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REVIEW ARTICLE

# Understanding for whom, under what conditions, and how an integrated approach to atrial fibrillation service delivery works: a realist review

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**Aims** To understand for whom, under what conditions, and how an integrated approach to atrial fibrillation (AF) service delivery works (or does not work).

**Methods and results** A realist review of integrated approaches to AF service delivery for adult populations aged ≥18 years. An expert panel developed an initial programme theory, searched and screened literature from four databases until October 2022, extracted and synthesized data using realist techniques to create context–mechanism–outcome configurations for integrated approaches to AF service, and developed an integrated approach refined programme theory. A total of 5433 documents were screened and 39 included. The refined programme theory included five context–mechanism–outcome configurations for how clinical and system-wide outcomes are affected by the way integrated approaches to AF service delivery are designed and delivered. This review identifies core mechanisms underpinning the already known fundamental components of integrated care. This includes having a central coordinator responsible for service organization to provide continuity of care across primary and secondary care ensuring services are patient centred. Additionally, a fifth pillar, lifestyle and risk factor reduction, should be recognized within an AF care pathway.

**Conclusion** It is evident from our provisional theory that numerous factors need to interlink and interact over time to generate a successfully integrated model of care in AF. Stakeholders should embrace this complexity and acknowledge that the learnings from this review are integral to shaping future service delivery in the face of an aging population and increased prevalence of AF.

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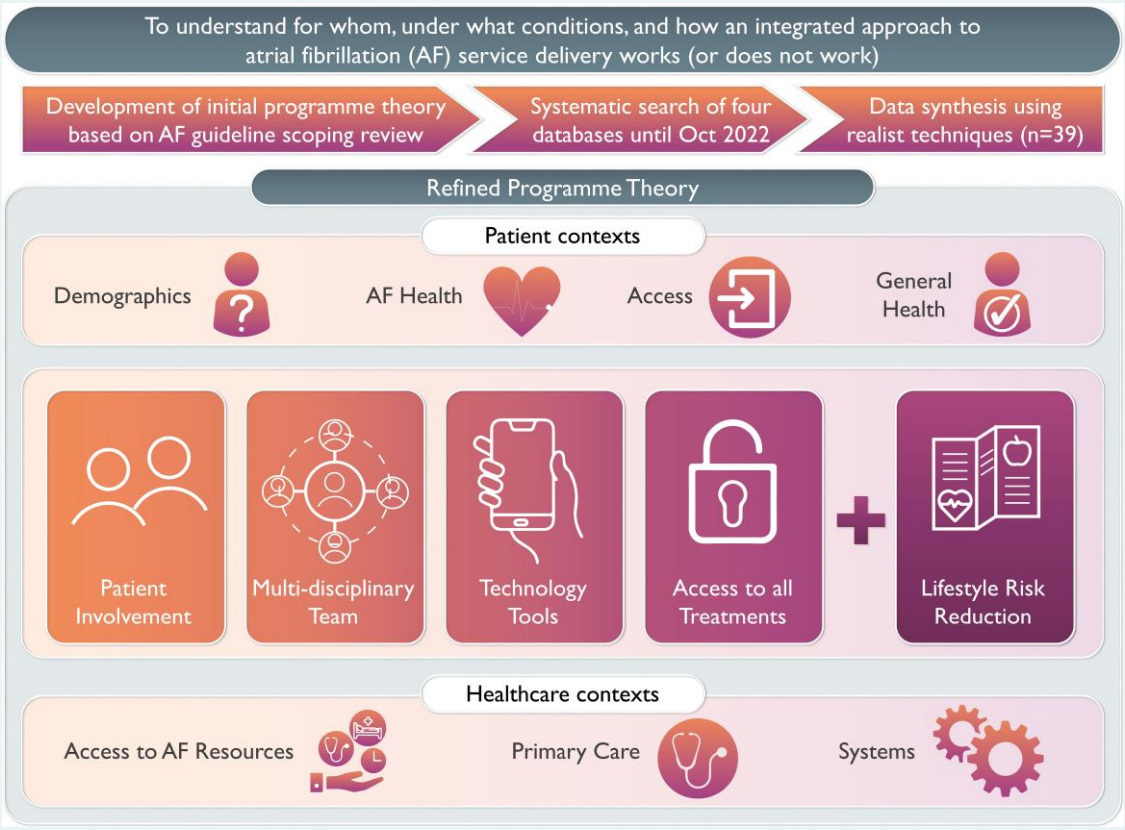
## Graphical Abstract




**Keywords** Atrial fibrillation • Integrated care • Integrated management • Realist review • Risk factor reduction

### Novelty

- An integrated atrial fibrillation approach to service delivery should incorporate a distinct physical activity and psychoeducational risk factor programme.
- Central coordinators are integral to the successful delivery of an integrated atrial fibrillation approach.
- Mechanisms identified within this review will help inform policy makers and healthcare professionals on how to adapt programme delivery across different settings and populations to increase successful implementation.

# Introduction

Atrial fibrillation (AF) is a clinically significant cardiac arrhythmia. Patients with AF may suffer from palpitations, breathlessness, fatigue, and reduced quality of life, or experience no symptoms at all.[1] Atrial fibrillation is associated with a five-fold increased risk of stroke.[2,3] Compared with stroke of other aetiology, AF-related strokes are more severe and result in higher levels of stroke-related morbidity.[4] Approximately 43.6 million people worldwide have AF,[5] and prevalence is increasing. The AF population is highly co-morbid, and risk factors include increasing age, diabetes, hypertension, obesity, obstructive sleep apnoea, and congestive heart failure.[6]

Care and treatment of AF are complex. Multiple international AF guidelines[5,7–9] promote an integrated approach to service delivery to improve outcomes. This can be defined as the provision of holistic, collaborative, and person-centred healthcare designed to improve patients' physical and psychosocial outcomes while also improving the efficiency of AF service delivery.[5,7–9] An integrated approach to AF care consists of four fundamental elements: (i) patient involvement, (ii) multidisciplinary teams (MDTs), (iii) technology tools, and (iv) access to all treatment options for AF.[7] Initiatives such as the CC-ABC pathway have been designed to streamline care. The CC-ABC pathway[10] states that first, AF should be confirmed and characterized (CC), and then the atrial fibrillation better care (ABC) pathway should be implemented: (A) avoid stroke, (B) better symptom management, and (C) cardiovascular risk reduction.[10] When delivered by an interdisciplinary team, the ABC pathway is associated with a 45% reduction in ischaemic

stroke incidence and 58% reduction in all-cause death.[11] Service adherence to the CC-ABC pathway is used as a performance bench marker as to whether a service is offering an integrated approach.[11] However, this pathway is only one tool within the multifaceted concept of an integrated approach.

There is inconsistent or limited evidence about the impact of integrated care across varying health conditions in terms of system-wide clinical and financial outcomes.[12] A specific integrated AF approach meta-analysis of three studies identified enhanced patient outcomes[13] but highlighted difficulties in knowing what components, in which subpopulations, would be of most benefit. This is a common limitation when trying to predict the success of complex systems when adopted in different settings among different populations.[14] There is a need to understand how and why an integrated approach to AF care works or does not work when applied within different settings. Realist review offers a method for explanatory analysis of interventions to determine what works for whom, in what circumstances, in what respects, and how.[15] Realist methods are based on the concept that when an intervention is delivered in different contexts, mechanisms (that make the intervention successful or not) are evoked in different ways to generate different outcomes. These are known as context, mechanism, outcome (CMO) configurations. The aim of this realist review is to understand what, for whom, under what conditions, and how an integrated AF approach can improve outcomes compared with traditional care.

# Methods

Realist review was used to understand how, for whom, and under what conditions an integrated AF approach works. The review followed Pawson's five-step iterative realist review template: (i) define the scope and clarify the purpose of the review, (ii) develop initial programme theory, (iii) evidence search and appraisal, (iv) extract and synthesize findings, and (v) draw conclusions and make recommendations.[15] The reporting of the review follows the 'Realist and Meta-Review Evidence Synthesis: Evolving Standards' (RAMESES) publication standard.[16] This process was overseen by an expert panel consisting of global leading academics in AF (L.N. and J.M.H.), nursing professionals (A.P., L.N., and J.M.H.), and researchers with expertise in realist methodology (C.L.H. and A.P.).

## Phases 1 and 2: defining the scope of the review and initial theory development

A preliminary scoping review of background literature and international AF guidelines[5,7–9] by the expert panel was used to; (i) identify currently used programme activities that facilitate an integrated AF approach to service delivery, (ii) develop initial assumptions about how successful integrated AF approaches are implemented (e.g. a theoretical approach that embodies the underlying logic of the programmes), (iii) consider who (e.g. patient demographics, cardiovascular, and non-cardiovascular clinicians and care givers) programme activities should target, (iv) explore under what conditions (e.g. cultural and psychological norms, geographical settings, and healthcare resources) an integrated AF approach is currently considered effective, and (v) why these programme activities are thought to work (or not).[14–17]

Discussion led to the development of a conceptual framework (*Figure 1*), which was used to guide the development of 14 initial programme theories. These theories took the format of *resource + response = outcome* (*Table 1*).

## Phase 3: evidence search and appraisal

### Searching for relevant studies

We searched MEDLINE, PubMed, CINAHL, PsycInfo, and Cochrane Controlled Register of Trials using search strategies developed with a research librarian that focused on each element of the preliminary conceptual framework (*Figure 1*; see Supplementary material online, *File S1*) in September 2020. Broad searching of grey literature was also undertaken, and we hand searched reference lists from included full texts. All methodologies (qualitative, quantitative, and mixed methods) relevant to an integrated AF approach to care delivery and offering contributing knowledge about the contexts, mechanisms, and outcomes were considered for inclusion.[15,16] We updated our search in October 2022 to confirm final programme theory CMO configurations.

Articles were considered if they included those with a confirmed diagnosis of AF, participants were aged 18 or over, and written in English. Articles must have contained any element or tested theories that addressed any component (context, mechanism, and/or potential outcomes) of the initial programme theory (*Figure 1*). Studies were excluded if:

- Atrial fibrillation was not the primary diagnosis.
- They only focused on screening and identification of AF.
- They only focused on warfarin management [e.g. international normalized ratio (INR) clinics].
- They were only based within secondary care (e.g. ablation-specific pathways).
- Were not written in English.

### Study screening and data extraction

Search results were downloaded into Endnote X20 (Clarivate Analytics, Philadelphia, USA) and duplicates removed. Two reviewers (A.P. and C.L.H.) screened titles and abstracts against the inclusion and exclusion criteria to identify texts for full-text review. Full-texts were then screened for quality by assessing relevance and rigor[15,16] (Box 1). Articles meeting at least criteria one (patient involvement) and one other criterion were included for full-text review (see Supplementary material online, *File S2*).

## Phase 4: extract and synthesize findings

For included studies, data were extracted by one reviewer (A.P.) and checked by a second reviewer (C.L.H.) using a bespoke data extraction form containing study characteristics (author, year, country, methodology used, setting, intervention, and patient group) and information relating to contexts, mechanisms, and outcome knowledge contribution. Individual study-level CMO data were analysed within the expert panel (A.P., L.N., J.M.H., and C.L.H.) and context, mechanism, and outcome themes identified. These themes were then linked back to the existing fundamental pillars of an integrated AF approach and chosen middle-range theory. Emerging findings aimed to scrutinize, develop, support, or refute the initial programme theories into a refined programme theory.[16]

### Middle-range theory

The integrated AF approach is based on the theoretical foundations of the chronic care model (*Figure 2*). The chronic care model can be used to frame the restructuring of health services in a multidimensional manner[18] and aims to improve health outcomes at population level (it is patient centred).[19] Community and healthcare systems form the two major conceptual dimensions of the model, which encompasses self-management support, delivery system design, decision support, and clinical information systems. Data synthesis for this realist review drew parallels between the abstract concepts from within the chronic care model and the pragmatic realities of AF service delivery implementation (CMO configurations).

# Results

## Overview

We identified 5433 articles after removing duplicates. We excluded 5320 and assessed 113 full-text articles using the selection and appraisal tools. Of these, 39 articles met the criteria for inclusion in the realist review analysis (*Figure 3*) (observational studies $n = 12$, randomized controlled trials $n = 10$, pilot/feasibility studies $n = 6$, cost analysis $n = 2$, qualitative $n = 2$, and other $n = 7$) (see Supplementary material online, *File S2*).

We identified patient (demographics, AF health, access, and general health) and healthcare contexts (access to resources, primary care, and systems) in which AF integrated care is delivered. Within these contexts, we identified five CMO configurations relating to four fundamental components of the integrated care approach plus an additional fifth component, lifestyle risk reduction (*Figure 4*). These are; (i) creating active, engaging *patient involvement* in shared decision-making, (ii) forming

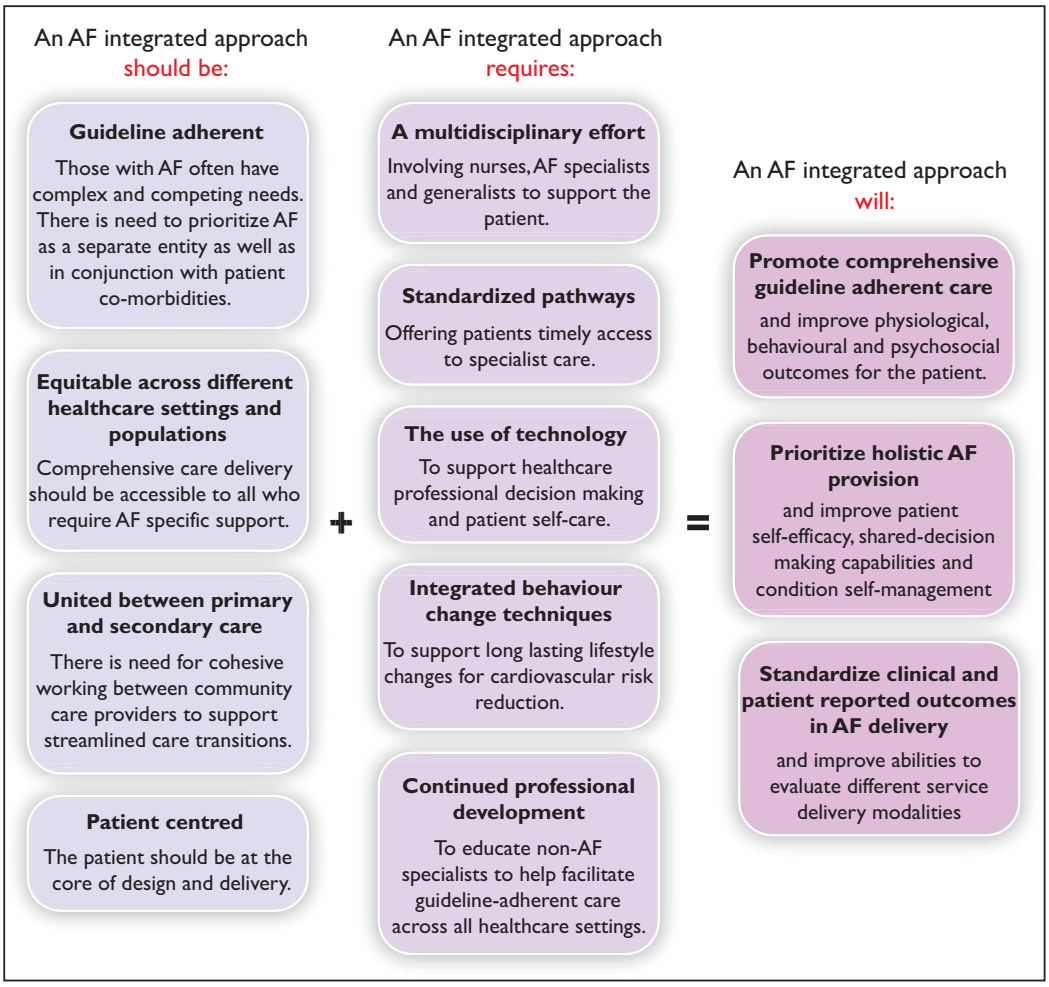



**Figure 1** Conceptual framework from which initial programme theories were developed (based on international guidelines and scoping review).[5,7–9,13] AF, atrial fibrillation.

a cohesive, co-ordinated, co-responsible *MDT*, (iii) implementing clinical and patient support *technology tools*, (iv) ensuring treatment pathways are ABC adherent for *access to all treatment*, and (v) incorporating structured psychoeducational and physical activity *lifestyle risk reduction*.

## Context, mechanism, outcome 1: creating active, engaging patient involvement in shared decision-making

Interventions that facilitated the outcome of patient-centredness included individualized care plans,[20,21] educational content,[22–35] use of behaviour change techniques (BCTs), e.g. monitoring and feedback,[25,26,35–41] relocation of services into primary care,[42] needs-based follow-up,[24,30] care team continuity,[21] and shared decision-making.[27] These structural elements of programmes were achieved using the mechanisms *personalized education*, *one-to-one time spent with patients*, *formalized follow-up*, and *BCTs*.

Providing *personalized education* was an opportunity to overcome the contextual barriers of baseline health literacy, quality of life, and AF presentation. Specific educational elements of AF care were sometimes poorly described meaning that what, how, and when content should be delivered was unclear.[24,27,29,43] Where educational delivery was explicitly described, motivational interviewing, realistic risk factor, or behaviour goal-setting contributed to creating patient-centred education,[32,38,39,44–46] as did offering repeated education opportunities during ongoing patient encounters.[20,29,44] Not all education was personalized. Single strategies for information sharing, e.g. mobile apps,[25,35–37] written information,[22,39] and group-based educational classes,[20,21,31] were implemented within some services instead of tailoring to patient preferences.

*One-to-one time* with an AF, or arrhythmia, nurse provided repeated opportunity for discussions between a patient and healthcare professional (HCP)[20,21,23,24,27,29,31,32,34,39,43,45–50] compared with a traditional cardiologist appointment alone. Patients valued the time to sit down and talk calmly at nurse-led clinics.[21,50] This additional human connection[45,49] allowed for questions, relationship building, and patient reassurance, in particular for when to seek emergency department treatment,[20,32,46] resulting in increased patient satisfaction.[50] However, this did not necessarily equate to greater understanding of their condition,[21,50] and minimal changes in health-related quality of life were observed.[31,39] Increased time with HCPs facilitated early initiation of and guideline-adherent oral anticoagulant (OAC) use.[20,22,24,32,37,47] It also facilitated earlier identification of AF complications, and underlying co-existing conditions (e.g. heart failure or pain and fever during INR checkups), and early intervention where necessary.[31,45] In some studies, one-to-one time with a specialist, specifically in

**Table 1 Initial programme theories (resource + response = outcome)**

| Architecture | | Programme theory |
|---|---|---|
| **1. Nurse-led care** | | |
| 1.1 | Comprehensive initial assessment with access to AF-specific investigations | If nurse-led clinics offer comprehensive initial assessments with access to AF-specific investigations (*resource*), then treatment plans will be tailored to individual patients (*response*) leading to patients feeling their care plan is appropriate for their needs (*short-term outcome*), which will increase patient engagement and lead to a positive care experience (*mid-term outcome*).<br>If a guideline-adherent, patient-compliant protocol was used for initial assessment (*resource*), then the healthcare team could determine the complexity of individuals and delegate healthcare roles for patient care (*response*), enabling appropriate implementation of anticoagulation, and/or rate and rhythm control and personalized follow-up plans (including timely referrals) (*outcome*). |
| 1.2 | Tailored education | If HCPs tailor education during consultations to the needs of their patient (*resource*), then patients will gain a better understanding of AF and an appreciation of their disease, treatment options, and management requirements (*response*), which will increase their competence and confidence to change their behaviour to help manage their disease (*outcome*). |
| 1.3 | Information about symptoms | If patients have access to information about AF symptoms (*resource*), then patients will be able to better understand the severity and seriousness of potential symptoms and when to act or not (*response*), which will reduce anxiety related to the unpredictability of AF symptoms (*outcome*). |
| 1.4 | Repeated contact | If nurse-led clinics provide repeated opportunities for patient contact (*resource*), then patients will be able to ask more questions and HCPs can check understanding (*response*), providing an opportunity to re-enforce previous knowledge for sustained patient understanding regarding condition, treatment, and long-term plan (*outcome*). |
| **2. Formalized referral pathway** | | |
| 2.1 | Systematic referral | If patients were systematically referred into an AF integrated care pathway (*resource*), all patients requiring input from an AF specialtist service would be captured to undertake, as a minimum, an initial assessment (*response*), providing a more inclusive service and identifying patient care needs in a timely manner (*short-term outcome*), resulting in improved support for patients (*outcome*). |
| 2.2 | Multidisciplinary team | If all members of the healthcare team had distinct roles (*resource 1*) working towards a unified goal (*resource 2*), then HCPs would know their predefined care responsibilities (*response*), leading to more organized team working (*short-term outcome*) and more guideline-adherent care (*mid-term outcome*). |
| 2.3 | Central coordinator | If AF service delivery is organized by a central coordinator (*resource 1*) with access to a centralized portal for communication and documentation (*resource 2*), then more efficient use of healthcare resources (*response 1*), continuity of care for the patient (*response 2*), and improved interprofessional communication between primary and secondary care (*response 3*) would lead to a more cohesive and holistic service among the extended healthcare team (*outcome*). |
| **3. Playing an active role** | | |
| 3.1 | Self-monitoring | If patients are offered/encouraged to self-monitor (*resource 1*) and receive feedback about their condition (*resource 2*), then patients would be more informed and better able to have constructive conversations with HCPs during contacts (*response 1*), and HCPs would have access to health data prior to consultations (*response 2*), leading to increased patient confidence, self-efficacy, and more accurate and focused healthcare interactions (*outcome*). |
| 3.2 | Dedicated one-to-one time | If HCPs offer dedicated one-to-one time for initial assessment and follow-up consultation (*resource*), then patients and HCPs will form a constructive and supportive relationship (*response*), which will increase healthcare inclusivity and patients will feel welcomed and engaged in their care (*outcome*). |
| 3.3 | Type of self-monitoring | If the type of self-monitoring (use of telehealth, written diary, and feedback loops) matches patient preference (*resource*), increased patient accessibility/usability (*response*) will improve patient engagement and provide a more inclusive AF service (*outcome*). |
| **4. Cardiac rehabilitation** | | |
| 4.1 | Psychoeducational consultations | If patients have access to evidence-based consultations that include emotional support mechanisms (*resource*), then patients will have a better understanding of their condition, be more prepared for AF-related symptoms, and be better placed to manage their condition (*response*), leading to increased emotional support, coping skills, medication adherence, and quality of life (*outcome*). |
| 4.2 | Physical activity programme | If patients with AF, who are deemed suitable for physical activity, receive support (*resource*) and have |

*Continued*

**Table 1** *Continued*

| Architecture | | Programme theory |
|---|---|---|
| | | access to structured exercise programmes (*resource*), then patients would be more likely to engage in physical activity for a longer period (*response*), leading to improved symptom burden, increased physical capacity, and improved psychological well-being (*outcome*). |
| **5. Technology tools** | | |
| 5.1 | Patient mobile app | If patients have used a mobile app that included BCTs (e.g. educational content and tracking) (*resource*), then patients would learn about their condition and track their symptoms and clinical observations (*response*), leading to improved patient–clinician communication and shared decision-making (*outcome*), enabling patients to take an active role in their own care (*response*), resulting in long-term changes in health behaviours (*outcome*). |
| 5.2 | Clinical decision technology | If HCPs have access to guideline-based clinical decision technology that incorporated checklist and communication tools (*resource*), clinicians would better implement streamlined guideline-adherent therapy (*response*), including appropriate recommendation of anticoagulation and/or rate and rhythm control and individualized treatment plans with appropriate referral and follow-up (*response*), and this would improve patient haemodynamic stability, stroke prevention, symptom burden, and cardiovascular risk reduction (*outcome*), improving patient life expectancy and quality of life (*outcome*). |

AF, atrial fibrillation; BCTs, behaviour change techniques; HCPs, healthcare professionals.

## Box 1 Abstract and full-text relevance and rigour screening questions.

(1) Known diagnosis of AF
(2) Aged ≥ 18 years
(3) Written in English
(4) Patient Involvement—Were patients informed, involved, empowered?
(5) Multidisciplinary Team—Were multiple professionals involved with management (+/− overseen by a chronic AF care team)?
(6) Technology Tools—Did technology help support a) the patient b) the healthcare professionals c) decision-making (shared or individually)?
(7) Access to all treatments—Were complex management decisions underpinned by guidelines (+/− supported by an AF Heart Team)?
(8) Structured Support for Lifestyle Changes—Did patients receive advice or intervention that encouraged long lasting cardiovascular risk factor reduction?
(9) Are conclusions aligned to the study design?

nurse-led clinics, was found to significantly lower ischaemic stroke/transient ischaemic attack rate, without an increase in bleeding complications.[29,31] This outcome was not observed in all studies,[24,39] but overall patient outcomes in nurse-led clinics were not found to be inferior to controlled trial settings.[34]

*Formalized follow-up* can be at pre-defined structured times[23,27,37,39,43,44] (e.g. 3-, 6-, or 12-month intervals), based on automated patient need/clinical risk,[24,26] or self-initiated by patients when required.[23,32] Follow-up can be in person or remote[27,33,37,42] and undertaken by primary or secondary care. For more complex patients, an easy fast-track pathway into an AF heart team has been suggested.[51] Successful follow-up requires clinicians and patients know when, where, and how follow-up arrangements will take place. This allows for clearly defined individual HCP follow-up responsibilities and equips patients with a clear pathway for ongoing care. Stable patients should be allowed to self-manage between contacts, which contributes to increased compliance with long-term therapy.[37,51]

Patient self-management relies on BCTs being incorporated into care plans. Behaviour change techniques used in AF care include use of realistic and SMART (specific, measurable, achievable, relevant, and time-bound) goal-setting,[39,46] self-monitoring (of symptoms and clinical parameters, e.g. heart rate and rhythm), feedback,[35] motivational interviewing,[45] and personalized education.[32] The success of BCTs to empower patients to self-manage their condition relies on patient motivation to engage (e.g. to perform heart rate and rhythm monitoring),[35] healthcare system adaptability to implement BCTs,[23,47,52] and training of HCPs to deliver BCTs effectively.[37,40,41,45]

## Context, mechanism, outcome 2: forming a cohesive, co-ordinated, co-responsible multidisciplinary team

Joint cardiologist and nurse working is commonly referred to as making AF services MDT compliant.[23,27,29,32–34,40,41,43,48,50,52] However, cardiologists and nurses should be supported by an AF heart team for complex decisions,[51] including electrophysiologists, cardiac surgeons, anticoagulation and stroke specialists, pharmacists,[44] and physiotherapists.[4,28]

Contexts influencing how teams work together include healthcare system structure,[20,24] communication systems between primary and secondary care,[42] access to resources (e.g. staffing levels, time, and finances),[22,31] and adaptability, confidence, and trust between professionals.[23] A cohesive, co-ordinated and co-responsible MDT can be achieved using the mechanisms *central coordinators*, *clearly defined roles*, *HCP education*, and *shared expertise*. Outcomes include improved quality of care, system sustainability, and improved guideline-adherent use of OACs.[20]

Atrial fibrillation pathways should be managed by a *central coordinator*.[22,31,40,49,50,53,54] Nurse-led, central coordinators work as a bridge between primary and secondary care[31] to facilitate the continuity of

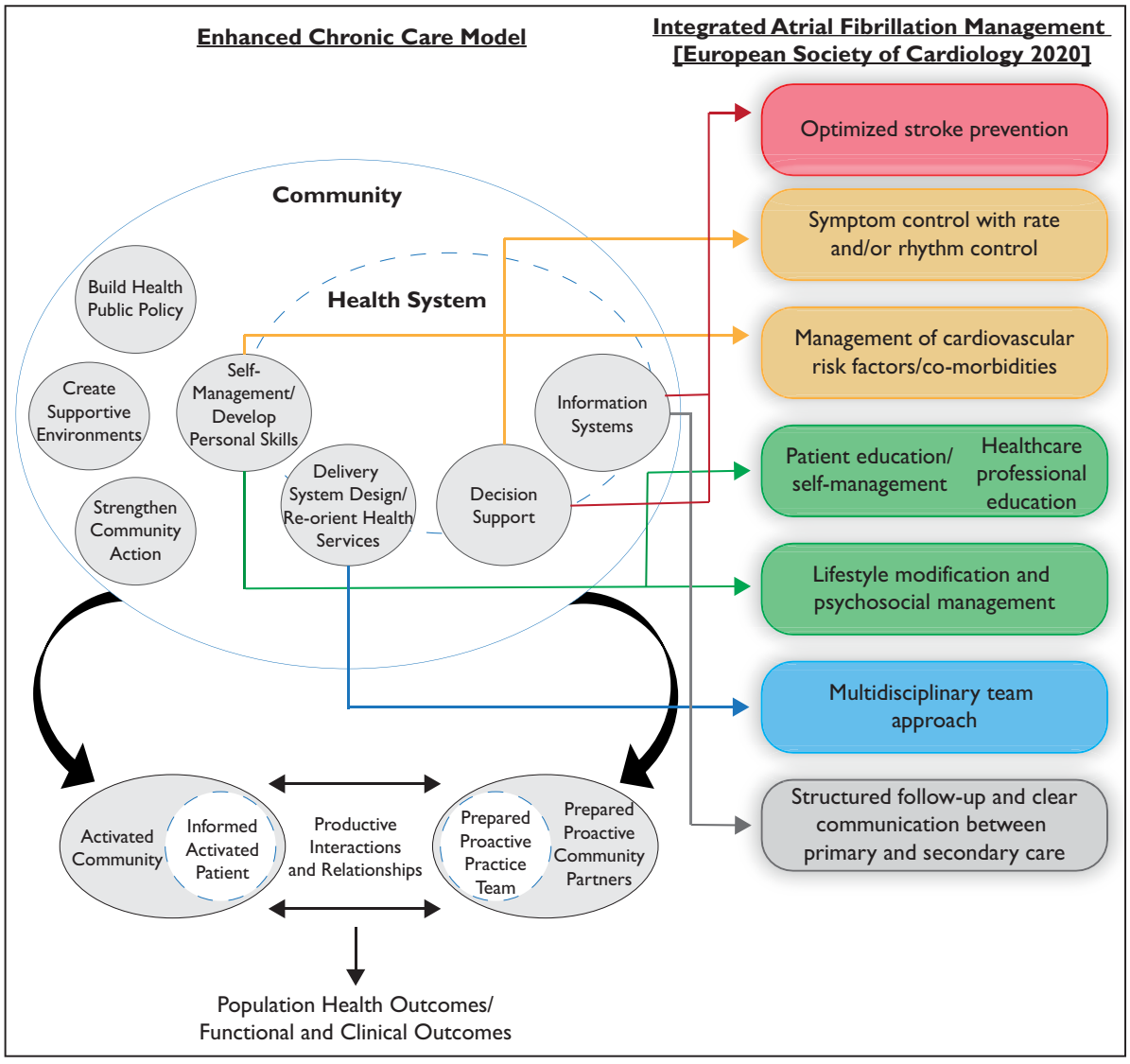



**Figure 2** Integrated atrial fibrillation approach mapped to the enhanced chronic care model.

care and care teams,[21] improve referral pathway efficiency,[20,22] and encourage timely initiation of guideline-adherent care by overcoming emergency department and primary care reluctance to initiate OACs.[20,22]

Creating *clearly defined roles* enables individual HCPs to know their responsibilities within the team.[29] This is particularly important when considering clinical boundaries between primary and secondary care.[55] A lack of regular exposure to AF clinical decision-making within primary care can cause barriers to patients being prescribed timely, guideline-adherent therapy.[22] Additional support and targeted AF *HCP education* or training[22,29,31,37] can increase HCP confidence to manage AF within primary care without secondary care input, unless required for more complex patients.[20,32,42] *Shared expertise* is another way that this can be achieved. For example, placing cardiologists in primary care which transforms the traditional two-level model of care to one-level.[42] The mechanisms of improved knowledge and increased responsibility can overcome the contextual barrier of reluctance of primary care to initiate OACs, therefore narrowing the gap between guidelines and clinical practice.

## Context, mechanism, outcome 3: implementing clinical and patient support technology tools

Technology tools that support integrated management include guideline-based decision support software, mobile apps, automated scoring systems, remote monitoring, and telecommunication.[25,26,29,32,34–37,39,45,49,56,57] These can be clinician, patient, or patient/clinician facing.

Clinician-facing technology can be used to provide guideline-based decision support,[32] the mechanisms for which are comprehensive *care checklists* and *integrated risk content*. *Care checklists* standardize assessment and ensure each patient is receiving appropriate care.[20,47,55] *Integrated risk content* works by determining individualized AF profiles and calculating patient stroke and bleeding risk.[43] Older healthcare software systems,[35] clinician digital health literacy,[35] and lack of resources impact technology implementation and adoption.

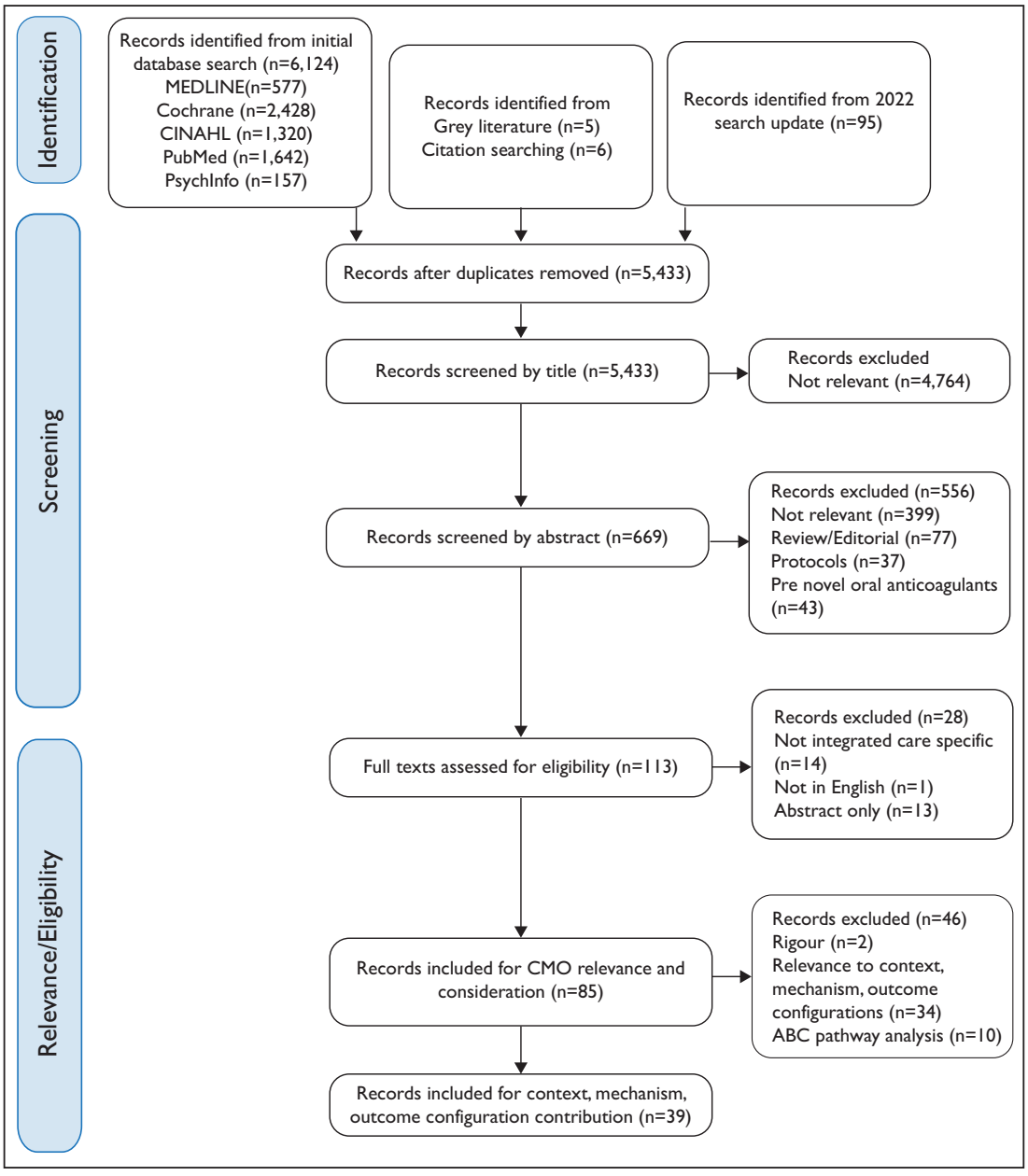



**Figure 3** Study identification flow diagram.

Patient-facing technology can be used to support self-management,[35,37] via the mechanisms of *incorporated education* and realistic *goal setting mechanisms*.[25,26,36] By incorporating education, monitoring, and feedback, technology can empower patients to participate in their own disease management,[37] particularly where healthcare is remotely delivered.[25] Having a central portal from which patients can self-access their health information can increase patient confidence to solve their own health problems.[56] Patient-related contexts to technology engagement include increasing age, previous experience with mHealth solutions, patient digital health literacy, and internet access.[25,26,36,45] These are influenced by system contexts such as system speed and reliability.[57]

Technology tools that are both patient and clinician facing work via the mechanism of *communication*. Increased patient knowledge through education and self-management enables patients to participate in shared decision-making.[37] Patients can record remote heart rate, rhythm measurements, and symptom diaries that can be reviewed by HCPs to support telecommunication appointments. Clinicians can base decisions (e.g. adjusting medication) on real-time data,[35] as well as populating risk scoring systems,[25,26,36,39,49] to identify stroke and bleeding risks. From this, individualized health counselling and goal setting can be designed.

Implementation of clinician-, patient-, or patient/clinician-facing technology tools requires significant HCP time investment.[36,56,58] Instruction for HCPs on systems use can boost the integration of technology into routine practice. However, patients may require increased clinician time initially to troubleshoot questions and encourage use.[59] Alternate and therefore additional resources may need to be offered

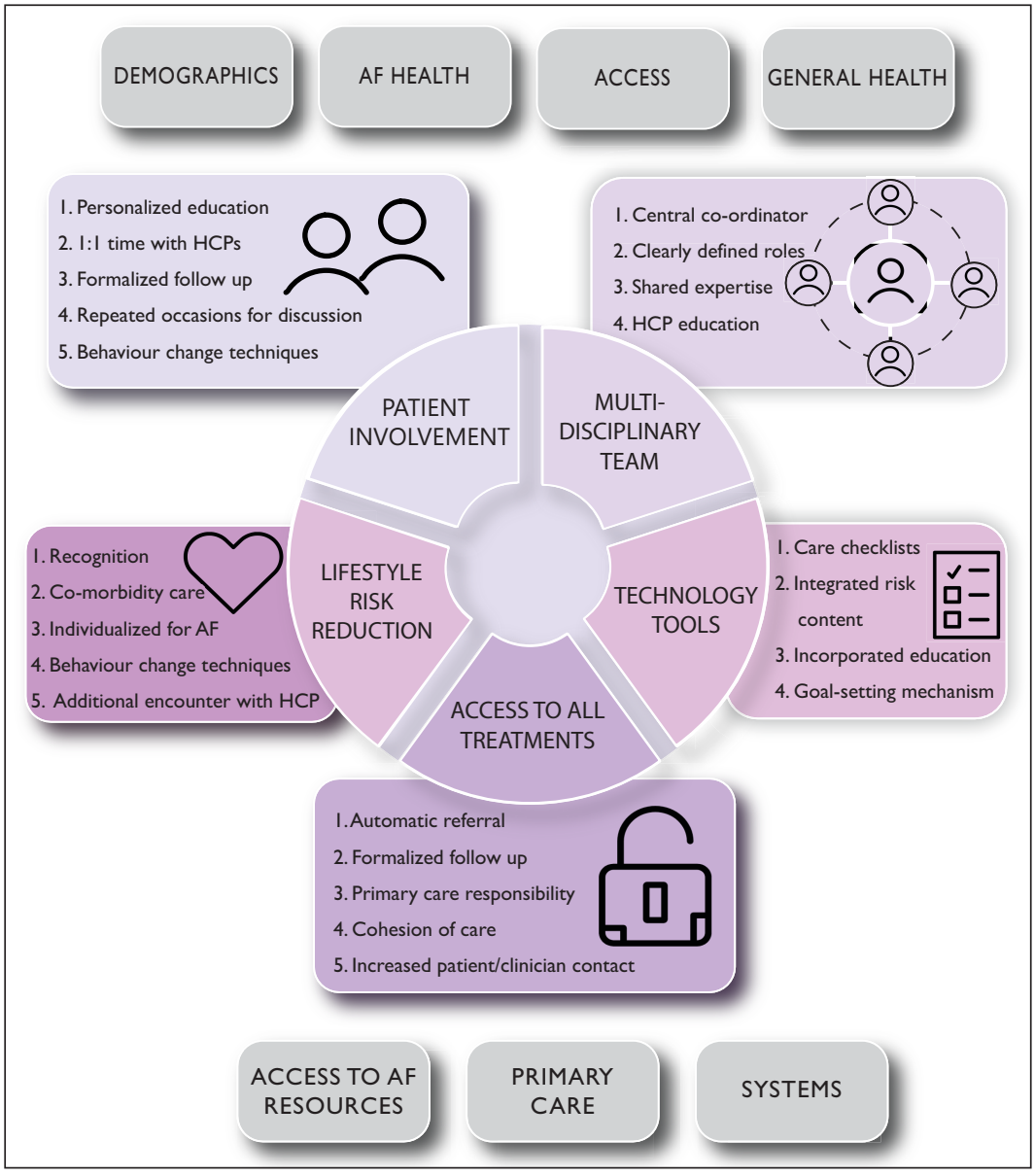



**Figure 4** Context, mechanism, outcome summary. AF, atrial fibrillation; HCP, healthcare professional.

to those unable to use what is being offered.[54] Digital security is not discussed; however, expert consensus states that technology should belong to the patient and that patient-facing technology should be designed with patients at the forefront of the design process.

## Context, mechanism, outcome 4: ensuring pathways are atrial fibrillation better care adherent for access to all treatment

Standardized care plans and formalized pathways should be used to create habitual and comprehensive adherence to guideline recommendations following the ABC pathway.[22–26,29,32,36,37,39,43,47,48,52,55,60] Patient-level contexts that could impact on ABC pathway adherence include accessibility to a primary care physician, symptom burden, $CHA_2Ds_2$-VASc score $\geq 2$, co-morbidities, and anxiety levels. *Automatic referral*, *formalized follow-up*, *primary care responsibility*, *cohesion of care*, and *increased patient/clinician communication/contact* will facilitate access to all treatment. Healthcare contexts heavily influence whether a service can be ABC adherent. Current treatment guidelines and local interpretation/implementation of those guidelines dictate clinician resources and decisions.[24,34,37]

*Primary care responsibility*, follow-up, and cohesion of care have already been discussed in relation to CMO 1 (patient centredness) and CMO 2 (MDT). Automatic referral[20,22,30,46] ensures all patients (known and newly diagnosed AF) are captured into the system. A triage system, likely nurse led, should exist to provide initial assessment of patient needs, ensure appropriate onward referral to cardiology or specialist clinics, or identify suitability for being followed up in primary care.[33,53] Such a system improves appropriateness of treatment

pathway and reduces the number of cardiologist referrals[53] and delays into specialist cardiologist care when required.[20] In the long term, this could lead to a reduction in AF-related emergency department visits and cardiovascular hospitalizations.[22,53]

### Context, mechanism, outcome 5: incorporating structured psychoeducational and physical activity lifestyle risk reduction

Structured lifestyle risk factor reduction should not be hidden within the fundamental component of access to all treatment options.[21,27,28,38,40,41,46,61] Risk factor reduction programmes should include psychoeducational strategies[20,21,31,40,41,62,63] and exercise to improve physical capacity of people with AF[28] and weight loss,[62,63] which can improve freedom from AF. Crucial to this is the incorporation of AF-specific education and health resources, including access to a professional with specialist AF knowledge.[44]

Atrial fibrillation–specific elements should incorporate evidence-based guidelines and could include an AF burden assessment[46] and motivational interviewing[45] and provide additional opportunities to address AF-specific risk factors, e.g. hypertension and obesity.[53] This may reduce symptom burden, AF event occurrence, and the need for surgical intervention and improve quality of life.[28] Mechanisms underpinning risk factor management programmes are *recognition*, *co-morbidity care*, *individualized for AF*, *regular review*, *BCTs*, and *additional encounters with HCPs*.

*Recognition* refers to ensuring stakeholders and policy makers understand and acknowledge that an AF service can only be considered integrated if psychoeducational and physical activity risk factor reduction strategies are included within routine clinical practice. Therefore, the core AF clinic team should have a role within the setup and/or delivery[20] and easy referral routes into these programmes.[27] Co-morbidity care,[31,45] alongside AF-specific management, enables underlying co-existing conditions to be managed. Discussion around AF symptom burden can not only improve AF symptom recognition but also provide education and red flags for professionals overseeing programmes.[31]

There is limited information on real-world implementation of AF-specific risk factor reduction. Identifiable contexts around the success of programmes include whether similar established programmes exist,[46] what the referral routes are into the service,[27,46] and when the service is available to individuals.[27] Such programmes may have greater beneficial outcomes for patients with multiple health needs,[38,46,53] but outcomes will be dependent on adherence,[62,63] attrition, and patient anxiety levels.[28] Atrial fibrillation specific risk factor reduction programme implementation studies, in the context of an integrated AF approach, are required to fully investigate how, what, and for whom lifestyle risk factor reduction may or may not work.

### Mapping of the five context, mechanism, outcomes against the chronic care model

The final programme theory comprising the five CMO configurations aligns closely with the chronic care model (*Figure 5*), with a simple but impactful adaptation. In the accepted chronic care model, the informed, activated patient and prepared, proactive practice teams are considered outcomes. We propose moving the *active, engaged patient involvement in decision-making* (CMO 1) and the *cohesive, co-ordinated, and co-responsible MDT* (CMO 2) from the outcome position within the current model to be incorporated within the two major conceptual dimensions *community* and *healthcare systems*. This adaptation of the model emphasizes that these two elements are early targetable priorities within an integrated care framework, not passive outcomes from a wider system.

## Discussion

This is the first study to examine the contexts, mechanisms, and outcomes that influence an integrated AF approach. We developed a refined programme theory that includes; (i) creating active, engaging patient involvement in shared decision-making, (ii) forming a cohesive, co-ordinated, co-responsible MDT, (iii) implementing clinical and patient support technology tools, (iv) ensuring pathways are ABC adherent for access to all treatment, and (v) incorporating structured psychoeducational and physical activity lifestyle risk reduction. The fundamental components of the integrated AF care pathway as recommended by international guidelines remain at the core of our refined theory. However, the four pillars have been classified as mechanisms that bring about integrated care, to outcomes. This subtle shift creates an adaptable framework from which an integrated AF approach can be successfully implemented across different AF populations and settings.

### Comparison with the existing literature

Our refined programme theory for an integrated AF approach aligns closely with the World Health Organization integrated people-centred health service recommendations to; (i) engage and empower people and communities, (ii) strengthen governance and accountability, (iii) prioritize primary and community care services, (iv) co-ordinate services within and across sectors, and (v) create an enabling environment.[64] This means that even though most of the publications included in our review were from high-income countries, our recommendations are likely to be adaptable for AF integrated care approaches within high-, medium-, and low-income countries. Moreover, integrated care approaches should be adjusted to the country and related healthcare system in which it is applied while adhering to these recommendations.

Existing integrated care approaches that are implemented in real-world settings often fail to achieve the desired primary and secondary outcomes, e.g. reduction in emergency department visits, hospital admissions, resource utilization, and improved patient experience.[12,13,65,66] Our review identified several structural barriers to effective implementation that have also been identified by other studies. These can be broadly covered under leadership, organizational culture, technology infrastructure,[67] and resources. The implementation of the ABC pathway within integrated AF care has been reported to improve guideline-based AF care[5] and mitigate the risk of major adverse outcomes by 40–60%.[11] However, our review highlights that the ABC pathway does not provide mechanisms for better coordination and shared care between primary and secondary settings. To provide more effective AF integrated care, we suggest the provision of a central coordinator and the use of clinician-facing technology to aid guideline-based decision in addition to implementation of the ABC pathway.

Assessing the direct benefits of integrated care approaches to patients and health systems is difficult. However, three patient groups have been identified as more likely to benefit from integrated care approaches. These are multimorbid patients with two or more chronic diseases, patients with moderate or severe mental health issues, and the elderly.[68] In the present review, increasing age was identified as a context within which integrated care is delivered but was only linked to one outcome—increased adherence in one study.[69] Therefore, there is a need to look at differing demographic groups to determine if these contexts have effect on outcomes in this population.

The current approach to cardiovascular and co-morbidity risk optimization within AF care (the C in ABC pathway) presents a medically focused approach to risk management. Adherence is measured by optimal management of hypertension, coronary artery disease, peripheral artery disease, heart failure, stroke, and diabetes as per current medical

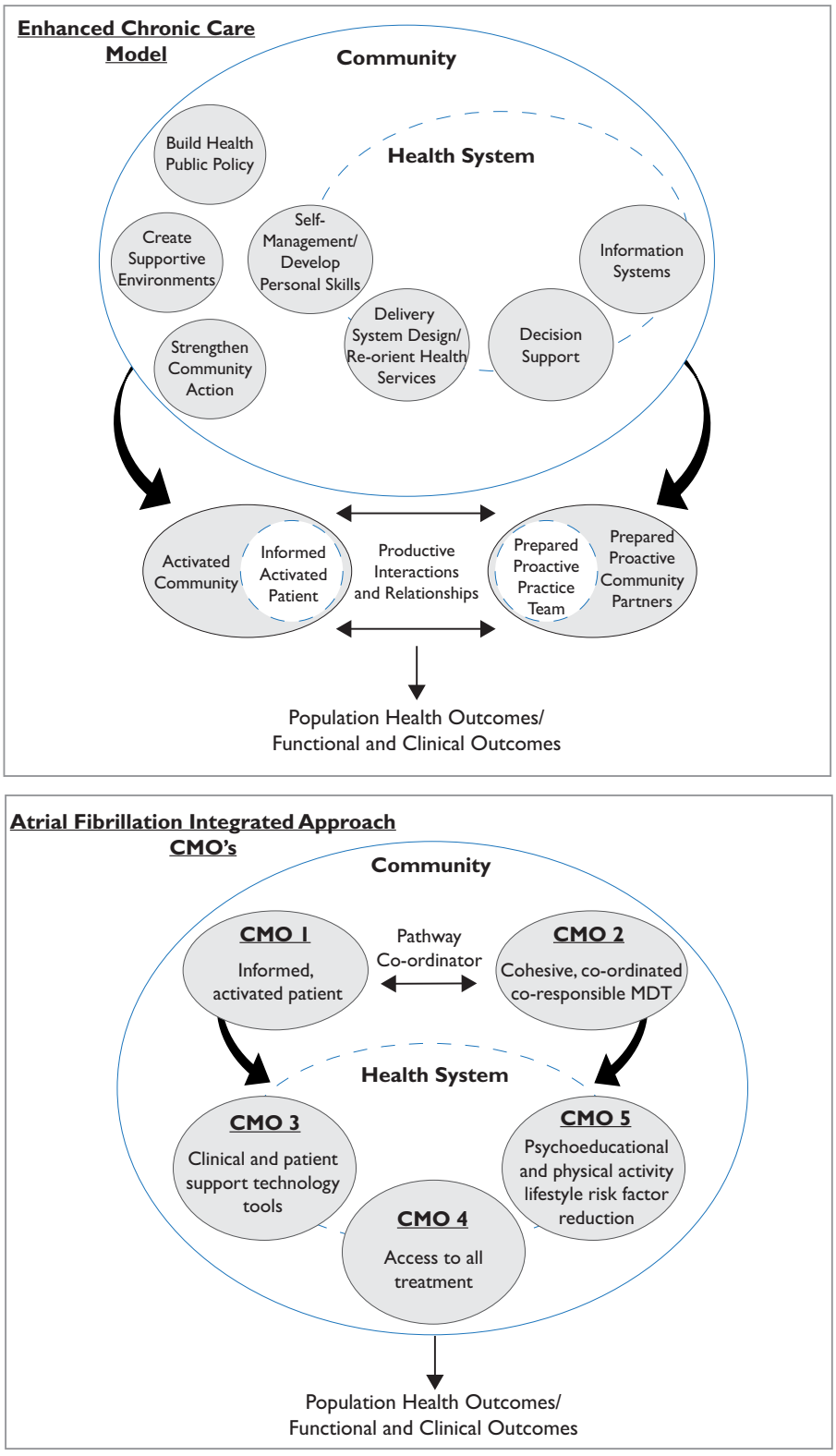



**Figure 5** Mapping of the atrial fibrillation integrated CMO configurations against the chronic care model. CMO, context, mechanism, and outcome.

guidelines.[70–73] This includes treatment with angiotensin-converting enzyme inhibitors, beta-blockers, and statins for hypertension and coronary artery disease, statins for stroke and peripheral artery disease, and insulin or oral antidiabetics for diabetes.[70–74] No consideration is given to weight management, physical activity, dietary changes, or long-term behaviour change to bring about risk reduction. This differs from the long-term management strategies for other cardiovascular diseases such as acute coronary syndrome and heart failure. For example, international guidelines for cardiac rehabilitation include nutritional counselling, risk factor modification, psychological management, disease education, and exercise training.[75–78] A co-ordinated approach to lifestyle risk reduction is required within AF integrated care and therefore needs to be recognized within the integrated model and not hidden within access to all treatment options. Prioritizing it as a separate entity allows us to approach risk reduction more holistically and proactively with the same weight of importance placed on it as medicalized treatment. Long-term co-morbidity management should include structured lifestyle modification programmes that incorporate BCTs and disease education to improve elements of self-management, e.g. weight management, smoking cessation, and medication adherence to anticoagulants for stroke prevention.[45,46,62,63,79] Atrial fibrillation is a complex, multifaceted condition that does not include an acute recovery period. Therefore, it is not appropriate to amalgamate AF risk reduction programmes into existing cardiac rehabilitation programmes.[80] Instead, specific risk reduction programmes should be co-designed with the AF population and piloted to provide robust evidence to their effectiveness. To increase the prominence of risk factor reduction, our review identified that structured psychoeducational and physical activity risk factor reduction should be an independent component within the fundamental components of integrated AF care.

## Strengths and limitations

A major strength of this review is the focus on the processes within integrated care. No study has previously explored how an integrated AF approach works and for whom. We used realist method to identify causal mechanisms, which allows our findings to be transferable across setting and activities. We acknowledge that subpopulation-level data were limited within this review and suggest that increased attention needs to be given to evaluating outcomes at a subpopulation level within future service design. The complexity of the subject presented significant challenges during the screening process, and it was not possible to consider all components individually resulting in potential gaps within the identified literature. However, the theories developed in this paper were robustly interrogated by working with an expert panel for integrated AF care and using the chronic care model to guide analysis. Realist review does not seek to evaluate effectiveness; rather, it should be used to describe relationships between the interventions being studied and potential contexts. Therefore, although direct recommendations have not been detailed, the mechanisms identified can be used as a framework for future intervention design, which may be robustly evaluated in future trials.

# Conclusions

We identified core mechanisms underpinning the fundamental pillars of integrated care and further expanded the model to include structured psychoeducational and physical activity lifestyle risk reduction as a separate entity within integrated AF care. It is evident from our provisional theory that numerous factors need to interlink and interact over time to generate a successfully integrated model of care in AF. Stakeholders should embrace this complexity and acknowledge that the learnings from this review are integral to shaping future service delivery in the face of an aging population and increased prevalence of AF.

# Author contributions

Contributors A.P., C.L.H., L.N., and J.M.H. originally designed the study. A.P. and C.L.H. acquired the data. A.P., C.L.H., L.N., and J.M.H. have analysed and interpreted the data. A.P., C.L.H., and L.N. have drafted the article, and J.M.H. has critically revised it. All authors undertake to give final approval of the version to be published and agree to be accountable for all aspects of the work.

# Supplementary material

Supplementary material is available at *European Journal of Cardiovascular Nursing* online.

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## Data availability

The data underlying this article are provided in the supplementary files.

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