meet the sleep time recommendations.

71% of sufficiently active Albertans meet the sleep time recommendations

Recommendations

Modifications to lifestyles, programs, services, environments, and policies can impact Albertans' time spent being physically active and sedentary. Developing various strategies to support Albertans to move more and sit less in their daily lifestyle is important in addressing the public health concern of physical inactivity and sedentary behaviour (Table 1).

At the same time, expending more energy throughout the day can also support achieving sufficient and quality sleep time. Supporting Albertans to develop healthy sleep habits and achieve sleep recommendations can reduce the potential development of physiological and mental health problems associated with too few or too many hours of sleep. Table 2 outlines strategies to support moving more, sitting less, and achieving sleep recommendations.

Table 2. Exemplar Methods of Increasing Physical Activity, Decreasing Sedentary Behaviour, and Supporting Sleep

Leisure-time	**Family and friends**
	■ Do physical activities your family enjoys or try new ones. ■ Walk with friends after dinner. ■ Stand while you talk on the phone. ■ Provide intergenerational physical activities that the whole family can participate in. ■ Set up a friendly physical activity tracker challenge with family and friends to support each other in being active, e.g., visit UWALK.ca.
	Outdoors
	■ Explore local parks, trails, recreation facilities, and school yards to be physically active. ■ Maintain safe outdoor spaces for physical activity all year round.
	Dog walking
	■ Make a habit of walking your dog 2 to 3 times a day. ■ Be a volunteer dog walker at the local animal shelter.
	Community
	■ Start a walking group or club in your neighbourhood. ■ Join a sports team or physical activity group. ■ Create a walking group using local trails, parks, and indoor facilities including recreation centres and malls. ■ Do not use the drive-through window. Instead, model active behaviour to friends, family, and others by getting out of the vehicle.

Transportation

Walk/wheel

Walk to do errands, travel to work, and meet up with friends.

- Park 10 minutes away from work to add 20 minutes of walking to your daily routine. This can add up to an extra 100 minutes of moderate physical activity per week.
- Take public transportation (bus or train). Individuals who take public transportation walk more than vehicle commuters.
- Get off the bus early and walk the rest of the way.
- Park farther from the store.
- Wear a physical activity tracker or use a physical activity application to measure:
  - physical activity and sitting time
  - daily steps and distance travelled
- Set up step challenges with family, friends, or co-workers (UWALK.ca).

Ride (cycle or skateboard)

Cycle to do errands, travel to work, and visit friends.

- The cities of Edmonton and Calgary are expanding their bike commuter routes. Visit their websites to map out the best paths and learn the rules of the road for safe cycling.
- Cities and towns can develop safe commuter routes and provide education to cyclists and drivers on how to share the road.
- Track the distance travelled and compare each day with a physical activity tracker.

Communities

- Build sidewalks and pathways.
- Add effective streetlights to light the way.
- Build safe, protected bike lanes.
- Provide secure bike racks and storage by popular amenities.
- Develop bike-share programs (e.g., Calgary, www.li.me/locations/calgary; Bixi-Montréal, bixi.com).
- Re-purpose streets with an Open Streets Model (e.g., 8-80 Cities Open Streets, www.healthiestpracticeopenstreets.org).
- See Active Transportation in Canada: A Resource and Planning Guide www.fcm.ca/Documents/tools/GMF/Transport_Canada/ActiveTranspoGuide_EN.pdf.
- Use a "Complete Streets" approach to community planning.
- Establish an "Open Streets" policy.

Workplace

Stand more

Use a standing desk and/or standing tables for meetings.

- Stand when you are speaking on the phone.
- Walk down the hall to speak with a co-worker rather than use email.

Take breaks from sitting

Take active breaks instead of coffee breaks.

- Set an activity tracker, phone application, or computer reminder hourly to remind yourself to move around.
- Schedule physical activity time into your calendar.

Make being active easy and attractive

- Maintain attractive and safe stairwells.
- Provide showers, bike storage, fitness equipment, walking maps, and/or communal gardens at work.
- Do workplace physical activity challenges on the UWALK.ca website or with physical activity trackers.

Develop a culture of physical activity

- Provide free or subsidized:
  - bus passes
  - commuter bike purchasing
  - access to fitness centres
  - physical activity classes
- Encourage senior management to be a positive role model for physical activity.
- Respect co-workers' physical activity breaks as non-negotiable time away from the office.
- Share monthly physical activity tips at the workplace.
- Start a UWALK.ca walking challenge, walking group, or sports team.
- Stay in hotels with fitness centres and use them.
- Find a physical activity buddy at work.
- Take the stairs instead of the elevator.

Sleep	Build healthy sleep habits
	■ Make time for sleep. ■ Maintain a regular sleep schedule. ■ Set the stage for a comfortable sleep environment. ■ Limit distractions including light and noise. ■ Avoid using electronic devices, such as a television, computer, tablet, smartphone, or video games, at least 30 minutes prior to going to bed. ■ Engage in regular physical activity at mid-day or late afternoon to avoid sleep disruptions. ■ Track your sleep patterns using a sleep diary (css-scs.ca/files/resources/brochures/Sleep%20Journal.pdf).
	For shift workers
	■ Use light blocking or opaque curtains to condition your biological clock. ■ Take a nap before starting the next shift. ■ Avoid reliance on sleep medications to sleep during the day.

Rationale

Physical inactivity and sedentary behaviour are risk factors for many chronic physical and mental health conditions, such as premature mortality, cardiovascular disease, stroke, hypertension, colon cancers, breast cancer, type 2 diabetes, depression, and anxiety.[1-4]

The Canadian Physical Activity Guidelines recommend that adults engage in a minimum of 150 minutes of moderate-to-vigorous physical activity per week and should minimize the amount of sitting time to achieve health benefits.[5] Sedentary behaviour includes sitting or lounging activities during waking hours and requires very little energy expenditure.[6] Common sedentary behaviours include working on a computer, watching television, and driving or riding in a car. A sedentary lifestyle has physiological effects that are independent and distinct from being physically inactive.[13]

The Alberta Survey on Physical Activity has reported on the physical activity status of adult Albertans biennially since 1993. This survey provides trends in physical activity status of Albertans over the years. Most recently, sleep behaviour has been examined in terms of health and well-being. This is the first year that the Alberta Survey on Physical Activity reports on sleep behaviour of Albertans.

Background

Survey Methods

The Alberta Survey on Physical Activity included a series of questions related to physical activity, walking, sedentary behaviour, and sleep behaviour, which was conducted by Banister Research in Edmonton, Alberta.

The sample included 1,200 adults living in Alberta, of which 601 were females and 599 were males (see Table 3).

Table 3. Gender of Respondents by Edmonton, Calgary, Other Alberta, and All Alberta

Gender	Edmonton	Calgary	Other Alberta	All Alberta
Male	213	203	183	599
Female	187	197	217	601
Total sample	400	400	400	1,200

Data collection methods included the following:

- Telephone interviews were conducted between June 4th and June 28th, 2018.
- Respondents were 18 years of age or older at the time of the survey and were living in households that could be contacted by direct dialing.
- A random-digit dialing approach ensured that respondents had an equal chance of being contacted whether or not their household was listed in a telephone directory.
- For 2018, sampling frames of telephone numbers included both landline (60%) and cell phone (40%) numbers, which were randomly generated by an outside vendor.
- Questions were asked about:
  - leisure-time physical activity,
  - walking,
  - sedentary behaviour,
  - self-efficacy, beliefs, and attitudes about physical activity,
  - access to physical activity,
  - sleep behaviour, and
  - demographics.

Data Quality

Of households contacted, 6% responded to the survey. Out of the total sample loaded (n = 32,767), 83% declined to participate in the survey.

The random sample of 1,200 is considered accurate +/– 2.8%, 19 times out of 20. Subsamples of 400 are considered to be accurate within +/– 4.8%, 19 times out of 20.

Please note, the subsamples of Edmonton metropolitan, Calgary metropolitan, and the rest of Alberta do not necessarily represent the age and gender of the populations in these specific regions. *Caution is advised in generalizing the findings related to these subsamples to the overall populations in these regions.*

Estimated Leisure-time Physical Activity

To estimate the leisure-time physical activity level of each respondent, the following questions were asked (adapted from the Godin Leisure-Time Exercise Questionnaire):[14]

> *Considering a 7-day period (week), we'd like to know how many times a week, on average, you do the following kinds of activity for more than 15 minutes during your free time:*
>
> - ***Strenuous*** *— activity is exhausting and typically makes you sweat and your heart beat faster (e.g., running, hockey, soccer, aerobics, cross country skiing, and vigorous swimming).*
> - ***Moderate*** *— activity is not exhausting (e.g., fast walking, easy bicycling, easy swimming, and dancing).*
> - ***Mild*** *— activity requires only minimal effort and doesn't usually cause you to sweat (e.g., yoga and easy walking).*

Weekly frequencies of strenuous, moderate, and mild activities were multiplied by their estimated value in METs[1] (nine, five and three, respectively). Then the total weekly leisure activity was calculated by adding the products of the three components.

Based on cut-offs determined by Garcia Bengoechea, Spence, and McGannon,[16] men were categorized as sufficiently physically active if they expended 38 METs per week and women sufficiently physically active if they expended 35 METs per week.

According to Jacobs, Ainsworth, Hartman, and Leon,[17] these measures equal 300 to 400 MET-minutes per day which equals 2,000 kilocalories per week.[18] An energy expenditure of 2,000 kilocalories or more per week is associated with a reduced risk of heart disease.[19]

Estimated Walking Behaviour

To estimate walking levels, the respondents self-reported their time spent walking for work, transportation, and leisure. The International Physical Activity Questionnaire — Long Form[20] questions for walking were used to assess duration and frequency of walking across each domain and in total. MET-minutes per week were calculated for walking by multiplying:

3.3 METs x duration in minutes x frequency per week for each domain of walking (work, transportation, and leisure)

These domain specific scores were summed to generate total walking MET-minutes/week. For example, walking for 30 minutes, 5 days per week would be equivalent to 495 MET-minutes/week:

3.3 METs x 30 min x 5 days = 495 MET-minutes/week

Walking behaviour was categorized according to the cut-off values determined by the International Physical Activity Questionnaire. A low level of walking was considered less than 600 MET-min/week. A moderate level of walking was considered 600 to 2,999 MET-min/week. A high level of walking was considered ≥ 3,000 MET-min/week.

[1] A MET is a measure of energy output equal to one's basal resting metabolic rate which is assumed to be 3.5 $mL \cdot kg^{-1} \cdot min^{-1}$.[14] Thus, two METs are equivalent to an intensity twice that of the resting metabolic rate. Physical activity intensity is often expressed in METs.

Estimated Sedentary Behaviour

The Sedentary Behaviour Questionnaire[21] was used to estimate time spent in sedentary behaviour during a typical week. Nine types of sedentary activities were assessed including: watching television, playing computer/video games, sitting while listening to music, sitting and talking on the phone, doing paperwork or office work, sitting and reading, playing a musical instrument, doing arts and crafts, and sitting to drive/ride in a car, bus or train.

Scores were summed to calculate sedentary time in minutes per weekdays and weekend days. The average sedentary behaviour time per week was calculated according to the following:

$$\frac{(\text{weekday SB}^* \times 5 \text{ days}) + (\text{weekend SB} \times 2 \text{ days})}{7 \text{ days}} = \text{average daily sedentary behaviour time}$$

*SB = sedentary behaviour time per day

The average daily sedentary behaviour time was categorized according to the lowest, middle, and highest tertiles (thirds) of the sample.

Estimated Sleep Behaviour

To estimate sleep behaviour, questions from the Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES)[21] and Pittsburgh Sleep Quality Index[23] were utilized. Respondents self-reported the usual time they fall asleep and wake up on weekdays or workdays, as well as on weekends or non-work days. In addition, respondents rated their overall quality of sleep; indicated whether they have an electronic device, such as a television, computer, tablet, smartphone, or video game, in their bedroom; and whether they use electronics before bedtime.

For adults, 18 to 64 years of age, 7 to 9 hours of sleep per night are recommended. For adults, 65 years of age or greater, 7 to 8 hours of sleep per night are recommended.[24,25]

An average of Albertans' sleep duration on weekdays or workdays, as well as on weekends or non-work days, was calculated.

The average daily sleep behaviour time is categorized in table 4.

$$\frac{(\text{weekday or workday sleep} \times 5) + (\text{weekend or non-workday} \times 2)}{2} = \text{average daily sleep behaviour time}$$

Table 4. Categories of Average Sleep Behaviour Time of Adults

Adults, 18 to 64 Years	Adults, ≥ 65 Years	Sleep Behaviour Category
< 7 hours	< 7 hours	Below recommendations
≥ 7 hours to ≤ 9 hours	≥ 7 hours to ≤ 8 hours	Meet recommendations
> 9 hours	> 8 hours	Above recommendations

Statistical Analysis

The data was weighted to compensate for subsample sizes in three categories — Edmonton, Calgary, and the rest of Alberta — as these were not proportional to the Alberta populations they represent. Additionally, the weighting took into consideration the population by census metropolitan area, gender and age group, based on the standard Geographical Classification 2011, annual (persons), and CANSIM (database).[26]

Descriptive statistics were calculated to determine the frequency of sufficiently active and inactive Albertans, as well as the proportion of Albertans participating in low, moderate, and high levels of walking. Sedentary behaviour time was calculated into tertiles to identify lowest, middle, and highest levels of sedentary behaviour among the sample of Albertans. Average weekly sleep behaviour was also categorized into tertiles to identify Albertans who were achieving the recommendations and who were above or below the recommendations.

A series of chi-square analyses were performed to test differences in leisure-time physical activity status (sufficiently active vs. insufficiently active) related to several sociodemographic and psychological factors. Two separate binary logistic regressions determined the unique contributions of psychological variables (e.g., confidence participating in physical activity) and accessibility variables (e.g., having easy access to places where one can be physically active) in predicting the likelihood of being sufficiently active when controlling for other variables (e.g., age).

Next, a series of chi-square analyses were conducted to test differences in the amount of walking levels according to various sociodemographic factors:

- low (< 600 MET-min/week)
- moderate (600 to 2,999 MET-min/week)
- high (≥ 3,000 MET-min/week)

A series of chi-square analyses were conducted to test differences in sedentary behaviour time according to different sociodemographic factors:

- lowest (< 6.8 hours per day)
- middle (≥ 6.8 to < 10 hours per day)
- highest (≥ 10 hours per day) tertiles.

Finally, a series of chi-square analyses were conducted to test differences in sleeping behaviour according to sociodemographic factors, as well as leisure-time physical activity status, walking levels, and sedentary behaviour time:

- low (< 7 hours/night)
- average (7 to 9 hours/night for adults, 18 to 64 years | 7 to 8 hours/night for adults ≥ 65 years)
- high (> 9 hours/night for adults, 18 to 64 years | > 8 hours/night for adults ≥ 65)[24]

LEISURE-TIME PHYSICAL ACTIVITY LEVELS IN ALBERTA

Findings

Although this number is slightly higher than the 2017 survey report, physical activity levels have remained relatively consistent over the last decade.

64% of Albertans get enough physical activity to achieve health benefits

Figure 3. Percentage of physically active Albertans over a decade.

Factors Influencing Leisure-time Physical Activity

Sociodemographic Factors

Sociodemographic factors assessed include: gender, age, education, annual household income, marital status, children in the household, and employment status. Only significant relationships between sociodemographic factors and physical activity participation were included in this section.

Age

Physical activity levels differ significantly according to age. Generally, physical activity levels decrease as Albertans age. As seen in Table 5, the proportion of sufficiently active Albertans drops steadily with each increase in the age category, with the exception of adults aged 35 to 44 years. Although this decrease is observed, compared to the previous report, there has been an increase in the proportion of sufficiently active adults within each age category.

Table 5. Albertans' Physical Activity Status According to Age Categories

Age: χ^2 (5, 1167) = 25.43, p < 0.001
■ 18 to 24 years (75% physically active)
■ 25 to 34 years (67% physically active)
■ 35 to 44 years (69% physically active)
■ 45 to 54 years (64% physically active)
■ 55 to 64 years (63% physically active)
■ ≥ 65 years (50% physically active)

Education

The proportion of sufficiently active Albertans is higher among those who completed high school or pursued post-secondary education compared to those who did not complete high school.

Table 6. Albertans' Physical Activity Status According to Education Categories

Education: χ^2 (2, 1190) = 10.10, p < 0.05
■ Less than high school education (48% physically active)
■ High school education (62% physically active)
■ Pursued post-secondary education (78% physically active)

Annual Household Income

The percentage of sufficiently active Albertans is highest among those with a household income of $125,000 or greater. Compared to the previous report, this year's report shows an increase in the proportion of sufficiently active adults within the annual household income category of <$20,000 and the $125,000 to $149,999 category.

Table 7. Albertans' Physical Activity Status According to Household Income Categories

Annual Household Income: χ^2 (5, 846) = 26.66, p < 0.05
■ < $20,000 (46% physically active)
■ $20,000 to $59,999 (53% physically active)
■ $60,000 to $99,999 (62% physically active)
■ $100,000 to $124,999 (65% physically active)
■ $125,000 to $149,999 (79% physically active)
■ ≥ $150,000 (72% physically active)

Employment Status

The percentage of Albertans who are sufficiently active varies according to employment status. Albertans who are unemployed, retired, on a leave, or on disability are less likely to be active than those who are students or employed. Of note, the proportion of sufficiently active adults who are unemployed has increased compared to the previous report.

Table 8. Albertans' Physical Activity Status According to Employment Status

Employment Status: χ^2 (5, 1198) = 21.99, p < 0.05
■ Full-time employment (67% physically active)
■ Part-time employment (68% physically active)
■ Student (71% physically active)
■ Unemployed (63% physically active)
■ Retired/semi-retired (52% physically active)
■ On leave/disability (44% physically active

Marital Status

The proportion of sufficiently active Albertans is highest among those who are separated or are single people that have never been married, followed by those who are common-law or have a live-in partner.

Table 9. Albertans' Physical Activity Status According to Marital Status

Marital Status: χ^2 (5, 1185) = 18.22, p < 0.05
■ Never married (single) (71% physically active)
■ Married (62% physically active)
■ Common-law/live-in partner (70% physically active)
■ Divorced (60% physically active)
■ Separated (60% physically active)
■ Widowed (47% physically active)

Psychological Factors

Confidence in Physical Activity Participation

Participation in physical activity is related to a person's confidence in their ability to successfully execute the steps needed to be physically active. Three types of physical activity self-efficacy were examined: general self-efficacy, coping self-efficacy, and scheduling self-efficacy. Higher levels of self-efficacy are associated with the initiation and maintenance of regular physical activity.

The proportion of physically active Albertans increases with greater general, coping and scheduling self-efficacy.

Table 10: Albertans' Physical Activity Status According to Levels of Self-efficacy

General Self-efficacy: χ^2 (2, 1190) = 171.81, $p < 0.001$

General self-efficacy: overall confidence to participate in regular physical activity.

- A lot (74% physically active)
- Some (43% physically active)
- None (13% physically active)

Coping Self-efficacy: χ^2 (2, 1193) = 171.58, $p < 0.001$

Coping self-efficacy: confidence to overcome potential barriers to physical activity such as bad weather, feeling tired or being in a bad mood.

- A lot (86% physically active)
- Some (60% physically active)
- None (30% physically active)

Scheduling Self-efficacy: χ^2 (2, 1198) = 172.54, $p < 0.001$

Scheduling self-efficacy: confidence to arrange one's schedule to participate in regular physical activity and overcome potential barriers associated with time constraints.

- A lot (78% physically active)
- Some (49% physically active)
- None (15% physically active)

Physical Activity Intentions and Beliefs

Health outcome expectancy beliefs of physical activity, intentions to be physically active, and perceptions that if one wanted to, one could easily participate in regular physical activity (perceived behavioural control) were assessed.

- ***Health outcome expectancies*** of physical activity refers to a person's belief that regular physical activity results in positive health consequences.[27]
- ***Perceived behavioural control*** refers to a person's perception of their ability to do physical activity regularly.[27]
- ***Intentions*** are a person's readiness to engage in regular physical activity, and it is considered to be the plan prior to engaging in physical activity.[27]

The proportion of sufficiently active Albertans increased as health outcome expectations, perceived behavioural control of physical activity, and behavioural intentions to be physically active increased.

Table 11: Albertans' Physical Activity Status According to Health Outcome Expectancy, Perceived Behavioural Control, and Behavioural Intentions to be Physically Active

Health Outcome Expectations:	χ^2 (2, 1198) = 27.38, p < 0.001
■ Disagree (20% physically active)	
■ Neutral (38% physically active)	
■ Agree (66% physically active)	
Perceived Behavioural Control:	χ^2 (2, 1194) = 125.06, p < 0.001
■ Disagree (22% physically active)	
■ Neutral (41% physically active)	
■ Agree (72% physically active)	
Behavioural Intentions:	χ^2 (2, 1194) = 130.38, p < 0.001
■ Disagree (23% physically active)	
■ Neutral (40% physically active)	
■ Agree (73% physically active)	

Environmental Factors

Environmental factors, such as access and proximity to recreational facilities and green spaces, have been associated with physical activity participation.[28] A greater proportion of Albertans who agreed that they have access to a place to be physically active attained a sufficient amount of physical activity.

Table 12: Albertans' Physical Activity Status According Perceived Access to Places to be Physically Active

Perceived Accessibility:	χ^2 (2, 1195) = 46.52, p < 0.001
■ Disagree (30% physically active)	
■ Neutral (57% physically active)	
■ Agree (68% physically active)	

Predictors of Sufficient Physical Activity Levels

Sociodemographic, psychological, and environmental factors were assessed as predictors of physical activity status using sequential logistic regression. The findings from these analyses are below.

Sociodemographic Predictors

The first series of analysis assessed the ability of sociodemographic factors (gender, age, income, education, employment status, children in the household, and marital status) in predicting physical activity status. Age, education, and household income were the only sociodemographic factors that predicted physical activity status. See Table 36 in the Appendix for the complete logistic regression results.

Age

- Albertans who are 65+ years were 0.34 times as likely to be physically active as Albertans between 18 to 24 years.

Education

- Albertans who have pursued a post-secondary education were 2.18 times as likely to be physically active as Albertans who have less than a high school education.

Annual Household Income

Compared to physical activity levels of Albertans with an annual household income of less than $20,000, Albertans with an annual household income:

- between $125,000 to $149,999 were 3.50 times more likely to be physically active;
- equal to or greater than $150,000 were 2.98 times more likely to be physically active.

Psychological Predictors

After controlling for sociodemographic factors, the psychological predictors (general self-efficacy, coping self-efficacy, and intentions to participate in regular physical activity) were assessed according to physical activity status in the second step of the analysis (see Table 37 in the Appendix for the complete logistic regression results). General self-efficacy, scheduling self-efficacy, and intentions to participate in physical activity were able to predict physical activity status.

General Self-efficacy:

- Albertans with moderate levels of general self-efficacy were 3.42 times more likely to be sufficiently physically active than those without general self-efficacy.
- Albertans with high levels of general self-efficacy were 6.47 times more likely to be sufficiently physically active than those without general self-efficacy.

Scheduling Self-efficacy:

- Albertans with high levels of scheduling self-efficacy were 6.01 times more likely to be sufficiently physically active than those without scheduling self-efficacy.

Intentions

- Albertans with high levels of intentions to participate in regular physical activity were 3.86 times more likely to be sufficiently physically active than those without intentions to participate in regular physical activity.

Environmental Predictors

After controlling for sociodemographic factors, the environmental predictor of access to places to be physically active was assessed for physical activity status in the second step of the analysis (see Table 38 in the Appendix).

Access to Places to be Physically Active:

- Albertans that have access to a place to be physically active were 4.05 times more likely to be sufficiently physically active than those without access to a place to be physically active.

Summary of Physical Activity Status of Albertans

The proportion of physically active Albertans has remained relatively constant over the last decade.

64% of Albertans report participating in a sufficient amount of physical activity for health benefits

Examining physical activity levels according to sociodemographic factors can provide insight for the development and implementation of physical activity programs and initiatives. These demographic trends of Albertans can help identify:

1) Albertans that could benefit from assistance in the maintenance of their current physically active lifestyle throughout their lifespan, and
2) Physically inactive Albertans that need support to adopt a physically active lifestyle.

For example, physical activities gradually decrease with age with only half of the population over 65 years of age achieving sufficient levels of physical activity. Also, achieving sufficient levels of physical activity is highest among those with a high school education and those who have pursued a post-secondary degree. Learning more about how to motivate and encourage physical activity in different stages of age may also help support more Albertans to be active throughout the lifespan.

As another example, physical activity levels drop drastically for Albertans who have less than a high school education. Developing opportunities for these Albertans to be physically active may provide the support needed to participate in and maintain a physically active lifestyle.

Health behaviours, such as participation in physical activity, can be predicted according to sociodemographic, psychological and environmental factors.[29,30] Albertans are more likely to achieve a sufficient amount of physical activity if they are 18 to 24 years of age, have an annual household income equal to or greater than $125,000, have pursued a post-secondary education, have moderate to high levels of general self-efficacy, have high levels of scheduling self-efficacy, have high levels of intentions to participate in regular physical activity, and report access to a place to be physically active.

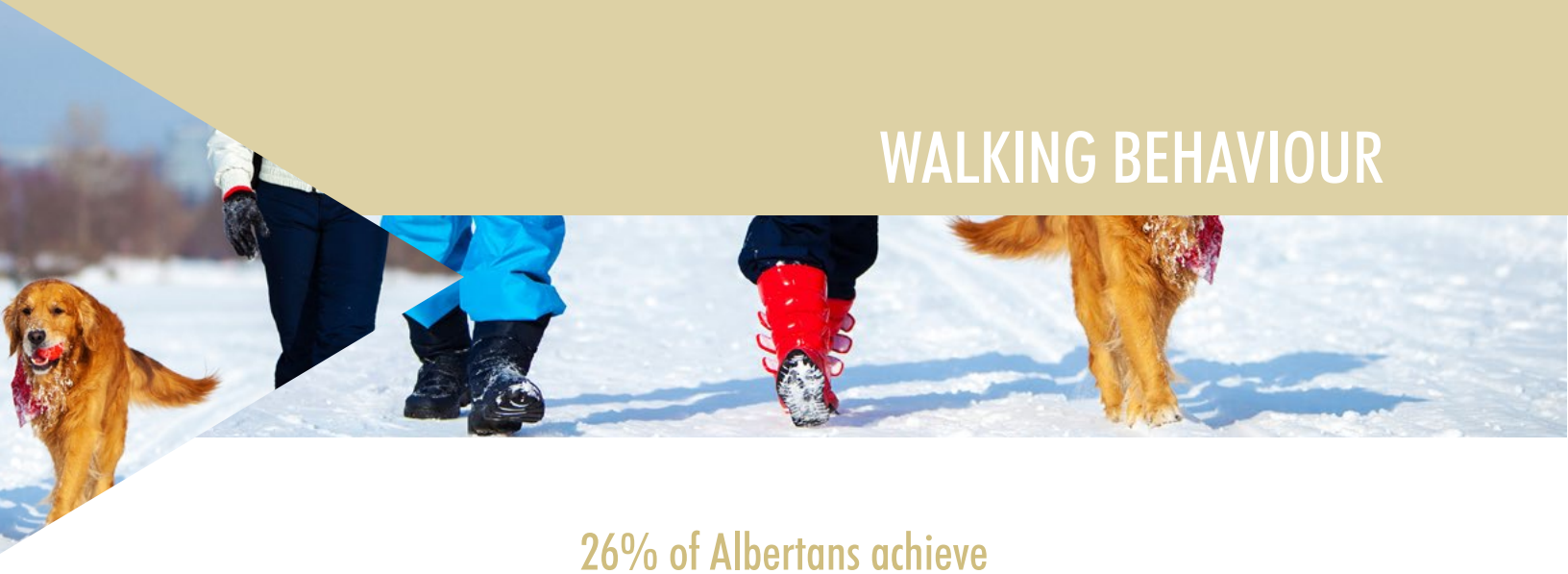
Helping Albertans build their confidence in their ability to participate in regular physical activity and to arrange one's schedule to participate in physical activity are examples of ways to overcome potential barriers that may arise. At the same time, it is important to understand Albertans' level of readiness to be able to support engagement in regular physical activity.

Examples of ways to enhance Albertans' general self-efficacy, scheduling self-efficacy, and intentions to participate in regular physical activity are:

- Provide opportunities for Albertans to experience and learn new physical activities as a way to build one's self-confidence in their ability to participate in regular physical activity (e.g., provide instructional materials including visuals on how to participate in an activity or a trial opportunity).
- Develop and disseminate materials that can motivate and help people to overcome common barriers in local or provincial programs and initiatives (e.g., provide babysitting; build places to walk safely in the dark, cold, icy winter; or provide information on how to support physical activity in the workplace).
- Share stories about how Albertans have overcome their physical activity barriers using online (e.g., blog, websites, and social media), print, and programs (e.g., cardiac rehabilitation groups, religious groups, and parent groups).
- Health practitioners can speak with clients about their level of readiness to be physically active and determine ways to overcome any barriers they may face by assisting them with a plan of action. To support this conversation, health practitioners can use the Centre for Active Living's Physical Activity Counselling Toolkit available at: www.centre4activeliving.ca/our-work/physical-activity-counselling-toolkit/.
- Share ideas about how Albertans schedule physical activity into their day-to-day lives, whether the activity occurs at home, during their commute, or at the workplace (e.g., identifying workplace physical activity opportunities and utilizing physical activity trackers or mobile applications reminders.)

Finally, providing equitable opportunities and access to places to be physically active all year round is an important public health strategy to reduce physical inactivity. Places to be physically active may include environments that consist of cycling paths, attractive and safe sidewalks or paths, open green spaces or parks, or even recreational facilities.[30]

WALKING BEHAVIOUR



26% of Albertans achieve high levels of walking (≥ 12,500 steps/day)

Walking is the most popular physical activity among Albertans,[12] with 26% of Albertans achieving high levels of walking (approximately ≥ 12,500 steps per day) and 35% of Albertans achieving moderate levels of walking (approximately 2,500 to < 12,500 steps).

Sociodemographic Factors Influencing Walking Behaviour

The influence of sociodemographic factors on walking behaviours of Albertans were assessed and include: gender, age, education, annual household income, marital status, children in the household, and employment status. Only significant relationships between sociodemographic factors and physical activity participation were included in this section.

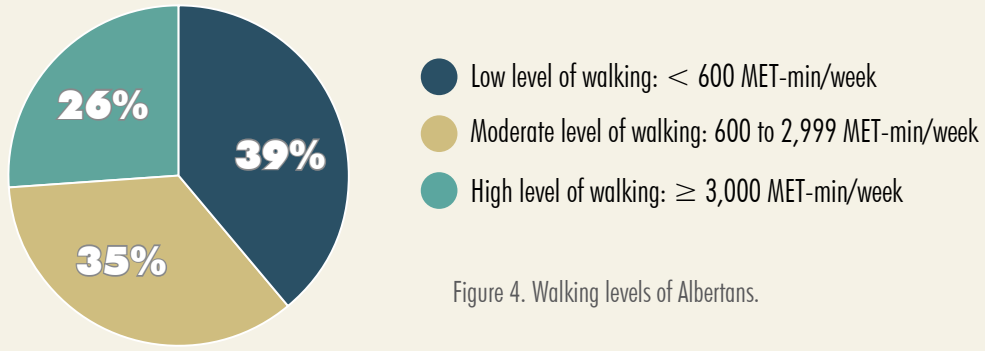


Figure 4. Walking levels of Albertans.

Age

Generally, walking levels decrease as Albertans age. Thirty-seven per cent of Albertans who are 25 to 34 years of age reported high levels of walking relative to only 12% of adults who are 65 years or older. Compared to the previous report, an increase was observed in the proportion of 18- to 24-year-old adults achieving high levels of walking.

Table 13. Percentage of Albertans in Low, Moderate, and High Walking Level Category According to Age

Age: χ^2 (10, 1168) = 67.01, p < 0.001			
	Walking Levels (%)		
Age	Low	Moderate	High
18 – 24 years	33	34	33
25 – 34 years	33	30	37
35 – 44 years	30	44	26
45 – 54 years	38	42	20
55 – 64 years	45	33	22
≥ 65 years	57	31	12

Annual Household Income

Walking levels are significantly different according to household income. Albertans with a household income less than $20,000, between $20,000 to $59,999, and between $100,000 to $124,999 had the greatest proportion of people in the low level of walking category. Additionally, Albertans with a household income of less than $20,000 did not achieve a high level of walking.

Table 14. Percentage of Albertans in Low, Moderate, and High Walking Level Category According to Annual Household Income

Annual Household Income: χ^2 (10, 846) = 25.38, p < 0.05			
	Walking Levels (%)		
Income	Low	Moderate	High
< $20,000	46	54	–
$20,000 to $59,999	42	34	24
$60,000 to $99,999	33	35	32
$100,000 to $124,999	44	27	29
$125,000 to $149,999	28	38	34
≥ $150,000	39	39	22

Employment Status

Walking levels of Albertans vary according to employment status. Full-time and part-time employed Albertans report the greatest rates of high levels of walking. Unemployed, retired/semi-retired, and individuals on leave/disability participate in low levels of walking with 43%, 62%, and 54%, respectively. Compared to the previous report, the proportion of students within low walking levels decreased, as the proportion of adults within moderate walking levels increased.

Table 15. Percentage of Albertans in Low, Moderate, and High Walking Level Categories According to Employment Status

Employment Status: χ^2 (10, 1199) = 93.64, p < 0.001			
	Walking Levels (%)		
Employment Status	Low	Moderate	High
Full-time employment	32	36	32
Part-time employment	39	31	30
Student	30	59	11
Unemployed	43	38	19
Retired/semi-retired	62	28	10
On leave/disability	54	39	7

Children in Household

Walking levels of Albertans are significantly different according to whether children (under 18 years of age) live in the household. Thirty percent of Albertans with children in the household achieve high levels of walking compared with 23% of Albertans with no children in the household.

Table 16. Percentage of Albertans in Low, Moderate and High Walking Level Categories According to Children (Under 18 Years of Age) Living in Household

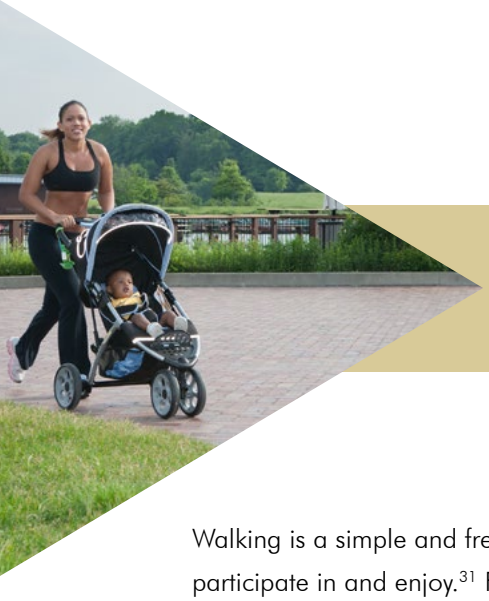
Children in Household: χ^2 (2, 1191) = 10.13, p < 0.05			
	Walking Levels (%)		
Children in Household	Low	Moderate	High
No children	42	35	23
Yes, children	33	37	30

Marital Status

Albertans who are divorced, separated, or widowed have the lowest proportion of people achieving high levels of walking. Those Albertans who are married and widowed have the highest proportion of people achieving low levels of walking with 43% and 55%, respectively. Compared to the previous report, an increase was observed in the proportion of divorced adults achieving moderate walking levels.

Table 17. Percentage of Albertans in Low, Moderate, and High Walking Level Categories According to Marital Status

Marital Status: χ^2 (10, 1185) = 26.57, p < 0.05			
	Walking Levels (%)		
Marital Status	Low	Moderate	High
Never married	32	35	33
Married	43	35	22
Common law/live-in partner	36	33	31
Divorced	36	43	21
Separated	37	42	21
Widowed	55	31	14

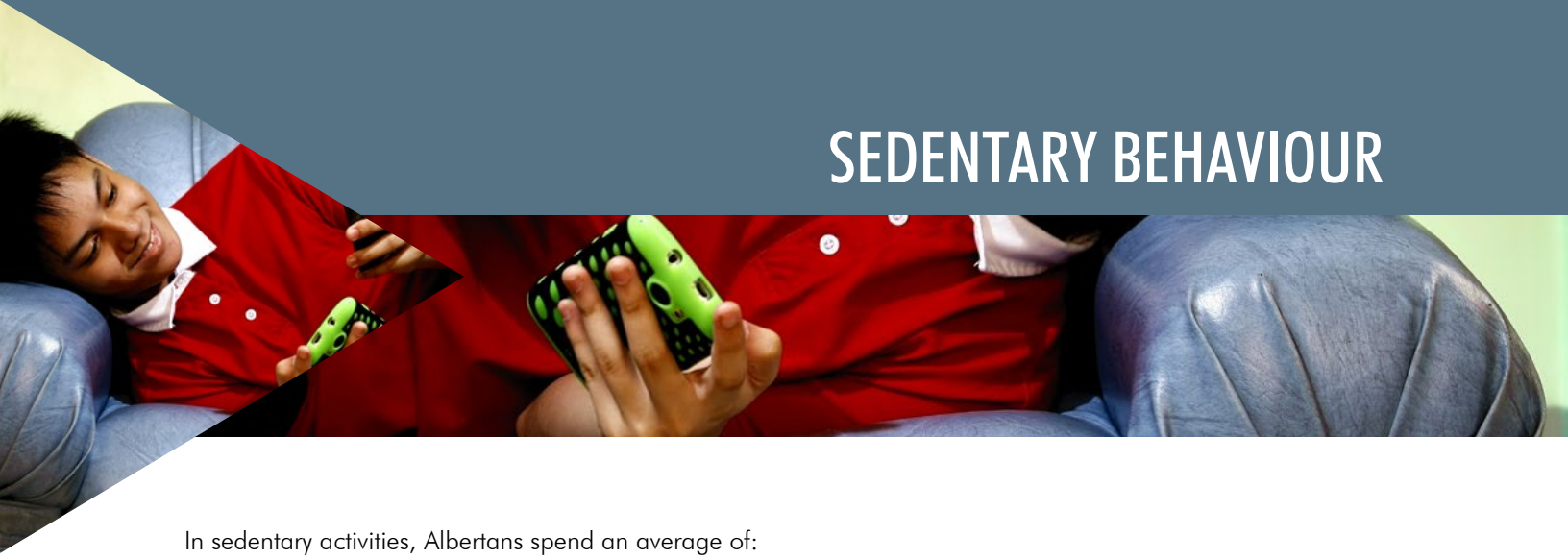


Summary of Walking Status of Albertans

Walking is a simple and free activity that most Albertans across various ages, cultures, and genders can participate in and enjoy.[31] For most Albertans, incorporating walking into one's daily routine is a realistic goal. This could include walking around the home, the workplace, or from place-to-place. It could also include walking for recreational leisure, such as dog walking and walking with friends. Most importantly, walking has many health benefits and can support improvements in cardiovascular fitness, body composition, blood pressure, blood glucose, and mental health.[31]

Active commuting or using active transportation, such as walking to and from work, is one way to schedule regular physical activity.[32] However, for many Albertans, walking to work may not be possible. Walking to use public transportation, such as walking to bus stops or train stations, can also help people attain the recommended amount of physical activity.[33,34] Although there is potential for exposure to air pollution or risk of injury from traffic while walking, health impact model studies have consistently found that the health benefits achieved from increasing physical activity levels outweigh the risks, with a mean benefit-to-risk ratio of 9.[35] At the same time, by walking around local neighbourhoods and using local walking trails, people become more familiar and are able to identify places where they can walk to do errands or meet with friends (e.g., stores and cafes).

When planning to do leisure-time walking, the first step is to identify areas that are convenient and enjoyable to walk regularly. For convenience, home and workplace neighbourhoods are common places to plan leisure-time walks. The perceived environmental aesthetics, traffic, personal safety, and pedestrian connectivity are four common correlates of walking.[36,37] Identifying convenient and safe sidewalks, parks, walking tracks, paths, or malls to walk allows people to create a walking plan. Dog ownership has also been associated with greater leisure-time walking.[38]



SEDENTARY BEHAVIOUR

In sedentary activities, Albertans spend an average of:

9.5 hours per weekday and **8.8 hours per weekend day.**

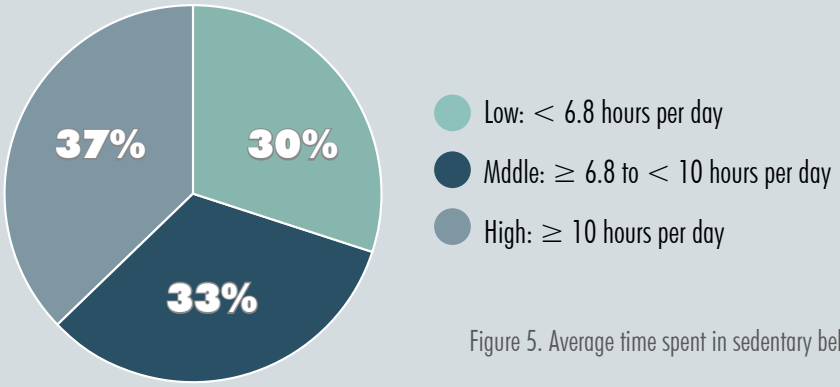


Figure 5. Average time spent in sedentary behaviour among Albertans.

Sociodemographic Factors Influencing Sedentary Behaviour

The influence of the following sociodemographic factors on sedentary behaviours of Albertans were assessed: gender, age, education, annual household income, marital status, children in household, and employment status. Only significant relationships between sociodemographic factors and physical activity participation were included in this section.

Education

Significant differences in sedentary behaviour time exists according to education. Adults with less than a high school education are most likely to spend 10 hours or more a day in sedentary behaviour.

Table 18. Education Status of Albertans According to Sedentary Behaviour Time Tertiles

Household Income: χ^2 (4, 1189) = 12.74, p < 0.05			
	Sedentary Behaviour (%)		
Education	Low	Moderate	High
Less than high school	24	23	53
High school	31	30	39
Post-secondary	31	35	34

Note: lowest tertile is < 6.8 hours of sedentary behaviour (SB) per day, middle tertile is ≥ 6.8 hours to < 10 hours of SB per day, and highest tertile is > 10 hours of SB per day.

Age

Significant differences in sedentary behaviour time exists according to age. Adults in the youngest age categories, 18 to 24 years and 25 to 34 years, are most likely to spend 10 hours or more a day in sedentary behaviour. In contrast, older adults (55+ years) are most likely to be in the lowest tertile of sedentary behaviour.

Compared to the previous report, the proportion of adults, 25 to 34 years, in the highest tertile of sedentary behaviour increased.

Table 19. Age of Albertans According to Sedentary Behaviour Time Tertiles

Age: χ^2 (10, 1164) = 45.77, p < 0.001			
	Sedentary Behaviour Time Tertiles (%)		
Age	Low	Moderate	High
18 - 24 years	20	31	49
25 - 34 years	27	24	49
35 - 44 years	27	39	34
45 - 54 years	28	36	36
55 - 64 years	38	32	30
≥ 65 years	39	33	28

Note: lowest tertile is < 6.8 hours of sedentary behaviour (SB) per day, middle tertile is ≥ 6.8 hours to < 10 hours of SB per day, and highest tertile is ≥ 10 hours of SB per day.

Annual Household Income

Sedentary behaviours are significantly different according to household income. Albertans with a household income of $20,000 to $59,999 and $60,000 to $99,999 are more likely to sit for more than 10 hours per day.

Compared to the previous report, the proportion of adults making $60,000 to $99,999 within the highest tertile of sedentary behaviour increased.

Table 20. Household Income of Albertans According to Sedentary Behaviour Time Tertiles

Annual Household Income: χ^2 (10, 848) = 26.28, p < 0.05			
	Sedentary Behaviour (%)		
Household Income	Low	Moderate	High
<$20,000	28	40	32
$20,000 to $59,999	35	24	41
$60,000 to $99,999	25	27	48
$100,000 to $124,999	28	33	39
$125,000 to $149,999	30	35	35
≥$150,000	30	41	29

Employment Status

Significant differences in sedentary behaviour time exist according to employment status. Full-time employees, students, and people on leave or disability are more likely to sit for more than 10 hours per day. At the same time, almost half of those on leave or disability were also within the lowest tertile of sedentary behaviour, which is a shift from the previous report.

Table 21. Employment Status of Albertans According to Sedentary Behaviour Time Tertiles

Employment Status: χ^2 (10, 1195) = 52.07, p < 0.001			
	Sedentary Behaviour (%)		
Employment Status	Low	Moderate	High
Full-time employment	24	34	42
Part-time employment	36	38	26
Student	23	40	37
Unemployed	47	22	31
Retired/semi-retired	38	34	28
On leave/disability	42	8	50

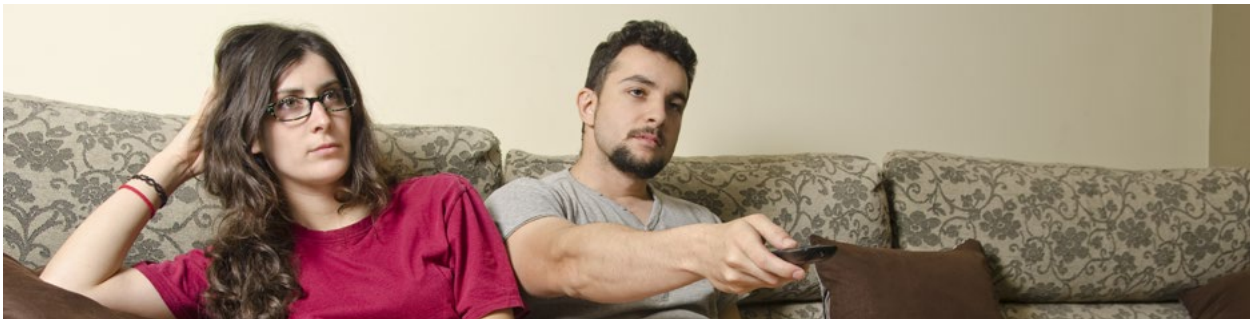
Marital Status

Significant differences in sedentary behaviour time exists according to marital status. The frequency is greatest for single, divorced, and separated Albertans reporting being sedentary for more than 10 hours per day.

Table 22. Marital status of Albertans According to Sedentary Behaviour Time Tertiles

Marital Status: χ^2 (10, 1184) = 65.93, p < 0.001			
	Sedentary Behaviour (%)		
Marital Status	Low	Moderate	High
Never married (single)	22	32	46
Married	36	35	29
Common-law/live-in partner	16	25	59
Divorced	25	38	37
Separated	37	36	27
Widowed	37	36	27

Note: lowest tertile is < 6.8 hours of sedentary behaviour (SB) per day, middle tertile is ≥ 6.8 hours to < 10 hours of SB per day, and highest tertile is ≥ 10 hours of SB per day.



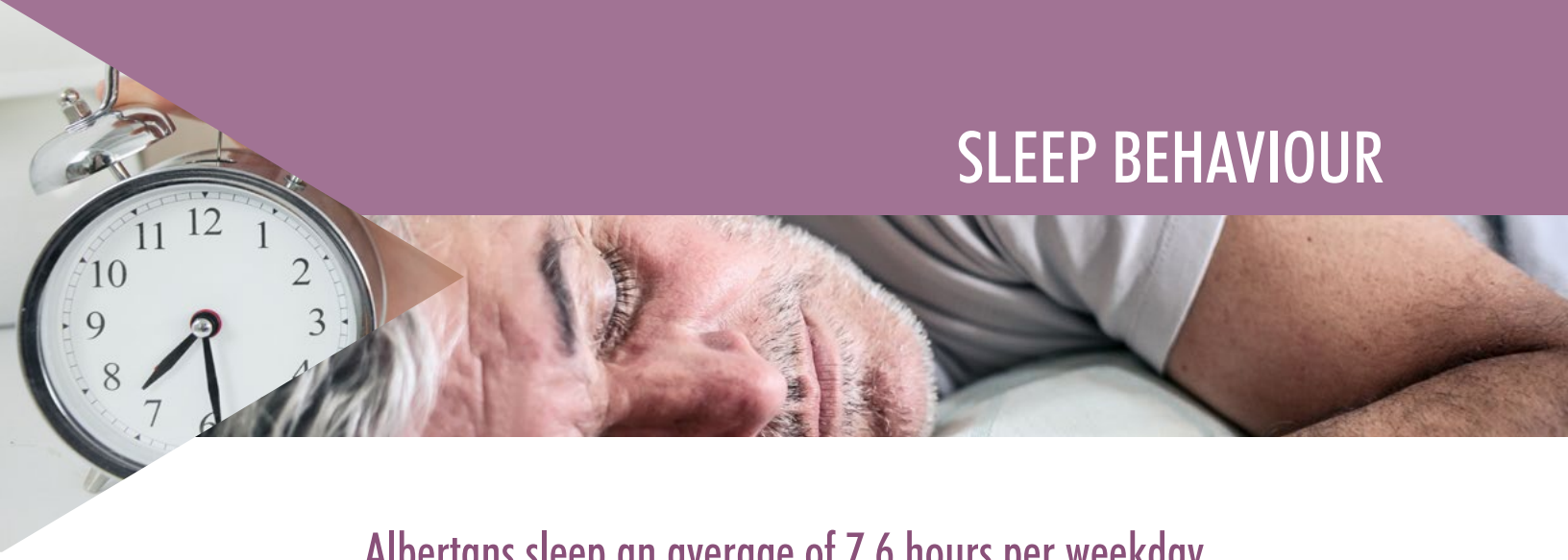
Summary of Sedentary Behaviour Time of Albertans

Over the last few years, sedentary behaviour time has garnered much attention. The amount of sedentary behaviour time is concerning since it has been identified as an independent and distinct risk factor for chronic disease from physical inactivity.[7] This suggests that although people can meet the physical activity guidelines, engagement in excessive sedentary behaviour can have negative health consequences.

The Alberta Survey on Physical Activity data identified the adult age categories, 18 to 24 years and 25 to 34 years, as having the largest proportion of people in the highest sedentary behaviour tertile of 10 hours or greater. On the contrary, older adults, 65 years or greater, are most likely to be in the lowest tertile (less than 6.8 hours per day).

According to employment status, full-time employees, students, and people on leave or disability had the greatest proportion of people in the highest sedentary behaviour tertile. There are many opportunities within workplaces and academic institutions to support Albertans who are full-time employees or students to move more and sit less throughout the day. One strategy is to build a culture that incorporates incidental physical activities, such as standing tables for meetings, having places where students can stand during lectures/classes, having options available to use standing desk stations, taking hourly movement breaks, and having walking meetings.

Furthermore, supporting employees to move more throughout the day may be a strategy for injury prevention. Workplaces seeking ways to support employees to move more or sit less throughout the workday can access the Centre for Active Living's toolkit titled *Increasing Physical Activity and Decreasing Sedentary Behaviour in the Workplace* available at: www.centre4activeliving.ca/our-work/centre-resources/increase-PA-and-decrease-sedentary-in-workplace/.



SLEEP BEHAVIOUR

Albertans sleep an average of 7.6 hours per weekday and 8.3 hours per weekend day

Of Albertans, 18 to 64 years of age, 74% meet the recommendations of 7 to 9 hours of sleep per day.

Of Albertans, 65 years of age or older, 44% meet the recommendations of 7 to 8 hours of sleep per day.

Table 23. Average Weekly Sleep Time Among Albertans

	Sleep Time (%)		
	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
Adults, 18 – 64 years (n = 963)	14	74	12
Adults, ≥ 65 years (n = 164)	12	44	44
All adults (n = 1,127)	14	70	16

Notes:
[a] Below Recommendations is < 7 hours per day.
[b] Meeting Recommendations for adults, 18 to 64 years, is ≥ 7 to ≤ 9 hours per day and for adults, 65 years or greater, is ≥ 7 to ≤ 8 hours per day.
[c] Above Recommendations for adults, 18 to 64 years, is > 9 hours and for adults, 65 years or greater, is > 8 hours.

Quality of Sleep

Three-quarters of Albertans rated their quality of a sleep as either fairly good or very good.

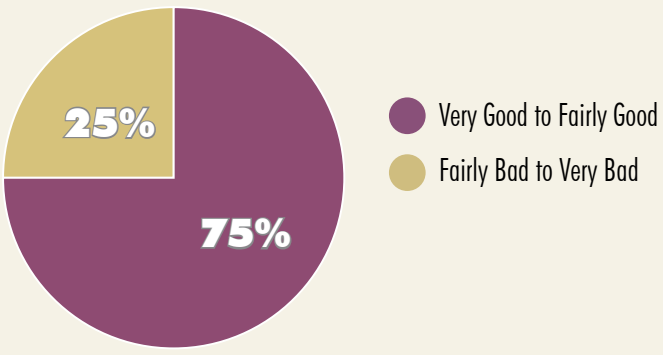


Figure 6. Albertans' quality of sleep.

Quality of Sleep & Meeting the Recommendations

Significant differences in meeting sleep recommendations exists according to self-reported quality of sleep. Regardless of the quality of sleep, the majority of Albertans met the sleep recommendations. Of note, almost one quarter of Albertans who reported fairly bad to very bad quality of sleep were below the sleep recommendations.

Table 24. Quality of Sleep According to Achievement of Sleep Recommendations

Quality of Sleep: χ^2 (2, 1119) = 18.77, p < 0.001			
	Sleep Recommendations (%)		
Quality of Sleep	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
Very good to fairly good	11	72	17
Fairly bad to very bad	22	64	14

Notes:
[a] Below Recommendations is < 7 hours per day.
[b] Meeting Recommendations for adults, 18 to 64 years, is ≥ 7 to ≤ 9 hours per day and for adults, 65 years or greater, is ≥ 7 to ≤ 8 hours per day.
[c] Above Recommendations for adults, 18 to 64 years, is > 9 hours and for adults, 65 years or greater, is > 8 hours.

Electronics in the Bedroom

Seventy percent of Albertans indicated they have an electronic device, such as a television, computer, tablet, smartphone, or video game, in the bedroom. Of those who indicated they have an electronic device in the bedroom, 65% stated using an electronic device within 30 minutes of bedtime.

65% of Albertans use an electronic device within 30 minutes of going to sleep

Table 25. Use of Electronics Prior to Bedtime According to Presence of Electronics in the Bedroom

Use of Electronics in Bedroom: χ^2 (3, 1186) = 157.65, p < 0.001				
	Use of Electronics Before Sleep Time (%)			
Presence of Electronics	No, Do Not Use	Yes, Within 30 Minutes	Yes, Within 1 Hour	Yes, Within 2 Hours
Yes	16	65	14	5
No	49	34	10	7

Sociodemographic Factors Influencing Sleep Behaviour

The influence of the following sociodemographic factors on Albertans meeting sleep recommendations were assessed: gender, age, education, annual household income, marital status, children in household, and employment status. Only significant relationships between sociodemographic factors and sleep recommendations were included in this section.

Age

Significant differences in meeting sleep time recommendations exist according to age. Adults in the 65 years or older category are less likely to meet recommendations compared to adults who are 18 to 64 years. In addition, the proportion of adults sleeping above the recommended hours was highest among adults 65 years or older.

Table 26. Age of Albertans According to Meeting Sleep Time Recommendations

Age: χ^2 (10, 1126) = 142.41, p < 0.001			
	Sleep Recommendations (%)		
Age	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
18 - 24 years	6	72	22
25 - 34 years	9	76	15
35 - 44 years	21	68	11
45 - 54 years	19	76	5
55 - 64 years	12	78	10
≥ 65 years	12	44	44

Notes: [a] Below Recommendations is < 7 hours per day.
[b] Meeting Recommendations for adults, 18 to 64 years, is ≥ 7 to ≤ 9 hours per day and for adults, 65 years or greater, is ≥ 7 to ≤ 8 hours per day.
[c] Above Recommendations for adults, 18 to 64 years, is > 9 hours and for adults, 65 years or greater, is > 8 hours.

Education

Significant differences in meeting sleep recommendation time exists according to education. Albertans with less than a high school education have the highest proportion of adults achieving below and above the sleep recommendations. Albertans who have pursued post-secondary education have the highest proportion of adults meeting the recommendations.

Table 27. Education Status of Albertans According to Meeting Sleep Time Recommendations

Education Level: χ^2 (4, 1120) = 18.05, p < 0.05			
	Sleep Recommendations (%)		
Education Level	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
< High school	27	52	21
High school	15	66	19
Pursued post-secondary	12	72	16

Note: [a, b, c] Refer to the table above for details on the sleep recommendations.

Annual Household Income

Significant differences in meeting sleep recommendation time exists according to annual household income. Albertans with an annual household income of $100,000 or greater are more likely to meet daily sleep recommendations.

Table 28. Household Income of Albertans According to Meeting Sleep Time Recommendations

Annual Household Income: χ^2 (10, 810) = 34.85, p < 0.001			
	Sleep Recommendations (%)		
Income	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
< $20,000	13	65	22
$20,000 to $59,999	14	62	24
$60,000 to $99,999	16	71	13
$100,000 to $124,999	7	81	12
$125,000 to $149,999	6	84	10
≥ $150,000	16	77	7

Notes:
[a] Below Recommendations is < 7 hours per day.
[b] Meeting Recommendations for adults, 18 to 64 years, is ≥ 7 to ≤ 9 hours per day and for adults, 65 years or greater, is ≥ 7 to ≤ 8 hours per day.
[c] Above Recommendations for adults, 18 to 64 years, is > 9 hours and for adults, 65 years or greater, is > 8 hours.

Employment Status

Significant differences in meeting daily sleep time recommendations exist according to employment status. Albertans who have full-time or part-time employment or who are students are most likely to achieve the daily sleep recommendations. Albertans who are on leave or disability are most likely to achieve below or above the daily sleep recommendations.

Table 29. Employment Status of Albertans According to Meeting Sleep Time Recommendations

Employment Status: χ^2 (10, 1126) = 66.14, p < 0.001			
	Sleep Recommendations (%)		
Employment Status	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
Full-time employment	14	75	11
Part-time employment	10	72	18
Student	2	77	21
Unemployed	11	69	19
Retired/semi-retired	16	52	32
On leave/disability	25	50	25

Note: [a, b, c] Refer to the table above for details on the sleep recommendations.

Children in Household

Significant differences in meeting daily sleep time recommendations exist according to whether children (under 18 years of age) live in the household. Seventy-three percent of Albertans with children in the household achieve the sleep recommendations.

Table 30. Presence of Children in the Household of Albertans According to Meeting Sleep Time Recommendations

Children in Household: χ^2 (2, 1121) = 29.51, p < 0.001			
	Sleep Recommendations (%)		
Children in Household	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
No children	11	68	21
Yes, children	18	73	9

Notes: [a] Below Recommendations is < 7 hours per day.
[b] Meeting Recommendations for adults, 18 to 64 years, is ≥ 7 to ≤ 9 hours per day and for adults, 65 years or greater, is ≥ 7 to ≤ 8 hours per day.
[c] Above Recommendations for adults, 18 to 64 years, is > 9 hours and for adults, 65 years or greater, is > 8 hours.

Marital Status

Significant differences in meeting daily sleep time recommendations exist according to marital status. Albertans who are married are most likely to sleep the recommended amount of hours per day, followed by those who have never married or who have a common law relationship or live-in partner. Albertans who are divorced or separated are most likely to sleep below the recommendations, while Albertans who are widowed are most likely to sleep more than the recommended hours of sleep per day.

Table 31. Marital Status of Albertans According to Meeting Sleep Time Recommendations

Marital Status: χ^2 (10, 1121) = 47.33, p < 0.001			
	Sleep Recommendations (%)		
Marital Status	Below Recommendations	Meet Recommendations	Above Recommendations
Never married	11	68	21
Married	12	74	14
Common law/live-in partner	17	67	16
Divorced	31	59	10
Separated	30	60	10
Widowed	15	51	34

Note: [a, b, c] Refer to the table above for details on the sleep recommendations.

Activity Factors Influencing Sleep Behaviour

The influence of activity factors on Albertans meeting daily sleep recommendations were assessed: leisure-time physical activity, walking levels, and sedentary behaviour time. Only significant relationships between activity factors and daily sleep recommendations were included in this section.

Leisure-time Physical Activity

Significant differences in meeting daily sleep time recommendations exist according to physical activity status. Seventy-one percent of sufficiently active Albertans meet the daily sleep recommendations compared to 67% who are insufficiently active.

71% of sufficiently active Albertans meet daily sleep recommendations

Table 32. Physical Activity Status of Albertans According to Meeting Sleep Time Recommendations

Physical Activity Status: χ^2 (2, 1127) = 22.36, p < 0.001			
	Sleep Recommendations (%)		
Physical Activity Status	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
Sufficiently active	16	71	13
Insufficiently active	10	67	23

Note: [a, b, c] Refer to the table on the previous page for details on the sleep recommendations.

Walking Levels

Significant differences in meeting daily sleep time recommendations exist according to walking levels of Albertans. Meeting the daily sleep time recommendations increases as walking level status increases. At the same time, Albertans who achieve low levels of walking are most likely to exceed the daily sleep recommendations.

Table 33. Walking Status of Albertans According to Meeting Sleep Time Recommendations

Walking Status: χ^2 (4, 1128) = 29.40, p < 0.001			
	Sleep Recommendations (%)		
Walking Status	Below Recommendations[a]	Meet Recommendations[b]	Above Recommendations[c]
Low (< 600 MET-min/wk)	15	63	22
Moderate (600 to 2,999 MET-min/wk)	13	71	16
High (≥ 3,000 MET-min/week)	12	80	8

Note: [a, b, c] Refer to the table on the previous page for details on the sleep recommendations.

Summary of Sleep Behaviour

Sleep behaviour is recognized as an important determinant of overall health and well-being[8,9] and is important for neural development, learning, memory, emotional regulation, metabolic health, and cardiovascular health.[10] It is recommended that adults, 18 to 64 years, sleep for 7 to 9 hours a day, while adults, 65 years or older, sleep for 7 to 8 hours per day.[24] In Canada, one-third of adults, 18 to 64 years and 65 years or older, sleep fewer hours than the recommendations, however few adults, 18 to 64 years, oversleep (3.3%) compared to adults who are 65 or older (15%).[25]

70% of Albertans meet the sleep recommendations

The Alberta Survey on Physical Activity data identified that 60% of adults, 18 to 64 years, and 44% of adults, 65 years or older, meet sleep recommendations. More specifically, adults, 65 years or older, were less likely to meet recommendations compared to adults, 18 to 64 years. In addition, the proportion of adults sleeping above the recommended hours was highest among adults, 65 years or older. At the same time, 25% of Albertans rated their sleep quality as bad.

Fifty-five percent of Albertans indicated they used an electronic device at least 30 minutes before going to sleep. At the same time, 70% of Albertans indicated that they have an electronic device, such as a television, computer, tablet, smartphone, or video game in the bedroom, of which 65% used the electronic device at least 30 minutes before going to sleep.

The Alberta Survey on Physical Activity also found that the proportion of adults who have less than a high school education, have an annual household income less than $100,000, who are on leave or on a disability, do not have children (under 18 years of age) living in the household, or who are divorced or separated are those who are least likely to achieve sleep recommendations.

Finally, 70% of Albertans who are sufficiently active meet the daily sleep recommendations, compared to 67% who are insufficiently active. At the same time, the proportion of adults meeting sleep time recommendations increased with each increase of walking level status.

OVERALL SUMMARY

The Canadian Physical Activity Guidelines for Adults and Older Adults recommend accumulating a minimum of 150 minutes of moderate-to-vigorous physical activity per week, in bouts of 10 minutes or more.[5] According to the self-report data in the Alberta Survey on Physical Activity, 64% of Albertans achieve enough physical activity. Although this number is slightly higher than the 2017 survey report, it has remained relatively consistent over the last decade.

Walking is the most common physical activity among Albertans.[12] This year, 26% of Albertans reported a high level of walking and 35% of Albertans achieved moderate levels of walking. Increasing the amount of walking Albertans engage in for leisure and transportation can help contribute to increasing the amount of moderate-intensity physical activity and reduce sedentary behaviour. Developing strategies to incorporate moving more and sitting less into Albertans' daily lifestyle is critical to addressing the public health concern of physical inactivity and sedentary behaviour.

The average time spent in sedentary behaviour during waking hours has increased since the previous report to 9.5 hours per day on weekdays and 8.8 hours per day on weekend days. When the average time respondents reported spending in sedentary time per day was calculated into thirds, the lowest third of Albertans spent less than 6.8 hours per day in sedentary behaviour, the middle group spent 6.8 to 10 hours per day in sedentary behaviour, and the highest third spent more than 10 hours in sedentary behaviour.

For the first time, the 2019 Alberta Survey on Physical Activity reported on sleep behaviours of Albertans. Based on self-reported data, 70% of Albertans meet the sleep recommendations. Sleep behaviour is recognized as an important determinant of overall health and well-being,[8,9] and is important for neural development, learning, memory, emotional regulation, as well as metabolic and cardiovascular health.[10] It is recommended that adults, 18 to 64 years, sleep for 7 to 9 hours a night, while adults, 65 years or older, sleep 7 to 8 hours per night.[24]

Focus on Sleep Behaviour

Achieving too few hours of sleep is associated with increased fatigue, decreased psychomotor performance, accidents, reduced academic performance, and reduced physical and psychological health, including weight regulation, mental health, blood sugar regulation, blood pressure, and cardiovascular health.[24,39] Sleeping more than the recommended hours of sleep in older adults is associated with morbidity (e.g., poor general health, diabetes, hypertension) and mortality. Moreover, sleeping above the recommendations may be an indicator of an underlying medical, neurological, or psychiatric issue.[39]

There is evidence to suggest that being physically active can support improvements in sleep. In fact, both regular and small bouts of physical activity can have benefits on overall sleep, sleep efficiency, sleep onset latency, sleep quality, as well as rapid eye movement sleep. Increasing minutes of moderate-to-vigorous physical activity per session can also improve sleep onset latency — in other words, reduce the time it takes to fall asleep.

Physical activity has also shown to improve sleep in those individuals with obstructive sleep apnea[40,41] and insomnia.[42,43] Although few studies have been conducted examining the relationship between sedentary behaviour and sleep, achieving too few or too many hours of sleep may lead to feelings of tiredness, which in turn can lead to more time spent being sedentary. At the same time, spending more time being sedentary, such as screen-time, may lead to reductions in sleep time and quality.[44,45] Sedentary behaviour has also shown to be associated with increased risk of insomnia and sleep disturbance.[46]

Building Healthy Sleep Habits

There are various strategies that can be used to support Albertans to build healthy sleep habits and achieve sleep recommendations. Although most adults can go to bed at a regular time and achieve uninterrupted sleep during a night, lifestyle factors and poor sleep habits can interfere. For example, older adults often experience shorter sleep durations and are disrupted frequently throughout the night, while shift workers frequently switch between day and night schedules, all of which can impact overall sleep. In addition, the blue light that is emitted from electronic devices can delay the body's internal clock and the release of the sleep-inducing hormone melatonin, which in turn makes it harder to fall asleep.[8]

Finding ways to be physically active throughout the day and breaking up sitting time can contribute to achieving the physical activity recommendations. Most importantly, physical activity can support falling asleep sooner and achieving a good night's sleep.

To build healthy sleep habits supportive of achieving sleep recommendations, the Canadian Sleep Society suggests the following:[8]

- **Make time for sleep**
  Make sleep a priority in your life. Sleep is just as important as a healthy diet or engaging in physical activity for an overall healthy lifestyle. In today's busy world, too many people simply do not make the time for sleep. Allow yourself enough time in bed to get the sleep you need.
- **Maintain a regular sleep schedule**
  As a general rule, you should strive to keep a regular sleep/wake schedule by getting up at the same time each morning, seven days per week. If you are experiencing difficulty sleeping at night, then a strict schedule becomes even more important.
- **Set the stage for sleep**
  Establish a comfortable sleep environment with an optimal room temperature and limited distractions from noise and light. Immediately before bed, establish a relaxing bedtime routine and avoid stress or use of electronic devices. Also, avoid substances with stimulants too close to bedtime (including food, caffeinated beverages, medications, and nicotine). Note that too much alcohol in the evening may disrupt your sleep later in the night by causing early morning awakenings. Regular exercise can be good for sleep, but do so around midday or early afternoon to avoid disrupting nighttime sleep. As well, avoid long naps, naps in late afternoon or evening, and heavy meals or fluids taken too close to bedtime. Lastly, save the bedroom for sleep and intimacy — do not eat, read, or watch television in bed.

- **Track your sleep habits**

  It is a good idea to track how much sleep you are getting by keeping a "sleep diary". It only takes a few minutes a day to complete, and it can help individuals determine their sleep patterns over a week. Once completed, it may be easier to identify patterns and practices that can be altered to support a better nights' sleep. For example, if an afternoon nap was taken too late in the day, it may have interfered with sleep at night. A sleep diary can be found on the Canadian Sleep Society's website (https://css-scs.ca/files/resources/brochures/Sleep%20Journal.pdf).

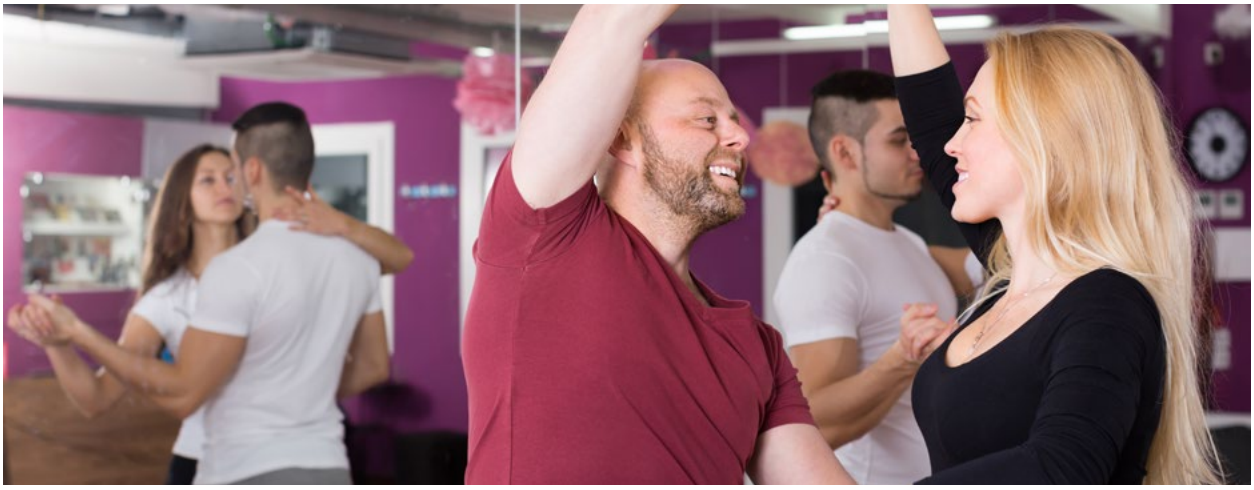
In addition to the strategies above, shift workers should aim to maintain regular bedtime rituals, whether it is during the day or night to prepare the body and mind for sleep. Other strategies include using light blocking or opaque curtains to condition your biological clock, taking a nap before starting the next shift, and avoiding reliance on sleep medications to sleep during the day.

Implications

The 2019 Alberta Survey on Physical Activity report has found improvements in Albertans achieving sufficient physical activity, however there is also an increased amount of time adults are spending in sedentary behaviours. Recommendations for improving physical activity levels include focusing on the distinction between physical activity and sedentary behaviour time and providing supports for Albertans to move more and sit less in the places they live, work, and play.

At the same time, Albertans need support on achieving better sleep habits. Recommendations for improving sleep include informing Albertans about sleep recommendations, the benefits of achieving sufficient hours of sleep, and the implications and risks of achieving too few hours of sleep.

Practitioners can support individuals to achieve a healthy balance of physical activity, sedentary behaviour, and sleep by increasing their awareness and importance of each within the 24-hour day. This in turn can support a decrease in the risk of developing chronic diseases and improve overall quality of life.



Recommendations

Modifications to lifestyles, programs, services, environments, and policies can impact Albertans' time spent being physically active or sedentary. Developing various strategies to support Albertans to move more and sit less in their daily lifestyle is important in addressing the public health concern of physical inactivity and sedentary behaviour (Table 34). At the same time, expending more energy throughout the day can also support achieving sufficient and quality sleep time. Supporting Albertans to develop healthy sleep habits and achieve sleep recommendations can reduce the potential development of physiological and mental health problems associated with too few or too much sleep. Table 34 outlines strategies to support moving more, sitting less, and achieving sleep recommendations.

Table 34. Exemplar Methods of Increasing Physical Activity, Decreasing Sedentary Behaviour, and Supporting Sleep

Leisure-time	**Family and friends**
	■ Do physical activities your family enjoys or try new ones. ■ Walk with friends after dinner. ■ Stand while you talk on the phone. ■ Provide intergenerational physical activities that the whole family can participate in. ■ Set up a friendly physical activity tracker challenge with family and friends to support each other in being active, e.g., visit UWALK.ca.
	Outdoors
	■ Explore local parks, trails, recreation facilities, and school yards to be physically active. ■ Maintain safe outdoor spaces for physical activity all year round.
	Dog walking
	■ Make a habit of walking your dog 2 to 3 times a day. ■ Be a volunteer dog walker at the local animal shelter.
	Community
	■ Start a walking group or club in your neighbourhood. ■ Join a sports team or physical activity group. ■ Create a walking group using local trails, parks, and indoor facilities including recreation centres and malls. ■ Do not use the drive-through window. Instead, model active behaviour to friends, family, and others by getting out of the vehicle.

Transportation

Walk/wheel

Walk to do errands, travel to work, and meet up with friends.

- Park 10 minutes away from work to add 20 minutes of walking to your daily routine. This can add up to an extra 100 minutes of moderate physical activity per week.
- Take public transportation (bus or train). Individuals who take public transportation walk more than vehicle commuters.
- Get off the bus early and walk the rest of the way.
- Park farther from the store.
- Wear a physical activity tracker or use a physical activity application to measure:
  - physical activity and sitting time
  - daily steps and distance travelled
- Set up step challenges with family, friends, or co-workers (UWALK.ca).

Ride (cycle or skateboard)

Cycle to do errands, travel to work, and visit friends.

- The cities of Edmonton and Calgary are expanding their bike commuter routes. Visit their websites to map out the best paths and learn the rules of the road for safe cycling.
- Cities and towns can develop safe commuter routes and provide education to cyclists and drivers on how to share the road.
- Track the distance travelled and compare each day with a physical activity tracker.

Communities

- Build sidewalks and pathways.
- Add effective streetlights to light the way.
- Build safe, protected bike lanes.
- Provide secure bike racks and storage by popular amenities.
- Develop bike-share programs (e.g., Calgary, www.li.me/locations/calgary; Bixi-Montréal, bixi.com).
- Re-purpose streets with an Open Streets Model (e.g., 8-80 Cities Open Streets, www.healthiestpracticeopenstreets.org).
- See Active Transportation in Canada: A Resource and Planning Guide www.fcm.ca/Documents/tools/GMF/Transport_Canada/ActiveTranspoGuide_EN.pdf.
- Use a "Complete Streets" approach to community planning.
- Establish an "Open Streets" policy.

Workplace	
	Stand more
	Use a standing desk and/or standing tables for meetings. ■ Stand when you are speaking on the phone. ■ Walk down the hall to speak with a co-worker rather than use email.
	Take breaks from sitting
	Take active breaks instead of coffee breaks. ■ Set an activity tracker, phone application, or computer reminder hourly to remind yourself to move around. ■ Schedule physical activity time into your calendar.
	Make being active easy and attractive
	■ Maintain attractive and safe stairwells. ■ Provide showers, bike storage, fitness equipment, walking maps, and/or communal gardens at work. ■ Do workplace physical activity challenges on the UWALK.ca website or with physical activity trackers.
	Develop a culture of physical activity
	■ Provide free or subsidized: ◆ bus passes ◆ commuter bike purchasing ◆ access to fitness centres ◆ physical activity classes ■ Encourage senior management to be a positive role model for physical activity. ■ Respect co-workers' physical activity breaks as non-negotiable time away from the office. ■ Share monthly physical activity tips at the workplace. ■ Start a UWALK.ca walking challenge, walking group, or sports team. ■ Stay in hotels with fitness centres and use them. ■ Find a physical activity buddy at work. ■ Take the stairs instead of the elevator.

Sleep	Build healthy sleep habits
	■ Make time for sleep. ■ Maintain a regular sleep schedule. ■ Set the stage for a comfortable sleep environment. ■ Limit distractions including light and noise. ■ Avoid using electronic devices, such as a television, computer, tablet, smartphone, or video games, at least 30 minutes prior to going to bed. ■ Engage in regular physical activity at mid-day or late afternoon to avoid sleep disruptions. ■ Track your sleep patterns using a sleep diary (css-scs.ca/files/resources/brochures/Sleep%20Journal.pdf).
	For shift workers
	■ Use light blocking or opaque curtains to condition your biological clock. ■ Take a nap before starting the next shift. ■ Avoid reliance on sleep medications to sleep during the day.

Resources to Support Active Living and Better Sleep Habits

A variety of resources exists to support Albertans to move more, sit less, and achieve sufficient sleep. Below are resources to support individuals and practitioners.

Useful Resources to Support Physical Activity and Reduce Sedentary Behaviour

Canadian Physical Activity Guidelines

The Canadian Physical Activity Guidelines for adults, 18-64 years, and for older adults, 65+ years, are available on the Canadian Society for Exercise Physiology website (csepguidelines.ca). The guidelines encourage participation in a variety of physical activities that are enjoyable and safe.

Adults: csepguidelines.ca/wp-content/uploads/2018/03/CSEP_PAGuidelines_adults_en.pdf

Older Adults: csepguidelines.ca/wp-content/uploads/2018/03/CSEP_PAGuidelines_older-adults_en.pdf

ParticipACTION

ParticipACTION is a national non-profit organization that has encouraged Canadians to get healthy by getting active since 1971. Today, ParticipACTION works with a variety of sport, physical activity, and recreation organizations, as well as government departments and corporate sponsors, to make physical activity a vital part of everyday life across Canada. A variety of resources, including the Canadian Physical Activity Guidelines, can be found on their website.

www.participaction.com/en-ca

Active Alberta 2011-2021

This 10-year document aims to focus government initiatives, challenge partners, and encourage Albertans to become more active. Active Alberta's vision is for all Albertans enjoy a high quality of life, improved health and wellness, strong communities, economic benefits, and personal fulfillment through recreation, active living, and sport.

https://open.alberta.ca/dataset/b9c193cf-9dc3-4e15-8ed9-8c8961e9ad21/resource/e22bfd29-f397-4e34-8306-796526397ee8/download/5641678-2012-activealbertapolicy.pdf

Centre for Active Living

CAL uses a population-health approach to promote and support physical activity participation. Using this approach, challenges CAL to move beyond an individual and behavioural view of health, toward creating social and physical environments that support physical activity for Albertans of all ages, abilities, and cultures.

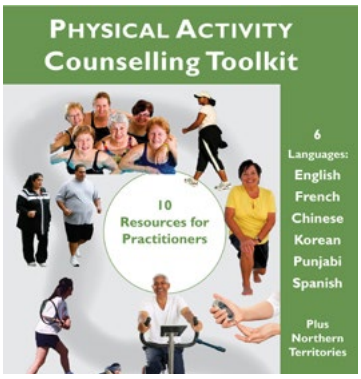
www.centre4activeliving.ca

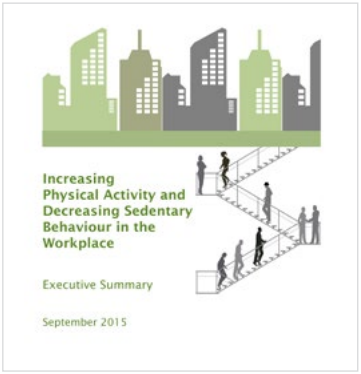
A variety of resources can be found on CAL's website to support active living in a variety of contexts. Examples include, but are not limited to:

- Physical Activity Counselling Toolkit
  www.centre4activeliving.ca/our-work/physical-activity-counselling-toolkit
- Increasing Physical Activity and Decreasing Sedentary Behaviour in the Workplace
  www.centre4activeliving.ca/our-work/centre-resources/increase-PA-and-decrease-sedentary-in-workplace/
- What is Daily Physical Activity?
  www.centre4activeliving.ca/news/2017/11/daily-physical-activity-infographic
- Preventing Falls Through Physical Activity: A guide for people working with older adults
  www.centre4activeliving.ca/media/filer_public/d9/e0/d9e0faf7-5ead-4a7b-8c49-96142d34a14b/booklet-falls.pdf
- Rural Route to Active Aging: A guide for people who want to stay active as they age
  www.centre4activeliving.ca/media/filer_public/47/68/4768b04b-9d46-40ea-b684-0f80e410e8be/booklet-rural.pdf

For additional resources, check out CAL's Resources section (www.centre4activeliving.ca/resources).

Centre for
Active Living





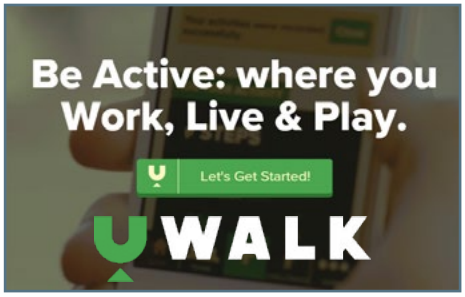
Be Fit For Life

The Be Fit For Life Network is a provincial initiative comprised of nine regional centres, located in colleges and universities across Alberta. The Network works together, alongside with many partners, to inspire, educate, and support Albertans to lead healthy, physically active lifestyles. Be Fit For Life Coordinators are experts in physical activity who work across sectors in their unique communities, setting the stage for collaboration and alignment of services to support the development of physical literacy.

befitforlife.ca

be fit for life
moving alberta

UWALK



UWALK is focused on empowering people to be active through walking. Walk to decrease tension, improve your mood, keep you energized, and boost your self-confidence.

uwalk.ca

Alberta Trailnet

Alberta TrailNet Society is a non-profit charitable organization whose mandate is to support the ongoing development of the Wild Rose Trail System, Alberta's provincial trail network. This includes the 2,987 km of the Trans Canada Trail in Alberta. TrailNet works with trail supporters, operators, provincial trail user associations, municipalities, and the provincial government to support trail projects throughout Alberta.

www.albertatrailnet.com

Useful Resources to Support Sleep

Canadian Sleep Society

The Canadian Sleep Society is committed to improving sleep for all Canadians through support for research, promotion of high quality clinical care, education of professionals and the public, and advocacy for sleep and sleep disorders medicine.

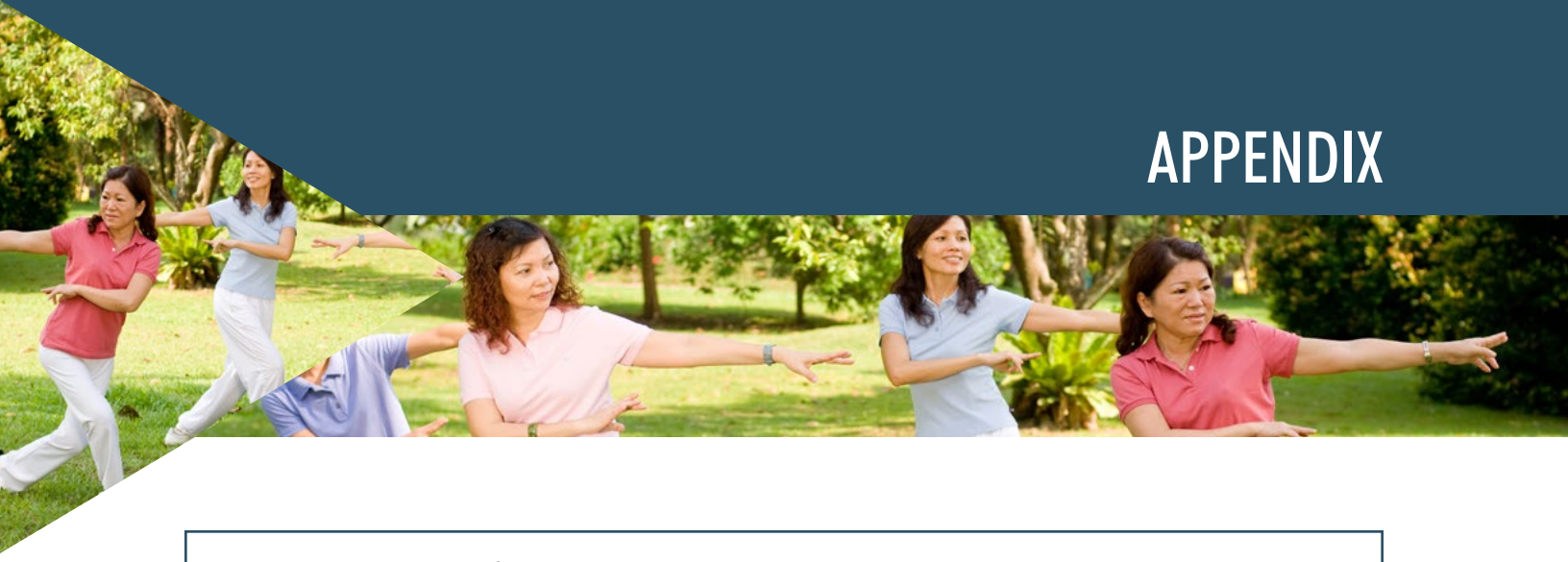
css-scs.ca

Sleep Diary: css-scs.ca/files/resources/brochures/Sleep%20Journal.pdf

National Sleep Foundation

The National Sleep Foundation offers a number of education opportunities for primary care physicians, researchers, and clinicians focused on sleep health, sleep medicine, and communities.

www.sleepfoundation.org/



APPENDIX

Table 35. Physical Activity Trends from 2009 to 2019 Reports

Variable	2009	2011	2013	2015	2017	2019
Participation in leisure-time physical activity						
% of adult Albertans who are active enough to experience health benefits	59%[b]	54%[b]	59%[c]	60%[c]	57%[d]	64%[e]
% of sufficiently active Albertans by location[a]						
Edmonton	55%	54%	57%	58%	56%	60%
Calgary	64%	51%	60%	63%	57%	68%
Rest of Alberta	56%	58%	61%	59%	59%	63%
Awareness of the importance of being physically active						
% of Albertans who agree or strongly agree that physical activity will keep them healthy	95%	94%	94%	93%	91%	94%
% of Albertans who agree or strongly agree that physical activity will reduce their chances of getting serious health problems	89%	90%	89%	88%	86%	87%
Perceived opportunities to be physically active						
% of Albertans who agree or strongly agree that they have easy access to places where they can be physically active	77%	76%	75%	75%	74%	79%

Notes:

[a] The results of the age and gender breakdowns for the total sample adequately reflect the overall Alberta adult population. However, the subsamples of Edmonton metropolitan, Calgary metropolitan and the rest of Alberta do not necessarily represent the age and gender of the populations in those specific regions. Caution is advised in generalizing the findings related to these subsamples to the overall populations in these regions.

[b] This analysis was weighted according to age in agreement with the 2006 Census data (Statistics Canada, 2006) to correct for the aging effect in the population.

[c] This analysis was weighted according to age according to postcensal estimates based on the 2006 Census data (Statistics Canada, 2012) to correct for the aging effect in the population.

[d] This analysis was weighted according to age in agreement with census metropolitan area, gender, and age group for July 1, based on the standard Geographic Classification 2011, annual (persons), CANSIM (database) (Statistics Canada, 2015).

[e] This analysis was weighted according to age in agreement with census metropolitan area, gender, and age group based on the standard Geographic Classification 2011, annual (persons), CANSIM (database) (Statistics Canada, 2018) .

Table 36. Sociodemographic and Psychological Factors Related to Physical Activity Status

Sociodemographic and Psychological Factors	Step 1[a]		Step 2[b]	
	OR[c]	CI[d]	OR[c]	CI[d]
Gender				
Male	1		1	
Female	0.99	0.72 – 1.34	1.01	0.70 – 1.45
Age (years)				
18 to 24	1		1	
25 to 34	0.50	0.20 – 1.25	0.43	0.16 – 1.21
35 to 44	0.70	0.27 – 1.82	0.79	0.27 – 2.32
45 to 54	0.50	0.20 – 1.26	0.63	0.22 – 1.81
55 to 64	0.43	0.17 – 1.12	0.53	0.18 – 1.54
> 65	0.34*	0.12 – 0.94	0.23*	0.07 – 0.80
Education				
< High school	1		1	
High school	2.00	0.96 – 4.16	0.96	0.40 – 2.30
Post-secondary	2.18*	1.13 – 4.20	0.83	0.37 – 1.84
Annual household income				
< $20,000	1		1	
$20,000 to $59,999	1.34	0.51 – 3.53	1.46	0.43 – 4.93
$60,000 to $99,999	1.85	0.69 – 4.98	1.44	0.42 – 4.97
$100,000 to $124,999	2.26	0.82 – 6.24	1.51	0.43 – 5.32
$125,000 to $149,999	3.50*	1.11 – 10.99	2.36	0.59 – 9.48
≥ $150,000	2.98*	1.09 – 8.18	1.80	0.51 – 6.30
Employment status				
Employed full-time	1		1	
Employed part-time	1.07	0.62 – 1.85	0.94	0.51 – 1.76
Student	1.38	0.71 – 2.70	1.25	0.57 – 2.71
Unemployed	1.29	0.36 – 4.61	1.07	0.26 – 4.35
Retired/semi-retired	1.05	0.64 – 1.75	1.22	0.67 – 2.20
On leave/disability	0.55	0.16 – 1.83	1.36	0.27 – 6.85
Children in household				
No children	1		1	
Yes, children	0.75	0.47 – 1.19	0.82	0.49 – 1.40
Marital status				
Never married	1		1	
Married	1.05	0.65 – 1.71	0.91	0.52 – 1.60
Common-law/live-in partner	1.47	0.68 – 3.15	1.94	0.80 – 4.71
Divorced	0.91	0.48 – 1.75	0.70	0.33 – 1.50
Separated	1.68	0.52 – 5.41	1.04	0.27 – 3.99
Widowed	0.92	0.45 – 1.87	0.92	0.40 – 2.13

Psychological Variables	Step 1[a]		Step 2[b]	
	OR[c]	CI[d]	OR[c]	CI[d]
General self-efficacy				
None			1	
Moderate			3.42*	1.03 – 1.31
High			6.47*	1.90 – 22.07
Coping self-efficacy				
None			1	
Moderate			0.90	0.50 – 1.64
High			1.97	0.98 – 3.97
Scheduling self-efficacy				
None			1	
Moderate			2.77	0.80 – 9.59
High			6.01*	1.67 – 21.60
Intention to participate in regular physical activity				
Low			1	
Moderate			1.56	0.57 – 4.29
High			3.86*	1.45 – 10.27
Perceived behavioural control				
Low			1	
Moderate			0.39	0.13 – 1.20
High			0.40	0.13 – 1.26

Notes:

[a] Step 1 refers to the variables entered first in the regression (in this case, sociodemographic variables).

[b] Step 2 refers to the variables subsequently entered in the regression (in this case, sociodemographic and psychological variables). This way, we determine the contribution of psychological variables in predicting activity status after controlling for sociodemographic variables.

[c] OR stands for "odd ratio." OR is an indicator of the change in odds resulting from a unit change in the predictor (e.g., the change in the odds of being sufficiently active resulting from a unit change in general self-efficacy). If the value is greater than 1, it indicates that as the predictor increases, the odds of the outcome occurring increase. The opposite is also true. The first group in each variable category (the one assigned a value of 1) is a reference group to which the other values are compared.

[d] CI stands for "confidence interval." CI is an estimate of the values between which the OR would fall in the actual population rather than the survey sample (i.e., 95 out of 100 occasions).

The Health Outcome Expectancy variable was not included in the above model for 2019 due to the skewed nature of the data.

*$p < 0.05$, **$p < 0.001$ compared to reference group

Table 37. Sociodemographic and Access to Places to be Active Related to Physical Activity Status

Sociodemographic and Access	Step 1[a]		Step 2[b]	
	OR[c]	CI[d]	OR[c]	CI[d]
Gender				
Male	1		1	
Female	0.99	0.72 – 1.34	0.97	0.71 – 1.34
Age (years)				
18 to 24	1		1	
25 to 34	0.50	0.20 – 1.25	0.47	0.19 – 1.20
35 to 44	0.70	0.27 – 1.82	0.64	0.24 – 1.71
45 to 54	0.50	0.20 – 1.26	0.53	0.20 – 1.36
55 to 64	0.43	0.17 – 1.12	0.44	0.17 – 1.15
≥ 65	0.34*	0.12 – 0.94	0.35*	0.13 – 0.99
Education				
< High school	1		1	
High school	2.00	0.96 – 4.16	1.94	0.91 – 4.14
Post-secondary	2.18*	1.13 – 4.20	1.94	0.98 – 3.82
Annual household income				
< $20,000	1		1	
$20,000 to $59,999	1.34	0.51 – 3.53	1.14	0.40 – 3.20
$60,000 to $99,999	1.85	0.69 – 4.98	1.35	0.46 – 3.90
$100,000 to $124,999	2.26	0.82 – 6.24	1.58	0.53 – 4.70
$125,000 to $149,999	3.50*	1.11 – 10.99	2.56	0.76 – 8.56
≥ $150,000	2.98*	1.09 – 8.18	1.98	0.67 – 5.84
Employment status				
Employed full-time	1		1	
Employed part-time	1.07	0.62 – 1.85	1.04	0.60 – 1.83
Student	1.38	0.71 – 2.70	1.47	0.74 – 2.91
Unemployed	1.29	0.36 – 4.61	1.08	0.30 – 3.84
Retired/semi-retired	1.05	0.64 – 1.75	0.98	0.58 – 1.63
On leave/disability	0.55	0.16 – 1.83	0.65	0.19 – 2.25
Children in household				
No children	1		1	
Yes, children	0.75	0.47 – 1.19	0.75	0.47 – 1.21
Marital status				
Never married	1		1	
Married	1.05	0.65 – 1.71	1.10	0.67 – 1.80
Common-law/live-in partner	1.47	0.68 – 3.15	1.57	0.72 – 3.43
Divorced	0.91	0.48 – 1.75	0.96	0.49 – 1.88
Separated	1.68	0.52 – 5.41	1.55	0.47 – 5.14
Widowed	0.92	0.45 – 1.87	0.98	0.47 – 2.03

Access Variable	Step 1[a]		Step 2[b]	
	OR[c]	CI[d]	OR[c]	CI[d]
Disagree			1	
Neutral			1.87	0.87 – 4.00
Agree			4.05**	2.07 – 7.96

Notes:

[a] Step 1 refers to the variables entered first in the regression (in this case, sociodemographic variables).

[b] Step 2 refers to the variable subsequently entered in the regression (in this case, sociodemographic and environmental). This way, we determine the contribution of accessibility (as an environmental factor) in predicting activity status after controlling for sociodemographic variables.

[c] OR stands for "odd ratio." OR is an indicator of the change in odds resulting from a unit change in the predictor (e.g., the change in the odds of being sufficiently active resulting from a unit change in accessibility). If the value is greater than 1, then it indicates that as the predictor increases, the odds of the outcome occurring increase. The opposite is also true. The first group in each variable category (the one assigned a value of 1) is a reference group to which the other values are compared.

[d] CI stands for "confidence interval." CI is an estimate of the values between which the OR would fall in the actual population rather than the sample (i.e., 95 out of 100 occasions).

*$p < 0.05$, **$p < 0.001$ compared to reference group

REFERENCES

1. Owen N, Healy GN, Matthews CE, Dunstan DW. Too much sitting: the population health science of sedentary behavior. *Exerc Sport Sci Rev.* 2010;38(3):105-113. doi: 10.1097/JES.0b013e3181e373a2.

2. Warburton DER, Nicol CW, Bredin SSD. Health benefits of physical activity: the evidence. *Can Med Assoc J.* 2006;174:801-809. doi: 10.1503/cmaj.051351.

3. Schuch FB, Vancampfort D, Firth J, et al. Physical activity and incident depression: a meta-analysis of prospective cohort studies. *Am J Psychiatry.* 2018;175(7):631-648. doi: 10.1176/appi.ajp.2018.17111194.

4. Teychenne M, Costigan SA, Parker K. The association between sedentary behaviour and risk of anxiety: a systematic review. *BMC Public Health.* 2015;15(1). doi: 10.1186/s12889-015-1843-x.

5. Canadian Society for Exercise Physiology. Canadian Physical Activity Guidelines for Adults 18 to 64 Years. 2011; http://www.csep.ca/CMFIles/Guidelines/CSEP_PAGuidelines_adults_en.pdf.

6. Sedentary Behaviour Research Network. Letter to the editor: standardized use of the terms "sedentary" and "sedentary behaviours". *Appl Physiol Nutr Metab.* 2012;37(3):540-542. doi: 10.1139/h2012-024.

7. Biswas A, Oh PI, Faulkner GE, et al. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Ann Intern Med.* 2015;162(2):123-132. doi: 10.7326/M14-1651.

8. Canadian Sleep Society. Normal sleep — patient information brochure. 2018; https://css-scs.ca/resources/brochures/normal-sleep. Accessed 19 September 2018.

9. Office of Disease Prevention and Health Promotion. Sleep health. 2017; https://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health. Accessed 19 September 2018.

10. Mukherjee S, Patel SR, Kales SN, et al. An official American Thoracic Society statement: the importance of healthy sleep. Recommendations and future priorities. *Am J Respir Crit Care Med.* 2015;191(12):1450-1458. doi: 10.1164/rccm.201504-0767ST.

11. 2018 Physical Activity Guidelines Advisory Committee. 2018 Physical Activity Guidelines Advisory Committee Scientific Report, 2018.

12. Alberta Government. 2017 Alberta recreation survey. 2017; https://open.alberta.ca/dataset/58b1254f-9842-4abf-8bb5-86ecb940245e/resource/077024f6-9900-4c70-a101-d0c1c099b0c3/download/recreation-survey-2017.pdf. Accessed 11 September 2018.

13. Tremblay MS, Colley RC, Saunders TJ, Healy GN, Owen N. Physiological and health implications of a sedentary lifestyle. *Appl Physiol Nutr Metab.* 2010;35(6):725-740. doi: 10.1139/H10-079.

14. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci.* 1985;10(3):141-146.

15. Tremblay MS, Shephard RJ, Brawley LR. Research that informs Canada's physical activity guides: an introduction. *Applied Physiology, Nutrition, and Metabolism*. 2007;32(S2E):S1-S8. doi: 10.1139/h07-104.

16. Garcia Bengoechea E, Spence JC, McGannon KR. Gender differences in perceived environmental correlates of physical activity. *The International Journal of Behavioral Nutrition and Physical Activity*. 2005;2:12. doi: 10.1186/1479-5868-2-12.

17. Jacobs DR, Ainsworth BE, Hartman TJ, Leon AS. A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Medicine and Science in Sports and Exercise*. 1993;25(1):81-91.

18. Elosúa R, García M, Aguilar A, Molina L, Covas M, Marrugat J. Validation of the Minnesota leisure time physical activity questionnaire in Spanish women. *Medicine and Science in Sports and Exercise*. 2000;32(1431-1437). doi: 10.1097/00005768-200008000-00011.

19. Paffenbarger RS, Wing AL, Hyde RT. Physical activity as an index of heart attack risk in college alumni. *American Journal of Epidemiology*. 1978;108(3):161-175.

20. International Physical Activity Questionnaire. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ): Short and Long Forms. 2005; http://www.ipaq.ki.se/scoring.pdf.

21. Rosenberg DE, Norman GJ, Wagner N, Patrick K, Calfas KJ, Sallis JF. Reliability and validity of the Sedentary Behavior Questionnaire (SBQ) for adults. *J Phys Act Health*. 2010;7(6):697-705.

22. Centers for Disease Control and Prevention (CDC). National Center for Health Statistics (NCHS): National Health and Nutrition Examination Survey Questionnaire. 2017; https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/questionnaires.aspx.

23. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research*. 1989;28(2):193-213.

24. Hirshkowitz M, Whiton K, Albert SM, et al. National Sleep Foundation's updated sleep duration recommendations: final report. *Sleep Health*. 2015;1(4):233-243. doi: 10.1016/j.sleh.2015.10.004.

25. Chaput JP, Wong SL, Michaud I. Duration and quality of sleep among Canadians aged 18 to 79. *Health Reports*. 2017;28:28-33.

26. Statistics Canada. Table 051-0056 - Estimates of population by census metropolitan area, sex and age group for July 1, based on the Standard Geographical Classification (SGC) 2011, annual (persons), CANSIM (database). 2018; https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501. Accessed 28 August 2018.

27. Abraham C, Conner M, Jones F, O'Connor D. *Health Cognition and Health Behaviours*. London: Hodder Education; 2008.

28. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW, Lancet Physical Activity Series Working Group. Correlates of physical activity: why are some people physically active and others not? *Lancet*. 2012;380(9838):258-271. doi: 10.1016/S0140-6736(12)60735-1

29. Loitz CC, Fraser SN, Bengoechea EG, Berry TR, McGannon KR, Spence JC. Sociodemographic patterns of leisure-time physical activity of Albertans 2000 to 2011. *Health & Fitness Journal*. 2012;5(1):1-15.

30. Choi J, Lee M, Lee J-k, Kang D, Choi J-Y. Correlates associated with participation in physical activity among adults: a systematic review of reviews and update. *BMC Public Health*. 2017;17(1). doi: 10.1186/s12889-017-4255-2.

31. Kelly P, Murphy M, Mutrie N. The Health Benefits of Walking. *Walking: Connecting Sustainable Transport with Health*: Emerald Publishing Limited; 2017:61-79.

32. Bauman A, Allman-Farinelli M, Huxley R, James WPT. Leisure-time physical activity alone may not be a sufficient public health approach to prevent obesity - a focus on China. *Obesity Reviews*. 2008;9(s1):119-126.

33. Besser LM, Dannenberg, AL. Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*. 2005;29(4):273-280. doi: 10.1016/j.amepre.2005.06.010.

34. Rissel C, Curac N, Greenaway M, Bauman A. Physical activity associated with public transport use—A review and modelling of potential benefits. *International Journal of Environmental Research and Public Health*. 2012;9(7):2454-2478. doi: 10.3390/ijerph9072454.

35. Winters M, Buehler R, Götschi T. Policies to promote active travel: evidence from reviews of the literature. *Current Environmental Health Reports*. 2017;4(3):278-285. doi: 10.1007/s40572-017-0148-x.

36. Saelens BE, Handy SL. Built environment correlates of walking: a review. *Medicine & Science in Sports & Exercise*. 2008;40(7 Suppl):S550-566. doi: 10.1249/MSS.0b013e31817c67a4.

37. Sugiyama T, Neuhaus M, Cole R, Giles-Corti B, Owen N. Destination and route attributes associated with adults' walking: a review. *Medicine & Science in Sports & Exercise*. 2012;44(7):1275-1286. doi: 10.1249/MSS.0b013e318247d286.

38. Westgarth C, Christley RM, Christian HE. How might we increase physical activity through dog walking?: A comprehensive review of dog walking correlates. *International Journal of Behavioral Nutrition and Physical Activity*. 2014;11(1):83. doi: 10.1186/1479-5868-11-83.

39. Institute of Medicine Committee on Sleep Medicine and Research. *Sleep disorders and sleep deprivation: an unmet public health problem*. Washington, DC: The National Academies Press; 2006.

40. Iftikhar IH, Kline CE, Youngstedt SD. Effects of exercise training on sleep apnea: a meta-analysis. *Lung*. 2014;192(1):175-184. doi: 10.1007/s00408-013-9511-3.

41. Aiello KD, Caughey WG, Nelluri B, Sharma A, Mookadam F, Mookadam M. Effect of exercise training on sleep apnea: a systematic review and meta-analysis. *Respir Med*. 2016;116:85-92. doi: 10.1016/j.rmed.2016.05.015.

42. Yang PY, Ho KH, Chen HC, Chien MY. Exercise training improves sleep quality in middle-aged and older adults with sleep problems: a systematic review. *Journal of Physiotherapy*. 2012;58(3):157-163. doi: 10.1016/s1836-9553(12)70106-6.

43. Alessi C, Vitiello MV. Insomnia (primary) in older people. *BMJ Clinical Evidence*. 2011.

44. Lakerveld J, Mackenbach JD, Horvath E, et al. The relation between sleep duration and sedentary behaviours in European adults. *Obesity Reviews*. 2016;17:62-67. doi: 10.1111/obr.12381.

45. Vallance JK, Buman MP, Stevinson C, Lynch BM. Associations of overall sedentary time and screen time with sleep outcomes. *Am J Health Behav*. 2015;39(1):62-67. doi: 10.5993/AJHB.39.1.7.

46. Yang Y, Shin JC, Li D, An R. Sedentary behavior and sleep problems: a systematic review and meta-analysis. *Int J Behav Med*. 2017;24(4):481-492. doi: 10.1007/s12529-016-9609-0.

Centre for
Active Living

2-131 University Hall, University of Alberta
Edmonton, Alberta, Canada T6G 2H9
Ph: 780.492.4863
E-mail: active.living@ualberta.ca
Website: www.centre4activeliving.ca
Facebook: /Centre4AL
Twitter: @Centre4AL
YouTube: Centre4ActiveLiving1