Detailed Statistical Methods and ICD Codes

All data were de-identified and this study was exempt from review by the Institutional Review Board of the Centers for Diseases Control and Prevention.

Patients with a new diagnosis of atrial fibrillation (AF) from January 1, 2014, to December 31, 2017 (i.e., patient selection period), in the IBM® MarketScan® Commercial Claims and Encounters (CCAE), Medicare Supplement, and Medicaid databases were selected through the IBM® Treatment Pathways, an online query cloud-based extraction tool. ICD-9-CM of 427.3 (from January 2014 to September 30, 2015) and ICD-10-CM of I48 (from October 1, 2015, to December 31, 2017) were used to identify AF diagnosis. Patients were identified as AF if there were at least one inpatient or emergency department (ED) encounter or two outpatient encounters at least 7-365 days apart from January 1, 2014, to December 31, 2017.

We restricted patients to be continuously enrolled from -180 days before the date of the first AF diagnosis to June 30, 2021, the end of the study period. We excluded the following groups of patients with: 1) AF diagnosis 180 days prior to the first AF diagnosis during the patient selection period (to identify incident AF patients), 2) oral anticoagulant (OAC) drug claims (identified by drug generics of apixaban, warfarin potassium, warfarin sodium, dabigatran etexilate mesylate, edoxaban, or rivaroxaban) 180 days prior to the first AF diagnosis, 3) valvular heart disease (as they were recommended to use warfarin) 180 days prior to the first AF diagnosis, and 4) venous thromboembolism (VTE) (as patients with VTE may use OAC drugs) 180 days prior to the first AF diagnosis, 5) hip/knee replacement surgery six weeks prior to the first AF diagnosis (as they may use OAC drugs), 6) pregnancy diagnosis from 180 days prior to AF dx to June 30, 2021, 7) aged less than 18 years based on the first diagnosis date, and 8)

capitated insurance. The corresponding ICD-9/10-CM and procedure codes are documented in Appendix Table 1.

Using the MarketScan pharmacy claims data, we defined treatment as a claim for any of the 5 FDA-approved OACs (apixaban, dabigatran, edoxaban, rivaroxaban, or warfarin). The number of days of drug supplied in pharmacy claims was used to determine the treatment period. For example, if patients had numbers between 0 to 30, they were defined as treated in the current month. If the numbers of days of drug supplies were between 31 and 60 days, then the patients were treated in the current and the following month. The maximum numbers of days of drug supplied for apixaban, dabigatran, edoxaban, rivaroxaban, and warfarin were 315, 180, 90, 255, and 460 days, respectively, from January 1, 2018, to June 30, 2021.

The differences in the proportions of patients with AF treated with each of the 5 FDA-approved OACs, and any OAC from January 2018 to June 2021 (December 2020 for patients in Medicaid) were tested using Welch's two-tail t-test by insurance types.

The means of medical costs and the number of medical service encounters, Charlson comorbidity index (CCI) scores, and categorical variables of CCI scores (0, 1, 2, and 3+) of AF patients with and without OAC prescription in 2019, the most recent year before the COVID-19 pandemic, are summarized. The differences in means for continuous variables were tested using the Wilcoxon nonparametric rank-sum test. The differences in means for the categorical variables were tested by Pearson's Chi-square test.

The *p*-values of < 0.05 indicate statistical significance. All analyses were conducted using Stata MP statistical software version 14.2 (StataCorp, College Station, TX) from March to August 2022.

Appendix Table 1. The ICD-9-CM, ICD-10-CM, and ICD-10-CM procedure codes used for exclusion criteria.

	ICD-9-CM	ICD-10-CM	ICD-10-CM procedure codes	References
Valvular heart disease	394.0, 394.1, 394.2, 396.0, 396.1, 421.0, 421.1, 421.9, 424.90, 424.91, 424.99	I050, I051, I052, I058, I059, I080,I081, I083, I342, I330, I339, I38, I39	N/A	Wetmore et al. 2020
Venous thromboembolism	415.1, 451.1, 453.2, 453.4, 453.82, 453.83, 453.84, 453.85, 453.86, 453.87, 453.89, 453.9	I26.0, I26.9, I80.1, I80.20, I82.210, I80.22, I80.23, I80.29, I82.40, I82.41, I82.42 I82.43, I82.44, I82.49, I82.4Y, I82.4Z, I82.60, I82.62, I82.890, I82.A1, I82.B1, I82.C1	N/A	Lutsey et al. 2019
Hip/knee replacement	81.51, 81.54	N/A	0SR90J9, 0SR90JA, 0SR90JZ, 0SRB0J9, 0SRB0JA, 0SRB0JZ, 0SRC07Z, 0SRC0JZ, 0SRC0J9, 0SRC0KZ, 0SRC0LZ, 0SRD07Z, 0SRD0JZ, 0SRD0J9, 0SRD0KZ, 0SRD0LZ, 0SRT07Z, 0SRT0JZ, 0SRT0KZ, 0SRU07Z, 0SRU0JZ, 0SRU0KZ, 0SRV07Z, 0SRV0JZ 0SRV0KZ, 0SRW07Z 0SRW0JZ, 0SRW0KZ	Wetmore et al. 2020
Pregnancy	630, 631, 632, 633, 634, 635, 636, 637, 638, 639,	O80, O81, O82, O83, O84, O68, O70, O71, O72, O73,	N/A	Bull-Otterson et al. 2020

	6401, 6402, 6411, 6412, 6421, 6422, 6431, 6432, 6441, 6442, 6451, 6452, 6461, 6462, 6471, 6472, 6481, 6482, 6511, 6512, 6521, 6522, 6531, 6532, 6541, 6542, 6551, 6552, 6561, 6562, 6571, 6572, 6581, 6582, 6591, 6592, 65601, 65602, 65611, 65612, 65621, 65622, 65631, 65632, 65641, 65642, 65651, 65652, 65661, 65662, 65671, 65672, 65681, 65682, 65691, 65692, 6701, 6702, 6711, 6712, 6721, 6722, 6731, 6732, 6741, 6742, 6751, 6752, 6761, 6762, 6771, 6772, 6781, 6782, 6791, 6792, 7680, 7681, V274, V278, V27, V30, V31, V32, V33, V34, V35, V36, V37, V38, V39	O74, O75, O76, O77, O24, O43, O44, O45, P95, Z37, Z38, O394, O364, O998, O365, O366		

Note: Wetmore JB, Roetker NS, Yan H, Reyes JL, Herzog CA. Direct-acting oral anticoagulants versus warfarin in Medicare patients with chronic kidney disease and atrial fibrillation. Stroke. 2020;51(8):2364-2373.
Lutsey PL, Zakai NA, MacLehose RF, et al. Risk of hospitalised bleeding in comparisons of oral anticoagulant options for the primary treatment of venous thromboembolism. British journal of haematology. 2019;185(5):903-911.
Bull-Otterson L, Huang Y-LA, Zhu W, King H, Edlin BR, Hoover KW. Human immunodeficiency virus and hepatitis C virus infection testing among commercially insured persons who inject drugs, United States, 2010–2017. The Journal of infectious diseases. 2020;222(6):940-947.