**Table S1.** Characteristics of five sleep databases included in the current study.

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| --- | --- | --- | --- |
|  | **Sleep database** | **PSG recording software usea/ Scoring criteria / N included** | **Hypopnea criteria** |
|  | **London Health Sciences Centre Sleep Apnea Assessment Unit PSG database (London, Ontario)**  All consecutive individuals who underwent Level 1 in-hospital diagnostic polysomnography (PSG) at the London Health Sciences Centre between 2007 and 2015 | Software: Natus SD3200 with Mdrive  Scoring: the American Academy of Sleep Medicine (AASM) criteria 20071 and 20122  N=12,672 (4,086 by 2012 criteria) | 2007 criteria: ≥30% decrease in flow from baseline with an associated oxygen desaturation of ≥4%  2012 criteria: ≥30% decrease in flow from baseline with an associated oxygen desaturation of ≥3% OR an associated arousal |
|  | **Sunnybrook Health Sciences Centre Sleep database (Toronto, Ontario)**  All consecutive individuals who underwent Level 1 in-hospital PSG at the Sunnybrook Health Sciences Centre between 2010 and 2015 | Software: Compumedics Neuroscan  Scoring: the AASM criteria 20071  N=3,006 | ≥30% decrease in flow from baseline with an associated oxygen desaturation of ≥4% |
|  | **St. Michael’s Hospital Sleep Laboratory database (Toronto, Ontario)**  All consecutive individuals who underwent Level 1 in-hospital PSG at theSt. Michael’s Hospital between 1994 [mostly since 1996] and 2010 | Software: Sandman 7.3 (and older versions)  Scoring: the AASM Task Force 1999 (Chicago Criteria)3  N**=**9,530 | ≥50% decrease in flow OR a clear reduction in flow that does not reach ≥50% AND is associated with either an oxygen desaturation of ≥3% or an arousal |
|  | **The Ottawa Hospital (TOH) Sleep database**  **(Ottawa, Ontario)**  All consecutive individuals who underwent Level 1 in-hospital PSG at the TOH between 2015 and 2017 | Software:Sandman 10.1  Scoring: the AASM criteria 20122  N=4,816 | ≥30% decrease in flow from baseline with an associated oxygen desaturation of ≥3% OR an associated arousal |
|  | **TOH Surgical Sleep database (Ottawa, Ontario)**  All consecutive individuals who underwent Level 1 in-hospital PSG at the TOH before surgery between 2003 and 2011 | Software:Sandman 9.2  Scoring: the AASM criteria 20071  N=4,051 | ≥30% decrease in flow from baseline with an associated oxygen desaturation of ≥4% |

aEach patient in the cohort underwent full in-laboratory polysomnography recording that was scored by a sleep technologist and reviewed by a sleep physician.

**Table S2. Categorization of cancers by cancer subtypes from the Ontario Cancer Registrya (https://seer.cancer.gov/siterecode/icdo3\_dwhoheme/index.html)**

|  |  |  |
| --- | --- | --- |
|  | **ICD-O-3 Site** | **ICD-O-3 Histology (Type)** |
|  | **From the National Cancer Institute website** | |
| **Anatomic sub-type (most common)** | | |
| Prostate | C619 | excluding 9050-9055, 9140, 9590-9992 |
| Breast | C500-C509 |
| Lung | C340-C349 |
| Colorectal | Colon excluding Rectum: C180-C189, C260  Rectum and Rectosigmoid Junction: C199, C209 |
| Kidney | Kidney and Renal Pelvis: C649, C659 |
| Bladder | Urinary Bladder: C670-C679 |
| Melanoma of the skin | C440-C449 | 8720-8790 |
| **Etiological type** | | |
| Potentially smoking-related4, 5\* | Oral Cavity and Pharynx (excluding tonsil and salivary gland): C000-C009, C019-C029, C030-C039, C040-C049, C050-C059, C060-C069, C100-C109, C110-C119, C129, C130-C139, C140, C142, C148  Pancreas: C250-C259  Nose, Nasal Cavity and Middle Ear: C300-C301, C310-C319  Larynx: C320-C329  Lung and Bronchus: C340-C349  Pleura: C384  Urinary Bladder: C670-C679  Kidney and Renal Pelvis: C649, C659  Other Urinary Organs: C680-C689 | excluding 9050-9055, 9140, 9590-9992 |
| Potentially alcohol-related6 | Tongue: C019-C029  Floor of Mouth: C040-C049  Gum and Other Mouth: C030-C039, C050-C059, C060-C069  Oropharynx: C100-C109  Hypopharynx: C129, C130-C139  Other Oral Cavity and Pharynx: C140, C142, C148  Esophagus: C150-C159  Liver: C220  Intrahepatic Bile Duct: C221  Larynx: C320-C329 | excluding 9050-9055, 9140, 9590-9992 |
| Potentially virus/immune-related6 | Liver: C220  Intrahepatic Bile Duct: C221  Skin, non-melanoma: C440-C449 (excluding histology: 8720-8790 for melanoma)  Cervix Uteri: C530-C539  Hodgkin Lymphoma:  Hodgkin – Nodal: C024, C098-C099, C111, C142, C379, C422, C770-C779 (histology: 9650-9667)  Hodgkin – Extranodal: All other sites (histology: 9650-9667)  Non-Hodgkin Lymphoma:  NHL – Nodal: C024, C098, C099, C111, C142, C379, C422, C770-C779 (histology: 9590-9597, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687-9691, 9695, 9698-9702, 9705, 9708-9709, 9712, 9714-9719, 9724-9729, 9735, 9737-9738, 9811-9818, 9823, 9827, 9837)  NHL – Extranodal: All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779 (histology: 9590-9597, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9688, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9712, 9714-9719, 9724-9729, 9735, 9737, 9738) OR All sites except C024, C098-C099, C111, C142, C379, C420-C422, C424, C770-C779 (histology: 9811-9818, 9823, 9827, 9837)  Leukemia:  Lymphocytic Leukemia: C420, C421, C424  Myeloid and Monocytic Leukemia: (histology: 9840, 9861, 9865-9867, 9869, 9871-9874, 9895-9897, 9898, 9910-9911, 9920, 9891, 9863, 9875-9876, 9945-9946, 9860, 9930)  Other Acute Leukemia: histology: 9801, 9805-9809, 9931  Aleukemic, subleukemic and NOS: C420, C421, C424 (histology: 9733, 9742, 9800, 9831, 9870, 9948, 9963-9964, 9827)  Myeloma histology: 9731-9732, 9734 | excluding 9050-9055, 9140, 9590-9992 |
| Potentially hormone-related6 | Breast: C500-C509  Corpus Uteri: C540-C549  Ovary: C569  Other Female Genital Organs: C570-C579  Prostate: C619 | excluding 9050-9055, 9140, 9590-9992 |
| **Detectable by screening** | | |
| Prostate, Breast, Colorectal, Cervical | Prostate: C619  Breast: C500-C509  Cervix Uteri: C530-C539  Colon excluding Rectum: C180-C189, C260  Rectum and Rectosigmoid Junction: C199, C209 | excluding 9050-9055, 9140, 9590-9992 |

aInformation on cancer status and type was derived from the Ontario Cancer Registry (OCR), a computerized database of information on all Ontarians since 1964 who have been newly diagnosed with cancer or died of cancer. It uses U.S. Surveillance, Epidemiology and End Results Site Recode definitions as International Classification of Diseases for Oncology (ICD-O)-3 codes (https://seer.cancer.gov/siterecode/) and is based on multiple combined sources of data to provide good quality incidence data7-10.

**Table S3**. **Definitions of variables considered in the statistical models derived from the health administrative data**

|  |  |
| --- | --- |
| **Variables** | **Definition** |
| **Demographics** | |
| Age at baselinea, years | Defined from both clinical and health administrative data |
| Sex, Men | Defined from both clinical and health administrative data |
| Neighbourhood income status | Ontario neighbourhoods are classified into one of the five approximately equal-sized income quintiles, ranked from poorest (Q1) to wealthiest (Q5) and these have been shown to be related to population health status and health care utilization11. Each patient was assigned to the income quintile based on the patient’s postal code at the time of baseline and Statistics Canada’s Postal Code Conversion File12, 13. |
| Living in rural area at baseline | Defined using patient’s postal code14. |
| Being an immigrant | Immigration Status was defined from the IRCC (Immigration, Refugees and Citizenship Canada) Permanent Residents database (https://open.canada.ca/data/en/dataset/) |
| **Presence of Prior Comorbidities (as defined from health administrative data)** | |
| Alcohol use disorder | (1) Hospitalizations (from CIHI/DAD):   * ICD-9 codes: 303; 3050 * ICD-10 codes: E244; E512; F10; G312; G621; G721; I426; K292; K70; K860; T510; X45; X65; Y15; Y573; Z502; Z714; Z721   (2) Outpatient visits for alcohol dependence syndrome:  OHIP codes: 303 |
| Congestive Heart Failure | From the Ontario Congestive Heart Failure (CHF) Dataset15 (ICES-derived Cohorts) |
| Diabetes | From the Ontario Diabetes Dataset16 (ICES-derived Cohorts) |
| COPD | From the Chronic Obstructive Pulmonary Disease Dataset17 (ICES-derived Cohorts) |
| Hypertension | From Ontario Hypertension Database18 (ICES-derived Cohorts) |
| Obesity | Hospitalizations (from CIHI/DAD):   * ICD-10 codes: E66.x * ICD-9 codes: 278.0 |
| Depression | (1) Hospitalization for depression (from CIHI/DAD and Ontario Mental Health Reporting System)   * ICD-9 codes: 296.2; 296.3; 296.5; 300.4; 309.x; 311 * ICD-10 codes: F20.4; F31.3-F31.5; F32.x; F33.x; F34.1; F41.2; F43.2 * DSM-IV codes: 29620 – 29626; 29630 – 29636; 29650 – 29656; 30040; 30900; 30928; 31100   (2) Outpatient visits for depression/anxiety  OHIP codes: 311; 300 |
| Charlson Comorbidity Index | Charlson et al. developed a weighted index of comorbidities for predicting mortality, originally derived in hospitalized general medical patients and initially validated in female oncology patients19. This index was subsequently adapted by Deyo et al. for use with the ICD-9 diagnosis and procedure codes that are frequently used in electronic health care administrative databases and is ubiquitous in health services research20. |
| **Variables reflecting the quality of care and prior health care exposure from health administrative data** | |
| Blood glucose testing (within 3 years before the diagnostic sleep study) | The OHIP lab data for any of the fee codes L111, L112, L104, L103, L253 |
| Chest X-ray (within 3 years before the diagnostic sleep study) | Any of the OHIP fee codes X090, X901, X902 |
| The number of the primary care office visit (within 1-year before the diagnostic sleep study) | The OHIP records for the desired period, where (feesuff = ‘A’ and spec = ‘00’) and location in (‘H’, ‘O’, ‘L’) |
| **OSA-Related Treatment in Follow-up: PAP, or bariatric, MMA or UPPP surgeries** | |
| Acceptance of positive airway pressure (PAP) treatment as based on PAP claims from ADP database21 | Individuals who received government-funded:   * “Continuous Positive Airway Pressure” OR * “Bi-level Positive Airway Pressure” OR * “Auto-titrating Positive Airway Pressure”22.   The date of the PAP funding approval was used as the date for a PAP treatment initiation.  In Ontario, 75% of the cost of a basic continuous (CPAP), auto-titration (APAP), or bilevel (without a back-up breathing rate) device is covered through the ADP which can only be prescribed by specialist sleep physicians following a diagnostic sleep study. Bilevel devices with a backup rate are fully funded by the government. |
| Bariatric surgery | (1) In-patient Bariatric Procedures23:  ICD-10 codes: E66 AND CCI codes: 1NF78  (2) Outpatient bariatric procedures23:  OHIP feecodes: S120; S114; S189  (3) Before 2002: ICD-9 codes24  Procedures: 1) 44.31, 44.38, and 44.39, 2) 43.82, 3) 44.95, and 4) 43.7, 43.89, 44.68, 44.69, 45.50, 45.51, 45.90, and 45.91.  To confirm the procedures as weight-loss surgery, only patients with obesity diagnosis (ICD-9 codes: 278.0, 278.00, 278.01, 278.03, 278.8, V77.8, and V85.30-V85.45) or with diagnosis-related group (DRG) code of 288 (indicating the primary reason for the hospital admission is weight-loss surgery) were included. Patients identified with abdominal neoplasm diagnosis (ICD-9 codes: 150.0–159.9) at hospital admission were excluded. |
| MMA/UPPP | Using CCI codes  (1) 2002-present: INCODE1-20 (CCI codes see below): INATSTAT1-20, exclude status attribute='A'.   * MMA: 1EE79 * UPPP: 1FQ78LA   (2) From July 1991 to 2001: PRCODE1-10 (CCI codes see below); PRSUFF1-10, exclude procedures with suffixes of '0', '8' or '9'   * UPPP: 3961, 3962, 3963, 3969 * MMA: 8851, 8871, 8876 |
|  |  |
| To adjust for possible lag time between the diagnosis of OSA and diagnosis of cancer | Incident cancers diagnosed within one year (lag period) from the date of the diagnostic sleep study were censored and only cancers first diagnosed after that lag period were analyzed. |

athe date of the diagnostic sleep study

**List of datasets used**: The Registered Persons Database (RPDB), Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD) and the Same Day Surgery (CIHI-SDS), Ontario Health Insurance Plan Physician Services Claims database (OHIP), NACRS - National Ambulatory Care Reporting System, HYPERTENSION, Ontario Congestive Heart Failure database (CHF), Ontario Chronic Obstructive Pulmonary Disease database, Assistive Devices Program dataset (ADP).

ADP – assistive device program; CCI – Canadian Classification of Health Interventions; CHF – chronic heart failure; COPD – chronic obstructive pulmonary disease; ICD – the International Statistical Classification of Diseases and Related Health Problems; MMA – maxillomandibular advancement surgery; UPPP – uvulopalatopharyngoplasty.

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