**Supplementary Table 1. ICD-10 codes used for defining the comorbidities and main hospitalisation causes**

|  |  |  |
| --- | --- | --- |
|  | **Definitions** | **Codes or conditions** |
| **Comorbidities** |  |  |
| Heart failure | Defined from diagnosis\* | ICD-10: I11.0, I50, I97.1 |
| Hypertension | Defined from diagnosis\* | ICD-10: I10, I11, I12, I13, I15 |
| Diabetes mellitus | Defined from diagnosis\*plus treatment | ICD-10: E10, E11, E12, E13, E14 plus treatment: all kinds of oral anti-diabetics and insulin |
| Previous ischaemic stroke | Defined from admission diagnosis plus imaging studies | Any admission diagnosis with I63 or I64 with concomitant brain-imaging studies (including computed tomography or magnetic resonance imaging) |
| Previous MI | Defined from diagnosis\* | ICD-10: I21, I22, I25.2 |
| Peripheral artery disease | Defined from diagnosis\* | ICD-10: I70.0, I70.1, I70.2, I70.8, I70.9 |
| Chronic kidney disease | Defined from eGFR (if laboratory value was not available, diagnosis code was used\*) | eGFR <60mL/min/1.73m2ICD-10: N18, N19 |
| Previous major bleeding | Defined from admission diagnosis | Any admission diagnosis with I60-62, K25-28 (subcodes 0-2 and 4-6 only), K92.0, K92.1, K92.2, K62.5, I85.0, or I98.3 |
| COPD | Defined from diagnosis\*plus treatment | ICD-10: J42, J43 (except for J43.0), J44 plus treatment: more than 1 of the following COPD drugs at least twice per year: long-acting muscarinic antagonists, long-acting beta-2 agonists, inhaled corticosteroids, short-acting muscarinic antagonists, short-acting beta-2 agonists, or methylxanthine (>1 month) |
| **Main cause of hospitalisation** |  |  |
| Major bleeding | Defined from admission diagnosis | Principal admission diagnosis with I60-62, K25-28 (subcodes 0-2 and 4-6 only), K92.0, K92.1, K92.2, K62.5, I85.0, or I98.3 |
| Ischaemic stroke | Defined from admission diagnosis plus imaging studies | Any admission diagnosis with I63 or I64 with concomitant brain-imaging studies (including computed tomography or magnetic resonance imaging) |
| AF control | Defined from admission diagnosis | Principal admission diagnosis with I48, I48.0, or I48.1 |
| MI | Defined from admission diagnosis | Principal or the secondary admission diagnosis with I21 or I22 |
| Heart failure | Defined from admission diagnosis | Principal or the secondary admission diagnosis with I11.0, I50, or I97.1 |
| SSS or PM-related | Defined from admission diagnosis or claim data | Principal or the secondary admission diagnosis with I495 or any admission claim for PM implantation/generator change/removal (2006-2008:O2003, 2008-2015:O0203, O0204, O0205, O0206, O0207, O0208, O0209, O0210) |
| RFCA for AF | Defined from admission claim data | Any admission claim for AF RFCA (M6542, M6547) |

\*To ensure accuracy, comorbidities were established based on one inpatient or two outpatient records of ICD-10 codes in the database.

AF, atrial fibrillation; COPD, chronic occlusive pulmonary disease; eGFR, estimated glomerular filtration rate; MI, myocardial infarction; PM, pacemaker; RFCA, radiofrequency catheter ablation; SSS, sick sinus syndrome.

**Supplementary Table 2. Distribution of Korean National Health Insurance beneficiaries aged ≥ 20 years (study population) by age and sex**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** |
| Total, n | 37,053,694 | 37,594,207 | 38,078,786 | 38,547,087 | 39,007,928 | 39,557,910 | 40,056,827 | 40,593,174 | 41,166,634 | 41,701,269 |
| Sex group, n |  |  |  |  |  |  |  |  |  |  |
| Men | 18,330,126 | 18,599,199 | 18,846,486 | 19,084,141 | 19,322,618 | 19,603,998 | 19,849,037 | 20,129,689 | 20,435,976 | 20,711,331 |
| Women | 18,723,568 | 18,995,008 | 19,232,300 | 19,462,946 | 19,685,310 | 19,953,912 | 20,207,790 | 20,463,485 | 20,730,658 | 20,989,938 |
| Age group, n |  |  |  |  |  |  |  |  |  |  |
| 20-29 | 7,611,094 | 7,461,124 | 7,378,678 | 7,189,265 | 7,003,238 | 6,883,527 | 6,792,802 | 6,766,617 | 6,835,393 | 6,896,972 |
| 30-39 | 8,857,665 | 8,800,441 | 8,608,104 | 8,522,592 | 8,449,178 | 8,358,487 | 8,275,072 | 8,147,676 | 7,976,119 | 7,857,933 |
| 40-49 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 | 8,932,912 |
| 50-59 | 5,573,511 | 5,889,864 | 6,198,789 | 6,575,316 | 7,028,311 | 7,508,879 | 7,788,986 | 8,041,766 | 8,263,032 | 8,392,795 |
| 60-69 | 3,733,515 | 3,872,908 | 3,987,188 | 4,072,221 | 4,166,825 | 4,197,449 | 4,314,938 | 4,466,479 | 4,712,416 | 5,089,893 |
| 70-79 | 2,072,709 | 2,208,766 | 2,338,886 | 2,484,188 | 2,603,758 | 2,755,942 | 2,954,146 | 3,056,411 | 3,129,667 | 3,159,341 |
| ≥ 80 | 707,996 | 758,882 | 815,194 | 879,662 | 941,677 | 1,002,315 | 1,078,184 | 1,159,595 | 1,259,996 | 1,371,423 |

**Supplementary Table 3. Trend of AF hospitalisations per 100 AF patients between 2006 and 2015**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **Relative****increase\*, %** | **P Value****for Trend** |
| Overall | 13.4 | 14.5 | 16.0 | 17.1 | 18.7 | 19.0 | 21.5 | 23.5 | 25.8 | 28.6 | 113 | <0.001 |
| Economic status |  |  |  |  |  |  |  |  |  |  |  |  |
| Low | 13.7 | 15.0 | 16.8 | 18.2 | 20.1 | 20.6 | 23.2 | 25.3 | 27.5 | 30.0 | 119 | <0.001 |
| Intermediate | 12.1 | 13.3 | 15.6 | 15.0 | 16.4 | 16.7 | 18.9 | 20.5 | 22.3 | 25.0 | 106 | <0.001 |
| High | 14.0 | 14.7 | 15.2 | 17.0 | 18.6 | 18.5 | 21.3 | 23.5 | 26.4 | 29.5 | 111 | <0.001 |
| CHA2DS2-VASc  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0-1 | 2.8 | 2.6 | 2.6 | 2.6 | 2.9 | 3.0 | 3.1 | 2.9 | 2.8 | 3.1 | 12 | <0.001 |
| ≥2 | 16.1 | 17.4 | 19.2 | 20.4 | 22.3 | 22.5 | 25.5 | 27.8 | 30.4 | 33.5 | 108 | <0.001 |
| Main cause of hospitalisation |  |  |  |  |  |  |  |  |  |  |  |
| Major bleeding† | 4.23 | 5.07 | 5.54 | 5.76 | 5.97 | 5.91 | 6.32 | 6.40 | 6.60 | 6.92 | 64 | <0.001 |
| Ischaemic stroke | 3.14 | 3.08 | 3.10 | 3.01 | 3.04 | 3.02 | 3.00 | 2.88 | 2.80 | 2.78 | -12 | <0.001 |
| AF control‡ | 1.56 | 1.66 | 1.68 | 1.76 | 1.86 | 1.98 | 2.23 | 2.28 | 2.42 | 2.51 | 61 | <0.001 |
| MI | 2.49 | 2.47 | 2.41 | 2.31 | 2.17 | 1.75 | 1.75 | 1.74 | 1.82 | 1.97 | -21 | <0.001 |
| Heart failure | 5.22 | 5.66 | 5.66 | 5.60 | 5.60 | 5.46 | 5.33 | 5.25 | 5.24 | 5.25 | 1 | <0.001 |
| SSS or PM-related | 0.34 | 0.34 | 0.28 | 0.28 | 0.28 | 0.31 | 0.31 | 0.36 | 0.37 | 0.37 | 8 | <0.001 |
| RFCA for AF | 0.14 | 0.14 | 0.10 | 0.16 | 0.20 | 0.23 | 0.26 | 0.25 | 0.26 | 0.29 | 110 | <0.001 |

\*2015 value minus 2006 value divided by 2006 value multiplied by 100.

†Major bleeding includes intracranial bleeding and GI bleeding.
‡Admission for anticoagulation, rate, and rhythm control for AF (AF as principal discharge diagnosis).

AF, atrial fibrillation; MI, myocardial infarction; PM, pacemaker; RFCA, radiofrequency catheter ablation; SSS, sick sinus syndrome.

**Supplementary Table 4. AF hospitalisation cost and Korean NHIS total expenditure**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **Relative increase\*,%** |
| **Annual Korean NHIS total expenditure, million €** |  |  |  |  |  |  |  |  |
|  | 31,589 | 34,600 | 35,775 | 38,923 | 41,603 | 42,165 | 43,032 | 44,586 | 47,238 | 49,898 | 58 |
| **Annual national cost for AF hospitalisation, million €** |  |  |  |  |  |  |  |
|  | 68.4 | 90.1 | 111.3 | 135.8 | 172.1 | 187.7 | 223.9 | 262.4 | 314.7 | 388.4 | 468  |
| **Proportion of AF hospitalisation cost to Korean NHIS total expenditure (%)** |  |  |  |  |  |
|  | 0.22 | 0.26 | 0.31 | 0.35 | 0.41 | 0.45 | 0.52 | 0.59 | 0.67 | 0.78 | 260 |

All costs are adjusted for inflation by calculating in terms of 2015 cost according to Korean Consumer Price Index data.

\*2015 value minus 2006 value divided by 2006 value multiplied by 100.

AF, atrial fibrillation; NHIS, national health insurance service.

**Supplementary Table 5. Mean length of stay according to main hospitalisation causes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **Relative increase\*,%** | **Overall** | **P Value****for Trend** |
| Major bleeding†  | 21.0 | 20.4 | 20.3 | 19.9 | 20.1 | 19.2 | 20.4 | 20.4 | 21.0 | 20.8 | -1 | 20.4 | <0.001 |
| Ischaemic stroke  | 17.5 | 17.0 | 17.1 | 16.2 | 15.7 | 12.5 | 15.1 | 15.0 | 14.8 | 14.8 | -16 | 15.3 | <0.001 |
| AF control‡ | 8.5 | 9.2 | 8.9 | 8.6 | 8.7 | 7.5 | 8.1 | 8.1 | 8.7 | 8.3 | -3 | 8.4 | <0.001 |
| MI  | 15.5 | 15.6 | 15.6 | 16.0 | 16.1 | 16.5 | 17.1 | 17.3 | 17.4 | 17.1 | 11 | 16.5 | <0.001 |
| Heart failure  | 14.9 | 15.6 | 15.6 | 16.1 | 16.2 | 15.6 | 16.3 | 16.3 | 16.4 | 16.2 | 9 | 16.0 | <0.001 |
| SSS or PM-related | 10.1 | 11.3 | 9.9 | 8.7 | 8.3 | 9.0 | 9.1 | 9.9 | 9.5 | 9.5 | -6 | 9.5 | <0.001 |
| RFCA for AF  | 6.8 | 6.2 | 6.2 | 5.5 | 5.3 | 5.1 | 5.0 | 5.0 | 5.0 | 4.6 | -33 | 5.1 | <0.001 |

Values are presented as days.

\*2015 value minus 2006 value divided by 2006 value multiplied by 100.

†Major bleeding includes intracranial bleeding and GI bleeding.

‡Admission for anticoagulation, rate, and rhythm control for AF (AF as principal discharge diagnosis).

AF, atrial fibrillation; MI, myocardial infarction; PM, pacemaker; RFCA, radiofrequency catheter ablation; SSS, sick sinus syndrome.