SUPPLEMENTS

Zeng A, *et al. BMJ EBM* 2024;0:1–12. doi: 10.1136/bmjebm-2023-112820

Supplement 1 | eMethods 1: PRISMA 2020 Checklist

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	3
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	4
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	5,6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Supplement 3
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	5,6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	6
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	6
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	6
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	6
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	6
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data	6

Section and Topic	Item #	Checklist item	Location where item is reported
		conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	6
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	6
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	-
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	6
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	6
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	-
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	7, Supplement 4
Study characteristics	17	Cite each included study and present its characteristics.	8
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Supplement 6,7
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Figure 2, Supplement 11-16
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Figure 2, Supplement 15
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Figure 2, Supplement 15
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Supplement 12
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Supplement 12
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Supplement

Section and Topic	Item #	Checklist item	Location where item is reported
			13
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	-
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	14
	23b	Discuss any limitations of the evidence included in the review.	15
	23c	Discuss any limitations of the review processes used.	15
	23d	Discuss implications of the results for practice, policy, and future research.	16
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	5
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	5
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	5, Supplement 2
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	1
Competing interests	26	Declare any competing interests of review authors.	1
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	1

Supplement 2 | eMethods 2: Modification from original PROSPERO Registration

Included interventions as described in original protocol:

Electronic patient decision aids used to facilitate patient decision-making regarding the use of therapy for the management of atrial fibrillation (AF). The included patient decision aids will encompass individualised stroke risk and relevant patient education material. Electronic tools can include, but are not limited to: computerised decision support tool, mobile applications. The intervention may include other components in addition to the decision aid tool. Decision aids for AF therapy can be focused on medication (e.g. anticoagulation medication) or procedures (e.g. AV node ablation).

The protocol was modified to include both digital patient decision aids and digital education tools to support treatment decisions in atrial fibrillation. The population was broadened to include patients with any type of AF.

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Supplement 3 | eMethods 3: Search Strategy

Search strategy was formulated with assistance from a clinical librarian.

English studies from 2005 onwards (consensus on the quality appraisal criteria of patient decision aids was established by International Patient Decision Aids Standards Collaboration that year(1)).

(Reference lists of included studies were also screened.)

1. **Search strategy for MEDLINE (via PubMED interface)**

	Search String
#1	(("atrial fibrillation"[MeSH Terms] OR ("atrial"[All Fields] AND "fibrillation"[All Fields])) OR "atrial fibrillation"[All Fields] OR "AF"[All Fields])
#2	("decision support techniques"[MeSH Terms] OR (("decision"[All Fields] AND "support"[All Fields]) AND "techniques"[All Fields]) OR "decision support techniques"[All Fields] OR ("decision"[All Fields] AND "aid"[All Fields]) OR "decision aid"[All Fields] OR "decision making, shared"[MeSH Terms] OR ("decision"[All Fields] AND "making"[All Fields] AND "shared"[All Fields]) OR "shared decision making"[All Fields] OR ("shared"[All Fields] AND "decision"[All Fields] AND "making"[All Fields]) OR ("decision making"[MeSH Terms] OR ("decision"[All Fields] AND "making"[All Fields]) OR "decision making"[All Fields]) OR "patient participation"[MeSH Terms] OR ("patient"[All Fields] AND "participation"[All Fields]) OR "patient preference"[MeSH Terms] OR ("patient"[All Fields] AND "preference"[All Fields]))
#3	(("digital"[All Fields] AND "health"[All Fields]) OR "digital health"[All Fields] OR "ehealth"[All Fields] OR ("mobile"[All Fields] AND "health"[All Fields]) OR "mobile health"[All Fields] OR "smartphone"[MeSH Terms] OR "smartphone"[All Fields] OR "smartphones"[All Fields] OR "smartphone's"[All Fields] OR "mobile applications"[MeSH Terms] OR ("mobile"[All Fields] AND "applications"[All Fields]) OR "mobile applications"[All Fields] OR "computers, handheld"[MeSH Terms] OR ("computers"[All Fields] AND "handheld"[All Fields]) OR "handheld computers"[All Fields] OR ("tablet"[All Fields] AND "computer"[All Fields]) OR "tablet computer"[All Fields] OR "web-based"[All Fields] "internet"[MeSH Terms] OR "internet"[All Fields] OR "internet-based"[All Fields] OR "website"[All Fields] OR "technology"[MeSH Terms] OR "technology"[All Fields] OR "technologies"[All Fields] OR "medical informatics"[MeSH Terms] OR ("medical"[All Fields] AND "informatics"[All Fields]) OR "medical informatics"[All Fields] OR ("health"[All Fields] AND "information"[All Fields] AND "technology"[All Fields]) OR "health information technology"[All Fields] OR "computerised" [All Fields] OR "computerized" [All Fields])
#4	#1 AND #2 AND #3

2. **Search strategy for EMBASE (Ovid platform)**

	Search String
#1	("atrial fibrillation" or "AF").af.
#2	("decision support techniques" or "decision aid" or "shared decision making" or "decision making, shared" or "decision making" or "patient participation" or "patient preference").af.
#3	("Digital health" or "ehealth" or "mobile health" or "smartphone" or "smartphones" or "smartphone's" or "mobile applications" or "computers, handheld" or "handheld computers" or "tablet computer" or "web-based" or "internet" or "internet-based" or "website" or "technology" or "technologies" or "medical informatics" or "medical information technology" or "computerised" or "computerized").af.
#4	#1 AND #2 AND #3

3. Search strategy for Scopus (Elsevier platform)

	Search String
#1	TITLE-ABS-KEY ("atrial fibrillation" OR "AF")
#2	TITLE-ABS-KEY ("decision support techniques" OR "decision aid" OR "shared decision making" OR "decision making, shared" OR "decision making" OR "patient participation" OR "patient preference")
#3	TITLE-ABS-KEY ("Digital health" OR "ehealth" OR "mobile health" OR "smartphone" OR "smartphones" OR "smartphone's" OR "mobile applications" OR "computers, handheld" OR "handheld computers" OR "tablet computer" OR "web-based" OR "internet" OR "internet-based" OR "website" OR "technology" OR "technologies" OR "medical informatics" OR "medical information technology" OR "computerised" OR "computerized")
#4	#1 AND #2 AND #3

Supplement 4 | eMethods 4. Calculating effect sizes as mean difference from standardized difference in means

1) Conducting a meta-analysis including only the 3 studies that reported decisional conflict on a scale of 0-100, in order to obtain the standard error of the effect size (SE)

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Random-Effects Model (k = 3; tau^2 estimator: REML)

tau^2 (estimated amount of total heterogeneity): 17.3615 (SE = 25.1448)
tau (square root of estimated tau^2 value):      4.1667
I^2 (total heterogeneity / total variability):   74.68%
H^2 (total variability / sampling variability):  3.95

Test for Heterogeneity:
Q(df = 2) = 8.0066, p-val = 0.0183

Model Results:

estimate      se     zval    pval     ci.lb   ci.ub
 -5.5274  2.8682  -1.9271  0.0540  -11.1490  0.0942  .

---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

SE: 2.8682

2) Using the standard error of the difference in means (SE) to calculate the standard deviation (SD) of the effect size of the 3 studies that reported on decisional conflict on the scale of 0-100.

Estimated SD Calculation:

$$\text{SD} = \frac{SE}{\sqrt{\frac{1}{Total\ sample\ size\ in\ interventions\ groups} + \frac{1}{total\ sample\ size\ in\ control\ groups}}}$$

Total sample size in intervention groups = 1027
Total sample size in control groups = 1031
SD= 65.058

Table 1: Sample size in interventions and control groups for the 3 studies that reported decisional conflict on scale of 0 to 100

First author, year	Sample size (intervention)	Sample size (control)
Kunneman 2020(2)	463	459
Wang 2022(3)	495	506

Fraenkel 2012(4)	69	66
Total sample size	1027	1031

3) Using the SD to extrapolate the difference in means in the 4 studies from the standardized difference in means
   Standardized difference in means = Difference in means/SD
   Difference in means= Standardized difference in means*SD
   = -0.19*65.058
   = -12.36102
   = -12.36
4) 95% CI Confidence intervals :
   Upper limit: upper limit (of the SMD) x SD
   = -0.08 x 65.058
   = -5.20
   Lower limit = lower limit (of the SMD) x SD
   = -0.30x65.058
   = -19.5174

Supplement 5 | eResults 1: List of Excluded Studies after Full-text Screen

List of articles excluded after full-text review for not meeting inclusion criteria regarding the population, intervention or outcome

Population:

1. Abedin Z, Hoerner R, Habboushe J, Lu Y, Kawamoto K, Warner PB, et al. Implementation of a Fast Healthcare Interoperability Resources-Based Clinical Decision Support Tool for Calculating CHA(2)DS(2)-VASc Scores. Circ Cardiovasc Qual Outcomes. 2020;13(2):e006286.

2. Arts DL, Abu-Hanna A, Buller HR, Peters RJG, Eslami S, van Weert HCPM. Improving stroke prevention in patients with atrial fibrillation. Trials. 2013;14(1).

3. Arts DL, Abu-Hanna A, Medlock SK, van Weert HC. Effectiveness and usage of a decision support system to improve stroke prevention in general practice: A cluster randomized controlled trial. PLoS One. 2017;12(2):e0170974.

4. Bajorek B, Magin P, Hilmer S, Krass I. Therapeutic outcomes postapplication of a computerised antithrombotic risk assessment tool (carat) for therapeutic decisionmaking in a cohort of australian patients with atrial fibrillation. European Stroke Journal. 2017;2 (1 Supplement 1):344-5.

5. Heaven B, Murtagh M, Rapley T, May C, Graham R, Kaner E, et al. Patients or research subjects? A qualitative study of participation in a randomised controlled trial of a complex intervention. Patient Educ Couns. 2006;62(2):260-70.

6. Holbrook A, Labiris R, Goldsmith CH, Ota K, Harb S, Sebaldt RJ. Influence of decision aids on patient preferences for anticoagulant therapy: a randomized trial. Cmaj. 2007;176(11):1583-7.

7. Michalowski W, Michalowski M, O'Sullivan D, Wilk S, Carrier M, editors. AFGuide system to support personalized management of atrial fibrillation. AAAI Workshop - Technical Report; 2017.

8. Wess ML, Saleem JJ, Tsevat J, Luckhaupt SE, Saleem JJ, Wise RE, et al. Usability of an Atrial Fibrillation Anticoagulation Decision-Support Tool. Journal of Primary Care & Community Health. 2011;2(2):100-6.

9. Noser EA, Zhang J, Rahbar MH, Sharrief AZ, Barreto AD, Shaw S, Grotta JC, Savitz SI, Ifejika NL. Leveraging Multimedia Patient Engagement to Address Minority Cerebrovascular Health Needs: Prospective Observational Study. Journal of medical Internet research. 2021 Aug 13;23(8):e28748.

10. Zhang C, Pan MM, Wang N, Wang WW, Li Z, Gu ZC, Lin HW. Feasibility and usability of a mobile health tool on anticoagulation management for patients with atrial fibrillation: a pilot study. European Journal of Clinical Pharmacology. 2022 Feb 1:1-2.

Intervention:

1. Ad N. Decision-making in Surgical Treatment for Stand-alone Atrial Fibrillation: Minimally Invasive Cox Maze Procedure. Innovations: Technology and Techniques in Cardiothoracic and Vascular Surgery. 2019;14(6):487-92.

2. Benditt DG, Adabag S, Chen LY. An earnest search for atrial fibrillation patients without thromboembolic risk. J Cardiovasc Electrophysiol. 2012;23(7):714-6.

3. Calenda BW, Fuster V, Halperin JL, Granger CB. Stroke risk assessment in atrial fibrillation: risk factors and markers of atrial myopathy. Nat Rev Cardiol. 2016;13(9):549-59.

4. Casciano JP, Singer DE, Kwong WJ, Fox ES, Martin BC. Anticoagulation therapy for patients with non-valvular atrial fibrillation: comparison of decision analytic model recommendations and real-world warfarin prescription use. Am J Cardiovasc Drugs. 2012;12(5):313-23.

5. Chackery DG, Keshavjee K, Mirza K, Ghany A, Holbrook AM. Integrating Clinical Decision Support into EMR and PHR: a Case Study Using Anticoagulation. Stud Health Technol Inform. 2015;208:98-103.

6. Desteghe L, Germeys J, Vijgen J, Koopman P, Dilling-Boer D, Schurmans J, et al. The impact of an online directed education platform on the knowledge level of atrial fibrillation patients undergoing cardioversion or pulmonary vein isolation. Europace. 2018;20 (Supplement 1):i24.

7. Fatima S, Holbrook A, Schulman S, Park S, Troyan S, Curnew G. Development and validation of a decision aid for choosing among antithrombotic agents for atrial fibrillation. Thromb Res. 2016;145:143-8.

8. Feeny AK, Rickard J, Patel D, Toro S, Trulock KM, Park CJ, et al. Machine Learning Prediction of Response to Cardiac Resynchronization Therapy: Improvement Versus Current Guidelines. Circ Arrhythm Electrophysiol. 2019;12(7):e007316.

9. Ferguson C, Hendriks J. Partnering with patients in shared decision-making for stroke prevention in atrial fibrillation. Eur J Cardiovasc Nurs. 2017;16(3):178-80.

10. Gordon S, Rowse V, Everington T, Meehan D, Duggan C. Supporting initiation of anticoagulation with 'jack', a video counselling tool. Europace. 2017;19 (Supplement 1):i47.

11. Guo Y, Lip GYH. Mobile health for cardiovascular disease: The new frontier for AF management: Observations from the huawei heart study and mAFA-II randomised trial. Arrhythmia and Electrophysiology Review. 2020;9(1):5-7.

12. Gussoni G, Di Pasquale G, Vescovo G, Gulizia M, Mathieu G, Scherillo M, et al. Decision making for oral anticoagulants in atrial fibrillation: the ATA-AF study. Eur J Intern Med. 2013;24(4):324-32.

13. Habboushe J, Altman C, Lip GYH. Time trends in use of the CHADS(2) and CHA(2) DS(2) VASc scores, and the geographical and specialty uptake of these scores from a popular online clinical decision tool and medical reference. Int J Clin Pract. 2019;73(2):e13280.

14. Hickey KT, Wan E, Garan H, Biviano AB, Morrow JP, Sciacca RR, et al. A Nurse-led Approach to Improving Cardiac Lifestyle Modification in an Atrial Fibrillation Population. J Innov Card Rhythm Manag. 2019;10(9):3826-35.

15. Hirsch O, Keller H, Krones T, Donner-Banzhoff N. Acceptance of shared decision making with reference to an electronic library of decision aids (arriba-lib) and its association to decision making in patients: an evaluation study. Implement Sci. 2011;6:70.

16. Hirsch O, Keller H, Krones T, Donner-Banzhoff N. Arriba-lib: association of an evidence-based electronic library of decision aids with communication and decision-making in patients and primary care physicians. Int J Evid Based Healthc. 2012;10(1):68-76.

17. Hong C, Kim S, Curnew G, Schulman S, Pullenayegum E, Holbrook A. Validation of a patient decision aid for choosing between dabigatran and warfarin for atrial fibrillation. J Popul Ther Clin Pharmacol. 2013;20(3):e229-37.

18. Horne BD, Jacobs V, May HT, Graves KG, Bunch TJ. Augmented intelligence decision tool for stroke prediction combines factors from CHA(2) DS(2) -VASc and the intermountain risk score for patients with atrial fibrillation. J Cardiovasc Electrophysiol. 2019;30(9):1452-61.

19. Hoskins MH, Patel AM, DeLurgio DB. Left Atrial Appendage Occlusion, Shared Decision-Making, and Comprehensive Atrial Fibrillation Management. Interv Cardiol Clin. 2018;7(2):267-83.

20. Hsu JC, Hsieh CY, Yang YH, Lu CY. Net clinical benefit of oral anticoagulants: a multiple criteria decision analysis. PLoS One. 2015;10(4):e0124806.

21. Kaner E, Heaven B, Rapley T, Murtagh M, Graham R, Thomson R, et al. Medical communication and technology: a video-based process study of the use of decision aids in primary care consultations. BMC Med Inform Decis Mak. 2007;7:2.

22. Kapoor A, Amroze A, Vakil F, Crawford S, Der J, Mathew J, et al. SUPPORT-AF II: Supporting Use of Anticoagulants Through Provider Profiling of Oral Anticoagulant Therapy for Atrial Fibrillation: A Cluster-Randomized Study of Electronic Profiling and Messaging Combined With Academic Detailing for Providers Making Decisions About Anticoagulation in Patients With Atrial Fibrillation. Circ Cardiovasc Qual Outcomes. 2020;13(2):e005871.

23. Kesselheim AS, Gagne JJ, Franklin JM, Eddings W, Fulchino LA, Campbell EG. Do patients trust the FDA?: a survey assessing how patients view the generic drug approval process. Pharmacoepidemiology and Drug Safety. 2017;26(6):694-701.

24. Kirchhof P, Schroeder S. NOACs in atrial fibrillation. European Heart Journal. 2017;38(31):2382-91.

25. Ko J, Koshy A, Sajeev J, Rajakariar K, Cooke J, Roberts L, et al. Evaluating Patient Attitudes and Barriers Towards Mobile Health Technology for Cardiac Monitoring: Results from a Prospective Multi-Centre Study in an Elderly Population. Journal of the American College of Cardiology. 2019;73 (9 Supplement 1):3013.

26. Kovoor J, McIntyre D, Chik W, Chow C, Thiagalingam A. Prospective Evaluation of a Cardiologist-Narrated Audio-Visual Educational Module in Facilitating Shared Decision-Making during Cardiology Outpatient Consultation for Atrial Fibrillation. Heart Lung and Circulation. 2019;28 (Supplement 4):S226.

27. Kovoor JG, McIntyre D, Chik WWB, Chow CK, Thiagalingam A. Validation of cardiologist-created, audiovisual education delivered via smart devices while awaiting outpatient consultation: Optimising atrial fibrillation management through shared decision making. Europace. 2020;22 (SUPPL 1):i215.

28. Lafuente-Lafuente C, Emery C, Laurendeau C, Fagnani F, Bergmann JF. Long term treatment of atrial fibrillation in elderly patients: a decision analysis. Int J Cardiol. 2012;155(1):102-9.

29. Marcucci M, Skjøth F, Lip GY, Iorio A, Larsen TB. A decisional model to individualize warfarin recommendations: Expected impact on treatment and outcome rates in a real-world population with atrial fibrillation. Int J Cardiol. 2016;203:785-90.

30. McAlister FA, Man-Son-Hing M, Straus SE, Ghali WA, Anderson D, Majumdar SR, et al. Impact of a patient decision aid on care among patients with nonvalvular atrial fibrillation: a cluster randomized trial. Cmaj. 2005;173(5):496-501.

31. Phillips KP, Paul V. Dealing With the Left Atrial Appendage for Stroke Prevention: Devices and Decision-Making. Heart Lung and Circulation. 2017;26(9):918-25.

32. Romero-Ortuno R, O'Shea D. Aspirin versus warfarin in atrial fibrillation: decision analysis may help patients' choice. Age Ageing. 2012;41(2):250-4.

33. Ruff CT. The Promise of Mobile Health in Managing Atrial Fibrillation. Journal of the American College of Cardiology. 2020;75(13):1535-7.

34. Schueller PO, Steiner S, Enayat M, Schannwell CM, Hennersdorf M, Strauer BE. Signal-averaged P-wave ECG as a marker of atrial electrical instability in patients with right ventricular dysfunction. J Physiol Pharmacol. 2007;58 Suppl 5(Pt 2):627-32.

35. Wang Y, Bajorek B. Clinical pre-test of a computerised antithrombotic risk assessment tool for stroke prevention in atrial fibrillation patients: giving consideration to NOACs. J Eval Clin Pract. 2016;22(6):892-8.

36. Wang Y, Bajorek B. Pilot of a Computerised Antithrombotic Risk Assessment Tool Version 2 (CARATV2.0) for stroke prevention in atrial fibrillation. Cardiol J. 2017;24(2):176-87.

Outcome:

1. Alves-Cabratosa L, García-Gil M, Comas-Cufí M, Ponjoan A, Martí R, Parramon D, et al. Incident atrial fibrillation hazard in hypertensive population: a risk function from and for clinical practice. Hypertension. 2015;65(6):1180-6.

2. Deitelzweig SB, Jing Y, Swindle JP, Makenbaeva D. Reviewing a clinical decision aid for the selection of anticoagulation treatment in patients with nonvalvular atrial fibrillation: applications in a US managed care health plan database. Clin Ther. 2014;36(11):1566-73.e3.

3. Eckman MH, Costea A, Attari M, Munjal J, Wise RE, Knochelmann C, et al. Atrial fibrillation decision support tool: Population perspective. Am Heart J. 2017;194:49-60.

4. Eckman MH, Wise RE, Naylor K, Arduser L, Lip GY, Kissela B, et al. Developing an Atrial Fibrillation Guideline Support Tool (AFGuST) for shared decision making. Curr Med Res Opin. 2015;31(4):603-14.

5. Eckman MH, Wise RE, Speer B, Sullivan M, Walker N, Lip GY, et al. Integrating real-time clinical information to provide estimates of net clinical benefit of antithrombotic therapy for patients with atrial fibrillation. Circ Cardiovasc Qual Outcomes. 2014;7(5):680-6.

6. Fox KAA, Lucas JE, Pieper KS, Bassand JP, Camm AJ, Fitzmaurice DA, et al. Improved risk stratification of patients with atrial fibrillation: An integrated GARFIELD-AF tool for the prediction of mortality, stroke and bleed in patients with and without anticoagulation. BMJ Open. 2017;7(12).

7. Fraenkel L, Street RL, Jr., Fried TR. Development of a tool to improve the quality of decision making in atrial fibrillation. BMC Med Inform Decis Mak. 2011;11:59.

8. Guo Y, Lane DA, Wang L, Chen Y, Lip GYH. Mobile Health (mHealth) technology for improved screening, patient involvement and optimising integrated care in atrial fibrillation: The mAFA (mAF-App) II randomised trial. Int J Clin Pract. 2019;73(7):e13352.

9. Guo Y, Lane DA, Wang L, Zhang H, Wang H, Zhang W, et al. Mobile Health Technology to Improve Care for Patients With Atrial Fibrillation. Journal of the American College of Cardiology. 2020;75(13):1523-34.

10. Kaiser K, Cheng WY, Jensen S, Clayman ML, Thappa A, Schwiep F, et al. Development of a shared decision-making tool to assist patients and clinicians with decisions on oral anticoagulant treatment for atrial fibrillation. Curr Med Res Opin. 2015;31(12):2261-72.

11. Kotecha D, Chua WWL, Fabritz L, Hendriks J, Casadei B, Schotten U, et al. European Society of Cardiology smartphone and tablet applications for patients with atrial fibrillation and their health care providers. Europace. 2018;20(2):225-33.

12. Kotecha D, Kirchhof P. ESC Apps for Atrial Fibrillation. European Heart Journal. 2017;38(35):2643-5.

13. Kunneman M, Branda ME, Noseworthy PA, Linzer M, Burnett B, Dick S, et al. Shared decision making for stroke prevention in atrial fibrillation: study protocol for a randomized controlled trial. Trials. 2017;18(1):443.

14. Murtagh MJ, Thomson RG, May CR, Rapley T, Heaven BR, Graham RH, et al. Qualitative methods in a randomised controlled trial: the role of an integrated qualitative process evaluation in providing evidence to discontinue the intervention in one arm of a trial of a decision support tool. Qual Saf Health Care. 2007;16(3):224-9.

15. Peleg M, Michalowski W, Wilk S, Parimbelli E, Bonaccio S, O'Sullivan D, et al. Ideating Mobile Health Behavioral Support for Compliance to Therapy for Patients with Chronic Disease: A Case Study of Atrial Fibrillation Management. J Med Syst. 2018;42(11):234.

16. Peleg M, Shahar Y, Quaglini S, Broens T, Budasu R, Fung N, et al. Assessment of a personalized and distributed patient guidance system. Int J Med Inform. 2017;101:108-30.

17. Peleg M, Shahar Y, Quaglini S, Fux A, García-Sáez G, Goldstein A, et al. MobiGuide: a personalized and patient-centric decision-support system and its evaluation in the atrial fibrillation and gestational diabetes domains. User Modeling and User-Adapted Interaction. 2017;27(2):159-213.

18. Sacchi L, Fux A, Napolitano C, Panzarasa S, Peleg M, Quaglini S, et al. Patient-tailored workflow patterns from clinical practice guidelines recommendations. Studies in health technology and informatics. 2013;192:392-6.

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Supplement 6 | eTable 1: Risk of bias assessment of included randomised trials

Rationale for judgement: Available as additional Supplement

eTable 1.a | Risk of bias assessment (RoB 2) of included randomised trials (Decisional Conflict Scale)

Authors, year of publication	D1	D2	D3	D4	D5	Overall
Kunneman et al, 2020(2)	+	+	+	+	+	+
Wang et al 2022(3)	+	+	+	?	+	?
Fraenkel et al, 2012(4)	?	?	+	?	-	-
Thomson et al, 2007(5)	+	?	-	-	?	-

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1: Risk of bias arising from the randomization process; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result

eTable 1.b | Risk of bias assessment (RoB 2) of included cluster- randomised trials (Decisional Conflict Scale)

Authors, year of publication	D1a	D1b	D2	D3	D4	D5	Overall
Guo et al, 2017(6)	NA	NA	NA	NA	NA	NA	NA

NA: Not applicable (because the outcome was not reported); Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1a: Risk of bias arising from the randomization process; D1b: Risk of bias arising from the timing of identification or recruitment of participants in a cluster-randomized trial; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Risk of bias due to Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result

eTable 1.c | Risk of bias (RoB 2) assessment of included randomised trials (patient knowledge)

Authors, year of publication	D1	D2	D3	D4	D5	Overall
Kunneman et al, 2020(2)	+	-	+	+	+	+
Wang et al 2022(3)	+	+	+	?	?	?
Fraenkel et al, 2012(4)	?	-	?	?	?	-
Thomson et al, 2007(5)	+	?	-	-	?	-

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1: Risk of bias arising from the randomization process; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result.

eTable 1.d | Risk of bias assessment (RoB 2) of included cluster- randomised trials (patient knowledge)

Authors, year of publication	D1a	D1b	D2	D3	D4	D5	Overall
Guo et al, 2017(6)	?	+	-	-	-	?	-

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1a: Risk of bias arising from the randomization process; D1b: Risk of bias arising from the timing of identification or recruitment of participants in a cluster-randomized trial; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Risk of bias due to Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result;

eTable 1.e | Risk of bias (RoB 2) assessment of included randomised trials (other outcomes- medication related outcome)

Authors, year of publication	D1	D2	D3	D4	D5	Overall
Noseworthy et al. 2022(7)	+	-	?	?	?	?

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1: Risk of bias arising from the randomization process; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result.

eTable 1.f | Risk of bias (RoB 2) assessment of included cluster randomised trials (other outcomes- medication related outcome)

Authors, year of publication	D1a	D1b	D2	D3	D4	D5	Overall
Guo et al, 2017(6)	?	+	-	+	+	?	-

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias. D1a: Risk of bias arising from the randomization process; D1b: Risk of bias arising from the timing of identification or recruitment of participants in a cluster-randomized trial; D2: Risk of bias due to deviations from the intended interventions (effect of adhering to intervention); D3: Risk of bias due to Missing outcome data; D4: Risk of bias in measurement of the outcome; D5: Risk of bias in selection of the reported result;

Supplement 7 | eTable 2: Risk of bias assessment of included non-randomised trials

eTable 2 Risk of bias assessment and quality rating of included non-randomised controlled trials (ROBINS-I)

	Pre-intervention			**At intervention**	**Post-intervention**		
Authors, year of publication	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result
De Castro et al, 2021(8)	+	-	?	?	-	?	-
Kovoor et al, 2021 (9)	+	-	?	?	-	?	-
Kapoor et al, 2021(10)	+	-	?	?	–	?	-
Loewen et al, 2019(11)	+	–	?	?	–	?	-
Eckman et al, 2018(12)	+	–	?	?	-	?	-
Stephan et al, 2018(13)	+	-	?	?	-	?	+

Outcome-related domains were assessed considering the outcomes mentioned in Table 2. +, Low risk of bias; −, high risk of bias; ?, some concerns of bias.

Supplement 8 | eTable 3: Population characteristics

	Population Characteristics			
Study (Authors, year, study design)	Mean CHAD2DS2-VASc[a]; HAS-BLED[b] / HEMORR$_2$HAGES[c]	Type of atrial fibrillation	Socioeconomic status	Educational level
Kunneman et al., 2020(2) RCT	3.5; 2.1	Non valvular	White: 767/906 Black: 102/906 Asian: 10/906 American Indian or Alaskan native: 5/906 Multiple races: 18/906 Other: 4/906 Hispanic: 7/893	Inadequate health literacy[i] 73/883
Wang et al, 2022(3) RCT	3.4; NR	Non valvular	Race and ethnicity Non-Hispanic White: 734/ 1001 Hispanic or Latino: 45/1001 Asian: 36 /1001 Black or African American: 169/ 1001 American Indian or Alaskan Native: 1/ 1001 Native Hawaiian or other Pacific Islander: 3/1001 Other or multiple: 13/1001	Highest level of education No college: 328/1001 College: 461/1001 Postgraduate: 181/1001 Decline to state: 31/1001
Guo et al, 2017(6) Cluster RCT	2.6; 1.5	Non valvular[d]	NR	NR
Fraenkel et al, 2012(4) RCT	2.1; 1.3	Non valvular [e]	Hispanic: 5/135 Non-white: 8/135 Lives alone: 35/135 Married: 81/135	Highest education level <9th grade: 5/135 9-12th grade: 60/135 >High School: 70/135

				Health literacy <9th grade: 28/ 135
Thomson et al, 2007(5) RCT	2.2; 1.6	Non valvular [f]	NR	NR
De Castro et al, 2021 (8) Quasi- experimental (1 arm)	NR	Non valvular	Annual household income (Philippine peso) < 80,000: 35/37 80,000-160,000: 1/37 320,000- 400,00: 1/37	Highest education level Elementary: 12/37 High School: 13/37 College: 4/37 Vocational: 3/37 Postgraduate: 5/37
Kovoor et al, 2021 (9) Quasi- experimental (1 arm)	NR	NR	Demographically diverse population	NR
Kapoor et al, 2021(10) Quasi- experimental (1 arm)	3.64; NR[o]	NR	Non white:1/37 White: 36/37 Hispanic: 1/37 Non-Hispanic: 1/37	NR
Loewen et al, 2019(11) Quasi- experimental (1 arm)	2.4, 2.2	NR[g]	NR	Highest education level Elementary/high school: 6/37 Vocational/ technical school: 4/37 College/University: 8/37 Undergraduate: 6/37 Graduate: 4/37 Rather not say: 8/37
Eckman et al, 2018(12) Quasi- experimental (1 arm)	3.0; 1.9	Non valvular[h]	White/Caucasian: 55/65 Black or African American: 9/65 Marital status: Single: 6 /65 Married: 44 /65 Divorced: 8 /65 Widowed: 7 /65	Highest education level 8th grade through high school graduate: 14/65 Some college or 2-year degree: 16/65 4-year college: 11/65 More than 4-year college: 24/65
Stephan et al, 2018(13) Quasi- experimental (1 arm)	3; 2	NR	(n=20) White (%) : 83.3	Schooling years 0-4 years (%): 33.3 5-8 years (%): 40 > 8 years (%): 26.7

			Who patients live with Alone (%) : 16.7 Companion (%) :26.7 Family (%): 53.3 Institutionalized (%) : 3.3 Family income 4-10 minimum wages (%) : 26.7 2-4 minimum wages (%) : 20 < 2 minimum wages (%) : 53.3	

[a]CHA2DS2-VASc score(14): congestive heart failure, hypertension, age ≥75 years, diabetes, previous stroke or transient ischemic attack or thromboembolism, vascular disease, age 65-74 years, and sex category; score range 0-9, with higher scores indicating higher risk (a CHA2DS2-VASc score of 1 or more for men and 2 or more for women indicates high risk); [b]HAS-BLED score(15): hypertension, abnormal kidney or liver function, stroke, bleeding, labile international normalized ratio, elderly age (>65years), and drug or alcohol use (score range, 0-9, with higher scores indicating higher risk); [c]HEMORR$_2$HAGES score(16) : Hepatic or renal disease, Ethanol abuse, Malignancy, Older age, Reduced platelet count or function, Rebleeding risk, Hypertension, Anemia, Genetic factors, Excessive fall risk, Stroke. The weighted mean CHAD2DS2-VASc across studies was 3.2. The weighted mean HAS-BLED score across studies was 1.9. [d]excluded valvular atrial fibrillation [e] paroxysmal atrial fibrillation were included if participants had at least two episodes of atrial fibrillation, with the most-recent episode documented in the previous 12 months or were receiving therapy with aspirin or warfarin. [f] paroxysmal atrial fibrillation was included. [g]and at risk of AF (defined as being >50 years without atrial fibrillation and with at least 1 atrial fibrillation stroke risk factor). [h] or atrial flutter [i] Self reported categories of being “not at all” or “a little bit” confident in filling medical forms without assistance

Supplement 9 | eTable 4: Extended Table of Function and Features of Electronic decision-support tools

Study	Functionalities		Features		
	Delivery (Format, administered by, mode of delivery)	Usage (frequency; duration)	Personalisation to the patient	Risk communication	Additional education resources
Kunneman et al., 2020(2) Noseworthy et al, 2022(7)	Web app [a]. Utilised with clinicians during consultation	- Single use by patient - Clinicians used tool with high fidelity[b] - Average encounter duration: 32 mins	▪ Individualised (1 year or 5 year, with and without anticoagulant treatment) stroke risk calculated with $CHAD_2DS_2$-VASc score[c] and bleeding risk with HAS-BLED2 score[d] after manual selection of risk factors ▪ Section to enter own notes of decision	- Natural frequency expressions (e.g., "out of 100 people like you") - 100-persons pictographs	- Creates patient report - Explains how to use the medications, estimated out-of-pocket costs, and association of lifestyle or medical factors with the risk of bleeding
Wang et al, 2022(3)	Web app via tablet (and can function offline) Patient utilised prior to consultation with minimal assistance. Clinicians had separate clinical tool.	Single use by patient Encounter duration: 11-20 mins	▪ Individualised risk score to determine stroke risk (with and without anticoagulant treatment) with CHAD2DS2-VASc score[c] after manual selection of risk factors	- Natural frequency expressions (e.g., "out of 100 people like you") - 100-persons pictographs	- Creates patient report - Provides online guide to anticoagulation for AF stroke prevention, video, quiz to check patient understanding - Worksheet for patients to record questions for the clinician visit - English & Spanish available; catered to wide range of health literacy
Guo et al, 2017(6)	Mobile app[e] with separate versions for patients and clinicians. Self-utilised by patient at home	Multiple use by patient (continual monitoring of heart rate and blood pressure and completion of patient educational program)	▪ Automatically calculates individualised stroke risk with CHAD2DS2-VASc[c] score and bleeding risk with HAS-BLED[d] score after upload of patient's personal health record.	-High versus low	- Educational and self-management resources, e.g., blood pressure self-monitoring - Includes personal health record

Fraenkel et al, 2012(4)	Computer software tool. Utilised prior to consultation (after it is administered by research nurse), followed by discussion with clinician	Single use Time to administer tool: 20-35 minutes to administer.	▪ Calculates individualised stroke risk with CHADS2[f] score and bleeding risk on Warfarin with HEMORR2HAGES[g] score after manual selection of risk factors by research nurse ▪ Estimates stroke risks on aspirin and warfarin and provides baseline bleeding risk and bleeding risk with aspirin (based on systematic reviews and meta-analyses). ▪ Elicits patient preferred option and reasons.	- Natural frequency expressions (e.g., "out of 100 people like you") - 100-person pictographs	▪ Creates patient report
Thomson et al, 2007(5)	Computer software tool. Utilised with clinicians prior to consultation	Single use for patients Encounter (median) duration: 31 minutes (10 min longer compared to control)	▪ Calculates individualised (1 or 5 year) stroke risk with Framingham equation[52] after manual selection of risk factors. ▪ Estimates stroke risk on warfarin and bleeding risk on warfarin (based on systematic review data).	- 100-person pictographs - Percentage	No
De Castro et al, 2021 (8)	Mobile application Utilised with clinicians during consultation	Single use of patients Encounter (median) duration: 15 (SD 6) minutes	▪ Calculates individualised stroke risk with CHAD2DS2-VAScc score and bleeding risk with HAS-BLEDd score after manual insertion of risk factors (with and without treatment)	- Natural frequency expressions (e.g., "out of 100 people like you") - 100-person pictographs	Medication dosing and diet advice
Kovoor et al, 2021(9)	Web-based Audio-visual modules Utilised during waiting time	- Single use for patients. - Encounter (median) duration: 14 min and 46 sec; maximum of 20 min to complete	No	N/A	4 educational videos (What is AF, AF management, stroke risk and anticoagulants, lifestyle modifications) -The module was recorded in English with language and readability aimed below an eighth grade level.
Kapoor et al, 2021(10)	- Mobile app[h] with versions for patients and clinicians. - Self-utilised at home by	Single use for patients Encounter (approximate)	Calculates individualised stroke risk with CHAD2DS2-VASc1 score[c] after manual insertion of risk factors	CHAD2DS2-VASc score	- Creates patient report - Selection of commonly asked questions for clinicians to review and answer - Links, Videos

	patient prior to visit with cardiologist	duration: 2-3 minutes			
Loewen et al, 2019(11)	Online app in a web browser[i] Self-utilised at home by patient	Single use for patients Encounter duration: 27 min.	▪ Calculates individualised stroke risk with CHAD2DS2-VASc[c] score and bleeding risk with HAS-BLED[d] score, with and without medication, after manual insertion of risk factors. ▪ Ranks the strength of their **values** on the 9 most important attributes of AF stroke prevention therapy (i.e., dietary and alcohol restrictions, number of daily doses, requirement for international normalized ratio blood tests, risk of stroke, risk of major bleeding, risk of intracranial haemorrhage, participation in occupational or recreational activities with a risk of traumatic injury, availability of an antidote, and cost).	▪ Risk communication through % and "1 in X chance of" format. ▪ Tool shows a "best match" % score for each therapy option along with corresponding patient values and preferences.	- Creates patient report - Standardized educational materials developed and used by Canadian province of British Columbia
Eckman et al, 2018(12)	Online web application[j] Utilised prior and during to consultation with cardiologist	Single use for patients Encounter duration: approximately 20 min.	▪ Calculates individualised stroke risk with CHAD2DS2-VASc[c] score and bleeding risk with HAS-BLED[d] score, automatically from EHR data ▪ **Elicits patient values and preferences** (e.g., stroke with either mild or severe long-term neurological sequelae, major gastrointestinal haemorrhage, taking a pill each day, having blood tests done on average once or twice a month)	100-person pictographs; scale with colours denoting risk; graphics of medication cards Risk communication: *through a "gambler" tool with a "poison pill" analogy* (the patient chooses a pill with varying probabilities that the pill leads to death versus the certainty of one of the above situations).[k] treatment recommendation based on projections for quality-adjusted life years	- Medication info - Creates patient report
Stephan et al, 2018(13)	Mobile app (clinician tablet). Utilised with Cardiologist during consultation	Single use for patients	▪ Calculates individualised stroke risk with CHAD2DS2-VASc[c] score and bleeding risk with HAS-BLED[d] score, manually entered. ▪ Estimates stroke risk and bleeding risk for each treatment option. ▪ **Elicits patient's preference**	100-person pictographs; graphics and colour code for risk information Risk communication: literacy targeted to low-income patients with low educational attainment Practical considerations	- Creates patient report (via SMS) - Medication info - Videos

Abbreviations: %: percentage; AF: atrial fibrillation; app: application; NR: not reported; SMS: Short Message Service;

[a]Freely available online conversation aid 'Anticoagulation choice decision aid' (https://anticoagulationdecisionaid.mayoclinic.org/);[b]Recorded interviews were reviewed by study coordinators using an ad hoc scale (total score of 7) points). Clinician(s) had a mean [SD] score, 5.6 [1.4] points of 7.0.; [c]CHA2DS2-VASc score(38): congestive heart failure, hypertension, age ≥75 years, diabetes, previous stroke or transient ischemic attack or thromboembolism, vascular disease, age 65-74 years, and sex category; score range 0-9, with higher scores indicating higher risk (a CHA2DS2-VASc score of 1 or more for men and 2 or more for women indicates high risk); [d]HAS-BLED score(39): hypertension, abnormal kidney or liver function, stroke, bleeding, labile international normalized ratio, elderly age (>65years), and drug or alcohol use (score range, 0-9, with higher scores indicating higher risk); [e]mAF app available in China for Android and Apple Operating Systems; [f]CHADS2 algorithm(44): Congestive heart failure history, Hypertension history, Aged ≥75, Diabetes mellitus history, Stroke symptoms previously or transient ischemic attack; [g]HEMORR$_2$HAGES score(40): Hepatic or renal disease, Ethanol abuse, Malignancy, Older age, Reduced platelet count or function, Rebleeding risk, Hypertension, Anemia, Genetic factors, Excessive fall risk, Stroke; [h]AFib 2gether mobile app, developed by Pfizer (https://play.google.com/store/apps/details?id=com.pfizer.us.AfibTogether&hl=en_US&gl=US); [i]The underlying software system, Dynamic Computer Interactive Decision Application (DCIDA; http://www. dcida.ubc.ca); [j]Atrial Fibrillation Shared Decision Making AFSDM web app; [k]Gafni A. The standard gamble method: what is being measured and how it is interpreted. Health Serv Res 1994;29:207-24.;

Supplement 10 | eTable 5: SUNDAE Checklist

Section	SUNDAE Checklist for evaluation studies of patient decision aids	Studies that evaluated patient decision aids
Title/abstract		1=Fraenkel et al. 2012(4) 2=Thomson et al. 2007(5) 3=Loewen et al. 2019(11) 4= de Castro et al. 2021(8)
1.	Use the term patient decision aid in the abstract to identify the intervention evaluated and, if possible, in the title.	2,3,4
2.	In the abstract, identify the main outcomes used to evaluate the patient decision aid.	2,3,4
Introduction	*As part of standard introduction (the problem, gaps, purpose):*	
3.	Describe the decision that is the focus of the patient decision aid.	1,2,3,4
4.	Describe the intended user(s) of the patient decision aid.	1,2,3,4
5.	Summarise the need for the patient decision aid under evaluation.	1,2,3,4
6.	Describe the purpose of the evaluation study with respect to the patient decision aid.	1,2,3,4
Methods	*Studies with a comparator should also address items 7–13 for the comparator, if possible*	
7.	Briefly describe the development process for the patient decision aid (and any comparator), or cite other documents that describe the process. At a minimum include the following: • participation of stakeholders in its development • the process for gathering, selecting and appraising evidence to inform its content • any testing that was done.	3,4
8.	Identify the patient decision aid evaluated in the study (and any comparator) by including:	3,4

	• name or information that enables it to be identified • date and/or version number • how it can be accessed, if available.	
9.	Describe the format(s) of the patient decision aid (and any comparator) (eg, paper, online, video).	1,2,3,4
10.	List the options presented in the patient decision aid (and any comparator).	1,2,3,4
11.	Indicate the components in the patient decision aid (and any comparator) including: • explicit description of the decision* • description of health problem* • information on options and their benefits, harms and consequences* • values clarification (implicit or explicit)* • numerical probabilities • tailoring of information or probabilities • guidance in deliberation • guidance in communication • personal stories • reading level or other strategies to help understanding • other components.	1,3,4
12.	Briefly describe the components from item 11 that are included in the patient decision aid (and any comparator) or cite other documents that describe the components.	1,3,4
13.	Describe the delivery of the patient decision aid (and any comparator) including: • how it was delivered (eg, by whom and/or by what method) • to whom it was delivered • where it was used • when it was used in the pathway of care • any training to support delivery • setting characteristics and system factors influencing its delivery.	1,2,3,4
14.	Describe any methods used to assess the degree to which the patient decision aid was delivered and used as intended (also known as fidelity).	3,4

15.	Describe any methods used to understand how and why the patient decision aid works (also known as process evaluation) or cite other documents that describe the methods.	1,2,3,4
16.	Identify theories, models or frameworks used to guide the design of the evaluation and selection of study measures.	3,4
17.	For all study measures used to assess the impact of the patient decision aid on patients, health professionals, organisation, and health system: • identify the measures • indicate the timing of administration in relation to exposure to the patient decision aid and healthcare interventions.	2,3,4
18.	For any instruments used: • name the instrument and the version (if applicable) • briefly describe the psychometric properties, or cite other documents.	3,4
Results	*In addition to standard reporting of results:*	
19.	Describe the characteristics of the patient, family and carer population(s) (eg, health literacy, numeracy, prior experience with treatment options) that may affect patient decision aid outcomes.	1,2,3,4
20.	Describe any characteristics of the participating health professionals (eg, relevant training, usual care vs study professional, role in decision-making) that may affect decision aid outcomes.	3,4
21.	Report any results on the use of the patient decision aid: • how much and which components were used • degree to which it was delivered and used as intended (also known as fidelity).	2,3,4
22.	Report relevant results of any analyses conducted to understand how and why the patient decision aid works (also known as process evaluation).	2,3
23.	Report any unanticipated positive or negative consequences of the patient decision aid.	3

Discussion	*As part of the standard discussion section (summary of key findings, interpretation, limitations and conclusion):*	
24.	Discuss whether the patient decision aid worked as intended and interpret the results taking into account the specific context of the study including any process evaluation.	2,3,4
25.	Discuss any implications of the results for patient decision aid development, research, implementation, and theory, frameworks or models.	1,2,3,4
Conflict of interest		
26.	All study authors should disclose if they have an interest (professional, financial or intellectual) in any of the options included in the patient decision aid or a financial interest in the decision aid itself.	1,2,3,4

*These components are needed to meet the definition of a patient decision aid.
Abbreviations: SUNDAE, Standards for Universal reporting of patient Decision Aid Evaluations.

Supplement 11 | eTable 6: Adherence to International Patient Decision Aids Standards

eTable 6.a: Qualifying criteria for Patient decision aids (PtDAs)

Study	Tool	Qualifying criteria for PtDAs[a]				
		The patient decision aid describes the health condition or problem (treatment, procedure, or investigation) for which the index decision is required	The patient decision aid explicitly states the decision that needs to be considered (index decision).	The patient decision aid describes the options available for the index decision.	The patient decision aid describes the positive features (benefits or advantages) and negative features (harms, side effects, or disadvantages) of each option.	The patient decision aid describes what it is like to experience the consequences of the options (e.g., physical, psychological, social).
Fraenkel et al, 2012(4) Cluster RCT	Patient Decision Aid	✓	✓	✓	✓	✓
Thomson et al, 2007(5) RCT	Patient Decision Aid	✓	✓	✓	✓	✓
De Castro et al, 2021 (8) Quasi- experimental (1 arm)	Patient Decision Aid	✓	✓	✓	✓	✓
Loewen et al, 2019(11) Quasi- experimental (1 arm)	Patient Decision Aid	✓	✓	✓	✓	✓

[a] Adapted from IPDAS(17)

eTable.6b: Additional criteria for Patient decision aids (PtDAs): certification and quality criteria

		Fraenkel et al, 2012	Thomson et al, 2007	De Castro et al.	Loewen et al, 2019
Information	The patient decision aid shows the negative and positive features of options with equal detail (e.g., using similar fonts, sequence, presentation of statistical information)	✓	✓	✓	✓
	The patient decision aid describes the natural course of the health condition or problem, if no action is taken (when appropriate).	✓	✓	✓	✓
	The patient decision aid makes it possible to compare the positive and negative features of the available options.	✓	✓	✓	✓
Probabilities	The patient decision aid provides information about outcome probabilities associated with the options (i.e., the likely consequences of decisions).	✓	✓	✓	✓
	The patient decision aid specifies the defined group (reference class) of patients for whom the outcome probabilities apply.	✓	✓	✓	✓
	The patient decision aid specifies the event rates for the outcome probabilities	✓	✓	✓	✓

	The patient decision aid allows the user to compare outcome probabilities across options using the same time period (when feasible).	✓	✓	✓	✓
	The patient decision aid allows the user to compare outcome probabilities across options using the same denominator (when feasible).	✓	✓	✓	✓
	The patient decision aid provides more than 1 way of viewing the probabilities (e.g., words, numbers, and diagrams).	✓	✓	✓	x
Values	The patient decision aid asks patients to think about which positive and negative features of the options matter most to them (implicitly or explicitly).	✓	✓	x	✓
Guidance	The patient decision aid provides a step-by-step way to make a decision.	✓	✓	✓	✓
	The patient decision aid includes tools like worksheets or lists of questions to use when discussing options with a practitioner.	✓	✓	x	✓
Development	The development process included a needs assessment with clients or patients.	✓	✓	✓	✓
	The development process included a needs assessment with health professionals.	x	✓	✓	✓
	The development process included review by clients/patients not involved in producing the decision support intervention.	✓	✓	✓	✓
	The development process included review by professionals not involved in producing the decision support intervention.	x	✓	✓	
	The patient decision aid was field tested with patients who were facing the decision.	✓	✓	✓	
	The patient decision aid was field tested with practitioners who counsel patients who face the decision.	x	✓	✓	
Evidence	The patient decision aid (or associated documentation) provides citations to the evidence selected.	✓	✓	✓	✓
	The patient decision aid (or associated documentation) provides a production or publication date.	✓	✓	✓	✓
	The patient decision aid (or associated documentation) provides information about the update policy.	x	x	x	x
	The patient decision aid provides information about the levels of uncertainty around event or outcome probabilities (e.g., by giving a range or by using phases such as ‘‘our best estimate is . . .’’).	x	x	x	✓
	The patient decision aid (or associated documentation) describes how research evidence was selected or synthesized.	✓	✓	✓	✓
	The patient decision aid (or associated documentation) describes the quality of the research evidence used.	✓	✓	✓	✓
Disclosure	The patient decision aid (or associated documentation) provides information about the funding source used for development.	✓	✓	✓	✓
	The patient decision aid includes authors’/developers’ credentials or qualifications.	✓	✓	✓	✓
Plain language	The patient decision aid (or associated documentation) reports readability levels (using 1 or more of the available scales).	x	x	x	x
Evaluation	There is evidence that the patient decision aid improves the match between the preferences of the informed patient and the option that is chosen.	x	x	x	x
	There is evidence that the patient decision aid helps patients improve their knowledge about options’ features.	✓	✓	✓	✓

Supplement 12 | eTable 7: Acceptability and satisfaction with digital patient decision-support tools

Study	Perceived patient satisfaction +/-engagement
Kunneman et al., 2020(2) RCT	Quality of Communication: NS[a,b] Preference in communication style[c]: ↔ between arms (aRR 1.0 ; 95%CI, 0.97 to 1.1)
Noseworthy et al, 2022(7) RCT	NR
Wang et al, 2022(3) RCT	Quality of communication: (did the clinician listen carefully) ↑ between arms[d]
Guo et al, 2017(6) Cluster RCT	> 90% of patients agreed *intervention* was easy, user-friendly, and helpful
Fraenkel et al, 2012(4) Cluster RCT	Engagement[c]: ↑ between arms (for risk of stroke and major bleeding discussion)
Thomson et al, 2007(5) RCT	NR
De Castro et al, 2021 (8)	100% of patients agreed the patient decision aid was useful and had sufficient information for decision making
Kovoor et al, 2021 (9) Quasi- experimental (1 arm)	82 out of 100 VAS Score[e](IQR 70-90) for the clinician's narration adding benefit to the patient experience
Kapoor et al, 2021(10) Quasi- experimental (1 arm)	48% of participants demonstrated audio evidence of patient's involvement in the clinician-patient discussion of treatment options High satisfaction with intervention (Median patient scored: 4.51 out 5[f], with 5 as complete satisfaction of intervention on scale) 62% of patients agreed with: "The app helped me clarify my anticoagulation preferences to my provider" Medium usability: 54% of participants agreed with "The app helped me decide whether to go on anticoagulation".
Loewen et al, 2019(11) Quasi- experimental (1 arm)	Medium usability: The overall mean usability[g] score was 61/100 (SD = 15.2),
Eckman et al, 2018(12) Quasi- experimental (1 arm)	Patient satisfaction with Decision Scale: ↑ pre-post [h]
Stephan et al, 2018(13) Quasi- experimental (1 arm)	NR

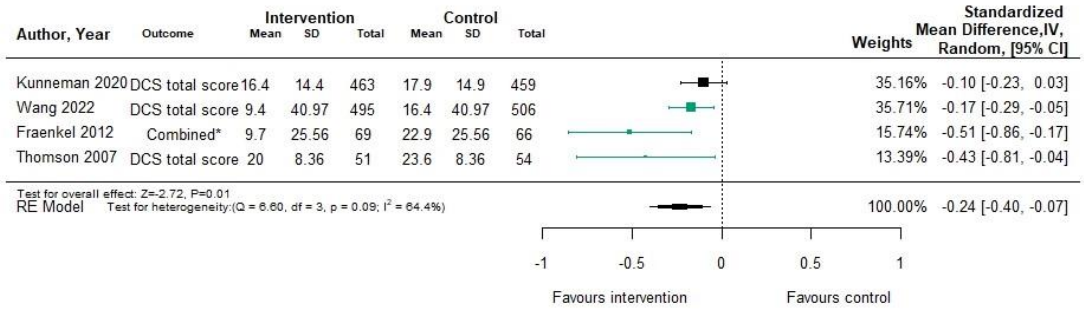
Abbreviations: aRR: adjusted risk ratio; CI: confidence interval; IQR: interquartile range; NR: not reported; NS: not statistically significant effect as per p-values (p>0.05) reported in the study; RCT: Randomised Control Trial; SD: standard deviation; VAS: Visual Analogue Scale; ↔ : no difference; P-values reported between intervention and control arm in RCTs, and pre- vs post-intervention in quasi-experimental studies.; >: more than.; ↑: increased;

[a]Primary outcome; [b]Quality of communication measured with the validated Consumer Assessment of Healthcare Providers and Systems (https://www.ahrq.gov/cahps/surveysguidance/survey-methods-research/index.html); [c] Calculated by proportion in intervention over proportion in control; [d]At one month follow up; [e] 100 on the VAS Score indicating complete agreement with the statement.; [f]Mobile App Rating Scale (MARS) validated questionnaire; [g]System Usability Scale; [h]Researcher-developed questionnaire with validation status unclear

Supplement 13 | eTable 8. Control group / Usual Care Definition

	Control group / Usual Care Definition
Study (Authors, year, study design)	
Kunneman et al., 2020(2) RCT	"In the standard care arm, clinical encounters were conducted according to the clinicians' usual approach."
Noseworthy et al, 2022(7) RCT	Same as above
Wang et al, 2022(3) RCT	"In the control arm (UC), the participants and the clinicians were not provided with the digital SDM tool and, therefore, followed usual clinical practice."
Guo et al, 2017(6) Cluster RCT	"usual care"
Fraenkel et al, 2012(4) RCT	"Baseline data were collected in a face-to-face interview before participants' regularly scheduled visits with their primary care provider; for participants in the intervention group, this was followed by administration of the tool."
Thomson et al, 2007(5) RCT	"Participants were randomised to either: (a) computerised decision aid (intervention) or (b) evidence-based paper guidelines (control) (…) In the evidence-based paper guidelines group, the clinic treatment recommendation was provided by applying decision analysis derived guidelines according to the participants' risk factor profile and the recommendation made directly to the participant by the clinic doctor. All treatment decisions were conveyed to the participants' own GP for ongoing care."

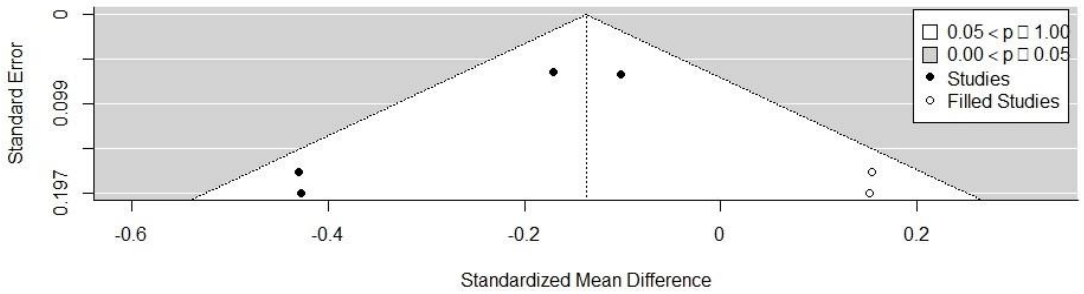
Supplement 14 | eFigure 1: Sensitivity analysis for combined effect size for two subscales



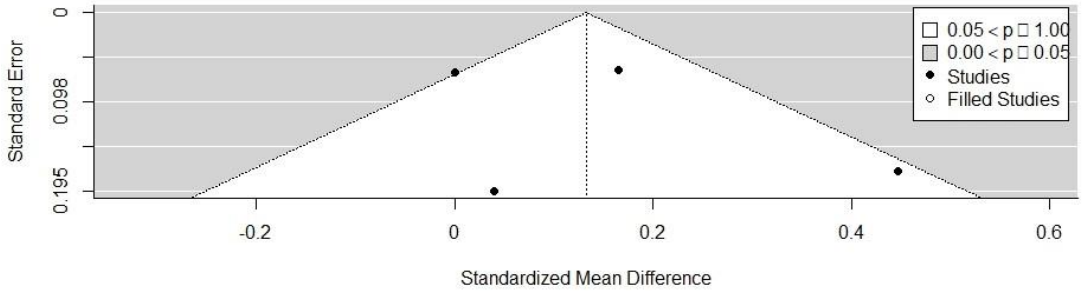
eFigure 1 | Forest plot of effect sizes and 95% CIs representing sensitivity analysis for combined effect size for two subscales (informed and values subscales) of Decisional Conflict Scale

Green denotes studies that adhere to IPDAS definition of decision aids. Data not available in Guo et al.

Supplement 15 | eResults 2: Publication bias analysis



eFigure 2 | Funnel plot of standard error by standardised difference in means (Duval and Tweedie trim- and fill- method) for Decisional Conflict scale. The funnel plot indicates publication bias, with small studies showing a bigger effect in reducing decisional conflict.



eFigure 3 | Funnel plot of standard error by standardised difference in means (Duval and Tweedie trim- and fill- method) for patient knowledge

Egger's regression test for Decisional conflict scale

```
Regression Test for Funnel Plot Asymmetry

Model:     mixed-effects meta-regression model
Predictor: standard error

Test for Funnel Plot Asymmetry: z = -2.03727, p = 0.04162
Limit Estimate (as sei -> 0):   b =  0.01245 (CI: -0.18165, 0.20655)
```

Egger's regression test for patient knowledge

```
Regression Test for Funnel Plot Asymmetry

Model:     mixed-effects meta-regression model
Predictor: standard error

Test for Funnel Plot Asymmetry: z = 0.57055, p = 0.56830
Limit Estimate (as sei -> 0):   b = 0.04921 (CI: -0.36327, 0.46170)
```

Supplement 16 | eTable 9: Outcomes of included quasi-experimental studies

Study	Decisional conflict	Patient knowledge
de Castro et al, 2021(8)	↓ Pre-post[b]	↑ pre-post[c]
Kovoor et al, 2021(18) Cross-sectional Quasi- experimental (1 arm)	Baseline data not available 90 out of 100 VAS Score[a] (IQR 82.5-97) for improving patient decision-making	NR
Kapoor et al, 2021(10) Quasi- experimental (1 arm)	NR	40% of patients agreed that the app improved their knowledge of anticoagulation
Loewen et al, 2019(11) Quasi- experimental (1 arm)	↓ Pre-post[b]	↑ pre-post[c]
Eckman et al, 2018(12) Quasi- experimental (1 arm)	↓ pre-post[b]	↑ pre-post [c]
Stephan et al, 2018(19) Quasi- experimental (1 arm)	Data not available[b]	↑ pre-post[c]

Abbreviations: AC: anticoagulation; IQR: Interquartile Range; NR: not reported; VAS: Visual analogue scale; ↑: Increase; ↓: decrease; [a] 100 on the VAS Score indicating complete agreement with the statement; [b]Decisional Conflict Scale is a validated 16-item scale that evaluates an individual's degree of uncertainty about the choice (score range, 0-100, with higher scores indicating greater decisional conflict; 5 subscales: informed; values; support; uncertainty; effective decision-making)[20]; [c]Researcher-developed questionnaire with validation status unclear;

Supplement 17 | eTable 10: Medication-related outcomes

Study	Medication Outcomes (Change in adherence, preference in treatment/therapy or patient-clinician concordance of treatment outcome)
Kunneman et al., 2020(2) RCT	Patient-clinician decision concordance about treatment selection[a]: NS
Noseworthy et al, 2022(21) (10-month follow up of Kunneman 2020 RCT)	Medication change: ↓ in intervention arm (Intervention 72/463; Control: 86/459; aOR: 0.79 (0.55-1.14))[a,b] Adherence: NS percentage of days covered ; ↑ intervention vs control on percentage of days covered higher than 80% (DOAC: aOR 1.42 (0.96 to 2.22); Warfarin: NR) [a,b]
Wang et al, 2022(22) RCT	Medication adherence (self-reported at 1 and 6 months): NS[c]
Guo et al, 2017(6) Cluster RCT	Medication adherence (self-reported at 1 month and 3 months): ↑ between groups[d]
Fraenkel et al, 2012(4) RCT	Medication change: NS
Thomson et al, 2007(5) RCT	Change in medication preference: Participants in the intervention group not already on warfarin were less likely to start warfarin than those in the control arm (4/16, 25% compared to the guidelines group 15/16, 93.8%, RR 0.27, 95% CI 0.11 to 0.63).
de Castro et al, 2021(8) Quasi- experimental (1 arm	NR
Kovoor et al, 2021(18) Quasi- experimental (1 arm)	Data not available 90 out of 100 VAS Score (IQR 81-97)[e] for improving potential treatment adherence
Kapoor et al, 2021(10) Quasi- experimental (1 arm)	Medication change: 12/37 (32%) patients started anticoagulation following their appointment Change in Medication preference: 23/37 (62%) patient agreed with statement "the app clarified my AC preferences to my provider)
Loewen et al, 2019(11) Quasi- experimental (1 arm)	Change in Medication preference: 22/37 (59%) participants indicated a change in preference to different drug class after using the tool
Eckman et al, 2018(12) Quasi- experimental (1 arm)	Medication change: 12 out of 65 participants made recommended treatment decision Medication Adherence:[f] ↑ pre-post (mean difference [95% CI]): 0.5(0.3,0.7) p value <.001
Stephan et al, 2018(19) Quasi- experimental (1 arm)	NR

Abbreviations: aOR: adjusted Odds Ratio; aRR: adjusted risk ratio; CI: confidence interval; DOAC: direct oral anticoagulant; NS: not statistically significant effect as per p-values (p>0.05) reported in the study; NR: not reported; RCT: Randomised Control Trial; ↓ : lower ; ↑: higher; P-values reported between intervention and control arm in RCTs, and pre- vs post-intervention in quasi-experimental studies.
[a] Calculated by proportion in intervention over proportion in control; [b] Adherence assessed by percentage days covered of the direct oral anticoagulant. [c] based on participant self-reported missed doses and

collected for post-adhoc analysis; [d] measured by Pharmacy Quality Alliance 3-item adherence measures: Low risk = 0, moderate risk = 2-7 and high risk = score 8-36; [e] 100 on the VAS Score indicating complete agreement with the statement; [f]Measured after second visit when shared decision-making recommendation offered, and one month later by telephone survey to assess adherence to decision made at the second with Morisky Medication Adherence Scale

Supplement 18 | eTable 11: Health outcomes in included studies

	Health outcomes	
Study	Perceived risk of stroke +/- bleeding	Anxiety
Kunneman et al., 2020(2) RCT	NR	NR
Noseworthy et al, 2022(7) RCT	NR	NR
Wang et al, 2022(3) RCT	NR	NR
Guo et al, 2017(6) Cluster RCT	NR	↓ between arms[a] (favouring intervention)
Fraenkel et al, 2012(4) RCT	↓ between arms (favouring intervention)	NS[b]
Thomson et al, 2007(5) RCT	NR	NS[b]
De Castro et al, 2021 (8)	NR	NR
Kovoor et al, 2021 (9) Quasi- experimental (1 arm)	NR	No data available 89 out of 100 VAS Score[c] (IQR 81-95) for improving consultation anxiety
Kapoor et al, 2021(10) Quasi- experimental (1 arm)	NR	NR
Loewen et al, 2019(11) Quasi- experimental (1 arm)	NR	NR
Eckman et al, 2018(12) Quasi- experimental (1 arm)	NR	NR
Stephan et al, 2018(13) Quasi- experimental (1 arm)	NS[d]	NR

Abbreviations: aRR: adjusted risk ratio; CI: confidence interval; IQR: interquartile range; NR: not reported; NS: not statistically significant effect as per p-values (p>0.05) reported in the study; RCT: Randomised Control Trial; SD: standard deviation; VAS: Visual Analogue Scale; ↔ : no difference; P-values reported between intervention and control arm in RCTs, and pre- vs post-intervention in quasi-experimental studies.; >: more than.; ↑: increased;

[a]Component of the EQ-5D-Y questionnaire; [b]Spielberger State Anxiety Index (validated)(46); [c] 100 on the VAS Score indicating complete agreement with the statement.; [d]Rated as low, moderate, or high risk of stroke and bleeding

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