SUPPLEMENTAL MATERIAL
Table S1. Checklist of recommendations for reporting of observational studies using the REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement

| Item No | STROBE items | RECORD items | Reported |
|---------|--------------|--------------|----------|
| **Title and abstract** | (a) Indicate the study’s design with a commonly used term in the title or the abstract. (b) Provide in the abstract an informative and balanced summary of what was done and what was found. | (1.1) The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included. (1.2) If applicable, the geographic region and time frame within which the study took place should be reported in the title or abstract. (1.3) If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract. | Abstract |
| **Introduction** | Explain the scientific background and rationale for the investigation being reported. | Introduction |
| **Objectives** | State specific objectives, including any prespecified hypotheses. | Introduction |
| **Methods** | Present key elements of study design early in the paper. | Methods |
| Study design | | | Methods |
| Setting | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection. | | Methods |
| Participants | 6 |
|--------------|---|
| (a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up. |
| (b) For matched studies, give matching criteria and number of exposed and unexposed. |

(6.1) The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be provided.

(6.2) Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided.

(6.3) If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage.

| Variables | 7 |
|-----------|---|
| Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable. |

(7.1) A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided.

| Data sources/measurement | 8 |
|--------------------------|---|
| For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. |

Methods, Supplemental Figure 1 & Supplemental Table 2

Methods & Supplemental Table 2

Methods
| Bias                  | 9 | Describe any efforts to address potential sources of bias. |
|----------------------|---|----------------------------------------------------------|
| **Study size**       | 10| Explain how the study size was arrived at.               |
| **Quantitative variables** | 11| Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why. |
| **Statistical methods** | 12| (a) Describe all statistical methods, including those used to control for confounding. (b) Describe any methods used to examine subgroups and interactions. (c) Explain how missing data were addressed. (d) If applicable, explain how loss to follow-up was addressed. (e) Describe any sensitivity analyses. |
| **Data access and cleaning methods** | N/A| (12.1) Authors should describe the extent to which the investigators had access to the database population used to create the study population. (12.2) Authors should provide information on the data cleaning methods used in the study. |
| **Linkage**          | N/A| (12.3) State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided. |
| Results                                                                 | 13 | 14 | 15 | 16 |
|------------------------------------------------------------------------|----|----|----|----|
| **Participants**                                                       |    |    |    |    |
| (a) Report numbers of individuals at each stage of study--e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed. |    |    |    |    |
| (b) Give reasons for non-participation at each stage.                  |    |    |    |    |
| (c) Consider use of a flow diagram.                                    |    |    |    |    |
| (13.1) Describe in detail the selection of the persons included in the study (i.e., study population selection), including filtering based on data quality, data availability, and linkage. The selection of included persons can be described in the text and/or by means of the study flow diagram. |    |    |    |    |
| **Descriptive data**                                                   |    |    |    |    |
| (a) Give characteristics of study participants (e.g. demographic, clinical, social) and information on exposures and potential confounders. |    |    |    |    |
| (b) Indicate number of participants with missing data for each variable of interest. |    |    |    |    |
| (c) Summarize follow-up time (e.g. average and total amount).          |    |    |    |    |
| **Outcome data**                                                       |    |    |    |    |
| Report numbers of outcome events or summary measures over time.        |    |    |    |    |
| **Main results**                                                       |    |    |    |    |
| (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g. 95% confidence interval). Make clear which confounders were adjusted for and why they were included. |    |    |    |    |
| (b) Report category boundaries when continuous variables were categorized. |    |    |    |    |
| (c) If relevant, consider translating estimates of                       |    |    |    |    |
relative risk into absolute risk for a meaningful time period.

| Other analyses 17 | Report other analyses done (e.g. analyses of subgroups and interactions, and sensitivity analyses). | Results |
|-------------------|-------------------------------------------------------------------------------------------------|---------|
| Key results 18    | Summarize key results with reference to study objectives. | Discussion |
| Limitations 19    | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias. | Discussion |
| Interpretation 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence. | Discussion |
| Generalizability 21 | Discuss the generalizability (external validity) of the study results. | Discussion |

**Other information**

| Funding 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based. | Acknowledgements & Funding |
|------------|-------------------------------------------------------------------------------------------------|-----------------------------|
| Accessibility of protocol, raw data, and N/A | (22.1) Authors should provide information on how to access any supplemental information | |
| programming code | such as the study protocol, raw data, or programming code. |
Table S2. Coding definitions for demographic and comorbid conditions

| Characteristic               | Database | Code                                      |
|------------------------------|----------|-------------------------------------------|
| Age, sex, income             | RPDB     |                                           |
| Diabetes                     | DAD      | ICD9: "250"                               |
|                              |          | ICD10: "E10", "E11", "E12", "E13", "E14" |
|                              | OHIP     | OHIP DX: "250"                            |
|                              |          | OHIP FEE: "Q040", "K029", "K030", "K045", "K046" |
| Hypertension                 | DAD      | ICD9: "401", "402", "403", "404", "405" |
|                              | OHIP     | ICD10: "I10", "I11", "I12", "I13", "I15" |
|                              |          | OHIP DX: "401", "402", "403"              |
| Ischemic stroke              | DAD      | ICD9: "433", "434", "436"                 |
|                              | OHIP     | ICD10: "H341", "I630", "I631", "I632", "I633", "I634", "I635", "I638", "I639", "I64" |
| Transient ischemic attack    | DAD      | ICD9: "435"                               |
|                              | OHIP     | ICD10: "H340", "G450", "G451", "G452", "G453", "G458", "G459" |
| Major hemorrhage- | DAD | ICD9: "430" | ICD10: "I600", "I601", "I602", "I603", "I604", "I605", "I606", "I607", "I609" |
| Subarachnoid hemorrhage | | | |
| Major hemorrhage- | DAD | ICD9: "431" | ICD10: "I61" |
| Intracranial hemorrhage | | | |
| Major hemorrhage- | DAD | ICD9: "432" | ICD10: "I62" |
| other non-traumatic intracranial hemorrhage | | | |
| Major hemorrhage- | DAD | ICD9: "5307", "5310", "5312", "5314", "5316", "5320", "5322", "5324", "5326", "5330", "5332", "5334", "5336", "5340", "5342", "5344", "5346", "5780", "5781" | ICD10: "I850", "I9820", "I983", "K2210", "K2211", "K2212", "K2214", "K2216", "K226", "K228", "K250", "K252", "K254", "K256", "K260", "K262", "K264", "K266", |
| Condition                                      | Source(s) | ICD9/10 Codes                                                                 |
|-----------------------------------------------|-----------|-------------------------------------------------------------------------------|
| Major hemorrhage - Lower gastrointestinal    | DAD       | ICD9: "5693", "5789"                                                          |
|                                               |           | ICD10: "K5520", "K625", "K922"                                               |
| Congestive heart failure                      | DAD, OHIP | ICD9: "425", "5184", "514", "428"                                             |
|                                               |           | ICD10: "I500", "I501", "I509", "I255", "J81"                                 |
|                                               |           | CCP: "4961", "4962", "4963", "4964"                                           |
|                                               |           | CCI: "1HP53", "1HP55", "1HZ53GRFR", "1HZ53LAFR", "1HZ53SYFR"                 |
|                                               |           | OHIP FEE: "R701", "R702", "Z429"                                              |
|                                               |           | OHIP DX: "428"                                                                 |
| Myocardial infarction (MI)                    | DAD       | ICD9: "410"                                                                    |
|                                               |           | ICD10: "I21", "I22"                                                            |
| Condition                                | DAD     | OHIP    | ICD9, ICD10, CCI, CCP, OHIP Fee, OHIP Dx |
|------------------------------------------|---------|---------|------------------------------------------|
| Coronary artery disease (excluding Angina) | DAD     | OHIP    | ICD9: "412", "410", "411"  
                                |         |         | ICD10: "I21", "I22", "Z955",  
                                |         |         | "I822"  
                                |         |         | CCI: "1IJ50", "1IJ76"  
                                |         |         | CCP: "4801", "4802", "4803",  
                                |         |         | "4804", "4805", "481", "482",  
                                |         |         | "483"  
                                |         |         | OHIP Fee: "R741", "R742",  
                                |         |         | "R743", "G298", "E646", "E651",  
                                |         |         | "E652", "E654", "E655", "Z434",  
                                |         |         | "Z448"  
                                |         |         | OHIP Dx: "410", "412" |
| Coronary artery bypass grafting (CABG)   | DAD     | OHIP    | CCI: "1IJ76"  
                                |         |         | CCP: "4811", "4812", "4813",  
                                |         |         | "4814", "4815", "4816", "4817",  
                                |         |         | "4819"  
                                |         |         | OHIP Fee: "R742", "R743",  
                                |         |         | "E654", "E645", "E652", "E646"|
| Peripheral vascular disease              | DAD     | OHIP    | ICD 9: "4402", "4408", "4409",  
                                |         |         | "5571", "4439", "444" |
| Code Type | Codes |
|-----------|-------|
| ICD 10    | "I700", "I702", "I708", "I709", "I731", "I738", "I739", "K551" |
| CCP       | "5125", "5129", "5014", "5016", "5018", "5028", "5038", "5126", "5159" |
| CCI       | "1KA76", "1KA50", "1KE76", "1KG50", "1KG57", "1KG76MI", "1KG87", "1IA87LA", "1IB87LA", "1IC87LA", "1ID87", "1KA87LA", "1KE57" |
| OHIP fee codes | "R787", "R780", "R797", "R804", "R809", "R875", "R815", "R936", "R783", "R784", "R785", "E626", "R814", "R786", "R937", "R860", "R861", "R855", "R856", "R933", "R934", "R791", "E672", "R794", "R813", "R867", "E649" |
| Chronic obstructive pulmonary disorder (COPD) | DAD | ICD9: "491", "492", "496" |
|---------------------------------------------|-----|--------------------------|
|                                             |     | ICD10: "J41", "J43", "J44" |

Outcome definitions

| Outcome          | Database | Codes                     |
|------------------|----------|---------------------------|
| Atrial Fibrillation | DAD      | ICD9: "4273"              |
|                  | NACRS    | ICD10: "I48"              |
| Dialysis         | OHIP     | Fee code:                 |
|                  |          | "R849", "G323", "G325", "G326", "G860", "G862", "G863", "G865", "G866", "G330", "G331", "G332", "G861", "G864" |
| Kidney transplant | CORR     | Transplanted_organ_type_code: "10", "11", "12", "18", "19", |
| Death            | RPDB     |                           |

1. Benchimol El, Smeeth L, Guttmann A, Harron K, Moher D, Petersen I, Sørensen HT, von Elm E, Langan SM and Committee RW. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. *PLoS Med.* 2015;12:e1001885.
Table S3. Crude counts of atrial fibrillation by eGFR and urine ACR category

| eGFR   | ACR <3 (N=589,264) | ACR 3-30 (N=120,565) | ACR >30 (N=26,837) |
|--------|--------------------|----------------------|--------------------|
| >90 (N=321,227) | 5708 (2.12)        | 1906 (4.17)          | 459 (6.85)         |
| 60-90 (N=320,998) | 14873 (5.63)       | 5826 (12.08)         | 1161 (13.73)       |
| 45-<60 (N=58,273) | 4769 (12.06)       | 2626 (18.18)         | 749 (17.44)        |
| 30-<45 (N=26,186) | 2411 (17.67)       | 1798 (20.82)         | 670 (17.17)        |
| 15-<30 (N=8760)  | 583 (20.75)        | 688 (21.23)          | 420 (15.5)         |
| <15 (N=1222)     | 23 (19.49)         | 51 (15.45)           | 88 (11.37)         |

Each box presents number with atrial fibrillation and percentage of category total. The ACR is in milligram per millimole. The eGFR is in milliliters per minute per 1.73 meter squared.

Abbreviations: ACR: albumin-to-creatinine-ratio, eGFR: estimated glomerular filtration rate, N: number
### Table 54. Crude rates (per 1000 person-years) for the incidence of atrial fibrillation by eGFR and urine ACR category

|                | ACR<3          | ACR 3-30        | ACR>30         |
|----------------|----------------|-----------------|----------------|
| eGFR >90       | 3.28 [3.19-3.36] | 6.08 [5.81-6.36] | 10.13 [9.23-11.11] |
| eGFR 60-90     | 8.81 [8.67-8.95] | 19.18 [18.69-19.68] | 22.4 [21.13-23.73] |
| eGFR 45-<60    | 19.63 [19.07-20.19] | 32.02 [30.81-33.27] | 31.49 [29.28-33.83] |
| eGFR 30-<45    | 31.34 [30.1-32.62] | 41 [39.12-42.94] | 35.41 [32.78-38.2] |
| eGFR 15-<30    | 44.1 [40.6-47.83] | 49.41 [45.79-53.25] | 41.98 [38.06-46.19] |
| eGFR <15       | 46.94 [29.76-70.43] | 54.48 [40.56-71.63] | 62.65 [50.24-77.18] |

The ACR is in milligram per millimole. The eGFR is in milliliters per minute per 1.73 meter squared.

Abbreviations: ACR: albumin-to-creatinine-ratio, eGFR: estimated glomerular filtration rate.
Table S5. Crude hazard ratios for the incidence of atrial fibrillation by eGFR and urine ACR category

|               | ACR<3   | ACR 3-30 | ACR>30 |
|---------------|---------|----------|--------|
| eGFR >90      | 1[ref]  | 1.83     | 3.05   |
|               |         | [1.73-1.92] | [2.77-3.35] |
| eGFR 60-90    | 2.70    | 5.82     | 6.80   |
|               | [2.62-2.78] | [5.61-6.03] | [6.39-7.25] |
| eGFR 45-<60   | 6.01    | 9.80     | 9.67   |
|               | [5.79-6.25] | [9.36-10.27] | [8.96-10.44] |
| eGFR 30-<45   | 9.65    | 12.68    | 10.99  |
|               | [9.20-10.12] | [12.02-13.37] | [10.14-11.9] |
| eGFR 15-<30   | 13.73   | 15.42    | 13.21  |
|               | [12.61-14.96] | [14.25-16.69] | [11.96-14.59] |
| eGFR <15      | 14.60   | 16.92    | 19.36  |
|               | [9.70-22.00] | [12.85,22.30] | [15.68-23.90] |

The ACR is in milligram per millimole. The eGFR is in milliliters per minute per 1.73 meter squared.

Abbreviations: ACR: albumin-to-creatinine-ratio, eGFR: estimated glomerular filtration rate.
Table S6. The adjusted hazard and sub-distribution hazard ratio for the incidence of atrial fibrillation by eGFR and urine ACR category

| Categories: | Cox model | | | Fine and Grey Model | |
|-------------|-----------|-----------|-----------|--------------------|-----------|
|             | ACR<3     | ACR 3-30  | ACR>30    | ACR<3              | ACR 3-30  | ACR>30    |
| eGFR >90    | 1 (ref)   | 1.53      | 2.55      | 1 [ref]            | 1.51      | 2.42      |
|             | [1.45-1.61] | [2.31-2.80] |          | [1.44-1.59]       | [2.20-2.66] |          |
| eGFR 60-90  | 1.09      | 1.68      | 2.22      | 1.16               | 1.72      | 2.14      |
|             | [1.06-1.13] | [1.62-1.75] | [2.08-2.37] | [1.12-1.20]       | [1.65-1.79] | [2.00-2.29] |
| eGFR 45-<60 | 1.27      | 1.76      | 2.09      | 1.35               | 1.74      | 2.00      |
|             | [1.21-1.32] | [1.67-1.85] | [1.93-2.26] | [1.29-1.41]       | [1.65-1.84] | [1.84-2.17] |
| eGFR 30-<45 | 1.43      | 1.77      | 1.97      | 1.46               | 1.66      | 1.73      |
|             | [1.36-1.51] | [1.67-1.88] | [1.82-2.14] | [1.38-1.54]       | [1.56-1.77] | [1.58-1.89] |
| eGFR 15-<30 | 1.55      | 1.81      | 2.08      | 1.42               | 1.54      | 1.64      |
|             | [1.41-1.69] | [1.66-1.96] | [1.88-2.31] | [1.29-1.56]       | [1.40-1.68] | [1.46-1.83] |
| eGFR <15    | 1.69      | 2.47      | 3.41      | 1.50               | 1.59      | 2.16      |
|             | [1.12-2.54] | [1.88-3.26] | [2.76-4.22] | [0.97-2.33]       | [1.17-2.18] | [1.69-2.76] |

Data adjusted for age, sex, income quintile, index year, comorbidities (diabetes, hypertension, Chronic obstructive pulmonary disease, coronary artery disease, myocardial infarction, stroke/transient ischemic attack, hemorrhage, congestive heart failure, peripheral vascular disease, coronary artery bypass graft).

Death was the competing event for Fine & Grey models. The ACR is in milligram per millimole. The eGFR is in milliliters per minute per 1.73 meter squared.

Abbreviations: ACR: albumin-to-creatinine-ratio, eGFR: estimated glomerular filtration rate.
Records with an ACR result within the accrual period (02-Apr-2002 to 31-Mar-2015) along with eGFR less than one year  
N=10,874,740

Exclude invalid IKN, missing DOB/sex, out of Ontario  
N = 10,868,976

Records with death date before the ACR test date excluded  
N remaining=10,868,734

Records with age<40 on the date of the ACR test excluded  
N remaining=10,300,292

Patients who received a kidney transplant before the ACR test date excluded  
N remaining=10,260,651

Patients with at least one dialysis before index excluded  
N remaining=10,133,722

Records with evidence of atrial fibrillation (in DAD or NACRS) prior to ACR test  
N remaining=2,327,980

Earliest eligible test for each patient  
Analytic Cohort=736,666

**Figure S1. Analytic cohort creation**

Abbreviations: ACR: albumin-to-creatinine-ratio, DAD: discharge abstract database, DOB: date of birth, eGFR: estimated glomerular filtration rate, IKN: institute for clinical evaluative sciences key number, N: number, NACRS: national ambulatory care reporting system