

## Appendix 1. Algorithms for identifying non-cancer outcomes.

Outcome	Algorithm	Evidence <sup>a</sup>	Performance (95% CI) <sup>b</sup>
Ischemic heart disease	2 physician billings in a 1-year period (with 1 billing in a hospital or emergency department) or 1 hospitalization record	Tier I <sup>1</sup>	SN: 77.0 (68.2-85.9) SP: 98.0 (97.0-98.9) PPV: 78.8 (70.1-87.5) NPV: 97.7 (96.8-98.7)
Congestive heart failure	1 hospitalization record or 1 physician billing plus a second record from either source in a 1-year period	Tier I <sup>2</sup>	SN 84.8 (77.7-92.0) SP 97.0 (96.1-97.7) PPV 55.6 (47.6-63.6)
Stroke/TIA	2 physician billings in a 1-year period or 1 hospitalization record	Tier I <sup>3</sup>	SN: 68.0 (60.5-75.5) SP: 98.9 (98.6-99.2) PPV: 66.2 (58.5-74.7) NPV: 99.0 (98.7-99.3)
Alzheimer's and related dementias	1 hospitalization record or 1 relevant prescription drug reimbursement record or 3 physician billing claims which were at least 30 days apart in a 2-year period	Tier I <sup>4</sup>	SN: 79.3 (72.9-85.8) SP: 99.1 (98.8-99.4) PPV: 80.4 (74.0-86.8) NPV: 99.0 (98.7-99.4)
Parkinsonism	2 physician billings at least 30 days apart in a 1-year period	Tier I <sup>5</sup>	SN: 70.6 (64.7-76.4) SP: 99.9 (99.9-100.0) PPV: 79.5 (74.0-85.0) NPV: 99.9 (99.9-99.9)
Osteoporosis	1 hospitalization record or 1 physician billing or 1 relevant prescription drug reimbursement record in a 2-year period	Tier II <sup>6</sup>	SN: 92.0 (NR) SP: 88.9 (NR) PPV: 87.5 (NR) NPV: 91.5 (NR)
Osteoporosis related fracture	1 physician billing associated with fracture treatment or 2 physician billings (including 1 by an orthopedic surgeon) in a 6-month period	Tier II <sup>7</sup>	Vertebral: SN 40 (10-70), PPV 82 (81-97) Humerus: SN 79 (74-84), PPV 89 (81-93) Wrist: SN 90 (88-92), PPV 96 (93-98) Hip: SN 95 (91-98), PPV 93.0 (90-96)
Hip fracture	1 hospitalization record (most responsible diagnosis) including 1 physician service code	Tier II <sup>8</sup>	1.08 (p=0.32) <sup>c</sup>
Wrist fracture	1 hospitalization record or 1 physician billing, preceded by a 6-month fracture-free period	Tier II <sup>8</sup>	1.03 (p=0.66) <sup>c</sup>
Humerus fracture	1 hospitalization record or 2 physician billings within 90 days, preceded by a 6-month fracture-free period	Tier II <sup>8</sup>	0.94 (p=0.49) <sup>c</sup>
Vertebral fracture	1 hospitalization record or 1 physician billing, preceded by a 12-month fracture-free period	Tier II <sup>8</sup>	0.80 (p=0.006) <sup>c</sup>
<sup>a</sup> Tier I for validation in Ontario; Tier II for validation in other Canadian provinces <sup>b</sup> SN sensitivity; SP specificity; NPV negative predictive value; PPV positive predictive value; NR not reported <sup>c</sup> Relative rates of osteoporosis-related incident fractures in women in administrative data using the Canadian Multicentre Osteoporosis Study as a reference			

## References

- 1) Tu K, Mitiku T, Lee DS, et al. (2010). Validation of physician billing and hospitalization data to identify patients with ischemic heart disease using data from the Electronic Medical Record Administrative data Linked Database (EMRALD). *Can J Cardiol*, 26(7): e225-e228.
- 2) Schultz SE, Rothwell DM, Chen Z, et al (2013). Identifying cases of congestive heart failure from administrative data: a validation study using primary patient records. *Chronic Diseases and Injuries in Canada*, 33(3): 1-7.
- 3) Tu K, Wang M, Young J, et al (2013). Validity of Administrative Data for Identifying Patients Who Have Had a Stroke or Transient Ischemic Attack Using EMRALD as a Reference Standard. *Can J Cardiol*, 29: 1388-1394.
- 4) Jaakkimainen RL, Bronskill SE, Tierney MC, et al (2016). Identification of Physician-Diagnosed Alzheimer's Disease and Related Dementia in Population-Based Administrative Data: A Validation Study Using Family Physicians' Electronic Medical Records. *Journal of Alzheimer's Disease*, 54: 337-349.
- 5) Butt DA, Tu K, Young J, et al (2014). A Validation Study of Administrative Data Algorithms to Identify Patients with Parkinsonism with Prevalence and Incidence Trends. *Neuroepidemiology*, 43: 28-37.
- 6) Leslie WD, Lix LM, Yogendran MS (2011). Validation of a case definition for osteoporosis disease surveillance. *Osteoporos Int*, 22: 37-46.
- 7) Jean S, Candas B, Belzile E, et al (2012) Algorithms can be used to identify fragility fracture cases in physician claims databases. *Osteoporos Int*, 23: 483-501.
- 8) Lix LM, Azimae M, Osman BA, et al (2012). Osteoporosis-related fracture case definitions for population-based administrative data. *BMC Public Health*, 12: 301.