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SUPPLEMENTARY MATERIAL
APPENDIX

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Ethnic and Immigrant Variations in the Time Trends of Dementia and Parkinsonism

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Appendix e-1. Administrative database algorithms to ascertain comorbidities among persons with dementia or parkinsonism

Comorbidity	Description	Sensitivity	Specificity
Chronic obstructive pulmonary disease[1]	1 or more ambulatory claims and/or 1 or more hospitalizations for chronic obstructive pulmonary disease	85%	79%
Congestive heart failure[2]	Aged >40 years, and either 1 hospital admission with a congestive heart failure diagnosis, or 1 OHIP claim/emergency department record with a congestive heart failure diagnosis followed within 1 year by a second record from either source or 1 hospital admission	85%	97%
Diabetes mellitus[3]	Either 1 hospital admission with diabetes mellitus diagnosis, or an OHIP claim followed within 2 years by either an OHIP claim or a hospital admission with diabetes mellitus diagnosis	86%	97%
Hypertension[4]	Either 1 hospital admission with a hypertension diagnosis, or an OHIP claim with a hypertension diagnosis followed within 2 years by either an OHIP claim or a hospital admission for hypertension	72%	95%
Traumatic brain injury*[5]	1 hospitalization record or 1 emergency department visit record for traumatic brain injury	Not available	Not available

OHIP - Ontario Health Insurance Program

*considered an accepted algorithm (Evidence Grade II)[5]

Appendix e-2A. Characteristics of persons with incident dementia in 2013/14, aged 20 years and older in Ontario, Canada, by ethnic origin

Characteristic	Chinese origin N=962	South Asian origin N=551	General population N=31 498
Sex, n (%)			
Female	578 (60.1)	290 (52.6)	18 521 (58.8)
Male	384 (39.9)	261 (47.4)	12 977 (41.2)
Age (years), mean (SD)	80.3 (10.5)	75.2 (12.5)	80.1 (10.4)
Immigration status			
Recent immigrant (<10 years)	69 (7.2)	59 (10.7)	315 (1.0)
Longer-term immigrant (≥10 years)	367 (38.1)	203 (36.9)	1 354 (4.3)
Long-term resident	526 (54.7)	289 (52.4)	29 829 (94.7)
Income quintile[b], n (%)			
1 – Lowest	237 (24.6)	118 (21.5)	6 741 (21.4)
2	200 (20.8)	147 (26.6)	6 489 (20.6)
3	184 (19.1)	100 (18.1)	6 016 (19.1)
4	189 (19.6)	100 (18.1)	6 016 (19.1)
5 – Highest	143 (14.9)	82 (14.8)	6 079 (19.3)
Residence[b], n (%)			
Urban	944 (98.1)	NA[c]	27 214 (86.4)
Rural	10 (1.0)	NA[c]	4 252 (13.5)

[a]fiscal year starts on April 1

[b]percentages do not add up to 100% due to missing values

[c]NA = not available due to cell sizes ≤5 (not reported to protect confidentiality of subjects)

Appendix e-2B. Characteristics of persons with incident parkinsonism in 2014/15, aged 20 years and older in Ontario, Canada, by ethnic origin

Characteristic	Chinese origin N=209	South Asian origin N=152	General population N=4 559
Sex, n (%)			
Female	83 (39.7)	59 (38.8)	1877 (41.2)
Male	126 (60.3)	93 (61.2)	2682 (58.8)
Age (years), mean (SD)	72.4 (11.4)	69.7 (11.8)	72.8 (11.1)
Immigration status			
Recent immigrant (<10 years)	23 (11.0)	17 (11.2)	70 (1.5)
Longer-term immigrant (≥10 years)	71 (34.0)	63 (41.5)	269 (5.9)
Long-term resident	115 (55.0)	72 (47.4)	4 220 (92.6)
Income quintile[b], n (%)			
1 – Lowest	41 (19.6)	44 (29.0)	789 (17.3)
2	49 (23.4)	27 (17.8)	858 (18.8)
3	40 (19.1)	35 (23.0)	883 (19.4)
4	34 (16.3)	27 (17.8)	987 (21.7)
5 – Highest	43 (20.6)	18 (11.8)	1 018 (22.3)
Residence[b], n (%)			
Urban	NA[c]	NA[c]	3 899 (85.5)
Rural	NA[c]	NA[c]	648 (14.2)

[a]fiscal year starts on April 1

[b]percentages do not add up to 100% due to missing values

[c]NA = not available due to cell sizes ≤5 (not reported to protect confidentiality of subjects)

Appendix e-3A. Associated factors with the incidence of dementia using Poisson regression modeling, 2001 to 2014, among persons of Chinese origin in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for immigration status			
Year	1.03	1.02	1.05
B. Adjusted for immigration status and traumatic brain injury			
Year	1.04	1.02	1.05
C. Adjusted for immigration status and diabetes			
Year	1.08	1.01	1.16
E. Adjusted for immigration status and stroke			
Year	1.00	0.94	1.06
F. Adjusted for immigration status and chronic obstructive pulmonary disease (COPD)			
Year	1.06	0.99	1.14
G. Adjusted for immigration status and hypertension			
Year	1.08	1.00	1.18
H. Adjusted for immigration status and congestive heart failure			
Year	1.01	0.95	1.07
I. Adjusted for immigration status and coronary artery disease			
Year	0.98	0.91	1.06
J. Adjusted for immigration status and education level			
Year	1.03	1.01	1.05
K. Adjusted for immigration status and body mass index			
Year	1.03	1.01	1.05
L. Adjusted for immigration status and smoking status			
Year	1.03	1.01	1.05
M. Adjusted for immigration status and physical activity level			
Year	1.03	1.01	1.05

Appendix e-3B. Associated factors with the incidence of dementia using Poisson regression modeling, 2001 to 2014, among persons of South Asian origin in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for immigration status			
Year	1.05	1.03	1.06
B. Adjusted for immigration status and traumatic brain injury			
Year	1.05	1.03	1.08
C. Adjusted for immigration status and diabetes			
Year	1.07	1.01	1.13
E. Adjusted for immigration status and stroke			
Year	1.07	0.93	1.22
F. Adjusted for immigration status and chronic obstructive pulmonary disease (COPD)			
Year	1.09	1.01	1.18
G. Adjusted for immigration status and hypertension			
Year	1.06	0.98	1.15
H. Adjusted for immigration status and congestive heart failure			
Year	1.04	0.88	1.23
I. Adjusted for immigration status and coronary artery disease			
Year	1.05	1.03	1.06
J. Adjusted for immigration status and education level			
Year	1.04	1.02	1.07
K. Adjusted for immigration status and body mass index			
Year	1.03	1.01	1.06
L. Adjusted for immigration status and smoking status			
Year	1.04	1.02	1.06
M. Adjusted for immigration status and physical activity level			
Year	1.04	1.01	1.06

Appendix e-3C. Associated factors with the incidence of parkinsonism using Poisson regression modeling, 2001 to 2015, among persons of Chinese origin in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for immigration status			
Year	1.00	1.00	1.01
B. Adjusted for immigration status and traumatic brain injury			
Year	1.00	1.00	1.01
C. Adjusted for immigration status and diabetes			
Year	1.01	1.00	1.03
E. Adjusted for immigration status and stroke			
Year	1.00	0.98	1.01
F. Adjusted for immigration status and chronic obstructive pulmonary disease (COPD)			
Year	1.01	0.99	1.03
G. Adjusted for immigration status and hypertension			
Year	1.01	1.00	1.03
H. Adjusted for immigration status and congestive heart failure			
Year	1.00	0.99	1.01
I. Adjusted for immigration status and coronary artery disease			
Year	1.00	0.98	1.02
J. Adjusted for immigration status and education level			
Year	1.00	1.00	1.01
K. Adjusted for immigration status and body mass index			
Year	1.00	1.00	1.01
L. Adjusted for immigration status and smoking status			
Year	1.00	1.00	1.01
M. Adjusted for immigration status and physical activity level			
Year	1.01	1.00	1.01

Appendix e-3D. Associated factors with the incidence of parkinsonism using Poisson regression modeling, 2001 to 2015, among persons of South Asian origin in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for immigration status			
Year	1.01	1.00	1.01
B. Adjusted for immigration status and traumatic brain injury			
Year	1.01	1.00	1.02
C. Adjusted for immigration status and diabetes			
Year	1.01	1.00	1.03
E. Adjusted for immigration status and stroke			
Year	1.04	0.99	1.09
F. Adjusted for immigration status and chronic obstructive pulmonary disease (COPD)			
Year	1.01	0.99	1.04
G. Adjusted for immigration status and hypertension			
Year	1.02	0.99	1.05
H. Adjusted for immigration status and congestive heart failure			
Year	1.04	0.99	1.10
I. Adjusted for immigration status and coronary artery disease			
Year	1.01	1.00	1.01
J. Adjusted for immigration status and education level			
Year	1.01	1.00	1.01
K. Adjusted for immigration status and body mass index			
Year	1.01	1.00	1.02
L. Adjusted for immigration status and smoking status			
Year	1.01	1.00	1.02
M. Adjusted for immigration status and physical activity level			
Year	1.01	1.00	1.02

Appendix e-4A. Associated factors with the incidence of dementia using Poisson regression modeling, 2001 to 2014, among recent immigrants in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for ethnicity			
Year	0.99	0.98	1.01
B. Adjusted for ethnicity and traumatic brain injury			
Year	0.97	0.95	1.00
C. Adjusted for ethnicity and diabetes			
Year	0.98	0.94	1.01
E. Adjusted for ethnicity and stroke			
Year	0.99	0.94	1.04
F. Adjusted for ethnicity and chronic obstructive pulmonary disease (COPD)			
Year	1.02	0.95	1.05
G. Adjusted for ethnicity and hypertension			
Year	0.94	0.88	1.01
H. Adjusted for ethnicity and congestive heart failure			
Year	0.99	0.95	1.03
I. Adjusted for ethnicity and coronary artery disease			
Year	1.01	0.99	1.02
J. Adjusted for ethnicity and education level			
Year	0.99	0.98	1.01
K. Adjusted for ethnicity and body mass index			
Year	0.99	0.98	1.01
L. Adjusted for ethnicity and smoking status			
Year	0.99	0.98	1.01
M. Adjusted for ethnicity and physical activity level			
Year	0.99	0.98	1.01

Appendix e-4B. Associated factors with the incidence of dementia using Poisson regression modeling, 2001 to 2014, among longer-term immigrants in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for ethnicity			
Year	1.06	1.05	1.08
B. Adjusted for ethnicity and traumatic brain injury			
Year	1.06	1.05	1.07
C. Adjusted for ethnicity and diabetes			
Year	1.05	1.04	1.07
E. Adjusted for ethnicity and stroke			
Year	1.09	1.04	1.14
F. Adjusted for ethnicity and chronic obstructive pulmonary disease (COPD)			
Year	1.10	1.04	1.16
G. Adjusted for ethnicity and hypertension			
Year	1.05	1.03	1.08
H. Adjusted for ethnicity and congestive heart failure			
Year	1.07	1.04	1.11
I. Adjusted for ethnicity and coronary artery disease			
Year	1.06	1.03	1.09
J. Adjusted for ethnicity and education level			
Year	1.07	1.05	1.08
K. Adjusted for ethnicity and body mass index			
Year	1.07	1.05	1.09
L. Adjusted for ethnicity and smoking status			
Year	1.07	1.05	1.08
M. Adjusted for ethnicity and physical activity level			
Year	1.07	1.05	1.08

Appendix e-4C. Associated factors with the incidence of parkinsonism using Poisson regression modeling, 2001 to 2015, among recent immigrants in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for ethnicity			
Year	1.00	1.00	1.01
B. Adjusted for ethnicity and traumatic brain injury			
Year	1.00	0.98	1.01
C. Adjusted for ethnicity and diabetes			
Year	0.99	0.98	1.01
E. Adjusted for ethnicity and stroke			
Year	1.00	0.98	1.02
F. Adjusted for ethnicity and chronic obstructive pulmonary disease (COPD)			
Year	1.01	0.99	1.03
G. Adjusted for ethnicity and hypertension			
Year	0.99	0.96	1.02
H. Adjusted for ethnicity and congestive heart failure			
Year	1.00	0.98	1.02
I. Adjusted for ethnicity and coronary artery disease			
Year	1.00	1.00	1.01
J. Adjusted for ethnicity and education level			
Year	1.00	0.99	1.01
K. Adjusted for ethnicity and body mass index			
Year	1.00	1.00	1.01
L. Adjusted for ethnicity and smoking status			
Year	1.00	1.00	1.01
M. Adjusted for ethnicity and physical activity level			
Year	1.00	1.00	1.01

Appendix e-4D. Associated factors with the incidence of parkinsonism using Poisson regression modeling, 2001 to 2015, among longer-term immigrants in Ontario, Canada

	Rate Ratio	95% Confidence Interval	
A. Adjusted for ethnicity			
Year	1.01	1.00	1.01
B. Adjusted for ethnicity and traumatic brain injury			
Year	1.01	1.01	1.01
C. Adjusted for ethnicity and diabetes			
Year	1.01	1.00	1.02
E. Adjusted for ethnicity and stroke			
Year	1.00	0.98	1.02
F. Adjusted for ethnicity and chronic obstructive pulmonary disease (COPD)			
Year	1.00	0.98	1.03
G. Adjusted for ethnicity and hypertension			
Year	1.02	1.01	1.03
H. Adjusted for ethnicity and congestive heart failure			
Year	1.00	0.99	1.02
I. Adjusted for ethnicity and coronary artery disease			
Year	1.01	0.99	1.02
J. Adjusted for ethnicity and education level			
Year	1.01	1.00	1.02
K. Adjusted for ethnicity and body mass index			
Year	1.01	1.01	1.02
L. Adjusted for ethnicity and smoking status			
Year	1.01	1.01	1.02
M. Adjusted for ethnicity and physical activity level			
Year	1.01	1.00	1.02

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