Health Care Resource Utilization and Cost in Parkinson's Disease Patients in a Real-World Setting in Quebec, Canada

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INTRODUCTION

- Parkinson's disease (**PD**) is a progressive neurodegenerative disease that primarily affects the parts of the brain that control movement.[1] PD is among the most common neurodegenerative disorders and causes severe disabilities.[2]

- Public Health Agency of Canada (PHAC) estimated the burden of PD in Canada in 2001 to be CAD$201.86 million in direct cost, with 49% in drug expenditures, 44% in hospital care expenditures, and 6.6% in physician care expenditures, while the indirect cost was estimated to be CAD$244.94 million.[2]

- There is limited data on the economic impact of PD in Quebec, Canada; this study adds evidence in a real-world setting.

OBJECTIVE

- The objective of this study is to analyze, in a real-world setting, health care resource utilization (**HCRU**) of patients with a diagnosis of PD in comparison to a matched control group of non-PD patients in Quebec, Canada.
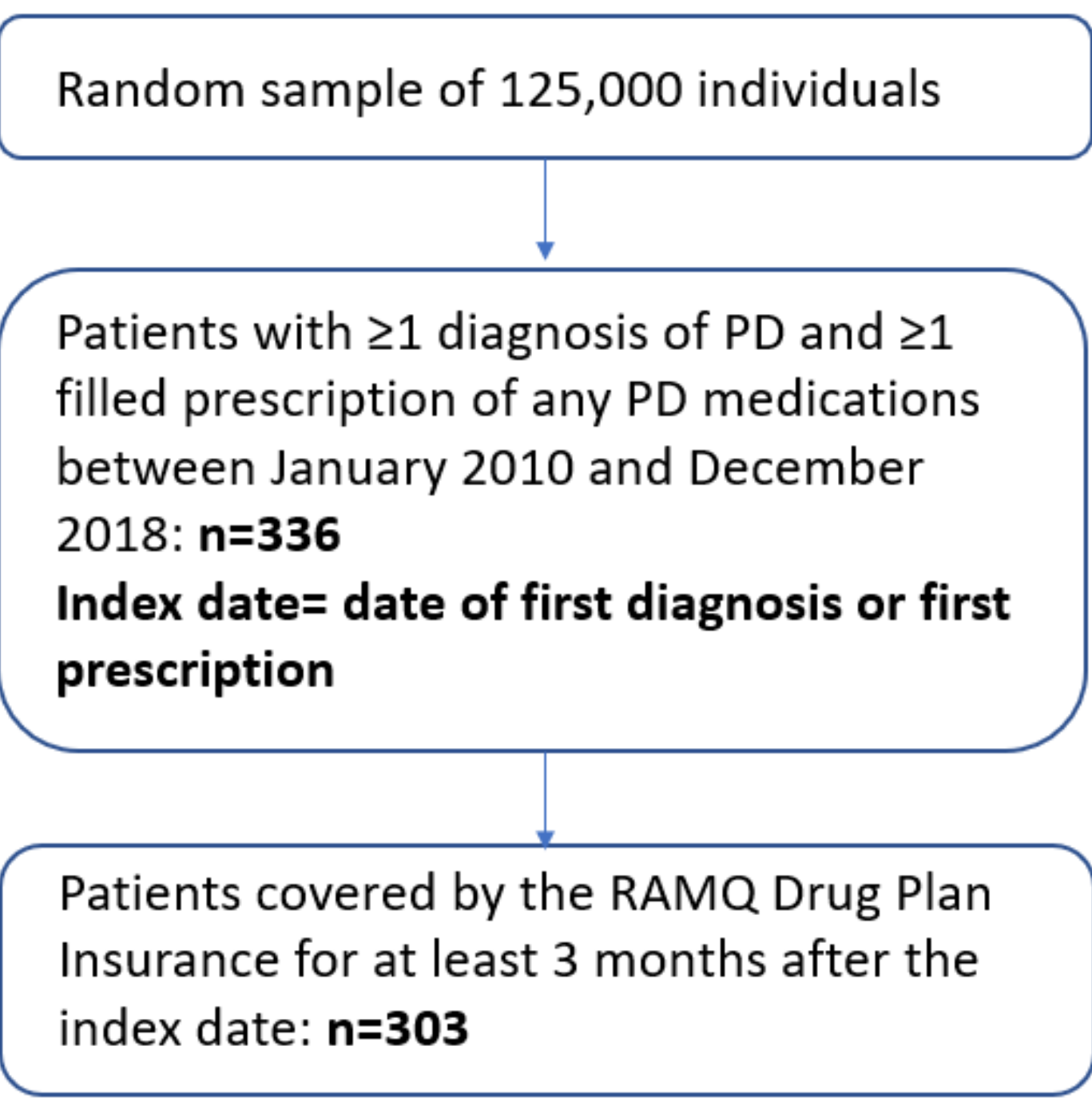
METHODS

<u>Design:</u> A retrospective, observational, cohort study of PD patients was conducted using data from the Régie de l'assurance maladie du Québec (**RAMQ**) databases.
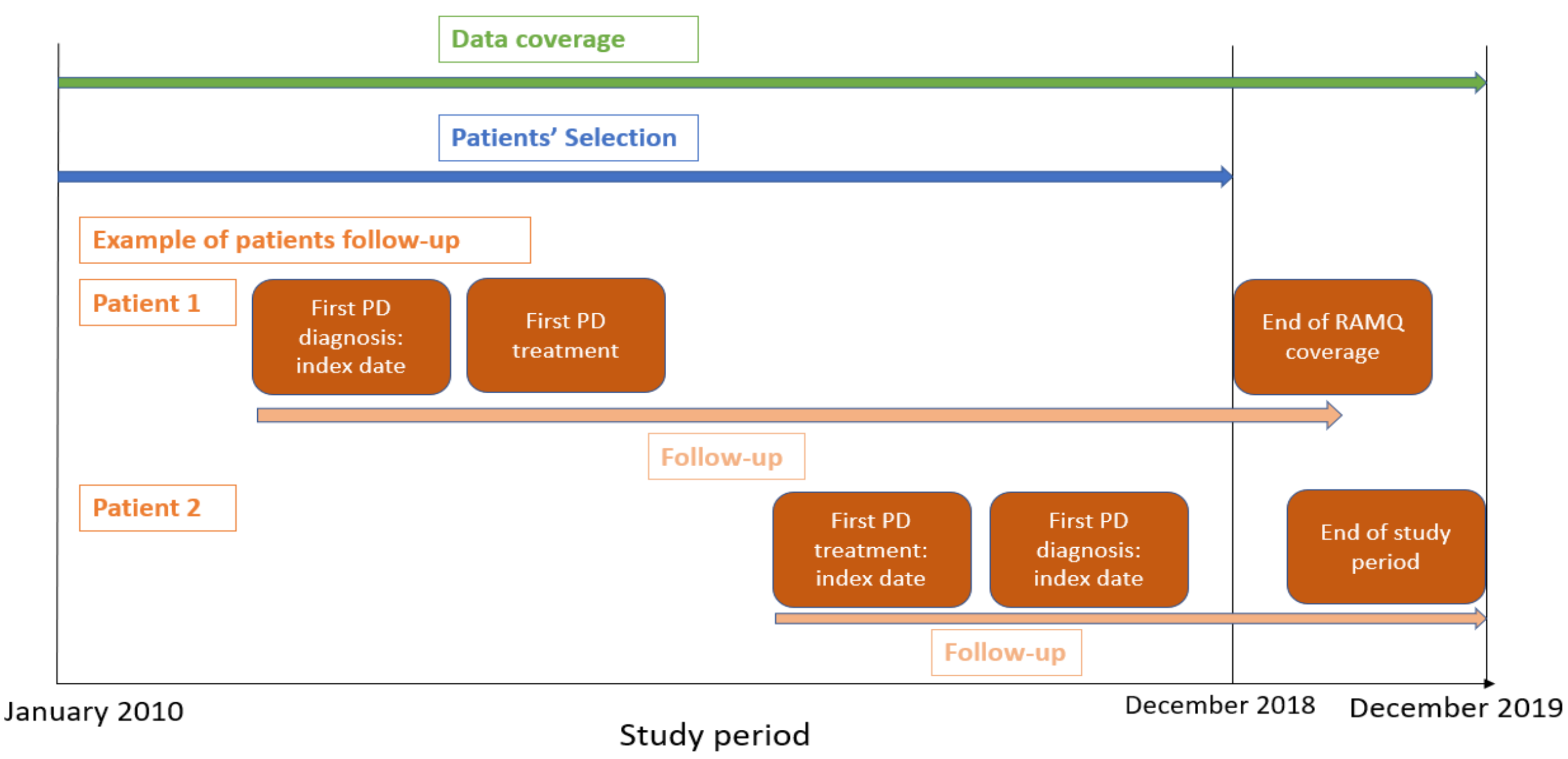
<u>End of follow-up</u>: the end of the coverage by the RAMQ Drug Insurance Plan, or by the end of the study period (December 2019), whichever came first.

<u>Patients' Selection</u>

- Random sample of 125,000 individuals

- Patients with ≥1 diagnosis of PD and ≥1 filled prescription of any PD medications between January 2010 and December 2018: **n=336**
  Index date= date of first diagnosis or first prescription

- Patients covered by the RAMQ Drug Plan Insurance for at least 3 months after the index date: **n=303**

- PD patients were selected if they had ≥ 1 diagnosis of PD (ICD-9 code 332.0 or ICD-10 code G20.x) and ≥ 1 filled prescriptions of any PD medications (levodopa, dopamine agonist, catechol-o-methyl transferase inhibitor, monoamine-oxidase-B inhibitor or anticholinergic drug).

- Control group: All patients with no diagnosis of PD from January 2010 to December 2018 were eligible.

  o For each case, 3 controls were randomly selected and matched for age groups and sex.

<u>Outcomes</u>

- Annualized HCRU and costs (2021 adjusted) for all-cause hospitalization, emergency department (**ED**) visits, outpatient visits and medication were calculated for PD patients and for the control group of non-PD patients.

- The total medical service cost included hospitalization, ICU, ED visits, outpatient visits and other visits.

- The total health care cost included total medical service costs and total medication costs.

- Costs of physician visits, medical procedures and medications were directedly available through the database, while the average costs reported in 2012 by the Ministry of Health and Social Services were used for inpatient and ED visits.

<u>Statistical Analysis</u>

- PD patients and the matched control group were compared using chi-squared tests for categorical variables and independent t-tests for continuous variables.

REFERENCES

1. National Institute on Aging. Parkinson's Disease. U.S. Department of Health and Human Services. Updated May 16, 2017. Accessed January 13, 2022, https://www.nia.nih.gov/health/parkinsons-disease
2. Canadian Institute for Health Information. The Burden of Neurological Diseases, Disorders and Injuries in Canada. Accessed January 2022, https://cpa.ca/cpasite/UserFiles/Documents/Practice_Page/Burden_neuro_diseases_en.pdf

DISCLOSURES

RESULTS

- Using the RAMQ Database, 303 PD patients and 909 (1:3 selection) age- and sex-matched control non-PD patients were identified.

<u>Table 1 Characteristics</u>:

- PD patients had a mean age of 74.3 years and 43.2% were female.

<u>Figure 1 and Table 2 HCRU and costs:</u>

- PD patients had statistically significant higher total health care services costs than the matched control group (**CAN$17,405 vs. CAN$6,431**), mainly due to higher inpatient costs (**CAN$12,171 vs. CAN$3,388**).

- PD patients had a higher number of outpatient, ED and other visits than their age group and sex-matched control group.

Table 1. Characteristics and Demographics of PD Patients and the Matched Control Group of Non-PD Patients

Characteristics	PD patients (n=303)	Matched control group[a] (n=909)	p-value[b]
Female, n (%)	131 (43.2)	393 (43.2)	1.00
Age, years, mean (SD)	74.3 (24.5)	71.0 (9.4)	**<0.01**
Age groups, years, n (%)			1.00
<18	0 (0)	0 (0.0)	
18-34	1 (0.3)	3 (0.3)	
35-49	6 (2)	18 (2.0)	
50-64	43 (14.2)	129 (14.2)	
65+	253 (83.5)	759 (83.5)	0.72
RAMQ Drug Insurance Plan, n (%)			
Social welfare	10 (3.3)	39 (4.3)	
Adherent	21 (6.9)	58 (6.4)	
65+ years	272 (89.8)	812 (89.3)	
Follow-up duration, years, mean (SD)	5.4 (1.8)	9.0 (2.0)	**<0.01**

[a] Groups age-and-sex-matched non-PD patients.
[b] p-value of the comparison between PD patients and the matched control group of non-PD patients.

Figure 1. Total HCRU Costs During the Follow-up in PD Patients and the Matched Control Group of Non-PD Patients
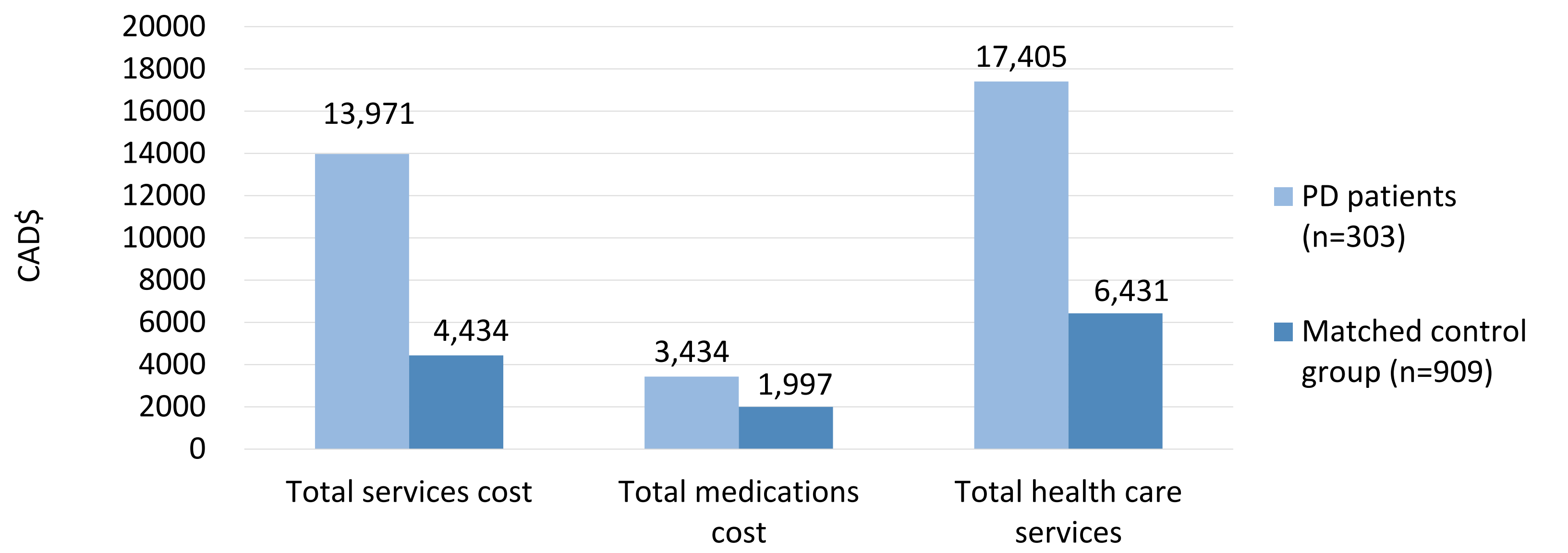

Table 2. HCRU and Costs During the Follow-up in PD Patients and the Matched Control Group of Non-PD Patients

All-cause HCRU	PD patients (n=303)	Matched control group[a] (n=909)	p-value[b]
Annualized inpatient visits			
Number of patients with at least one visit per year, n (%)	232 (76.6)	667 (73.4)	0.27
Number of visits per patient, mean (SD)	0.6 (0.9)	0.3 (0.4)	**<0.01**
Duration of stay, days, mean (SD)	7.6 (13.0)	2.1 (4.1)	**<0.01**
Cost, CAN$, mean (SD)	12,171 (20,543)	3,388 (6,637)	**<0.01**
Annualized ED visits			
Number of patients with at least one visit per year, n (%)	252 (83.2)	741 (81.5)	0.52
Number of visits per patient, mean (SD)	1.7 (2.3)	0.8 (1.2)	**<0.01**
Cost, CAN$, mean (SD)	672 (980)	271 (433)	**<0.01**
Annualized outpatient visits			
Number of patients with at least one visit per year, n (%)	302 (99.7)	905 (99.6)	1.00
Number of visits per patient, mean (SD)	9.3 (8.3)	6.9 (6.6)	**<0.01**
Cost, CAN$, mean (SD)	1,049 (833)	724 (668)	**<0.01**
Annualized other visits			
Number of patients with at least one visit per year, n (%)	215 (71)	714 (78.5)	0.01
Number of visits per patient, mean (SD)	2.4 (4.5)	1.8 (3.1)	0.04
Cost, CAN$, mean (SD)	79 (168)	51 (126)	0.01
Annualized total costs (CAN$)			
Total services cost, mean (SD)	13,971 (21,404)	4,434 (7,099)	**<0.01**
Total medications cost, mean (SD)	3,434 (2,969)	1,997 (2,615)	**<0.01**
Total health care services, mean (SD)	17,405 (22,369)	6,431 (8,189)	**<0.01**

[a] Groups age-and-sex-matched non-PD patients.
[b] p-value of the comparison between PD patients and the matched control group of non-PD patients.

STRENGTH AND LIMITATIONS

Strength:
- The reliance of the Quebec provincial health plan (RAMQ) data allows this research to reflect the real-world practice setting, while having a large number of patients.

Limitations:
- There are limitations inherent to the use of administrative claims databases, such as the reliance of ICD-9/10 codes for medical services as well as the restriction to reimbursed drugs (i.e., over-the-counter medication or those delivered during hospitalization are not available in the RAMQ data).

- Due to the overlap between the symptoms of parkinsonism and PD, some patients may be misclassified.

CONCLUSION

PD patients have a high burden of HCRU and cost compared to individuals without PD with the same age and sex, with inpatient cost as the major factor contributing to the difference.