Quantifying the opportunity costs of intra-Direct Oral Anticoagulants (DOAC) switching pathways across the National Health Service (NHS) in England: A Structured Framework

8340

Alik Vodyanov, MSc[1] Vishal Mashru Bsc (Hons); MPharms, [2] Niraj Lakhani, Bsc (Hons); MPharms[3] Alistair Gordon, MSc, PGDip, BA (Hons)[4] Angus Evans, PhD [5]Shazia Aziz, MPharm (Hons), IP, PGCert, MRPharmS (Advanced)[7]

[1]HEOR, Cardiff, United Kingdom; [2]Leicester, Leicestershire and Rutland ICB , Leicester, United Kingdom ; [3]Willows Health, Leicester, United Kingdom;[5] Daiichi Sankyo UK Ltd., Uxbridge, United Kingdom; [6]Daiichi Sankyo UK Ltd., Uxbridge, United Kingdom; [7]Rochdale Health Alliance, Rochdale, United Kingdom

BACKGROUND

A previously developed Microsoft (MS) excel-based model forecasts market dynamics in individual NHS Integrated Care Boards (ICB) and describes the impact of intra- Direct Oral Anticoagulant (DOAC) switching from drug acquisition costs perspective. However, this existing model did not consider potential opportunity and monetary costs that involve patient interactions with healthcare staff during intra-DOAC switch as a part of medicine optimisation routes in National Health Service (NHS) ICBs.

OBJECTIVES

DOACs as treatment options are effective and recommended by NICE in the prevention of stroke in patients with atrial fibrillation (AF) and have been widely adopted across the NHS in England.[1] NHS England commissioning policy suggests that usage of the lowest-cost acquisition DOAC should be increased, including through reviewing patient medication plans through a combination of opportunistic and systematic medication reviews.[2]

The purpose of this study was to identify and validate assumptions for inputs into a health economic model which quantifies the operational and NHS resource costs associated with intra-DOAC switching, and to develop a generic switching pathway model applicable across NHS ICBs in England.

METHODS

To appropriately extend the MS excel model functionality and capture the opportunity costs associated with DOAC switch within NHS ICBs, a structured desk-based research approach was employed. This included an OVID™ literature search and targeted google search to identify publicly available NHS guidelines and standard operating procedures (SOPs) related to intra-DOAC switching in patients with atrial fibrillation (AF).

The review focused on consistent operational steps, healthcare professional involvement and time commitments. Time commitments for proportional steps and batch processing feasibility were estimated based on assumptions. Expert involvement was facilitated through a series of interviews to validate research results. Once the switch pathway was developed, a simulation of 100 hypothetical patients within an NHS ICB currently prescribed a DOAC was undertaken to quantify potential opportunity costs.

RESULTS

Whilst the peer-reviewed literature on this topic was limited, several ICB-level SOPs were identified. These documents revealed variability in implementation but shared common operational touchpoints. OVID search terms can be generalised to [DOAC/Warfarin + UK + switching] and have yielded around 100 hits, however none of the publications were relevant in identifying the logistics of the switching patterns. Google search was focussed on identifying publicly available practical guidelines and SOPs for NHS HCPs.

A generic switching schematic was developed (Table1, and Figure 1 & 2), outlining 14 key steps involving pharmacists, General Practitioners, pharmacy technicians, and nurses. Estimated average time per patient was approximately 99 minutes, distributed across pharmacist-led reviews, GP consultations, technical processing, and patient communication steps.

This schematic was integrated into the MS excel-based model to enable the quantification of time and resource commitment of a pre-determined sample of patients, in accordance with the modifiable parameters selected.

Total costs from the 100-patient simulation across 4 healthcare professional disciplines and grades resulted in 138.67 hours of staff time and £3,623.99 of staff costs (Table 2).

Key words: Direct-acting Oral anticoagulant, DOAC, Opportunity cost, health economics, model

Funding Disclosure: This study was funded by Daiichi Sankyo UK Ltd. Three authors either work directly for, or indirectly via commercial partnership with, Daiichi Sankyo UK Ltd. Alik Vodyanov is an employee of HEOR Ltd. Other authors have contributed without remuneration for participation in this research and analysis.

Conflict of Interest Statement: This study was funded by Daiichi Sankyo UK Ltd.

Table 1: Identified steps within the DOAC switch pathway

#	Category	Task	Proportional assumption	Person(s) responsible	**Assumed** time commitment (minutes) or comment
1	Compliance procedures	Pre-EMIS run agreements in GP practice	No	Pharmacist / GP	Negligible – performed once per switch run
2	Identification of patients	Run EMIS report to identify patients on existing DOAC therapy with AF and no valid exclusion criteria		Pharmacist / Technician	
3		Confirm patient meets inclusion criteria. Refer to GP for further review if necessary	No	Pharmacist / Technician	5
4	Data quality review	If monitoring values within last 3 months are missing, highlight and action as agreed with practice and update	Yes	Pharmacist / Technician	5
5		U+E, FBC, LFT, BP, HR, weight, height		GP / Nurse / Technician	10
6		Review patient once all monitoring values are documented	No	Pharmacist / Technician	10
7	Switch suitability evaluation	Calculate CHAD2DS2-VASc, ORBIT, CrCl		Pharmacist	2.5
8		Review choice of DOAC			2.5
9		Discuss any queries identified with GP / CL	Yes	Pharmacist + GP	10 + 10
10	Switch	For switch-suitable patients, discuss and agree with patients changes to existing DOAC therapy	No	Pharmacist	15
11		Document the switch according to minimum data requirements			5
12	Follow-up	Review 4 weeks after switch with patient (x2-3 checks with community pharmacist)			10
13		Discuss issues / concerns with GP	Yes	Pharmacist + GP	10 + 10
14	Monitoring	Monitoring according to renal profile	No	Pharmacist	Universal for all therapies – irrelevant for switching pathway

Abbreviations: CrCl, creatinine clearance; FBC, Full Blood Count; LFT, Liver Function Test; BP, Blood Pressure; HR, Heart Rate; GI, Gastro-intestinal; MDS, Monitored Dosage System; SNOMED CT, Systematized Nomenclature of Medicine Clinical Terms; LMWH, low molecular weight heparin

Table 2: Opportunity costs of switching (100 patient simulation)

Total hours	FY 2025 - 2026 Hours required	Staff cost
Technician	47.88	£ 859.90
Pharmacist	89.49	£ 2,691.22
GP	1.31	£ 72.88
Total	138.67	£ 3,623.99
Total working (7.5h) days	18.49	
Total Patients	100	

DISCUSSION AND CONCLUSIONS

The developed switch pathway provides a structured framework for integrating operational costs into a health economic evaluation that can assist in health system resource decision-making in this field. This enables a more comprehensive assessment of the opportunity costs and trade-offs associated with intra-DOAC switching policies and may inform decision-making at both the ICB and national levels in the NHS.

This research is to our understanding the first attempt to create a conceptual analytical framework which attempts to quantify the opportunity costs of large-scale intra-DOAC switching. Due to limitations with the selected literature search strategy, several important assumptions must be made on time commitments. Attempts to validate these assumptions through feedback from clinical experts with experience in implementing large-scale intra-DOAC switch projects strengthen assumptions; however, there may be considerable heterogeneity in approaches taken dependent on local context.

However, to reflect and adjust to this expected variability, efforts are made by allowing the user of the MS excel model to adjust multiple parameters and assumptions at once when simulating a defined patient cohort. This allows for a more accurate calculation in accordance with locally designed protocols and processes on this topic. Future research may wish to consider integration of these costs as part of a broader cost-effectiveness analysis, taking into consideration drug tariff costs, as well as statistically expected and clinically relevant events associated with each selected option.

The concept of opportunity cost is a principle accepted within the field of economic evaluation of healthcare system decision-making, reflecting the trade-offs inherent within a health system with an exogenous budget and limited resources. Therefore, this analytical framework which quantifies project proposals in common health resource units may support a more thorough understanding of the costs and benefits of selecting one health system programme over another.

Figure 1

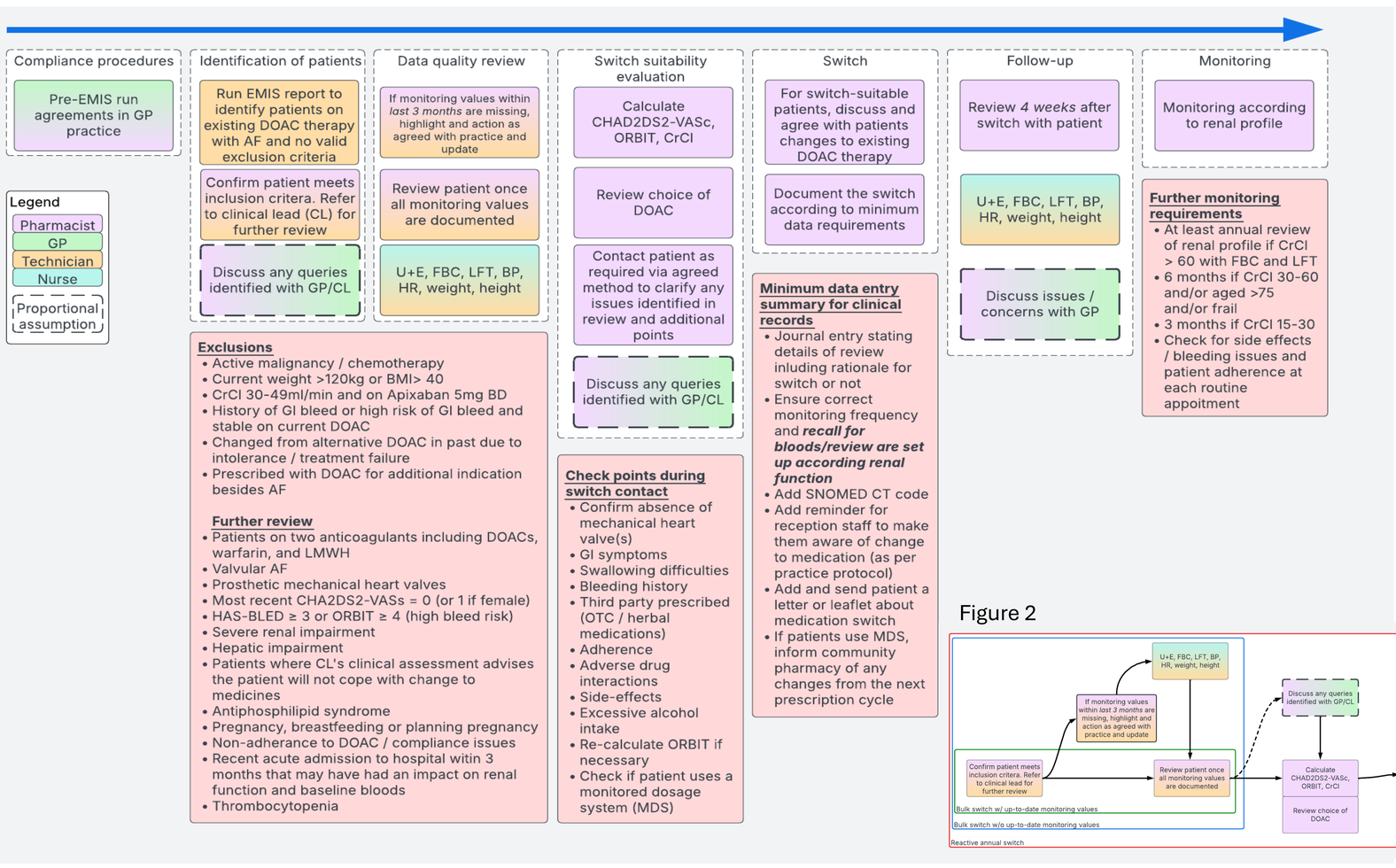
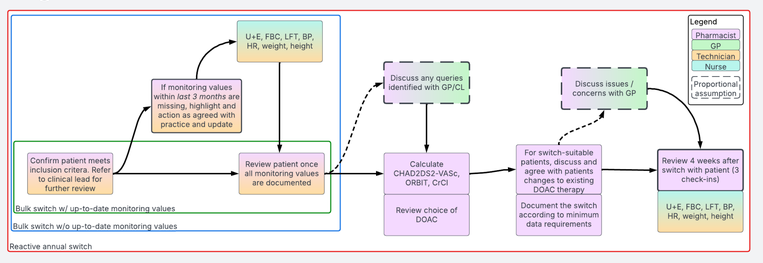


Figure 2



References: [1] NICE, 2021. NG196: Atrial fibrillation: diagnosis and management. Available: https://www.nice.org.uk/guidance/ng196/chapter/Recommendations#stroke-prevention (Accessed: September 2025). [2]NHS England, 2024. Commissioning note: Commissioning recommendations for national procurement for direct-acting oral anticoagulant(s) (DOACs)Available: https://www.england.nhs.uk/long-read/commissioning-recommendations-for-national-procurement-for-doacs/ (Accessed: September 2025)