

Supplementary Table 1: Databases used in cohort creation and for variables used in study

Database name	Database description	Use in current study
Ontario Dementia Database (Dementia)	ICES derived data cohort, based on algorithm which discerns dementia diagnosis in the health administrative data Algorithm*: 1 hospitalization or same-day surgery for dementia <i>and/or</i> 3 physician visits for dementia within 2 years (each at least 30 days apart) <i>and/or</i> filled prescription for a cholinesterase inhibitor (Se=79.3%, Sp=99.1%, PPV=80.4%, NPV=99.0%)	Cohort creation: used to define a cohort of individuals with dementia Case ascertainment date (earliest of the dates described left) used as index date
Ontario Drug Benefit Claims (ODB)	Contains prescription drug claims, received under the Ontario Drug Benefit program, which mostly includes individuals aged ≥ 65	Captures medication use (at the generic, subclass, and class level), including the specific days a prescription was “filled” over
Registered Persons Data Base (RPDB)	Basic demographic information about Ontarians (who have received an Ontario health card)	Basic demographics used as covariates and to describe the cohort over time
Discharge Abstract Database (DAD)	Contains patient data about acute, rehab, chronic and day surgery institutions in Ontario	Used to describe health service use prior to entering the cohort and to define the outcome of fall-related hospitalizations
Ontario Health Insurance Plan (OHIP)	Contains claims paid for by the Ontario Health Insurance Plan	Used to define specific characteristics (such as comorbidities)
Continuing Care Reporting System (CCRS)	Contains clinical and demographic information on residents receiving facility based continuing care services (long-term care [nursing] homes)	Used to define censoring dates (admission to long-term care [nursing] homes) and apply initially exclusion
Census Area Profiles (Census)	Contains demographic information and income information from the Census	Used to define neighbourhood income level and urban/rural residence as covariates

*RL Jaakkimainen et al., “Identification of physician-diagnosed Alzheimer’s disease and related dementias in population-based administrative data: A validation study using family physicians’ electronic medical records”, Journal of Alzheimer’s Disease, vol. 54, no. 1, pp. 337–349, Aug. 2016, <https://doi.org/10.3233/JAD-160105>.



Supplementary Table 2: Detailed description of the algorithm used to define incident dementia cases

Description of algorithm used	ICD-9 billing codes and specific prescriptions	Health administrative databases derived from	Sensitivity	Specificity	PPV	NPV
One hospital billing or three physician claims in 2 years separated by at least 30 days or one prescription filled	ICD-9 (46.1, 290.0, 290.1, 290.2, 290.3, 290.4, 294.x, 331.0, 331.1, 331.5, 331.82); ICD-10 (F00.x, F01.x, F02.x, F03.x, G30.x); OHIP (290, 331). Prescription drug reimbursement records were examined for reference to the cholinesterase inhibitor subclass including donepezil (Aricept), galantamine (Reminyl, Reminyl ER, Razadyne, Razadyne ER), rivastigmine (Exelon), tacrine (Cognex), and memantine (Ebixa, Namenda).	Canadian Institute for Health Information hospital Discharge Abstract Database (CIHI-DAD), Ontario Health Insurance Plan (OHIP), National Ambulatory Care Reporting System (NACRS), Ontario Drug Benefit (ODB)	79.3	99.1	80.4	99

*Results of sensitivity, specificity, PPV and NPV from Jaakkimainen, R. L., Bronskill, S. E., Tierney, M. C., Herrmann, N., Green, D., Young, J., Ivers, N., Butt, D., Widdifield, J., & Tu, K. (2016). Identification of Physician-Diagnosed Alzheimer's Disease and Related Dementias in Population-Based Administrative Data: A Validation Study Using Family Physicians' Electronic Medical Records. *Journal of Alzheimer's Disease*, 54(1), 337–349. <https://doi.org/10.3233/JAD-160105>.



Supplementary Table 3: Clinical and demographic characteristics in community-dwelling older adults with incident dementia between 2014 and 2016 in Ontario, Canada at index and at five years

	At index N = 99046	At five years N = 15222
Age		
Mean (SD)	83.1 (7.2)	78.9 (6.4)
67-74	13853 (14.0)	4156 (27.3)
75-84	40586 (41.0)	7950 (52.2)
85+	44607 (45.0)	3116 (20.5)
Female	57143 (57.7)	9046 (59.4)
Urban location	86549 (87.6)	13809 (90.8)
Neighbourhood Income Quintile		
Lowest (1)	23790 (24.1)	3006 (19.8)
2	22345 (22.6)	3224 (21.2)
3	18869 (19.1)	2893 (19.1)
4	17009 (17.2)	2844 (18.7)
Highest (5)	16738 (17.0)	3216 (21.2)
Number of chronic conditions		
0-1	5349 (5.4)	1039 (6.8)
2	8584 (8.7)	1672 (11.0)
3	14108 (14.2)	2482 (16.3)
4	17958 (18.1)	3035 (19.9)
5+	53047 (53.6)	6992 (45.9)
Prevalence of specific chronic conditions		
AMI	7751 (7.8)	732 (4.8)
Asthma	14185 (14.3)	2244 (14.7)
Cancer	56260 (56.8)	8295 (54.5)
Arrhythmia	22305 (22.5)	2599 (17.1)
Coronary heart disease	36859 (37.2)	4695 (30.8)
COPD	13724 (13.7)	1267 (8.3)
CHF	17168 (17.3)	1265 (8.3)
Diabetes	34326 (34.7)	4653 (30.6)
Hypertension	81740 (82.5)	11633 (76.4)
Mood disorders	53712 (54.2)	8882 (58.4)
Mental health	23406 (23.6)	3821 (25.1)
Osteoarthritis	72203 (72.9)	11141 (73.2)
Osteoporosis	16605 (16.8)	2795 (18.4)
Renal	12882 (13.0)	1061 (7.0)
Rheumatoid arthritis	3007 (3.0)	401 (2.6)
Stroke	11493 (11.6)	1254 (8.2)
Have at least one of health system visit in year prior		
Home care	31765 (32.1)	2244 (14.7)
Mental health hospitalizations	269 (0.3)	39 (0.3)
Rehabilitation stays	2147 (2.3)	181 (1.2)
Hospitalization	16697 (16.9)	1763 (11.6)
Complex continuing care	827 (0.8)	44 (0.3)
Emergency department	35599 (35.9)	4573 (30.0)
Number of medications		
Median (IQR)	4 (2-7)	4 (2-6)
0-1	17265 (17.4)	2501 (16.4)
2-4	33024 (33.3)	5888 (38.7)
5-9	40929 (41.3)	5924 (38.9)
=>10	7828 (7.9)	909 (6.0)

Supplementary Table 4: Common medication pairs concurrently dispensed in community-dwelling older adults with incident dementia between 2014 and 2016 in Ontario, Canada at index (N = 99,046) and at five years following (N = 15,222)

Medication dyad	Frequency (%)	
	At index	At five years
STATINS + BETA-BLOCKERS	17786 (18.0)	2444 (16.1)
STATINS + ACE INHIBITORS	16285 (16.4)	2714 (17.9)
STATINS + PROTON PUMP INHIBITORS	15912 (16.1)	2456 (16.1)
STATINS + CALCIUM BLOCKERS	13995 (14.1)	2234 (14.7)
STATINS + DIURETICS	12949 (13.1)	1579 (10.3)
STATINS + ORAL ANTI-GLYCEMICS	12397 (12.5)	2079 (13.7)
BETA-BLOCKERS + DIURETICS	11088 (11.2)	979 (6.4)
PROTON PUMP INHIBITORS + BETA-BLOCKERS	11021 (11.1)	1249 (8.2)
BETA-BLOCKERS + ACE INHIBITORS	10467 (10.6)	1323 (8.7)
STATINS + ANGIOTENSIN II ANTAGONIST	9873 (10.0)	1957 (12.9)
BETA-BLOCKERS + CALCIUM BLOCKERS	9303 (9.4)	1187 (7.8)
PROTON PUMP INHIBITORS + DIURETICS	8975 (9.1)	845 (5.6)
PROTON PUMP INHIBITORS + CALCIUM BLOCKERS	8826 (8.9)	1154 (7.6)
CALCIUM BLOCKERS + ACE INHIBITORS	8665 (8.8)	1234 (8.10)
STATINS + HYPOTHYROIDISM THERAPY	8619 (8.7)	1393 (9.2)

*ACE = Angiotensin-converting enzyme.

Supplementary Table 5: Common central nervous system-active medication pairs concurrently dispensed in community-dwelling older adults with incident dementia between 2014 and 2016 in Ontario, Canada at index (N=99,046) and at five years following (N = 15,222)

Medication dyad	Frequency (%)	
	At index	At five years
SSRIs + CHOLINESTERASE INHIBITORS	2665 (2.7)	693 (4.5)
ANTIPSYCHOTIC AGENTS + SSRIs	2031 (2.1)	281 (1.8)
BENZODIAZEPINE DERIVATIVES + SSRIs	1804 (1.8)	493 (3.2)
ANALGESICS & ANTIPYRETICS + ANTIDEPRESSANTS	1645 (1.7)	128 (0.8)
ANTIDEPRESSANTS + CHOLINESTERASE INHIBITORS	1644 (1.7)	377 (2.5)
ANTIDEPRESSANTS + SSRIs	1614 (1.6)	399 (2.6)
OPIOIDS + SSRIs	1614 (1.6)	218 (1.4)
OPIOIDS + ANTIDEPRESSANTS	1574 (1.5)	198 (1.3)
ANTIPSYCHOTIC AGENTS + ANTIDEPRESSANTS	1459 (1.5)	183 (1.2)
BENZODIAZEPINE DERIVATIVES + CHOLINESTERASE INHIBITORS	1442 (1.5)	453 (2.9)
ANALGESICS & ANTIPYRETICS + CHOLINESTERASE INHIBITORS	1269 (1.3)	243 (1.6)
OPIOIDS + ANALGESICS & ANTIPYRETICS	1166 (1.2)	75 (0.4)
LEVODOPA + CHOLINESTERASE INHIBITORS	1067 (1.1)	143 (0.9)
ANTIPSYCHOTIC AGENTS + CHOLINESTERASE INHIBITORS	1044 (1.1)	219 (1.4)

*SSRI = selective serotonin reuptake inhibitors.