Table 1. Characteristics of participants (N=19,996), first CARTaGENE wave (2009-2010)

| Characteristics                      | N (%)          |
|--------------------------------------|----------------|
| **Sex**                              |                |
| Men                                  | 9,686 (48.4%)  |
| Women                                | 10,310 (51.6%) |
| **Age**                              |                |
| 40-49                                | 6,935 (34.7%)  |
| 50-59                                | 7,602 (38.0%)  |
| 60-69                                | 5,459 (27.3%)  |
| **Region**                           |                |
| Montréal                             | 15,227 (76.2%) |
| Saguenay                             | 799 (4.0%)     |
| Québec city                          | 3,045 (15.2%)  |
| Sherbrooke                           | 925 (4.6%)     |
| **Education**                        |                |
| High school or less                  | 5,185 (25.9%)  |
| College/vocational training          | 6,325 (31.6%)  |
| University or more                   | 8,357 (41.8%)  |
| Missing                              | 129 (0.6%)     |
| **Income quintiles**                 |                |
| Lowest (24999$ and less)             | 2,465 (12.3%)  |
| Low-middle (25 000$ to 49 999$)      | 4,361 (21.8%)  |
| Middle (50 000$ to 74 999$)          | 4,057 (20.3%)  |
| Upper-middle (75 000$ to 99 999$)    | 5,831 (29.2%)  |
| Highest (100 000$ and up)            | 1,961 (9.8%)   |
| Missing                              | 1,321 (6.6%)   |
| **Health care utilization**           |                |
| < 20 claims in last 3 years          | 8,837 (44.2%)  |
| ≥ 20 claims in last 3 years          | 11,159 (55.8%) |
| **Charlson comorbidity index (CCI)** |                |
| 0                                    | 15,159 (75.8%) |
| 1                                    | 2,802 (14.0%)  |
| 2                                    | 1,131 (5.7%)   |
| 3 to 12                              | 904 (4.5%)     |

*CCI is derived from AHD
Table 2. Morbidity frequencies and measures of agreement by diagnosis, (N=19,996), CARTaGENE

| Diseases                      | Concordant cases* | Frequency (%) | Sensitivity (%) (95% CI) | Specificity (%) (95% CI) | PPV (%) (95% CI) | Kappa (95% CI) |
|-------------------------------|-------------------|---------------|--------------------------|--------------------------|-----------------|----------------|
| Chronic diseases              |                   |               |                          |                          |                 |                |
| Hypertension                  | 3,660             | 25.00         | 22.80                    | 73.83                    | (72.15-75.51)   | 94.15          | (92.25-96.05)  | 80.79          | (79.03-82.55)  | 0.70           | (0.69-0.71)    |
| OA                            | 1,554             | 16.10         | 20.50                    | 38.48                    | (37.26-39.70)   | 89.70          | (87.84-91.56)  | 49.05          | (47.68-50.42)  | 0.31           | (0.29-0.32)    |
| Depression                    | 1,717             | 16.70         | 18.40                    | 51.16                    | (49.76-52.56)   | 91.59          | (89.71-93.47)  | 57.83          | (56.34-59.32)  | 0.45           | (0.43-0.47)    |
| Diabetes                      | 1,338             | 7.60          | 8.00                     | 85.06                    | (83.25-86.87)   | 99.15          | (97.2-100)     | 89.74          | (87.88-91.6)   | 0.86           | (0.85-0.88)    |
| COPD                          | 340               | 5.69          | 7.62                     | 22.46                    | (21.53-23.39)   | 95.69          | (93.77-97.61)  | 30.06          | (28.99-31.13)  | 0.21           | (0.18-0.23)    |
| Hypothyroidism                | 932               | 7.10          | 7.60                     | 61.52                    | (59.98-63.06)   | 97.4           | (95.47-99.33)  | 66.1           | (64.51-67.69)  | 0.61           | (0.59-0.63)    |
| Asthma                        | 991               | 13.00         | 6.40                     | 78.15                    | (76.42-79.88)   | 91.43          | (89.56-93.3)   | 38.31          | (37.1-39.52)   | 0.47           | (0.45-0.49)    |
| Chronic renal failure         | 44                | 0.31          | 3.30                     | 5.09 (4.65-5.53)         | 99.91           | (97.95-100)    | 72.13          | (70.47-73.79)  | 0.09           | (0.07-0.12)    |
| Stroke                        | 170               | 1.65          | 2.06                     | 41.36                    | (40.10-42.62)   | 99.18          | (97.23-100)    | 51.67          | (50.26-53.08)  | 0.45           | (0.40-0.49)    |
| IBS                           | 170               | 4.48          | 1.82                     | 46.96                    | (45.62-48.3)    | 96.31          | (94.39-98.23)  | 19.10          | (18.24-19.96)  | 0.25           | (0.22-0.29)    |
| MI                            | 296               | 2.81          | 1.68                     | 88.62                    | (86.77-90.47)   | 98.66          | (96.71-100)    | 52.95          | (51.52-54.38)  | 0.66           | (0.62-0.69)    |
| Crohn’s disease               | 103               | 0.60          | 1.40                     | 38.01                    | (36.80-39.22)   | 99.91          | (97.95-100)    | 85.83          | (84.01-87.65)  | 0.52           | (0.46-0.58)    |
| RA                            | 123               | 2.90          | 0.88                     | 71.10                    | (69.45-72.75)   | 97.74          | (95.8-99.68)   | 21.81          | (20.89-22.73)  | 0.33           | (0.28-0.37)    |
| Schizophrenia                 | 58                | 0.38          | 0.82                     | 35.37                    | (34.20-36.54)   | 99.91          | (97.95-100)    | 77.33          | (75.61-79.05)  | 0.48           | (0.41-0.56)    |
| MS                            | 74                | 0.41          | 0.66                     | 56.49                    | (55.02-57.96)   | 99.96          | (98-100)       | 90.24          | (88.38-92.1)   | 0.69           | (0.62-0.76)    |
| Epilepsy                      | 65                | 0.56          | 0.55                     | 59.63                    | (58.12-61.14)   | 99.76          | (97.80-100)    | 58.04          | (56.55-59.53)  | 0.59           | (0.51-0.66)    |
| Cirrhosis                     | 26                | 0.28          | 0.41                     | 31.71                    | (30.61-32.81)   | 99.85          | (97.89-100)    | 47.27          | (45.92-48.62)  | 0.38           | (0.27-0.48)    |
| Parkinson’s disease           | 24                | 0.12          | 0.32                     | 38.10                    | (36.89-39.31)   | 100            | (98.04-100)    | 100            | (98.04-100)    | 0.55           | (0.43-0.68)    |
| SLE                           | 23                | 0.28          | 0.32                     | 35.94                    | (34.76-37.12)   | 99.84          | (97.88-100)    | 41.82          | (40.55-43.09)  | 0.39           | (0.27-0.5)     |
| Cancers                       |                   |               |                          |                          |                 |                |                |
| Breast                        | 327               | 1.76          | 1.90                     | 86.28                    | (84.46-88.1)    | 99.88          | (97.92-100)    | 93.43          | (91.54-95.32)  | 0.90           | (0.87-0.92)    |
| Prostate                      | 169               | 0.89          | 1.26                     | 67.6                     | (65.99-69.21)   | 99.95          | (97.99-100)    | 94.94          | (93.03-96.85)  | 0.79           | (0.75-0.83)    |
| Melanoma                      | 72                | 1.67          | 0.80                     | 45.28                    | (43.96-46.6)    | 98.68          | (96.73-100)    | 21.62          | (20.71-22.53)  | 0.29           | (0.23-0.34)    |
| Site             | Cases | Sensitivity | specificity | Positive LR | Negative LR | Concordance |
|------------------|-------|-------------|-------------|-------------|-------------|-------------|
| Colon            | 61    | 0.42        | 0.70        | 43.57 (42.28-44.86) | 99.89 (97.93-100) | 73.49 (71.81-75.17) | 0.55 (0.47-0.62) |
| Non-Hodgkin's lymphoma | 39    | 0.22        | 0.53        | 36.79 (35.6-37.98) | 99.97 (98.01-100) | 88.64 (86.79-90.49) | 0.52 (0.42-0.62) |
| Lung             | 45    | 0.27        | 0.48        | 47.37 (46.02-48.72) | 99.96 (98-100) | 84.91 (83.1-86.72) | 0.61 (0.51-0.7) |
| Cervical         | 21    | 0.66        | 0.38        | 28 (26.96-29.04) | 99.45 (97.5-100) | 16.03 (15.25-16.81) | 0.20 (0.13-0.27) |
| Bladder          | 40    | 0.22        | 0.34        | 58.82 (57.32-60.32) | 99.98 (98.02-100) | 93.02 (91.13-94.91) | 0.72 (0.63-0.82) |
| Thyroid          | 43    | 0.27        | 0.30        | 71.67 (70.01-73.33) | 99.94 (97.98-100) | 79.63 (77.88-81.38) | 0.75 (0.67-0.84) |
| Kidney           | 31    | 0.17        | 0.27        | 57.41 (55.92-58.9) | 99.98 (98.02-100) | 91.18 (89.31-93.05) | 0.70 (0.6-0.81) |
| Rectum           | 12    | 0.08        | 0.25        | 24 (23.04-24.96) | 99.98 (98.02-100) | 75 (73.30-76.70) | 0.36 (0.21-0.51) |
| Uterus           | 18    | 0.39        | 0.19        | 47.37 (46.02-48.72) | 99.7 (97.74-100) | 23.08 (22.14-24.02) | 0.31 (0.2-0.42) |

* Concordant cases represent the double positive for self-reported CaG diagnosis and AHD (consult text for specific definition).

CaG: Self-reported diagnosis in the CARTaGENE cohort; ADH: Administrative health data; CI: Confidence Interval; COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; MI: Myocardial infarction; OA: Osteoarthritis; RA: Rheumatoid arthritis; SLE: Systemic lupus erythematosus.
Table 3. Fit statistics for the complete logistic models where concordant cases were higher than 30, CARTaGENE

| Diseases                      | Pseudo-R² | Model Wald p | Sex p | Age groups p | Regions p | Education p | Income quintiles p | Heavy health utilization p | CCI² p |
|-------------------------------|-----------|--------------|-------|--------------|-----------|-------------|-------------------|---------------------------|--------|
| Chronic diseases              |           |              |       |              |           |             |                   |                           |        |
| Hypertension                  | 0.0246    | <0.0001      | <0.0001 | <0.0001      | 0.0254    | 0.1090      | <0.0001          | <0.0001                   | <0.0001 |
| OA                            | 0.0561    | <0.0001      | <0.0001 | <0.0001      | 0.001     | 0.0033      | 0.0003            | <0.0001                   | 0.13    |
| Depression                    | 0.0282    | <0.0001      | <0.0001 | 0.0004       | 0.0002    | 0.06        | <0.0001          | <0.0001                   | 0.86    |
| Diabetes                      | 0.0432    | <0.0001      | <0.0001 | <0.0001      | 0.3250    | 0.3736      | 0.3928            | 0.0003                    | <0.0001 |
| COPD                          | 0.0358    | <0.0001      | <0.0001 | 0.64         | 0.0031    | <0.0001     | <0.0001          | <0.0001                   | <0.0001 |
| Hypothyroidism                | 0.0572    | <0.0001      | <0.0001 | <0.0001      | 0.33      | 0.72        | 0.34              | <0.0001                   | 0.18    |
| Asthma                        | 0.0196    | <0.0001      | <0.0001 | <0.0001      | 0.0003    | 0.79        | <0.0001          | <0.0001                   | <0.0001 |
| Chronic renal failure         | 0.0649    | <0.0001      | <0.0001 | 0.0236       | 0.0216    | 0.0410      | 0.0120            | <0.0001                   | <0.0001 |
| Stroke                        | 0.0679    | <0.0001      | 0.0114 | <0.0001      | 0.07      | 0.81        | 0.0146            | <0.0001                   | <0.0001 |
| IBS                           | 0.0439    | <0.0001      | <0.0001 | 0.09         | 0.27      | 0.41        | 0.17              | <0.0001                   | 0.82    |
| MI                            | 0.1278    | <0.0001      | <0.0001 | <0.0001      | 0.78      | 0.41        | 0.0063            | <0.0001                   | <0.0001 |
| Crohn's disease               | 0.0305    | <0.0001      | 0.22   | 0.77         | 0.37      | 0.93        | 0.48              | <0.0001                   | 0.0230  |
| RA                            | 0.0497    | <0.0001      | 0.08   | <0.0001      | 0.0017    | 0.0452      | <0.0001          | <0.0001                   | 0.14    |
| Schizophrenia                 | 0.1158    | <0.0001      | 0.0173 | 0.0043       | 0.21      | 0.91        | <0.0001          | <0.0001                   | 0.23    |
| MS                            | 0.0290    | 0.0628       | 0.06   | 0.08         | 0.23      | 0.45        | 0.25              | 0.053                     | 0.80    |
| Epilepsy                      | 0.0300    | 0.0023       | 0.90   | 0.76         | 0.61      | 0.73        | 0.43              | 0.0042                    | 0.0082  |
| Cancers                       |           |              |       |              |           |             |                   |                           |        |
| Breast                        | 0.1026    | <0.0001      | <0.0001 | 0.63         | 0.77      | 0.40        | 0.54              | 0.0090                    | <0.0001 |
| Prostate                      | 0.2108    | <0.0001      | NA    | <0.0001      | 0.0389    | 0.15        | 0.71              | 0.0150                    | <0.0001 |
| Melanoma                      | 0.0393    | <0.0001      | 0.49   | <0.0001      | 0.14      | 0.54        | 0.0047            | <0.0001                   | <0.0001 |
| Colon                         | 0.1251    | <0.0001      | 0.0017 | 0.09         | 0.72      | 0.17        | 0.18              | <0.0001                   | <0.0001 |
| Non-Hodgkin's lymphoma        | 0.1631    | <0.0001      | 0.0152 | 0.91         | 0.32      | 0.08        | 0.15              | 0.0002                    | <0.0001 |
| Lung                          | 0.1134    | <0.0001      | 0.13   | 0.21         | 0.0089    | 0.34        | 0.39              | 0.0013                    | <0.0001 |
| Bladder                       | 0.0923    | <0.0001      | 0.73   | 0.06         | 0.98      | 0.93        | 0.84              | 0.14                      | <0.0001 |
| Thyroid                       | 0.1140    | 0.0001       | 0.32   | 0.23         | 0.84      | 0.13        | 0.41              | 0.0074                    | <0.0001 |
| Kidney                        | 0.0998    | <0.0001      | 0.92   | 0.26         | 0.78      | 0.051       | 0.53              | 0.06                      | <0.0001 |

p: probabilities; COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; MI: Myocardial infarction; OA: Osteoarthritis; RA: Rheumatoid arthritis; SLE: Systemic lupus erythematosus; CCI: Charlson comorbidity index; NA: no model possible.
Fig. 1 Selected co-factor effects of agreement between diseases.

A) Sex effect: women versus men

OR greater than 1 means that agreement is stronger in women compared to men.

COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; Lymphoma: Non Hodgkin’s lymphoma; SLE: Systemic lupus erythematosus.
B) Health care utilization effect: heavy vs. light users

OR greater than 1 means that agreement is stronger in heavy health care users compared to light users. COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; Lymphoma: Non Hodgkin’s lymphoma; SLE: Systemic lupus erythematosus.
C) Comorbidity effect: increase in one unit of the Charlson comorbidity index

OR greater than 1 means that agreement is stronger for each unit increase of the Charlson comorbidity index.

COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; Lymphoma: Non Hodgkin’s lymphoma; SLE: Systemic lupus erythematosus.
D) Older age effect: 60-69 years old versus 40-49 years old

OR greater than 1 means that agreement is stronger in older participants compared to the younger ones. COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; Lymphoma: Non Hodgkin’s lymphoma; SLE: Systemic lupus erythematosus.
E) Income effect: highest versus lowest income quintiles

OR greater than 1 means that agreement is stronger in the highest quintile group compared to the lowest.

COPD: Chronic obstructive pulmonary disease; IBS: Irritable bowel syndrome; MS: Multiple sclerosis; Lymphoma: Non Hodgkin’s lymphoma; SLE: Systemic lupus erythematosus.
**APPENDIX A** - List of selected conditions/morbidities, the self-reported survey questions used to access them, as well as the specific algorithm and ICD codes used on MED-ÉCHO administrative health data.

| Disease                           | Self-reported survey question                                                                 | Administrative health database algorithm | ICD-9 relevant codes | ICD-10 relevant codes |
|-----------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------|----------------------|-----------------------|
| Asthma                            | Has a doctor ever told you that you had asthma?                                               | 1 hospitalization or 3 physician claims in 2 years or less | 493                  | J45                   |
| Chronic renal failure             | Has a doctor ever told you that had kidney disease such as renal failure, renal infection or a kidney stones? What type of renal failure was it? | 1 hospitalization or 3 claims in 1 year | 583, 584, 585, 586, 592, 593.9 | N00-N23 |
| Cirrhosis<sup>b</sup>             | Has a doctor ever told you that you had a liver disorder such as cirrhosis or chronic hepatitis? What kind of liver disorder was it? | 1 hospitalization or 1 physician claim | 571.2, 571.5, 571.6 | K70.3, K74.3, K74.4, K74.5, K74.6 |
| Chronic obstructive pulmonary disease (COPD)<sup>c</sup> | Has a doctor ever told you that you had chronic bronchitis? | 1 hospitalization or 2 physician claims in 2 years or less | 416.8, 416.9, 490–92, 494–505, 506.4, 508.1, 508.8 | J27.8, J27.9, J40–44, J44–46, J47, J60–J67, J68.4, J70.1, J70.3 |
| Crohn's disease<sup>d</sup>       | Has a doctor ever told you that you suffer from a bowel disorder such as Crohn's Disease, Ulcerative colitis, Irritable bowel syndrome, polyps or diverticular disease? What kind of bowel disorder was it? | 2 hospitalizations or 2 physician claims in 3 years or less | 555                  | K50                   |
| Depression                        | Has a doctor ever told you that you had depression?                                            | 1 hospitalization or 2 physician claims in 2 years or less | 296.2, 296.3, 296.5, 300.4, 309, 311 | F20.4, F31.3–F31.5, F32, F33, F34.1, F41.2, F43.2 |
| Diabetes                          | Has a doctor ever told you that you had diabetes?                                              | 1 hospitalization or 2 physician claims in 3 years or less, exclude gestational diabetes | 250                  | E10-E14 |
| Epilepsy                          | Has a doctor ever told you that you had a neurological condition or migraines? What type of neurological condition was this? | 1 hospitalization or 2 physician claims in 2 years or less | 345                  | G40-G41 |
| Condition                     | Question                                                                 | Code(s)          | ICD-10 Code(s) |
|------------------------------|--------------------------------------------------------------------------|------------------|----------------|
| Hypertension                 | Has a doctor ever told you that you had high blood pressure or hypertension, other than high blood pressure occurring only in pregnancy? | 1 hospitalization or 2 physician claims in 3 years or less, exclude gestational hypertension | 401-405, I10-I13, I15 |
| Hypothyroidism               | Has a doctor ever told you that you had thyroid disease? Is (or was) it hyperthyroidism or hypothyroidism? | 1 hospitalization or 2 physician claims in 2 years or less | 240.9, 243, 244, 246.1, 246.8, E00-E03, E89.0 |
| Irritable bowel syndrome (IBS)| Has a doctor ever told you that you suffer from a bowel disorder such as Crohn's Disease, Ulcerative colitis, Irritable bowel syndrome, polyps or diverticular disease? What kind of bowel disorder was it? | 1 hospitalization or 2 physician claims in 2 years or less | 564.1, K58 |
| Multiple sclerosis (MS)      | Has a doctor ever told you that you had a neurological condition or migraines? What type of neurological condition was this? | 2 hospitalizations or 2 physician claims in 3 years or less | 323, 340, 341.0, 341.9, 377.3, G35, G36, G37, H46 |
| Myocardial infarction (MI)   | Has a doctor ever told you that you have had a myocardial infarction or a heart attack? | 1 hospitalization | 410, I21-I22 |
| Osteoarthritis (OA)          | Has a doctor ever told you that you had arthritis? What kind of arthritis is (or was) it? | 1 hospitalization or 1 physician claim in 2 years or less | 715, M15-M19 |
| Parkinson’s disease          | Has a doctor ever told you that you had a neurological condition or migraines? What type of neurological condition was this? | 1 hospitalization or 2 physician claims in 2 years or less | 332, G20, G21, G22 |
| Rheumatoid arthritis (RA)    | Has a doctor ever told you that you had arthritis? What kind of arthritis is (or was) it? | 1 hospitalization or 3 physician claims, one by rheumatologist, in 2 years or less | 714, M05-M06 |
| Schizophrenia                | Has a doctor ever told you that you had Schizophrenia? | 1 hospitalization or 2 physician claims in 2 years or less | 295, F20, F21, F23.2, F25 |
| Systemic lupus erythematosus (SLE) | Has a doctor ever told you that you suffer from systemic lupus erythematosus, often called SLE or "Lupus"? | 1 hospitalization or 3 physician claims, one by rheumatologist, in 2 years or less | 710, M32 |
| Condition       | Question                                                                 | Episodes/Claims | ICD Codes          |
|-----------------|--------------------------------------------------------------------------|-----------------|--------------------|
| Stroke          | Has a doctor ever told you that you have had a stroke?                   | 1 hospitalization or 1 physician claim | I60, I61, I63, I64 |
| Bladder cancer  | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C67, D09.0 |
| Breast cancer   | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C50, D05 |
| Cervical cancer | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C53 D06 |
| Uterine cancer  | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C55 |
| Prostate cancer | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C61, D07.5 |
| Colon cancer    | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C18 |
| Rectum cancer   | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C19-C21 |
| Kidney cancer   | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less | C64 |
| Cancer Type       | Question                                                                 | Count Criteria                                                                 | ICD Codes           |
|------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------|
| Lung cancer      | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less                      | C34, C38.4, 162.2-162.9, 163.231.2 |
| Trachea cancer   | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less                      | 162.0, C33          |
| Non-Hodgkin's    | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less                      | 200, 202, 203.0, 238.6, C82–C85, C88, C90.0, C90.2, C96 |
| lymphoma         |                                                                           |                                                                                 |
| Melanoma         | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less                      | 172, 232, C43, D03  |
| Thyroid cancer   | Has a doctor ever told you that you had cancer or a malignancy of any kind? What type of cancer or malignancy of any kind was it? | 1 hospitalization or 2 physician claims in 2 years or less                      | 193, C73, D09.3     |

a Adapted from Quan et al. (2005)[34] and Tonelli et al. (2015)[35]
b Includes alcohol misuse and cirrhosis (571.2, K70.3).
c Combination of chronic bronchitis and emphysema.
d Original algorithm also includes other type inflammatory bowel disease. ICD codes were restricted to Crohn's disease.