10 YEARS OF BREAKTHROUGHS A HEALTHIER FUTURE

BigData@Heart
Big Data for Better Hearts

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Stroke Risk, Bleeding Risk and Anticoagulation in Hospital EHRs

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Facts & Figures

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Challenge

Atrial fibrillation (AF) is a heart condition characterised by an irregular heart rate which increases stroke risk 5-fold. Stroke risk in AF can be effectively managed by oral anticoagulation (OAC), but this is known to be underutilized in practice. 20% of stroke cases in England are linked to AF and these are more likely to be fatal. Understanding OAC prescribing is therefore a significant step to achieving a reduction in a cardiovascular cause of morbidity and mortality.

We sought to understand stroke risk management for AF in routine secondary care data, and whether OAC prescribing decisions correlate with stroke and bleed risk scores.

Approach & Methodology

De-identified, free text EHR data was analysed with an NLP pipeline (Figure 1) for 10,030 AF patients at King's College Hospital (KCH), London between 2011 and 2018. Corrected odds ratios calculated with multivariate logistic regression in R.

Value of IMI collaboration

Through the IMI collaboration there is unparalleled ability to validate these findings (with partner sites covering >16 million people) and translate them into patient benefit through clinical and industry partners. We also have a unique opportunity understand how real-world data can complement trial data generated by EFPIA partners.

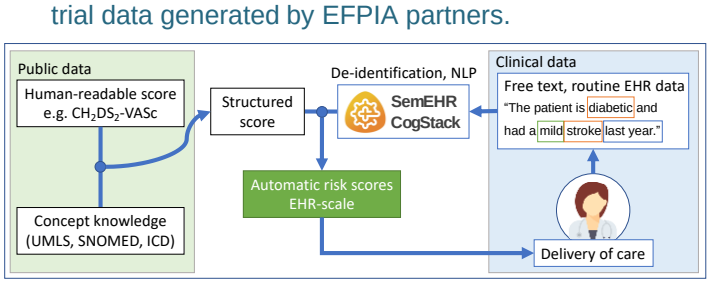

Figure 1. Overview of risk score pipeline. All data remains behind the NHS firewall.

Results

Previous studies using structured data on research cohorts has shown that OAC prescribing rates for AF are approximately 50-60%. We first replicated this finding using unstructured, routinely collected data (Figure 2).

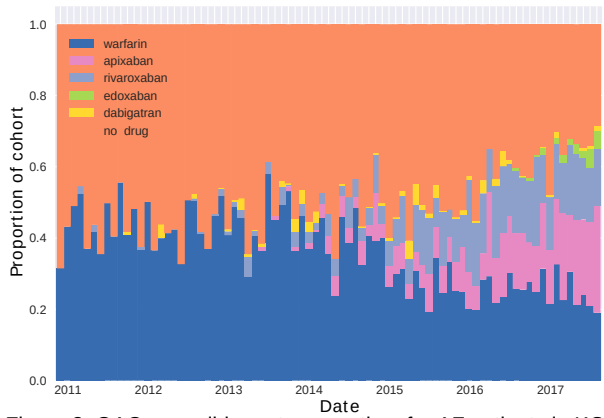

Figure 2. OAC prescribing rates over time for AF patients in KCH.

Using our NLP pipeline, we calculated CH_2DS_2-VASc (stroke) and HAS-BLED (bleeding) risk scores for our cohort and stratified prescribing rates by risk score (Figure 3). Corrected odds ratios show significant changes in prescribing rate with stroke risk (OR 1.33), bleed risk (OR 0.87) and antiplatelet use (OR 0.33).

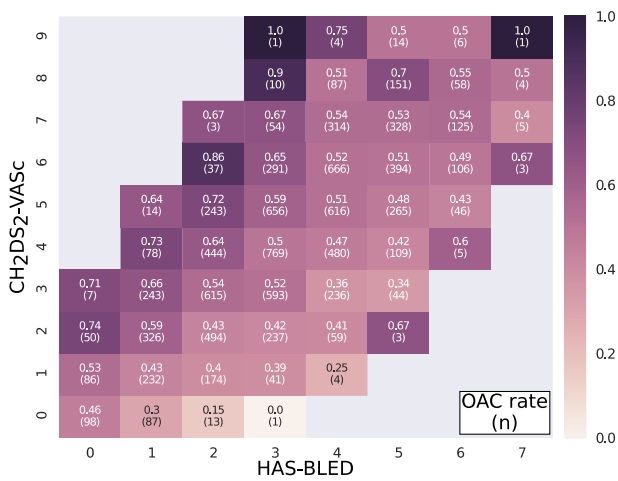

Figure 3. OAC prescribing rate (n patients) vs stroke and bleed risk

Impact & take home message

Routine secondary care data can replicate findings from research cohorts but has much greater flexibility. The same pipeline can be used to deliver near-real-time risk scores to the bedside through IMI collaboration. OAC remain underutilised for stroke risk management in AF in secondary care but prescribing is increasing.

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