CURRENT MANAGEMENT AND HEALTH CARE USE FOR PEOPLE WITH OSTEOARTHRITIS

Summary Report

February 2023

MSSU
USSM

Strategy for Patient-Oriented Research
SPOR
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Stratégie de recherche axée sur le patient
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PROJECT INFO

PROJECT TITLE

Current Management and Health Care Use for People with Osteoarthritis

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HOW TO CITE THIS REPORT

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KEY FINDINGS

- Despite being healthier and less clinically severe than the wider Canadian population with osteoarthritis (OA), people with OA in the Maritimes were older, more likely to be female, and had lower education levels, lower income, and higher rates of unemployment, compared to people without OA.

- People with OA reported lower physical activity levels than those without OA. People with OA who reported low levels of physical activity levels also had more comorbidities.

- People with OA used significantly more opioid and Non-Steroidal Anti-Inflammatory Drug (NSAID) medications than those without OA. Yet, people with OA who reported higher physical activity levels reported less opioid use, which suggests a possible protective effect of increased physical activity on the use of pain medications, particularly in early stages of the disease.

- In Nova Scotia, people with OA used more health care resources than those without OA. People with lower physical activity levels had higher health care use, regardless of whether they had OA.

SUMMARY REPORT

WHAT IS OSTEOARTHRITIS?

OA is a degenerative joint disease that can cause severe pain and negatively impact daily life, for example by limiting mobility (1). OA affects 1 in 8 Canadians with rates expected to increase over the next 20 years (2). Rates of OA are rising fastest amongst people 45-55 years old—which leads to patients using health care resources earlier and for longer (2–4). Without a cure, clinical management focuses primarily on medication for pain relief while patients wait for joint replacement surgery.

WHY IS THIS RESEARCH IMPORTANT?

The consequences of this disease are far-reaching for patients and the health system. Patients often suffer declines in physical and mental health, as well as socioeconomic wellbeing (5, 6). The need for joint replacement surgery adds strain to an already overwhelmed health care system (6), contributing to longer surgical wait times (7-9), and an increased need for more treatments (such as pain medications) (5). Given increasing wait times for surgeries, mostly for hip and knee joints, and the large number of patients in need, the current approach to treating OA is not sustainable (9, 10). An improved understanding of the patient population for those seeking clinical care may help to identify ways to improve management, as well as determine and communicate the importance of physical activity, and inform models of care for patients with OA.

However, we do not know whether the current clinical management of people with OA in the Maritimes is well-aligned with the current management guidelines for physical activity and weight management (10). This information will be crucial to initiate a shift in OA management throughout the Maritimes from a focus on pharmacological symptom relief to non-pharmacological and non-surgical treatment options.

ACRONYMS

ANCOVA	Analysis of Covariance
BMI	Body mass index
CI	Confidence Interval
CIHI	Canadian Institute for Health Information
DAD	Discharge Abstract Database
HDNS	Health Data Nova Scotia (administrative health data repository)
MMCI	Modified, Modified Continuity Index
MSI	Nova Scotia Medical Services Insurance
NACRS	National Ambulatory Care Reporting System
NB	New Brunswick
NS	Nova Scotia
NSAID	Non-Steroidal Anti-Inflammatory Drug
OA	Osteoarthritis
OR	Odds ratio
PATH	Partnership for Tomorrow's Health
PEI	Prince Edward Island
PHARM	Seniors' Pharmacare

KEY TERMS

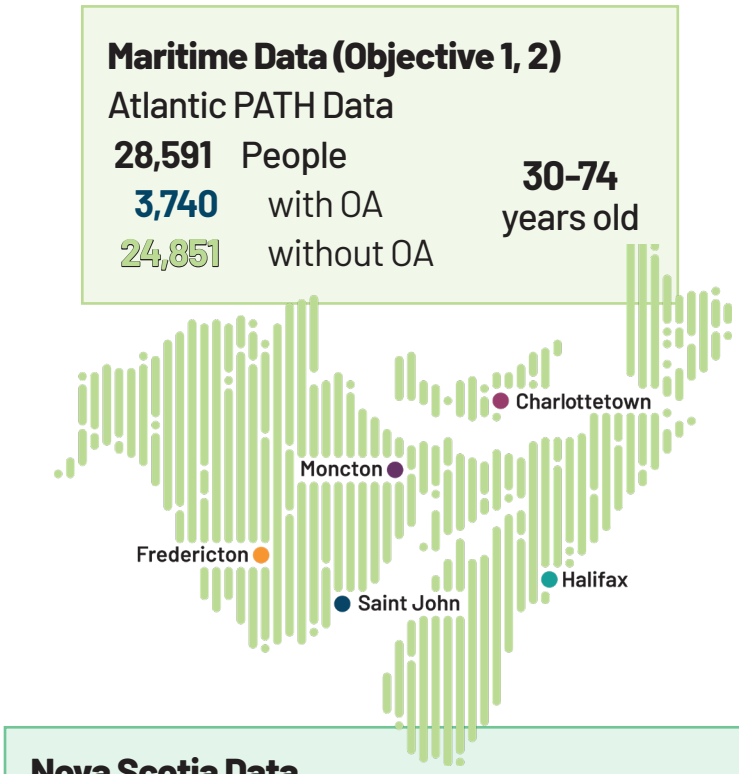
Analysis of Covariance (ANCOVA) – Used to examine differences in mean outcomes by looking at the influence of multiple independent variables while controlling for covariates (variables that influence the outcome).

Ambulatory visits – Medical care provided on an outpatient basis, for example a doctor's office or an office visit in a hospital-setting.

Comorbidities – When more than one disease or medical condition affects a person at the same time.

Logistic regression – Observations/variables are used to predict a binary outcome (e.g., use or non-use of opioids)

Osteoarthritis (OA) – A degenerative joint disease that can cause severe pain and functional limitations.



OBJECTIVES

Different data sets including different populations were used to investigate specific research questions.

Maritime Data (Atlantic PATH Data)

1. Describe differences in self-reported physical activity levels and use of pain medication between people with and without self-reported OA from the Maritimes.
2. Examine how associations between self-reported use of pain medication, physical activity, and OA diagnoses vary by sociodemographics (e.g., age, employment status), anthropometrics (e.g., body mass index), health status, and comorbidity burden across the Maritimes.

Nova Scotia Data (Atlantic PATH and Administrative Health Data)

3. Examine how pain medication, physical activity, and health care use differ between individuals with and without OA in Nova Scotia.
4. Examine whether associations between physical activity and pain medication use differ based on OA site (i.e., knee, hip, upper limb, lower limb, spine) for patients in Nova Scotia.

HOW WAS THIS RESEARCH DONE?

Existing data (Table 1) were used to examine the self-reported characteristics of people living with and without OA in all three Maritime Provinces (NB, NS, PEI), and to identify trends in health care use by Nova Scotians with and without self-reported OA.

Table 1. Data Sources

DATA	SOURCE	SCOPE	DESCRIPTION
PATH Data	Atlantic PATH	Maritime-wide (NB, NS, PEI)	Survey responses from people aged 30-74 years and living in the Maritimes (12). For more information on these data, see PATH Core and Questions Unique to the Atlantic Provinces.
Administrative Health Data	Health Data Nova Scotia (HDNS)	NS	Provincial administrative health data from one-year before and one-year after people completed the PATH core questionnaire. Data came from multiple sources: MSI Physician Billings (MED), CIHI Discharge Abstract Database (DAD), Seniors' Pharmacare (PHARM), National Ambulatory Care Reporting System (NACRS).

More detail on data sources and variables is included in the full research report, which is available on request from info@mssu.ca.

For the first component of the research, data collected by the Atlantic Partnership for Tomorrow's Health (PATH) was used. This data was collected to better understand cancer and chronic disease in Atlantic Canada. For the current study, data was drawn from 28,591 people aged 30-74 years old who completed the baseline PATH core questionnaire from the three Maritime Provinces. The questionnaire asked about lifestyle, sociodemographic information (e.g., education and work history), health issues, anthropometrics, and physical activity. The researchers were able to compare key individual characteristics, health, and physical activity and function between those who reported having OA and those who did not.

In the second part of the study, Atlantic PATH data for NS residents was linked with provincial administrative health data from one-year before and one-year after they completed the PATH core questionnaire. The provincial administrative health data (e.g., doctor visits) and resource consumption (e.g., pain medications) allowed the researchers to learn about health care use by Nova Scotians with and without self-reported OA.

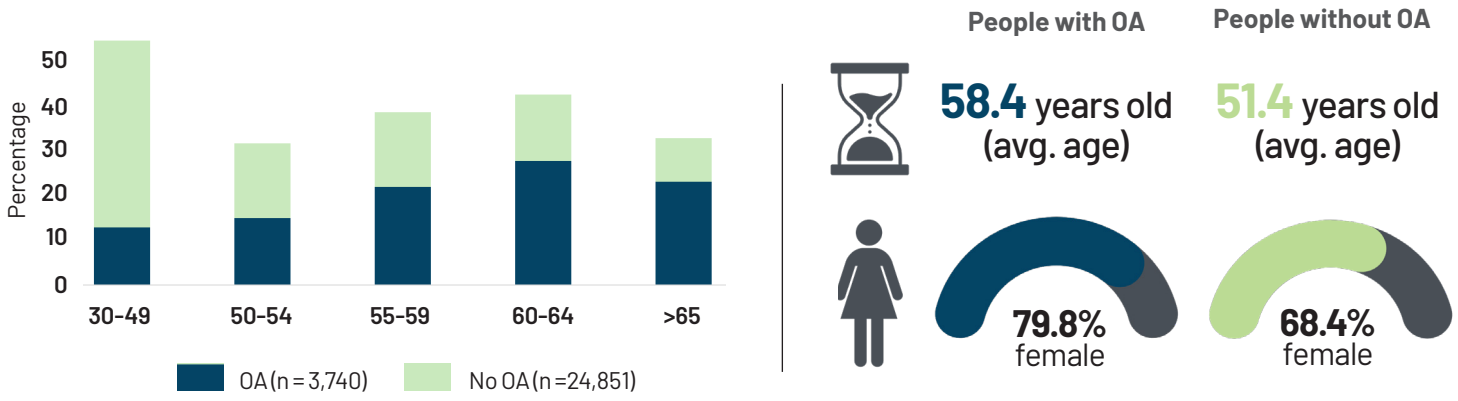
RESULTS

Maritime Data (Atlantic PATH Data) - Objectives 1 and 2

Sociodemographic characteristics

- People with OA were older (mean = 58.4 ± 7.6 years) than those without OA (mean = 51.4 ± 10.0 years) ($p < .001$).
- Both groups had more females than males, but there were significantly more females with OA (79.8%) compared to without (68.4%) ($p < .001$).
- People with OA had lower educational levels (high school and trade; $p < .05$), lower income levels (< $25,000; $25,000-49,999; $50,000-74,999; $p < .05$), and had higher rates of unemployment than those without OA ($p < .001$).

Figure 1. Age distribution and sex

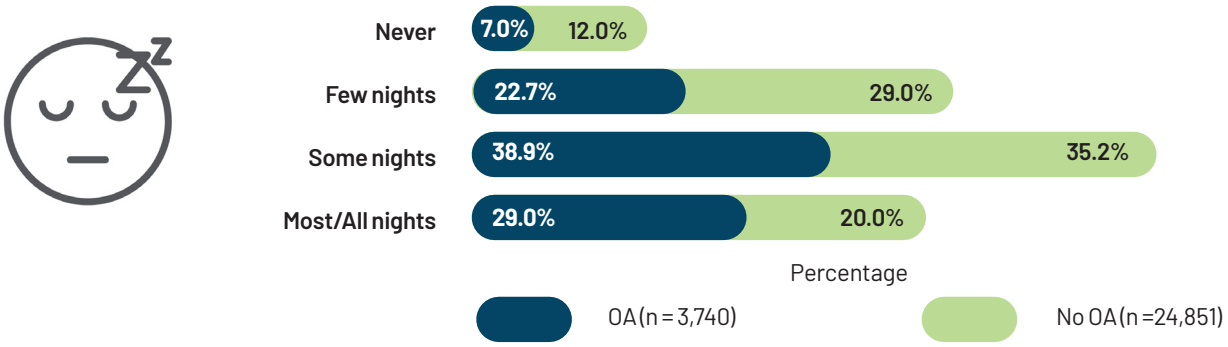


Lifestyle, behaviour, and mood

- Sleep problems were more common amongst people with OA, than those without OA. People with OA compared to those without OA reported experiencing more sleep problems 'some of the time' (38.9% vs. 35.2%, $p < .05$) or 'most or all of the time' (29.0% vs. 20.0%, $p < .05$).
- People with OA reported mild (13.3% vs. 11.2%), moderately severe (1.5% vs. 1.0%), or severe depression (0.7% vs. 0.4%) more often than people without OA (all $p < .05$), and had significantly higher median depression scores (median (IQR) = 2.3 (4) vs. 2.0 (4), $p < .001$).

Please note: *Percentages do not always add to 100 because not all respondents answer each survey question, thus some responses are missing.*

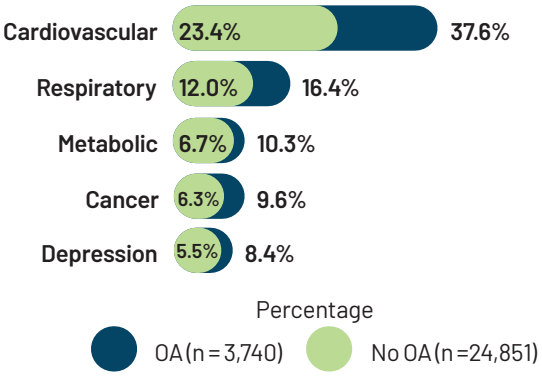
Figure 2. Sleep problems



Physical activity, anthropometry, and comorbidities

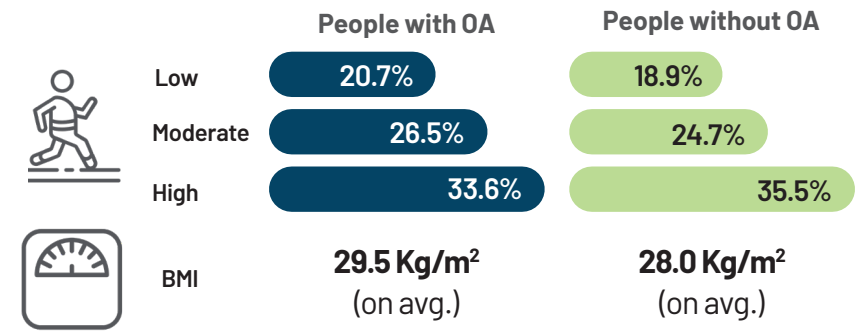
- People with OA reported low physical activity levels (20.7% vs. 18.9%, $p < .05$) more frequently than people without OA, and were less likely to report high levels of physical activity (33.6% vs. 35.5%, $p < .05$).
- On average, people with OA had a higher mean Body Mass Index (BMI) compared to those without OA (29.5 ± 6.7kg/m^2 vs. 28.0 ± 5.7kg/m^2, $p < .001$).
- People with OA reported having a higher number of comorbidities (e.g., heart disease, diabetes), with a higher percentage of OA participants having one (34.9% vs. 30.3%), two (17.7% vs. 10.7%), three (5.9% vs. 3.2%) or more than three (2.1 vs. 1.1%) comorbidities, respectively (all $p < .05$).
- Analysis of Covariance (ANCOVA) was used to understand the relationship between OA, physical activity, and the number of comorbidities, after adjusting for sociodemographic differences. Those with OA ($p < .001$), and those with lower (compared to higher) physical activity levels ($p < .001$) had a higher number of comorbidities. Additionally, people with OA who reported low physical activity levels had significantly more comorbidities compared to those without OA who also reported low physical activity levels ($p = .02$).

Figure 3. Types and number of comorbidities



# COMORBIDITIES	PEOPLE WITH OA	PEOPLE WITHOUT OA
1	34.9%	30.3%
2	17.7%	10.7%
3	5.9%	3.2%
4+	2.1%	1.1%

Figure 4. Physical activity levels and BMI



People with OA who reported low physical activity levels had significantly more comorbidities compared to those without OA who also reported low physical activity levels.

Medications

A type of analysis, logistic regression, was used to investigate the relationship between having OA, physical activity level, and use of opioids and/or Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). This analysis also accounted for possible effects of comorbidities, and sociodemographic and lifestyle characteristics. Summary findings highlight any statistically significant relationships.

- While overall opioid use was low, significantly more people with OA, versus without, reported using both weak (2.1% vs. 0.7%) and strong (1.7% vs. 0.4%) opioids ($p < .05$).
- Even after controlling for sociodemographic and lifestyle differences, people with OA were 3.2 times more likely to use opioids (95% CI 2.6-5.2, $p < .001$).
- Overall, those with higher physical activity levels (OR = 0.5, 95% CI 0.3-0.8, $p < .01$)—regardless of OA status—were less likely to use opioids compared to participants reporting low physical activity.
- NSAID use was also significantly higher among people with OA versus without (16.2% vs. 3.6%, $p < .001$).
- Combining opioid and NSAID use, and adjusting for sociodemographic and lifestyle differences, participants with OA were 4.0 times more likely to use these types of medications compared to those without OA (95% CI 2.9-5.6, $p < .001$).

Figure 5. Use of opioids and NSAIDs

MEDICATION	PEOPLE WITH OA	PEOPLE WITHOUT OA
Weak opioids	2.1%	0.7%
Strong opioids	1.7%	0.4%
NSAIDs	16.2%	3.6%

After adjusting for sociodemographic and lifestyle differences, people with OA were:

3.2x more likely to use opioids

4.0x more likely to use opioids + NSAIDs

Nova Scotia Data (Atlantic PATH and Administrative Health Data) - Objective 3 and 4

Medications and physical activity

Data on medication use came from Seniors' Pharmacare, and therefore only includes Nova Scotian PATH participants over the age of 65.

- Using administrative health data, a higher percentage of people with OA, versus without, used opioids (1.6% vs. 0.4%; $\chi^2 = 54.6$, OR = 4.1, $p < .001$).
- Logistic regression was also used to examine the relationship between OA, physical activity, and use of opioids in the administrative health data. People with OA who reported moderate ($p < .01$) or high ($p < .001$) levels of activity were less likely to use opioids than people with OA who reported low levels of physical activity.

Health care use

Overall, health care use was higher for people with OA, and for those with lower physical activity levels.

- People with OA had a higher proportion of medical procedures, notably lower (5.6% vs. 1.1%; $p < .001$) and upper (0.8% vs. 0.4%; $p = .001$) limb procedures and received more lower limb diagnoses (13.6% vs. 2.1%; $p < .001$), and upper limb diagnoses (1.8% vs. 0.4%; $p < .001$) than people without OA.
- The Modified, Modified Continuity Index (MMCI), a measure of continuity of care for patients, was higher for people with OA (0.8 ± 0.2 vs. 0.7 ± 0.3, $p < .001$). This suggests more consistent interactions with health care providers and this relationship held true regardless of their physical activity level.

People with OA had a higher MMCI, which suggests more consistent interactions with health care providers.

- People with OA, versus without, reported more ambulatory visits (14.3 ± 10.1 vs. 10.4 ± 8.3, p < .001), as did people reporting low (11.7 ± 9.2) versus moderate (11.1 ± 8.3) (p = .03) and high (10.5 ± 8.4, p < .001) physical activity.
- Those with OA, versus without, reported seeing more ambulatory providers (3.4 ± 2.3 vs. 3.1 ± 2.1, p < .001), as did individuals reporting low versus high physical activity levels (3.3 ± 2.3 vs. 3.1 ± 2.1, p = .02).

Figure 6. OA procedural indicators and health service use

	PEOPLE WITH OA	PEOPLE WITHOUT OA
Diagnoses consistent with OA		
Lower limb (e.g. hips, knees)	13.6%	2.1%
Upper limb and spine	1.8%	0.4%
Medical procedures associated with OA		
Lower limb (e.g. hips, knees)	5.6%	1.1%
Upper limb and spine	0.8%	0.4%

AMBULATORY CARE	PEOPLE WITH OA	PEOPLE WITHOUT OA
# visits	14.3	10.4
# providers	3.4	3.1

AMBULATORY CARE	LOW ACTIVITY (REGARDLESS OF OA STATUS)	HIGH ACTIVITY (REGARDLESS OF OA STATUS)
# visits	11.7	10.5
# providers	3.3	3.1

LIMITATIONS

This study relied on the use of self-reported data for much of the analysis, and thus comes with limitations as the accuracy cannot be verified. However, we also supplemented the self-reported PATH data with administrative health data. The administrative health data found that people with OA had more upper and lower limb procedures and diagnoses, and showed similar patterns for medication use, which supports the accuracy of the self-reported data. Additionally, the Atlantic PATH sample may not be representative of the general Atlantic Canadian population or OA populations elsewhere in Canada, therefore reducing the generalizability of the findings (11).

CONCLUSIONS

This research provides important baseline data about the sociodemographic characteristics, physical activity and health status of people with OA in the Maritime Provinces. This information enhances our understanding of the relationship between physical activity and the functioning of individuals with OA. Interestingly, those with self-reported OA in this study are a younger and healthier population compared to population-based demographics of those with OA (2), and are likely in the early stages of OA. The differences found in this population are important to understand when considering early interventions and prevention of severe OA, however they may not be generalizable to the broader OA cohort.

The research also identifies several gaps for future research, namely the need to better understand how treatment strategies (e.g., physiotherapy, medication) are prescribed by health care providers, how OA management in the current health care system aligns with the most recent international clinical practice guidelines, and investigating whether the health care needs of individuals with OA are being met.

Want to know more? Email info@mssu.ca to request a copy of the full report.

REFERENCES

1. Mora JC, Przkora R, Cruz-Almeida Y. Knee osteoarthritis: pathophysiology and current treatment modalities. J Pain Res. 2018;11:2189–96.
2. Arthritis Facts, Figures and Statistics [Internet]. [cited 2022 Sep 21]. Available from: https://arthritis.ca/about-arthritis/what-is-arthritis/arthritis-facts-and-figures
3. Badley EM. Arthritis in Canada: what do we know and what should we know? J Rheumatol Suppl. 2005 Jan;72:39–41.
4. Public Health Agency of Canada C for CDP and C. Life with arthritis in Canada: a personal and public health challenge. 2010.
5. Mahon JL, Bourne RB, Rorabeck CH, Feeny DH, Stitt L, Webster-Bogaert S. Health-related quality of life and mobility of patients awaiting elective total hip arthroplasty: a prospective study. Cmaj. 2002 Nov 12;167(10):1115–21.
6. Walker JG, Littlejohn GO. Measuring quality of life in rheumatic conditions. Clin Rheumatol. 2007 May;26(5):671–3.
7. Nova Scotia Health Authority. Joint Replacement Indicator Reporting, Fiscal Year 2017/18. 2018.
8. Nova Scotia Health Authority Perioperative Services Program. Hip and Knee Action Plan update. 2018 p. 1–4.
9. Canadian Institute for Health Information. Wait times for joint replacements and cataract surgery growing in much of Canada. 2019.
10. Hunter DJ, Nevitt M, Losina E, Kraus V. Biomarkers for osteoarthritis: current position and steps towards further validation. Best Pr Res Clin Rheumatol. 2014 Feb;28(1):61–71.
11. Shrestha S, Dave AJ, Losina E, Katz JN. Diagnostic accuracy of administrative data algorithms in the diagnosis of osteoarthritis: a systematic review. BMC Med Inf Decis Mak. 2016 Jul 7;16:82.
12. Sweeney E, Cui Y, DeClercq V, Devichand P, Forbes C, Grandy S, et al. Cohort Profile: The Atlantic Partnership for Tomorrow's Health (Atlantic PATH) Study. Int J Epidemiol. 2017 Dec 1;46(6):1762–1763i.