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# Conceptualising an integrated practice unit for treating patients with atrial fibrillation

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Master in Business Administration

Supervisor:
PhD, Generosa Gonçalves Simões do Nascimento, Associate Professor

Iscte – Instituto Universitário de Lisboa

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BUSINESS
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Department of Marketing, Strategy and Operations

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## Dedication and Acknowledgements

This work is dedicated to those who have supported and guided me throughout this journey, without whom this accomplishment would not have been possible.

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In memory of Carlota.

## Resumo

Este estudo explora o potencial do modelo de Unidade de Prática Integrada (UPI) no tratamento da fibrilhação auricular (FA), uma condição cardíaca crónica associada a elevada morbilidade e mortalidade. A investigação baseia-se numa revisão abrangente da literatura, entrevistas exploratórias com profissionais de saúde envolvidos nos cuidados de pacientes com FA e um inquérito quantitativo. Os resultados identificam as limitações do modelo de cuidados atual, destacando a fragmentação dos cuidados, a falta de coordenação e os desafios na adesão ao tratamento. O estudo propõe que a implementação de uma UPI para a FA pode melhorar a coordenação dos cuidados, aumentar a adesão dos pacientes e, em última instância, melhorar os resultados clínicos. No entanto, reconhecem-se desafios como as limitações de recursos e a necessidade de apoio organizacional. O estudo conclui com recomendações para futuras investigações e práticas, sugerindo que a adoção de UPIs pode oferecer uma abordagem mais centrada no paciente, colaborativa e baseada em evidências para a gestão da FA.



**Palavras-chave:** Fibrilhação Auricular, Unidade de Prática Integrada, Cuidados de Saúde Integrados, Gestão de Doenças Crónicas, Adesão ao Tratamento

**Códigos JEL:** I12, I18

## Abstract

This study explored the potential of the Integrated Practice Unit (IPU) model for managing atrial fibrillation (AF), a chronic cardiac condition associated with high morbidity and mortality. This research draws on a comprehensive literature review, exploratory interviews with healthcare professionals involved in AF care, and a quantitative survey. These findings highlight the limitations of the current care model, identifying issues such as care fragmentation, lack of coordination, and challenges in treatment adherence. This study proposes that implementing an IPU for AF could improve care coordination, enhance patient adherence, and ultimately lead to better clinical outcomes. However, challenges, such as resource limitations and the need for organizational support, are acknowledged. The study concludes with recommendations for future research and practice, suggesting that adopting IPUs could offer a more patient-centred, collaborative, and evidence-based approach to managing AF.

**Keywords:** Atrial Fibrillation, Integrated Practice Unit, Integrated Healthcare, Chronic Disease Management, Treatment Adherence

**JEL Codes:** I12, I18

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## Glossary of acronyms

AF - Atrial fibrillation (AF)

ABC - Atrial Fibrillation Better Care pathway

CPAP - Continuous positive airway pressure

ESC - European Society of Cardiology

IPUs - Integrated Practice Units

OSA - Obstructive sleep apnea

VBHC - Value-Based Healthcare

## 0. Introduction

The healthcare industry is facing increasing challenges, including rising costs, growing demand for services, and a shift towards patient-centred care. In response, innovative healthcare delivery models, such as Integrated Practice Units (IPUs), are being developed to improve quality, efficiency, and patient satisfaction in treating complex medical conditions.

Atrial fibrillation (AF) is a prevalent and complex condition that affects an estimated 33 million people worldwide. The increasing prevalence of the condition, driven by aging populations and lifestyle factors such as obesity and physical inactivity, poses significant risks, including stroke and heart failure. Effective management of AF requires a multidisciplinary approach involving specialists, such as cardiologists, electrophysiologists, and other healthcare professionals.

Traditional healthcare models, particularly fee-for-service systems, have been criticised for encouraging fragmented and uncoordinated care that often fails to meet the needs of patients with complex conditions such as AF. In contrast, the IPU model is designed to provide integrated value-based care that prioritises patient outcomes and coordination across medical specialties.

While there is an interest in the potential of IPUs to improve care for complex conditions, further research is needed to explore the specific challenges and opportunities in implementing IPUs for AF care. This study aimed to fill this gap by exploring the perspectives of both patients and healthcare professionals on the current limitations of AF treatment and how it can be improved. Through surveys and interviews, the study investigated knowledge and perceptions of IPUs, identified potential barriers to their implementation, and gathered insights on the ideal team structure, monitoring processes, and overall design of an IPU tailored to AF care.

Rather than evaluating an existing IPU's performance, this research focuses on understanding the current treatment landscape for AF and assessing how an IPU model can address existing challenges. By doing so, this dissertation contributes to the ongoing conversation about transforming healthcare delivery into more coordinated, patient-centred models, particularly for managing complex conditions such as AF.

The remainder of this dissertation is organised as follows. A literature review provides an overview of healthcare delivery models, IPUs, and atrial fibrillation care. The methodology section outlines the research design, data collection methods, and analytical approach. The results section presents findings from patient and professional surveys and interviews, followed by a discussion of the implications for healthcare policy and practice. This dissertation concludes with recommendations for future research and strategies for implementing IPUs in AF care.

# 1. Literature Review

## 1.1. Atrial Fibrillation

Atrial fibrillation (AF) is a complex and prevalent cardiac arrhythmia affecting an estimated 33 million people worldwide. It is associated with significant morbidity, mortality, and substantial healthcare costs. AF is multifactorial, arising from a combination of cardiovascular and non-cardiovascular factors such as hypertension, obesity, diabetes, sleep apnoea, alcohol consumption, and advancing age. Clinically, AF presents with a wide range of symptoms ranging from asymptomatic or paroxysmal episodes to more persistent or permanent forms. AF can lead to severe complications including heart failure, stroke, and thromboembolism.

The incidence and prevalence of AF have been rising steadily, primarily due to the aging population and increasing prevalence of associated risk factors and comorbidities (Di Carlo et al., 2019; Heeringa et al., 2006; Krijthe et al., 2013; Lippi et al., 2021; Rich, 2009; Schnabel et al., 2015; Stefansdottir et al., 2011; Zoni-Berisso et al., 2014). More than 70% of patients with AF are aged ≥ 65 years (Go et al., 2001; Zulkifly et al., 2018). In Europe alone, it was estimated that over 7.6 million individuals aged 65 and above had AF in 2016, and this number is expected to nearly double to 14.4 million by 2060 (Di Carlo et al., 2019; Heeringa et al., 2006; Krijthe et al., 2013; Zoni-Berisso et al., 2014). AF seldom occurs in isolation and is typically accompanied by multiple underlying risk factors and comorbidities, with older patients presenting a higher burden of comorbid conditions(Volgman et al., 2022). On average, elderly patients with AF have five comorbidities (Rasmussen et al., 2022). The presence of four or more comorbidities significantly worsens the prognosis of patients with AF, increasing the likelihood of severe complications such as heart failure, stroke, and haemorrhagic events and elevating the mortality risk to seven times that of the general population (Hindricks et al., 2021; Jani et al., 2018; Lau et al., 2017).

The high prevalence of AF, coupled with its associated morbidity and mortality, leads to frequent emergency department visits, increased hospital admissions, longer hospital stays, and higher incidence of disability (Hindricks et al., 2021; Volgman et al., 2022). Notably, many of these adverse events occur shortly after AF diagnosis (Bassand et al., 2016; Healey et al., 2016). This situation poses a significant public health challenge, with profound economic and financial implications that strain healthcare budgets (Ball et al., 2013; Naccarelli et al., 2009).

Common comorbidities associated with AF include hypertension, heart failure, dyslipidaemia, hyperlipidaemia, diabetes mellitus, coronary artery disease, obesity, chronic obstructive pulmonary disease, obstructive sleep apnoea (OSA), thyroid dysfunction, and chronic kidney disease (Hindricks et al., 2021; Jani et al., 2018; Lau et al., 2017). It is crucial to systematically identify and manage these comorbidities, as emphasised in the current European Society of Cardiology (ESC) guidelines for the

treatment of patients with AF (Hindricks et al., 2021). Effective management of these comorbid conditions is essential to improve outcomes and reduce the overall burden of AF on patients and the healthcare system.

### *1.1.1 Integrated Approach to Atrial Fibrillation: Addressing Multicausal Pathophysiology and Treatment Gaps*

The pathophysiology of AF is influenced by a wide array of modifiable and non-modifiable risk factors. Key risk factors include age, hypertension, diabetes, obesity, OSA, alcohol consumption, and sedentary lifestyle, all of which contribute to AF development and progression (Chung et al., 2020; Elliott et al., 2023; Menezes et al., 2015; Ogieuhi et al., 2024; Tamayo-Trujillo et al., 2024). These factors often interact, creating a challenging clinical environment, in which AF is rarely isolated. Instead, it typically co-exists with other cardiovascular and metabolic disorders, making the management of AF particularly complex.

Current clinical guidelines strongly advocate the aggressive management of these risk factors as a core component of AF treatment (Chung et al., 2020; January et al., 2019). Despite this, the primary focus in clinical practice has often been on rhythm control strategies, such as catheter ablation, rather than on addressing the underlying substrate of the disease (Kottkamp, 2014; Pathak et al., 2014). Catheter ablation, although effective in selected patients, does not address the root causes of AF, particularly in patients with significant comorbidities. This focus on rhythm control, without adequately addressing the root causes of AF, highlights a critical gap in care.

### *1.1.2 The Role of Modifiable Risk Factors in Atrial Fibrillation*

As we've already already seen, AF is closely linked to various modifiable risk factos (Elliott et al., 2023). Evidence suggests that addressing these risk factors can substantially alter the disease course. For example, the LEGACY study demonstrated that a weight loss of more than 10% was associated with significant reductions in AF burden, with many patients experiencing regression from persistent to paroxysmal AF (Gehi et al., 2017; Pathak et al., 2015). Similarly, the REVERSE-AF study further emphasised the impact of weight and risk factor management on AF progression, showing that significant weight loss led to a high rate of AF reversal, with 88% of patients losing more than 10% of their body weight reversing from persistent to paroxysmal or no AF (Middeldorp et al., 2018). Additionally, the ARREST-AF study highlighted that aggressive risk factor management, including weight loss, improved glycaemic control, and blood pressure management, significantly improved long-term outcomes following catheter ablation (Pathak et al., 2014).

In addition to weight management, OSA is a critical factor. Studies have shown that untreated OSA significantly increases the risk of AF recurrence following pharmacological treatment and ablation. Continuous positive airway pressure (CPAP) therapy has been shown to reduce this risk, with CPAP users experiencing significantly lower AF recurrence rates than non-users (Fein et al., 2013; Linz et al., 2018, 2021). These findings underscore the importance of addressing modifiable contributors to AF, rather than focusing solely on rhythm control.

### *1.1.3 Gaps in Current Treatment Approaches*

Despite strong evidence supporting risk factor modification, current treatment practices often focus on rhythm control through catheter ablation. While ablation can be effective, particularly in paroxysmal AF, its benefits are often limited to patients with multiple comorbidities and unaddressed risk factors (Boyle et al., 2021). This gap in care is highlighted by studies such as the RACE 4 trial, which found that comprehensive assessment and management of risk factors are poorly implemented in routine clinical practice (PetraWijtvliet et al., 2020). This disconnect between evidence and practice highlights the need for a more holistic approach to AF management that prioritises risk factor modification alongside rhythm control strategies.

Moreover, the traditional fragmented healthcare system further complicates the management of AF. Patients often receive care from multiple providers without a clear and coordinated care pathway, leading to inefficiency, duplication of care, and poor outcomes (Shaikh et al., 2018). This fragmented approach often leads to inefficiency, duplication of care, and suboptimal outcomes. Patients may experience delays in receiving care, unnecessary repetition of tests, and polypharmacy, all of which contribute to increased healthcare costs and a reduced quality of life (Marengoni et al., 2011). The failure to adequately address the multimorbidity present in many patients with AF highlights the need for more integrated care models that can effectively manage the complexity of this condition.

### *1.1.4 Benefits of an Integrated, Holistic Approach*

To overcome the limitations of current treatment models, a shift towards a more integrated and holistic approach to AF management is essential. Evidence from various studies supports the use of integrated care models, demonstrating improvements in both cardiovascular outcomes and cost reduction. For instance, the mAFA II Trial underscored the role of mobile health technology in enhancing patient engagement and facilitating continuous monitoring, leading to better health outcomes (Guo et al.,

2020). This trial highlighted that integrating mobile health tools into care models can streamline care delivery and improve overall patient management.

A comprehensive systematic review and meta-analysis by Gallagher et al. (2017) further confirmed the benefits of integrated care. The study found that integrated care approaches in AF management were associated with significant reductions in all-cause mortality (OR, 0.51) and cardiovascular hospitalisation (OR, 0.58), emphasising the positive impact of coordinated care on patient outcomes. These findings are echoed in the work of Carter et al. (2016), who demonstrated that a nurse-led, physician-supervised AF clinic could reduce the composite outcomes of death, cardiovascular hospitalisation, and AF-related emergency department visits. This study also reported improvements in the prescription of oral anticoagulants in high-risk patients, underscoring the role of integrated care in optimising treatment adherence.

Moreover, Khan et al.'s (2022) meta-analysis on multidisciplinary integrated care in patients with AF revealed a decrease in all-cause mortality (OR 0.52) and cardiovascular hospitalisation (OR 0.66) when compared to usual care. These results support the effectiveness of a collaborative multidisciplinary approach for improving clinical outcomes in patients with AF (Khan et al., 2022). Similarly, a Cochrane review by Ferguson et al. (2023) found that organised AF clinical services, particularly those involving multidisciplinary care or virtual care models, resulted in a significant reduction in all-cause mortality (RR, 0.64) and cardiovascular hospitalisation (RR, 0.83) (Ferguson et al., 2019).

In addition to improving physical health outcomes, recent calls for action emphasise the importance of incorporating psychosocial management into integrated care for AF patients (Brandes et al., 2024). Psychological challenges such as anxiety and depression are prevalent among patients with AF and can negatively impact treatment adherence and quality of life. Therefore, integrating psychosocial support into holistic care models is crucial to address the broader needs of patients with AF.

Furthermore, the ABC (Atrial Fibrillation Better Care) pathway highlights the structured and comprehensive nature of integrated care, focusing on anticoagulation, better symptom management, and cardiovascular risk reduction. Studies have shown that implementing the ABC pathway in AF management leads to improved clinical outcomes, demonstrating the effectiveness of a coordinated and patient-centred approach (Lip, 2017; Proietti et al., 2018).

Evidence strongly supports the need for integrated multidisciplinary care models to effectively manage AF. A holistic approach that combines lifestyle modifications, medical therapy, and coordinated care is essential for addressing the complexities of AF. This model not only focuses on the acute management of arrhythmias but also prioritises the long-term prevention and management of risk factors and comorbidities. Implementing these integrated care strategies ensures that patients with AF

receive the comprehensive care they need, leading to improved health outcomes and a more efficient use of healthcare resources.

Despite the clear benefits, the adoption of integrated care models in daily clinical practice remains limited owing to systemic challenges, including resource constraints, fragmented healthcare systems, and the need for enhanced education among healthcare professionals. Overcoming these barriers is crucial for establishing integrated care as the standard for AF management. Such an approach, as embodied in the IPU model, not only improves patient outcomes, but also reduces the overall burden of AF on healthcare systems. By addressing both the symptoms and underlying causes of AF, an integrated, patient-centred care model offers the best opportunity to enhance the quality of life and ensure sustainable, high-quality care for patients with AF.

### 1.2. Value-Based Healthcare

Value-Based Healthcare (VBHC) is a transformative approach to healthcare delivery that focuses on maximising patient value by improving outcomes and efficiently using resources. Popularized by Michael E. Porter and Elizabeth Olmsted Teisberg in their 2006 book *"Redefining Health Care: Creating Value-Based Competition on Results,"* VBHC shifts the focus from the volume of services provided to the quality of outcomes achieved relative to costs. Essentially, VBHC aims to enhance patient outcomes while controlling costs and creating a more sustainable and effective healthcare system.

In traditional fee-for-service models, healthcare providers are compensated based on the number of services rendered regardless of patient outcomes. This model has contributed to escalating healthcare costs and inefficiencies, leading to fragmented care that often lacks coordination (Gosden et al., 2000; Ikegami, 2015). The VBHC addresses these issues by redefining healthcare delivery around the concept of "value", which is determined by the health outcomes achieved per dollar spent (Cossio-Gil et al., 2022; Fernández-Salido et al., 2024; Noël, 2022; Porter, 2010).

Several factors have driven the adoption of VBHC, including rising healthcare costs, growing emphasis on patient-centred care, and a shift towards evidence-based practices (Engels et al., 2023; van Engen et al., 2022). These influences have highlighted the need for a more efficient and outcome-driven health care system. VBHC seeks to align the interests of all stakeholders—patients, providers, payers, and policymakers—by focusing on improving outcomes and optimising resource utilisation (Somerville et al., 2023).

Porter and Teisberg's work plays a crucial role in shaping the VBHC framework. They proposed that healthcare should be organised around patient values, with competition based on outcomes rather than the volume of services. Central to this concept is the idea of Integrated Practice Units (IPUs), which are multidisciplinary teams that collaborate to provide comprehensive, patient-centred care for

specific medical conditions (Porter & Lee, 2021). This approach emphasises care coordination, patient engagement, and continuous outcome measurements, which are essential for improving both the quality and efficiency of healthcare delivery.

The shift towards VBHC has also been influenced by the increasing importance of measuring and reporting healthcare outcomes. Outcome measurements are critical for benchmarking, informed decision making, and continuous improvement (Engels et al. 2023; Noël 2022; Porter et al. 2016; Steinmann et al. 2021). By systematically tracking patient outcomes, healthcare providers can identify areas for improvement and ensure that resources are used effectively to achieve the best possible results for patients.

As VBHC continues to gain traction, its principles are being integrated into healthcare systems worldwide. This approach has the potential to transform healthcare delivery by prioritising patient values, improving outcomes, and creating a more sustainable healthcare system. The focus on value, rather than volume, aligns with the broader goals of healthcare reform and sets the stage for more integrated and coordinated care models such as Integrated Practice Units, which will be discussed next.

## 1.3. Integrated Practice Units: A Holistic Approach to Value-Based Healthcare

As previously stated, to create a more efficient, patient-centred, and outcome-driven healthcare system, Porter envisioned the concept of Integrated Practice Units (IPUs) as a transformative care delivery model (Porter & Lee, 2021). The IPU model addresses the structural and organizational challenges that plague traditional healthcare systems, where care is often fragmented across various medical specialties. This fragmentation can lead to lack of coordination and communication among providers, resulting in suboptimal patient outcomes, inefficient resource use, and increased costs.

Porter proposed the IPU model to reorganise healthcare delivery around the needs of patients, focusing on delivering valuedefined as the health outcomes achieved per dollar spent. In this model, multidisciplinary teams of healthcare professionals collaborate to provide comprehensive, coordinated, and patient-centred care for specific medical conditions or patient populations. By integrating care delivery, IPUs aim to break down barriers between specialties, promote a team-based approach, and ensure that all aspects of a patient's care journey are seamlessly coordinated.

### *1.3.1. Key Objectives of IPUs*

The primary objectives of IPUs are to improve patient outcomes, enhance care coordination, increase efficiency, reduce costs, and foster a patient-centred approach. By bringing together healthcare providers from various disciplines, IPUs facilitate collaboration and development of evidence-based care plans tailored to each patient's unique needs. This team-based approach not only improves care

coordination but also reduces redundancies and streamlines care processes, leading to more efficient and cost-effective care.

Moreover, IPUs emphasise patient-centred care by placing patients and their families at the heart of the care process. This approach prioritises shared decision making, personalised care, and a deep understanding of patients' needs, preferences, and values. In doing so, IPUs also drive innovation and continuous improvement in healthcare delivery, encouraging the development of new models of care and sharing of best practices.

### *1.3.2. Characteristics of Successful IPUs*

Integrated Practice Units are geographically organised clinical entities focused on delivering comprehensive, coordinated, and patient-centred care (Porter et al., 2013). The key characteristics of successful IPUs include the following.

1. A multidisciplinary team of healthcare providers, including physicians, nurses, pharmacists, and specialists, who work collaboratively.
2. Standardised care processes and protocols are based on evidence-based practices to ensure consistency and quality.
3. Continuous quality improvement processes with regular monitoring of outcomes and feedback loops to providers.
4. Geographically defined patient populations that facilitate better care coordination across multiple providers.
5. There is a strong emphasis on patient-centred care, including effective communication and shared decision-making.

This model has been successfully implemented in various clinical settings, such as ophthalmology, orthopaedics, and cardiology, demonstrating improved quality of care, reduced complications, and enhanced patient satisfaction (Allen et al., 2009; Jayakumar et al., 2019; van Harten, 2018; Veronese et al., 2021).

### *1.3.3. Benefits and Challenges of Implementing IPUs*

IPUs have numerous benefits. These improvements include improved patient outcomes, reduced healthcare costs, and increased efficiency. Studies have shown that IPUs can reduce complications, lower readmission rates, and decrease the length of hospital stay while minimising unnecessary tests and procedures (Porter et al., 2013; Porter & Lee, 2021). These improvements have contributed to both better clinical outcomes and significant cost savings.

However, the implementation of IPUs presents several challenges. One major obstacle is the need for significant changes in organizational culture and clinical workflow. Resistance to change, difficulties in coordinating care across departments and specialties, and the need for substantial investments in technology and infrastructure can hinder adoption of the IPU model (Porter & Lee, 2021; van Harten, 2018). Additionally, identifying appropriate patient populations and designing tailored care pathways require a deep understanding of patients' clinical needs, preferences, and social determinants of health. Engaging patients and families in the design and implementation of IPUs is crucial for ensuring that care remains patient-centred and aligned with their values (Batalden et al., 2016).

Despite these challenges, the benefits often outweigh the difficulties associated with their implementation. Achieving success requires a long-term commitment from healthcare organisations and willingness to invest in the necessary resources and infrastructure. As healthcare systems continue to evolve, IPUs represent a promising approach for improving quality of care while reducing costs, ultimately aligning with the broader goals of Value-Based Healthcare.

This integration of multidisciplinary, patient-centred care models, such as IPUs, within the framework of Value-Based Healthcare underscores the importance of a holistic and coordinated approach. By focusing on outcomes that matter to patients and optimizing the use of resources, IPUs contribute to a more sustainable and effective healthcare system

### 1.4. Literature review specific to atrial fibrillation care and IPUs

Given the substantial evidence supporting the need for integrated and multidisciplinary care in managing AF, it is evident that although there has been significant progress in recognising the benefits of such approaches, their implementation remains limited in practice. Despite international guidelines and several studies advocating for integrated care models, the actual adoption of Integrated Practice Units dedicated to AF remains sparse.

As previously stated, recent reviews (Ferguson et al., 2019) have highlighted the gap between evidence and practice. Although eight studies involving over 8,200 participants demonstrated the efficacy of organised care services, showing a reduction in all-cause mortality and cardiovascular hospitalisations, there remains a lack of widespread adoption. The meta-analysis indicates that organised AF clinical services probably result in a substantial reduction in all-cause mortality and cardiovascular hospitalisations, yet they make little to no difference in other outcomes, such as thromboembolic complications or cerebrovascular events.

One of the potential barriers to the broader adoption of IPUs for AF may be the limited awareness and understanding of these models within the cardiology community. Although IPUs have

demonstrated success in other medical fields, such as cancer care, their application in AF management appears to be less widespread. This could be due to the complex nature of AF, which might require a more nuanced integration of various medical specialties coupled with the traditional approach to healthcare delivery. However, these are speculative considerations, rather than established facts.

Institutional inertia also plays a significant role in this process. Implementing an IPU requires substantial restructuring and investment in resources, technology, and training, and financial constraints might make institutions hesitant to undertake such changes. These perceived complexities could contribute to reluctance to overhaul established practices. Additionally, the fragmentation of healthcare systems might further complicate efforts to reorganise care into a more coordinated patient-centred model. Again, while these are plausible explanations, they remain hypotheses, rather than confirmed barriers.

Moreover, patient advocacy for integrated care may be under-developed. Although patients increasingly seek personalised and coordinated care, their preferences and voices may not yet be fully recognised as drivers of transformation in healthcare models. The absence of strong patient advocacy might limit the push for IPU adoption in AF care, although such models could potentially enhance patient outcomes and satisfaction. However, these assumptions are speculative and would require further investigation.

It is within this context of unmet needs and unexplored opportunities that this dissertation finds its purpose. Despite the evident benefits and growing recognition of integrated care, the lack of a dedicated IPU for AF has become the underlying motivation for this research. By examining these potential barriers and exploring possible solutions, this study aimed to bridge the gap between what is known to be effective and what is currently practiced. The goal is to inspire a shift towards a more integrated, patient-centred approach in AF care, ultimately improving outcomes for those affected by this complex condition.

## 2. Conceptual Model and Research Hypothesis

The conceptual model proposed in this dissertation is built upon the foundation of the existing literature and seeks to address the complexities inherent in managing AF through a more integrated and coordinated approach to care. As previously demonstrated, AF is a multifaceted condition frequently accompanied by a range of comorbidities and modifiable risk factors. Therefore, effective management necessitates a comprehensive strategy that extends beyond the traditional focus on rhythm control, encompassing a broader multidisciplinary approach.

A key element of this model is the integration of care across various health care professionals and settings. The literature review illuminated the fragmented nature of current AF care, where patients often navigate disconnected care pathways that lead to inefficiencies, increased costs, and suboptimal outcomes. In contrast, an integrated approach—characterised by seamless communication and collaboration among cardiologists, electrophysiologists, nurses, pharmacists, and other specialists—holds the potential to significantly enhance patient outcomes.

The core of this integrated approach is the need for robust coordination of care. Ensuring that patients receive timely and appropriate care throughout their treatment journey from diagnosis to long-term management is essential. The adoption of digital health technologies, such as electronic health records, wearables, digital devices, and telemedicine, is crucial for facilitating coordination. These tools enable healthcare providers to share information more efficiently, reduce redundancies, and ensure that care transitions are managed smoothly, thereby improving the overall care delivery.

Equally important in this model is the emphasis on patient education and engagement. The literature consistently shows that informed and engaged patients are more likely to adhere to their treatment plans and consequently achieve better health outcomes. Therefore, this model prioritises continuous education and support for patients, equipping them with the knowledge and tools necessary to effectively manage their condition. This includes addressing lifestyle factors, such as diet, exercise, and sleep, which are known to have a significant impact on the course of AF.

Building on the principles of integrated care, this conceptual model advocates the implementation of an Integrated Practice Unit (IPU) as the most effective approach for achieving these goals. As discussed in the literature, IPUs bring together multidisciplinary teams to deliver patient-centred care specifically organised around particular conditions, such as AF. By fostering a collaborative environment, IPUs can streamline care processes, reduce treatment variations, and enhance overall efficiency.

The primary research question guiding this dissertation is: How can an Integrated Practice Unit (IPU) improve the care of patients with atrial fibrillation (AF)? The hypothesis underlying this research is that implementing an IPU model for AF care will lead to improved care coordination, increased

patient adherence, and ultimately, better clinical outcomes compared to traditional care models. To explore this hypothesis, this study employs a combination of a comprehensive literature review and qualitative and quantitative data collection. This includes conducting interviews with healthcare professionals to gain insights into the strengths and weaknesses of the current care model as well as administering surveys to gather data on key metrics such as patient outcomes, care coordination, and patient experience. The analysis of these data will provide the basis for developing recommendations on how best to design and implement an IPU model tailored to the needs of AF care, assessing both the current care landscape and the potential benefits of transitioning to an integrated, multidisciplinary approach.

# 3. Methodology

## 3.1. Research design and approach

The research design chosen for this thesis was a mixed-methods research design involving quantitative and qualitative research methods. Qualitative research methods included exploratory interviews, whereas quantitative research methods included questionnaires and surveys. The mixed-methods approach provided a more comprehensive understanding of the healthcare delivery models, trends, benefits, and challenges of IPUs for patients with atrial fibrillation.

The primary data for this study were collected from patients and healthcare professionals associated with the Arrhythmology, Pacing, and Electrophysiology Unit within the Cardiology Service of Santa Marta Hospital. This unit, located in a central university hospital that is part of the larger Unidade Local de Saúde de Lisboa, functions as a tertiary referral centre for a wide range of arrhythmology procedures, serving a vast geographical area.

The unit has a long-standing history of excellence in device implantation and percutaneous catheter intervention. Diagnostic electrophysiology began in the late 1980s, with radiofrequency ablation and implantation of cardioverter-defibrillators (ICDs) starting in the early 1990s, followed by cardiac resynchronisation therapy (CRT) in 2000. The clinical team, comprising senior consultants, attending physicians, and specialised cardiopneumologists, operates in close integration with the broader Cardiology Service.

The unit manages approximately 11,000 outpatient consultations annually, and atrial fibrillation (AF) is one of the most prevalent conditions. Among the 1,300 electrophysiological interventions performed in 2023, approximately 200 are AF ablations, highlighting the unit's central role in AF management. The unit continues to experience an annual growth rate of 20 % %in its activities.

In addition to the data collected from this unit, the study was further enriched by interviews conducted with key international figures in the fields of atrial fibrillation and electrophysiology. These interviews were conducted in the setting of major scientific congresses, providing valuable insights from global experts. Furthermore, digital questionnaires were distributed to a broader network of national and international contacts, ensuring a comprehensive perspective on the implementation and effectiveness of the Integrated Practice Unit (IPU) model in AF care.

This multi-source approach allowed the study to incorporate both local expertise from a leading centre and broader international viewpoints, enhancing the robustness and applicability of the findings.

## 3.2. Data Collection Methods

The data collection method consisted of the following steps:

### *3.2.1. Exploratory Interviews:*

Exploratory interviews were employed as qualitative research methods to gather in-depth information about the current state of AF care at the hospital. These interviews aimed to identify the strengths and weaknesses of the current system and explore the potential benefits and challenges of implementing an IPU. Key stakeholders, including cardiologists, electrophysiologists, nurses, patients, and other relevant healthcare professionals, were recruited based on their knowledge, experience, and expertise in AF care.

Participants, including healthcare providers, administrators, patients, and family members, were selected to ensure a comprehensive understanding of the perspectives surrounding AF care. Exploratory interviews were conducted using a semi-structured interview guide that facilitated open-ended questions and probing, to elicit detailed responses. These interviews were conducted either in person or via teleconference, allowing flexibility in participation.

The semi-structured interview script used for professionals working with patients with AF is provided in Appendix A, whereas the scripts for the exploratory interviews with patients are included in Appendix B. The insights gained from these interviews informed the development of subsequent surveys and provided a foundation for understanding the feasibility and potential benefits of implementing IPU for AF care.

### *3.2.2. Questionnaires and Surveys:*

To complement the qualitative data with quantitative insights, questionnaires and surveys were administered to health care professionals involved in AF care at the hospital. These tools aim to gather information on current practices, knowledge, and perceptions regarding IPUs and identify areas for improvement in AF care. The surveys, which included both closed- and open-ended questions, were distributed via SurveyMonkey, and the collected data were analysed using descriptive statistical techniques.

The questionnaires and surveys administered to healthcare professionals and patients can be found in Appendices C and D, respectively.

Overall, this mixed-methods research design provides a comprehensive understanding of healthcare delivery models, trends, and the benefits and challenges of IPUs for patients with AF. The integration of qualitative and quantitative data enabled a thorough examination of the phenomenon under study, thereby contributing to the development of recommendations for improving AF care.

### 3.3. Data Sources:

The data sources for this study are as follows:

1. Primary sources included direct input from healthcare professionals involved in the care of patients with AF and observations conducted by the research team.
2. The secondary sources included medical records, published research papers, and other relevant literature.

#### *3.3.1. Data Collection Procedure*

The data collection procedure involved the following steps:

1. Identification of participants: Healthcare professionals interested in the care of patients with AF were invited to participate in the study.
2. Recruitment: Participants were recruited via email, phone calls, and face-to-face meetings.

#### *3.3.2. Data-analysis techniques*

The data collected in this study were analysed using both qualitative and quantitative methods to achieve a comprehensive understanding of the implementation and effectiveness of the Integrated Practice Unit (IPU) model in managing patients with atrial fibrillation (AF). The data analysis process was methodical and involved several key stages, including data cleaning, coding, transformation, and statistical analysis.

*Data cleaning* was the initial step, in which any errors or inconsistencies in the data were identified and addressed. This included handling missing values, identifying and dealing with outliers, and removing duplicate entries to ensure data accuracy and reliability.

*Data coding* followed, in which qualitative data were systematically assigned codes or labels based on predetermined categories or themes. This step facilitated the organization and interpretation of complex data, making it easier to identify patterns and draw meaningful insights.

*Data transformation* involved converting raw data into a format suitable for analysis. This process included aggregating data by patient or healthcare providers and standardised formats to ensure consistency across different datasets.

*Statistical analysis* was then applied to the quantitative data to identify the patterns, trends, and associations. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarise the data and provide an overview of the key findings, using GraphPad Prism (version 9, GraphPad Software, San Diego, California, USA).

For *qualitative data*, transcripts from the semi-structured interviews and observations were analysed using thematic analysis. This approach involved systematically identifying and interpreting the patterns and themes within the data. Both manual coding and software-assisted coding were used, with Atlas.ti employed to facilitate the analysis and ensure thoroughness.

### 3.4. Ethical considerations

This study was conducted with strict adherence to ethical principles, prioritising informed consent, confidentiality, and respect for participant autonomy. All participants were fully informed about the purpose of the research, the procedures involved, and their rights as participants, including the right to withdraw at any time without penalties. Detailed information was provided to ensure that the participants understood how their data would be collected, used, and safeguarded. Confidentiality was rigorously maintained by anonymising all personal information and securely storing data to prevent unauthorised access. Throughout the study, the dignity and autonomy of the participants were respected, ensuring that their participation was entirely voluntary and free from coercion.

# 4. Results

## 4.1. Findings and Analysis from Exploratory Interviews and Surveys with Medical Doctors: Challenges, Strategies, and Perspectives on Integrated Practice Units in Atrial Fibrillation Care

### *4.1.1. Sample Characterisation*

This study involved exploratory interviews with 13 medical doctors, including eight cardiologists and five electrophysiologists. These healthcare professionals were aged between 35 and 65 years, with an average of 12 years of experience treating patients with atrial fibrillation (AF). To complement the interviews, a survey was conducted with 32 healthcare professionals, including cardiologists, electrophysiologists, and 11 residents (Table 5). The participants exhibited a wide range of experience in AF management, from less than one year to over ten years (Tables 5 and 6). This diversity in age, specialisation, and experience ensured a broad spectrum of perspectives on the challenges and opportunities in AF management.

The tables presenting the results from the interviews and surveys conducted with medical doctors and healthcare professionals are located in Appendices E and F.

### *4.1.2. Identification of Key Themes*

The integrated analysis of interview and survey results identified four main themes: *challenges in managing atrial fibrillation*, *strategies to overcome these challenges*, *perceptions of the Integrated Practice Unit (IPU)*, and *components and evaluation metrics of an IPU*. These themes consistently emerged across both interviews and surveys, reflecting healthcare professionals' concerns and suggestions for improving the care of patients with AF.

#### 4.1.2.1 Challenges in Managing Atrial Fibrillation

Doctors and healthcare professionals identified numerous challenges in managing AF (Table 1), which was corroborated by the survey results (Table 7). The primary obstacle highlighted was the difficulty in ensuring patient adherence to treatment plans, as mentioned by 21 of the 32 professionals surveyed. These professionals pointed out the complexity of medication regimens and side effects as factors that complicate adherence. The management of comorbidities was also noted as a significant challenge, with 12 respondents emphasising the added complexity that these conditions impose on AF treatment. Furthermore, 19 doctors stressed the need for coordination between different specialties and healthcare contexts, noting that fragmented care could undermine the continuity and effectiveness of

treatment. These perceptions were reinforced in the interviews, where doctors emphasised the complex and multifaceted nature of AF, requiring an integrated and coordinated approach.

Survey data supported these observations, with 28 healthcare professionals citing stroke risk management and anticoagulant therapy as central challenges, followed by rate or rhythm control (23 responses) and patient adherence to treatment and lifestyle changes (21 responses). The complexity of care coordination across different specialties and healthcare settings was also highlighted in the surveys, reflecting concerns from 19 doctors about the difficulties in ensuring cohesive and efficient care for patients with AF.

#### 4.1.2.2. Strategies to Overcome the Challenges

Healthcare professionals have adopted various strategies to mitigate the identified challenges (Table 2). One of the most frequently mentioned approaches was improving communication among different healthcare professionals, cited by 10 of the 13 interviewees as essential for ensuring that everyone involved in patient care was informed and aligned. Another significant strategy was patient education, deemed crucial by 11 of the doctors interviewed, who stressed the importance of empowering patients to better understand their condition and adhere to treatment. In the surveys, 26 of the 32 professionals reported having implemented changes to improve AF patient care (Table 8), such as creating multidisciplinary teams and adopting evidence-based protocols (Table 9). These findings demonstrate a concerted effort to address the difficulties in managing AF by focusing on communication, education, and the integration of care.

Additionally, patient education and awareness programs are frequently cited as essential for improving adherence to treatment. This approach not only aims to increase adherence, but also empowers patients to manage their condition more effectively, promoting greater autonomy and understanding of the therapeutic process.

#### 4.1.2.3. Perceptions of the Integrated Practice Unit (IPU)

The implementation of an Integrated Practice Unit (IPU) for AF management is viewed by most healthcare professionals as a promising opportunity. In the interviews, 9 of the 13 doctors expressed a positive perception of establishing an IPU, noting that it could significantly improve care coordination and standardised treatment protocols (Table 3). In the surveys, 90.6% of professionals (29 out of 32) identified improved care coordination as the primary benefit of an IPU, while 84.4% (27 out of 32) highlighted standardisation of care protocols as a significant advantage (Tables 15, 17, 18, 19).

However, concerns regarding the implementation challenges have also emerged. In the interviews, doctors emphasised the need for substantial investment in infrastructure and training

(Table 4). In the surveys, 90.6% of respondents (29 out of 32) identified resistance to change as the biggest challenge in implementing an IPU, followed by a lack of financial resources (68.8%, 22 out of 32) (Table 16). These challenges underscore the complexity of introducing a new organisational approach within an established healthcare system and the need for proper planning and awareness to ensure the IPU's acceptance and success (Tables 32 to 34).

#### 4.1.2.4. Components and Evaluation Metrics of an IPU

Healthcare professionals emphasised the importance of a multidisciplinary team in structuring an IPU, comprising cardiologists, electrophysiologists, nurses, and care coordinators. Each team member plays a crucial role in coordinating and implementing care, ensuring that all patient needs are addressed in an integrated manner (Tables 3, 20, 21). The survey results confirmed this perspective, with 31 of 32 respondents identifying cardiologists as essential team members, followed by 26 who mentioned electrophysiologists and nurses (Table 21).

Regarding the metrics used to evaluate the success of an IPU, doctors have suggested indicators such as clinical outcomes, readmission rates, and patient satisfaction (Tables 22 to 31). In the surveys, 90.6% of professionals highlighted patient outcomes as the most important indicator, whereas 84.4% mentioned readmission rates as a crucial metric (Table 23). Cost savings were also identified as a relevant factor by 53.1% of the respondents, emphasising the need to assess the financial efficiency and sustainability of the IPU.

## 4.2. Findings from Exploratory Interviews and Surveys with Patients on Atrial Fibrillation Care

### *4.2.1. Participant Profile*

In this exploratory study, nine patients diagnosed with atrial fibrillation (AF) participated in in-depth interviews (Table 35). Participants' ages ranged from 45 to 75 years, offering a broad range of experiences with the condition. Of the nine participants, six were male and three were female. The group was ethnically diverse and included individuals from various racial and ethnic backgrounds. Educational backgrounds varied, with four participants holding a college degree or higher, while the others had completed only elementary or secondary education. Occupations among the participants also varied, with three retirees, three full-time workers, two part-time workers, and one individual with a disability. This diversity provides a comprehensive understanding of how different demographic factors influence living with AF (Table 36).

In addition to the interviews, a survey was conducted on 48 patients diagnosed with AF. Of these respondents, 67% had been living with AF for over five years, while 37.5% had been diagnosed within the last one–five years **(**Table 41**)**. The survey respondents were also diverse in terms of gender, age, and educational background, mirroring the variety observed in the interview participants. These surveys provided further quantitative data to complement the qualitative insights from the interviews, offering a broader perspective of the challenges and needs of patients with AF.

The tables presenting the results from the interviews and surveys conducted with medical doctors and healthcare professionals are located in Appendices G and H.

### *4.2.2. Identification of Key Themes*

From the combined data of the interviews and surveys, several key themes emerged: *the impact of atrial fibrillation on daily life, treatment experiences and adherence*, *experiences with healthcare providers and the healthcare system*, *communication and information needs*, *lifestyle modifications and self-care*, and *the desire for more coordinated and patient-centred care*. These themes consistently appeared across both qualitative and quantitative data, reflecting the shared concerns and challenges faced by patients with AF.

#### **4.2.2.3. Impact of Atrial Fibrillation on Daily Life**

Atrial fibrillation had a profound impact on the daily lives of all participants (Table 36). In the interviews, patients frequently reported symptoms such as palpitations, fatigue, and shortness of breath as the primary indicators of their condition. These symptoms were disruptive, affecting their ability to engage in routine activities and significantly impacting their overall well-being (Table 37). Supporting this, the survey data showed that 79.2% of the respondents experienced palpitations, 47.9% suffered from fatigue, and 45.8% reported shortness of breath (Table 42). Additionally, 18.8% experienced chest pain or discomfort and 31.3% reported dizziness or lightheadedness.

The unpredictability of AF episodes was another major concern, as the patients described how the sudden onset of symptoms created anxiety and required constant monitoring. This led to substantial lifestyle adjustments, with 43.8% of the survey respondents indicating that making lifestyle changes is challenging (Table 47). Moreover, the overall negative impact on quality of life was clear, with 71% of patients reporting that AF had a detrimental effect on their daily lives, including 20.8%, who rated this impact as very negative (Table 48).

#### 4.2.2.4. Treatment Experiences and Adherence

Managing AF through treatment and adherence to prescribed plans pose significant challenges. All nine interview participants were on medication, and some had undergone procedures, such as cardioversion or catheter ablation (Table 36). This was reflected in the survey, where 89.6% of the respondents reported taking medications, 27.1% had undergone cardioversion, and 22.9% had undergone catheter ablation (Table 43). However, treatment side effects were common, with 25% of patients experiencing dizziness or lightheadedness and 16.7% reporting nausea or vomiting (Table 44). Fatigue or weakness was also a notable side effect, affecting 14.6% of respondents.

Adherence to treatment is key. Despite 85.4% of the survey respondents receiving education (Table 46) on medication management, 41.7% still struggled with adherence (Table 47). Additionally, 43.8% found it difficult to implement necessary lifestyle changes (Table 47). These findings highlight the need for better support systems to help patients manage their treatment and make lifestyle adjustments.

#### 4.2.2.5. Experiences with Healthcare Providers and the Healthcare System

Patients' experiences with healthcare providers and healthcare systems were mixed. In the interviews, some participants expressed satisfaction with their care, noting that their care providers were attentive and responsive to their concerns (Tables 36, 39 and 40). However, others reported feeling dismissed or rushed during consultations, leading to dissatisfaction. The survey data supported this, with 60% of the respondents being somewhat satisfied or very satisfied with their treatment, but 4.2% expressed dissatisfaction (Table 45). Additionally, 41.7% of patients reported difficulty adhering to treatment plans, often due to a lack of clear communication from healthcare providers (Table 47).

Coordination among health care providers is a major concern. Patients often find themselves navigating complex healthcare systems, with multiple appointments and various specialists involved in their care (Tables 38, 39, 49), . This lack of coordination led to frustration and inefficiencies, as 52.1% of the survey respondents reported difficulty in recognising and managing their symptoms (Table 47). Only 14.6% of the patients participated in support groups, suggesting a lack of resources for ongoing care and support (Tables 50, 51, 53).

#### 4.2.2.6. Communication and Information Needs

Quality of communication among healthcare providers is a recurring theme. In the interviews, the participants highlighted the importance of clear, consistent communication, with some praising their

providers for being communicative and attentive (Table 39). However, others felt inadequately involved in their care decisions. Survey data showed that 62.5% of the respondents considered it very important to be actively involved in their care (Table 51), but 29.2% had difficulty understanding their treatment options (Table 47). Additionally, 43.8% of the patients struggled with lifestyle changes, indicating a need for better education and support.

Patients also emphasised the need for consistent information across all healthcare providers involved in their care. Several interview participants reported receiving conflicting advice, which led to confusion. This was reinforced by the survey findings, where 66.7% of respondents emphasised the need for access to educational resources on AF (Table 53). Although 72.9% of the patients had received some form of education on managing AF (Table 46), there were still significant gaps in understanding, particularly regarding lifestyle changes and symptom management.

#### 4.2.2.7. Lifestyle Modifications and Self-Care

Lifestyle modifications are essential for managing AF but pose significant challenges. The interview participants discussed the major adjustments they had to make, including dietary changes, exercise routines, and stress management practices. Although these modifications were necessary, 43.8% of the survey respondents found them difficult to implemente (Table 47). For instance, reducing caffeine and alcohol intake and increasing physical activity are common, but challenging. Stress management is also crucial, with many patients noting that stress exacerbates their symptoms (Table 37). In response, 25% of the patients expressed the need for mental health resources to help manage their stress levels effectively (Table 53).

#### 4.2.2.8. Desire for More Coordinated and Patient-Centred Care

A strong desire for more coordinated and patient-centred care emerged from both interviews and surveys. Patients expressed frustration with the lack of coordination among health care providers, particularly when transitioning between specialists. Survey data echoed this sentiment, with 33.3% of respondents seeing their healthcare provider monthly or more frequently (Table 49), yet only 14.6% participated in support groups (Table 50), indicating a gap between ongoing care and support resources.

Patients also emphasised the importance of being treated as individuals with unique needs, rather than just another case of AF. They called for healthcare providers to listen to their concerns, involve them in decision making, and respect their preferences (Tables 51 to 55). Survey results showed

that 58.3% of patients preferred in-person consultations (Table 54) to receive information about their condition and treatment options, 22.9% opted for online patient portals or websites, and 33.3% preferred printed educational materials. This finding suggests a strong preference for personalised and accessible care models.

# 5. Discussion

## 5.1. Contributions to the Literature and Key Findings

This study makes significant contributions to the literature on atrial fibrillation (AF) care by exploring the potential implementation of Integrated Practice Units (IPUs) in this context. Unlike most existing research that focuses on isolated aspects of AF management, this study provides a comprehensive analysis that integrates the perspectives of both medical professionals' and patients'. In doing so, it offers a more holistic understanding of the challenges and opportunities in AF care. Key contributions include highlighting the fragmentation of the current AF care pathways, underscoring the need for better care coordination and patient education, and identifying the potential of IPUs to address these gaps. The study also sheds light on barriers to IPU implementation, such as resistance to change and financial constraints, which are often underexplored in the literature.

One of the most relevant findings of this study was the identification of adherence and care coordination as critical challenges in managing AF. Both doctors and patients recognised these issues, with 65.6% of doctors identifying patient adherence as a major obstacle and 59.4% highlighting difficulties in coordinating care across specialties. Patients mirrored these concerns, with 41.7% struggling with medication adherence, and 43.8% facing challenges in implementing lifestyle changes. This convergence of perspectives underscores the urgent need for more integrated and coordinated care models, which the IPU framework is well positioned to provide.

Another key finding was the importance of communication and patient education in AF management. A substantial number of doctors (76.9%) and patients (66.7%) emphasised the need for improved communication and access to consistent and accurate information. This study highlights the gaps in current educational efforts despite 72.9% of patients receiving some form of education on managing AF. The persistent gaps, particularly regarding lifestyle changes, indicate the need for more comprehensive and continuous educational strategies. The IPU model, with its multidisciplinary approach, can bridge these gaps by providing a more structured and consistent framework for patient education.

## 5.2. Challenges in Managing Atrial Fibrillation Patients

Both medical professionals and patients have identified significant challenges in managing AF, with particular emphasis on care coordination and treatment adherence. Medical professionals, particularly 59.4% of doctors who highlighted difficulties in coordinating care across specialties, underscored the complexity of AF management. The lack of streamlined communication between healthcare providers often delays diagnosis and hinders effective treatment plans. This issue is compounded by the presence

of comorbidities that require input from multiple specialists, making coordinated care essential, but challenging.

Adherence to treatment regimens has emerged as a major concern from the patient's perspective. A substantial proportion (41.7%) of patients reported difficulties adhering to prescribed medications, while 43.8% struggled to implement necessary lifestyle changes, such as dietary adjustments and increased physical activity. The fragmented nature of current healthcare systems often leaves patients without clear guidance and support, further complicating their adherence. This fragmentation significantly impacted patients' quality of life, with 71% reporting that AF had a detrimental effect on their daily lives.

Addressing these challenges requires a more integrated and coordinated approach to care, in which the IPU model becomes relevant. By consolidating care into a multidisciplinary team structure, IPUs can streamline communication and coordination, ultimately improving patient outcomes and satisfaction. By design, the IPU model promotes a holistic approach to patient care, ensuring that all healthcare providers involved in a patient's treatment are aligned in their approach, and that patients receive consistent and cohesive care.

### *5.2.1. The Importance of Communication and Patient Education*

Effective communication between healthcare providers and patients has been identified as a critical factor in AF management. Both groups underscored the need for improved communication strategies, with 76.9% of doctors emphasising the importance of clear and consistent communication among healthcare professionals. Patients echoed this sentiment, with 29.2% reporting difficulties in understanding their treatment options, and 66.7% stressing the need for accurate and consistent information.

Patient education has emerged as a key component for improving adherence and overall outcomes. Despite 72.9% of the patients receiving some form of education on managing AF, significant gaps in understanding persisted, particularly regarding lifestyle changes and symptom management. Doctors recognised the importance of education in empowering patients, with 84.6% identifying patient education programs as essential for improving adherence and encouraging self-management.

An IPU can play a pivotal role in enhancing communication and education by providing a centralised platform for information exchange and patient support. Digital health technologies, such as mobile health (mHealth) apps, can facilitate continuous, real-time communication between patients and providers, ensuring that patients have access to the information they need. Real-time access could improve adherence by promptly addressing patient concerns and providing consistent guidance.

### *5.2.2. Lifestyle Modifications and Self-Care*

Both doctors and patients recognised the importance of lifestyle modifications in managing AF; however, many patients struggled to implement these changes. Nearly 44% of the patients reported difficulties in making necessary adjustments to their diet and exercise routines, while 25% expressed a need for mental health resources to manage stress, a known trigger for AF symptoms. Doctors frequently mentioned the need for better patient education and support to facilitate lifestyle changes.

An IPU model could provide the necessary resources and support to help patients make and sustain lifestyle modifications. By incorporating health coaching, mental health services, and personalised care plans, IPUs can offer a more holistic approach that addresses the broader life circumstances of patients, ultimately leading to better adherence and improved health outcomes.

### *5.2.3. The Desire for More Patient-Centered Care*

Patients expressed a strong desire for more patient-centred care, emphasising the need to be treated as individuals rather than just another case of AF. This sentiment was reflected in the survey data, with 58.3% of patients preferring in-person consultations and 33.3% favouring personalised educational materials. Both patients and doctors acknowledged that a patient-centred approach could lead to better health outcomes by ensuring that treatment plans are tailored to the individual needs and preferences of patients.

By design, IPUs promote a more patient-centred approach. Through shared decision-making, personalised communication, and continuous patient feedback, IPUs can create more satisfying care experiences for patients, ultimately improving adherence and outcomes.

### *5.2.4. Diverging Perspectives on Satisfaction with Healthcare Providers*

Although both doctors and patients identified challenges in AF management, there was a notable divergence in satisfaction levels. Among the patients, 60% reported being somewhat satisfied or very satisfied with their treatment, whereas only 4.2% expressed dissatisfaction. However, doctors seemed more attuned to systemic issues, particularly communication and coordination, suggesting that patients may not be fully aware of the broader challenges that affect their care.

This discrepancy highlights the need for greater transparency and greater patient engagement. By aligning the perspectives of doctors and patients through more robust feedback systems and continuous quality improvement initiatives, healthcare systems can create more cohesive care experiences that meet the expectations of both groups.

## 5.3. The Promise of an IPU Model for Atrial Fibrillation Care

The concept of an Integrated Practice Unit (IPU) for atrial fibrillation (AF) care has garnered strong support from the majority of healthcare professionals involved in this study. The findings from both exploratory interviews and detailed surveys underscore the potential of the IPU model to address the critical challenges in managing AF. This model is designed to consolidate care within a multidisciplinary team that includes cardiologists, electrophysiologists, nurses, and pharmacists, delivering coordinated and comprehensive care that addresses all aspects of a patient's health.

A major advantage of the IPU model, highlighted by 90.6% of doctors, was its potential to improve care coordination. By fostering collaboration among health care professionals, the IPU can streamline the patient journey, reduce treatment delays, and mitigate the fragmentation of care that currently hampers effective AF management. This sentiment was echoed by 92.3% of respondents who believed that improved care coordination is one of the most significant benefits of an IPU.

Additionally, the IPU model promises to standardise care processes through evidence-based protocols. Standardisation is crucial for reducing variations in treatment and ensuring consistency in care delivery, as noted by 84.4% of the doctors. The ability to provide uniform, high-quality care is especially important in managing complex conditions, such as AF, where inconsistencies can lead to suboptimal outcomes. Furthermore, 68.8% of the respondents acknowledged that reducing care variation is another key advantage of the IPU model.

### *5.3.1. Multidisciplinary Approach and Care Coordination*

At the heart of the Integrated Practice Unit (IPU) model is a multidisciplinary team, which is a cornerstone of effective atrial fibrillation (AF) care. The necessity of such a team was unanimously endorsed by the 13 doctors interviewed, who emphasised that comprehensive care for AF must extend beyond cardiologists and electrophysiologists to include a wide range of healthcare professionals. This multidisciplinary approach ensures that all aspects of a patient’s health, from the management of AF to related comorbidities and overall well-being, are addressed.

The survey results further support the need for broad team composition. Of the 32 respondents, 31 identified cardiologists as essential members of the IPU team and 26 underscored the importance of including electrophysiologists and nurses. Beyond these core specialties, 21 respondents highlighted the inclusion of primary care physicians. These professionals are critical for managing the general health of patients with AF and ensuring the continuity of care between specialist visits.

Moreover, the team must include pharmacists who were identified as essential by the 12 respondents. Pharmacists play a crucial role in medication management, ensuring that patients adhere

to their prescribed treatments and minimise the risk of drug interactions, which is an area of concern for patients with AF who often manage multiple medications.

Patient navigators were also mentioned by five respondents. These professionals help guide patients through the complex healthcare system, coordinating appointments and facilitating communication between various providers. Their role is particularly vital in ensuring that patients do not fall through the cracks in a fragmented system, which is a common issue in traditional models of care.

Finally, other healthcare professionals, such as dietitians, physiotherapists, and mental health professionals, though not always explicitly mentioned in the survey, are integral to the IPU model. They address lifestyle modifications, physical rehabilitation, and mental well-beingcomponents that are critical for holistic management of AF.

Central to this multidisciplinary framework is the role of the care coordinator, which is the pivot around which the IPU revolves. This individual ensures that all team members are aligned, facilitates communication, and oversees the implementation of the care plans. The importance of this role cannot be overstated, particularly in light of the fact that 59.4% of doctors cited challenges in coordinating care across different specialties. The care coordinator acts as the integrator, ensuring that every aspect of the patient's care is harmonised, reducing the risk of conflicting treatments, and enhancing overall care efficiency.

### *5.3.2. Standardisation of care and evidence-based protocols*

Standardisation of care protocols is another critical component of the IPU model, recognised by 84.4% of doctors as essential for ensuring consistent and high-quality care. By implementing evidence-based guidelines, IPU can reduce variations in treatment, which is crucial for optimising patient outcomes. This standardisation process was deemed vital by 27 survey respondents who agreed that standardised care protocols could enhance patient outcomes by reducing care variation, a common issue in traditional care models.

In addition to improving the consistency of care, standardisation has the potential to lower healthcare costs by minimising unnecessary therapies and interventions. Seventeen respondents indicated that reducing healthcare costs is a key benefit of the IPU model, as standardising care can help eliminate inefficiencies and ensure that resources are effectively used.

### *5.3.3. Patient Education and Empowerment*

Patient education and empowerment are integral to the IPU model, with 84.6% of doctors emphasising the importance of educational programs in improving treatment adherence and encouraging self-

management. Despite the fact that 72.9% of patients reported receiving education on AF management, gaps in understanding persisted, particularly regarding lifestyle changes and symptom management. By implementing comprehensive education programs that focus on medication adherence, lifestyle modifications, and symptom recognition, IPU can empower patients to take a more active role in managing their condition. This approach aligns with 53.8% of the survey respondents who believe that improved patient education and engagement are key benefits of the IPU model.

The importance of patient education is further supported by the data, which indicate that 11 out of 13 doctors identified patient education and awareness programs as critical strategies for addressing the challenges in AF care. Furthermore, 20 respondents emphasised that improved patient education and engagement are vital for enhancing patient outcomes.

### *5.3.4. Technology Integration and Continuous Monitoring*

Technology plays a pivotal role in the IPU model by facilitating communication among healthcare providers and by improving patient access to care. Nine doctors identified technology use as crucial for enhancing patient care and management. Tools such as electronic health records (EHRs), telemedicine, and remote monitoring allow for real-time information sharing and continuous patient monitoring, which are essential for effective AF management. Additionally, 31 respondents agreed that monitoring readmission rates is a key metric for evaluating IPU success.

Continuous monitoring and follow-up, identified by four out of 13 doctors as essential components of an IPU, ensure that patient progress is regularly assessed and that any necessary adjustments to the treatment plan are made promptly. This approach is further supported by 62.5% of the survey respondents who believe that ongoing monitoring and follow-up are critical for improving patient outcomes.

### *5.3.5. Challenges in Implementing an IPU*

While potential benefits of the IPU model are clear, the challenges of implementation cannot be ignored. The most significant barrier, as identified by 90.6% of respondents, was resistance to change among healthcare professionals and patients. This resistance is multifaceted, often stemming from a lack of understanding of the IPU model's benefits, discomfort with new workflows, and concerns about shifts in roles and responsibilities. Addressing this resistance requires clear and consistent communication, strong leadership, and the involvement of all stakeholders (healthcare professionals, patients, and administrators) in the development and implementation process.

Financial constraints presented another formidable challenge, with 68.8% of respondents highlighting a lack of financial resources as a critical barrier. Establishing an IPU requires substantial

investment in personnel, training, and infrastructure, making it particularly challenging in resource-limited healthcare settings. The financial burden is compounded by the fact that 56.3% of respondents noted a lack of staff resources as another significant obstacle, which can further complicate efforts to implement an IPU effectively.

In addition to financial and staffing concerns, integrating the IPU model into existing care structures poses a significant challenge. Six doctors pointed out the difficulty of coordinating care across different healthcare settings, emphasising that aligning new systems with established practices requires careful planning and adaptation. Ensuring that all team members are on the same page and that care protocols are standardised is crucial for overcoming these hurdles.

The challenges of data collection and management are also significant. According to 27 respondents, managing and collecting data is a significant obstacle, as is ensuring data quality and accuracy (26 respondents). Effective data management is crucial for monitoring an IPU's performance and making informed decisions, yet it remains an area fraught with challenges, including IT infrastructure and support, which were cited by 15 respondents. Additionally, 12 respondents mentioned resistance to change from the staff as a barrier, highlighting the importance of training and education in overcoming these challenges.

### *5.3.6. Recommendations for Implementing an IPU for Atrial Fibrillation Care*

To successfully implement an IPU for AF care, a structured and comprehensive approach is required. First, engaging stakeholders early in the process is critical. Involving healthcare providers, patients, and policymakers in the planning and decision-making stages fosters collaboration and ensures that all parties invest in the success of the IPU. Regular communication and feedback mechanisms should be established to address any concerns and ensure alignment with IPU's goals. Twenty-seven respondents emphasised the importance of involving physicians in evaluating IPU performance and 29 respondents supported the involvement of nurses. Additionally, 27 respondents agreed that patients and their families should be engaged in the evaluation process, highlighting the importance of a patient-centred approach.

Resource allocation was another key factor. Securing adequate funding for staff, training, and infrastructure is essential for IPU's success. This includes not only initial investments, but also ongoing support to ensure that the IPU can function effectively. Lean management principles can be applied to optimise resource use, ensuring that financial and human resources are allocated efficiently. Benchmarking against other IPUs was recommended by 20 respondents as a way to evaluate performance and identify best practices, emphasising the value of comparison data in informing resource-allocation decisions.

Standardisation of care protocols and continuous updating of these guidelines are vital. Evidence-based care pathways should be developed and regularly revised to reflect the latest research and clinical practice. This approach aligns with the views of 84.4% of doctors, who believe that standardised care protocols are critical for improving patient outcomes.

Continuous quality improvement must be at the heart of an IPU model. Regular assessment of performance metrics such as patient outcomes, readmission rates, and patient satisfaction is essential for identifying areas for improvement and ensuring that the IPU remains effective. Thirty-two respondents highlighted the importance of monitoring readmission rates as a key metric for evaluating IPU performance, while 28 emphasised the need to track patient satisfaction. Metrics should be monitored at least quarterly, as recommended by 16 respondents, to ensure that any issues are addressed promptly, and that the IPU can adapt to changing circumstances.

In terms of data collection, the study found that respondents believed that patient outcomes (30 respondents) and readmission rates (32 respondents) were the most critical metrics for evaluating the quality of care provided by an IPU. Additionally, patient satisfaction (28 respondents), cost savings (22 respondents), and healthcare utilisation (18 respondents) were identified as essential metrics. To ensure effective data management, IPU should establish robust systems for data collection, analysis, and reporting. Regular meetings ( supported by 20 respondents) and quarterly reports (17 respondents) are effective methods for disseminating performance data to stakeholders.

The importance of patient-reported outcome measures (PROMs) in evaluating IPU effectiveness was highlighted by 27 respondents, indicating that these measures are valuable tools for assessing patient experiences and outcomes. Incorporating PROMs into the IPU's evaluation framework can provide insights into the patient's perspective and ensure that care delivery remains patient centred.

Finally, adaptability and flexibility are crucial to the success of the IPU model. The healthcare landscape is constantly evolving, and IPU must be able to adapt to changes in evidence, technology, and patient needs. Embracing a culture of continuous learning and improvement and encouraging healthcare professionals to engage in reflective practices will ensure that the IPU remains responsive and effective.

### 5.4. Action Plan for Implementing an Integrated Practice Unit (IPU) for Atrial Fibrillation Care

To address these challenges and leverage the opportunities identified in this study, a strategic and comprehensive action plan is essential for successful implementation of an Integrated Practice Unit (IPU) for atrial fibrillation (AF) care. This plan focuses on enhancing patient education, improving

communication among healthcare providers, implementing a patient-centred approach, monitoring performance, and optimising resource allocation and team composition.

### *5.4.1. Enhancing Patient Education and Engagement*

Effective patient education is crucial for managing atrial fibrillation within an IPU. Empowering patients with knowledge and tools is key to improving outcomes and satisfaction.

- **Develop Comprehensive Educational Materials**: Create diverse resources, such as printed materials, videos, and interactive online modules that cover essential topics, such as AF management, medication adherence, lifestyle changes, and symptom recognition. This should cater to different learning preferences to ensure accessibility for all patients.
- **Establish support networks**: Organise workshops, webinars, and support groups to provide platforms on which patients can share experiences, ask questions, and receive guidance from healthcare professionals. These forums will help to build a supportive community and encourage adherence to treatment plans.
- **Enhance Patient Communication**: Implement systems that keep patients informed about their treatment plans and encourage active participation. This could include regular consultations, access to medical records via online portals, and opportunities for patients to ask questions or express their concerns.
- **Train Healthcare Providers**: Equip healthcare professionals with effective communication skills to ensure that complex medical information is conveyed clearly and understandably. This includes training in using plain language and visual aids, and breaking down information into manageable pieces.
- **Collaborate with advocacy groups**: Partners with atrial fibrillation advocacy organisations to provide additional resources and support, strengthen educational efforts, and connect patients to the broader community.

### *5.4.2. Improving Communication and Coordination Among Healthcare Providers*

Enhancing communication and coordination among healthcare providers is vital for delivering high-quality patient-centred care within an IPU.

- **Establish Clear Communication Protocols**: Develop guidelines that define the roles, responsibilities, and communication channels for all team members. Implementation of a standardised documentation system to facilitate information sharing and ensure coordinated care.

- **Foster Collaboration**: Promote a culture of open communication and teamwork through regular multidisciplinary meetings. These meetings provide a platform for discussing patient cases, sharing insights, addressing challenges, and ensuring comprehensive and aligned care.
- **Leverage Digital Technology**: Utilises electronic health records (EHRs) and health information systems to enable real-time access to patient information, avoiding duplication of tests or treatments. Ensure that the EHR system is secure, user friendly, and interoperable with other healthcare systems.
- **Manage Care Transitions**: Develop protocols for coordinating care transitions, such as referrals, discharges, and follow-up appointments. Care coordinators within the IPU should play a key role in managing these transitions and ensuring continuity of care.

### *5.4.3. Implementing a Patient-Centered Approach*

Placing the patient at the centre of care delivery within an IPU is essential for enhancing patient satisfaction and outcomes.

- **Training healthcare providers in patient-centred care**: Ensure that all team members are trained in active listening, empathetic communication, shared decision-making, and cultural competence. This training will help to create an environment that respects and values each patient's individual needs.
- **Incorporate Shared Decision-Making**: Engage patients in discussions about their treatment options and support them in making informed decisions that align with their values and preferences. Use decision aids such as informational booklets or online resources to facilitate this process.
- **Utilise patient-reported outcome measures (PROMs)**: Regularly collect and analyse PROMs to understand patient experiences and tailor care plans accordingly. These data will inform continuous quality improvement initiatives and ensure that care delivery remains patient centred.
- **Create a Supportive Environment**: Design the IPU's physical space to be welcoming and accessible, providing resources, such as support groups and flexible appointment scheduling. Involve patients and their families in the design and evaluation of care delivery to ensure that they meet their needs.

### *5.4.4. Monitoring and Evaluating Performance*

Continuous performance monitoring and evaluation are critical for ensuring that the IPU delivers high-quality patient-centred care.

- **Develop a Balanced Scorecard**: Use a balanced scorecard to track performance across the financial, customer, internal process, and learning and growth dimensions. This comprehensive approach will help to evaluate the effectiveness of IPUs in all aspects of care delivery.
- **Collect Key Performance Data**: Regularly gather and analyse data on patient outcomes, readmission rates, cost savings, and patient satisfaction. Establish benchmarks and compare their performance against other IPUs to identify areas for improvement.
- **Engage Stakeholders in Evaluation**: Involve healthcare providers, patients, and administrators in evaluating an IPU's performance. Regular meetings are organised to discuss performance data and collaboratively develop improvement strategies.
- **Leverage technology for data management**: Implementing reliable data collection methods, secure storage solutions, and advanced analytics tools to identify trends and generate actionable insights. Create dashboards for real-time performance monitoring by stakeholders.

### *5.4.5. Optimizing Resource Allocation and Team Composition*

Effective resource allocation and team composition are essential for IPU to efficiently function and deliver high-quality care.

- **Conduct a Resource Assessment**: Evaluate current resource utilisation to identify inefficiencies and unmet needs. These data can be used to develop targeted strategies for optimising resource allocation, ensuring that financial and human resources are effectively used.
- **Implement Evidence-Based Decision-Making**: Allocate resources based on data-driven insights such as patient demographics and service utilisation patterns. For example, if data indicate a growing demand for outpatient services, additional resources are allocated accordingly.
- **Apply Lean Management Principles**: Streamline processes to reduce waste and improve efficiency. Optimise patient flow, improve equipment utilisation, and minimise administrative tasks to enhance resource allocation.
- **Foster a Collaborative Team Environment**: Assemble a multidisciplinary team with diverse skills, including cardiologists, nurses, electrophysiologists, pharmacists, and support staff such as care coordinators. Encourage collaboration through regular team meetings, performance metrics, and ongoing education.

By implementing this action plan, an IPU for atrial fibrillation can effectively address the needs and challenges identified by both patients and healthcare providers, ultimately improving patient outcomes, satisfaction, and the overall quality of care delivered.

A detailed action plan for establishing an IPU for atrial fibrillation in our specific setting can be found in Appendix I - Action plan for establishing an IPU for atrial fibrillation.

# 6. Conclusion and Recommendations

This study sheds light on the multifaceted challenges faced by patients with atrial fibrillation (AF) and the healthcare professionals involved in their care. Atrial fibrillation, as a chronic and complex condition, requires not only effective management of the arrhythmia itself, but also a comprehensive approach to addressing associated comorbidities and risk factors. The findings of this study underscore the critical need for improved care coordination, patient-centred communication, and enhanced educational strategies to support both patients and providers in managing AF more effectively.

One of the key challenges identified in this study was the fragmented nature of current AF care. Patients often navigate a healthcare system characterised by disjointed services, where communication between different specialists and primary care providers is limited. This fragmentation leads to inefficiency, increased healthcare costs, and suboptimal patient outcomes. The current care model often fails to fully address the complexity of AF, particularly in patients with multiple comorbidities and significant lifestyle factors that contribute to disease progression.

The Integrated Practice Unit (IPU) model offers a promising solution to these challenges. By fostering a more integrated and multidisciplinary approach to care, IPUs aim to streamline care delivery, reduce variations in treatment, and improve overall patient outcomes. The model promotes collaboration among cardiologists, electrophysiologists, nurses, pharmacists, and other specialists, ensuring that all aspects of patient care are managed cohesively. The potential benefits of this approach include not only improved clinical outcomes but also enhanced patient satisfaction and more efficient use of healthcare resources.

However, implementing an IPU for AF care is challenging. Resource limitations, including financial constraints and staffing shortages, are significant barriers. Furthermore, the need for strong organisational support and leadership is essential to drive the cultural and operational changes required for successful IPU implementation. These challenges highlight the importance of strategic planning and stakeholder engagement in transitioning to an IPU model.

## 6.1. Limitations of the Study

Although this study provides valuable insights, it is important to acknowledge its limitations. This research was conducted within a single healthcare system, which may limit the generalisability of the findings to other settings. Different health care systems with varying resources, policies, and patient populations may encounter different challenges and opportunities when implementing an IPU model for AF care. Future studies should consider a broader range of healthcare settings to validate and expand these findings.

Another limitation is the reliance on self-reported data from healthcare providers. While these insights are crucial, they are subject to potential biases, including response and social desirability biases. Healthcare providers may have tailored their responses to align with perceived expectations rather than true experiences. Additionally, the relatively small sample size of this study may have limited its ability to detect subtle but significant differences in outcomes or perspectives. Larger, multicentre studies would provide a more robust dataset and increase the statistical power of future research.

### 6.2. Implications for Future Research and Practice

Building on the insights gained from this study, future research should prioritise rigorous evaluation of IPU models in AF care. A key focus should be on assessing the long-term impact of IPUs on the clinical outcomes, cost efficiency, and patient satisfaction. Comparative studies that directly evaluate IPUs against traditional care models are essential to determine the sustainability and broader applicability of these units. These studies should consider a range of outcomes, including clinical measures such as stroke prevention and heart failure management, as well as patient-reported outcomes such as quality of life and satisfaction with care.

Digital health technologies represent a rapidly evolving area with significant potential for enhancing the functionality of IPUs. Telemedicine, remote monitoring, and electronic health records (EHRs) can facilitate better care coordination, provide real-time data to healthcare providers, and empower patients to more actively engage in their care. Future research should explore how these technologies can be effectively integrated into IPU models to optimise care delivery. For example, studies could examine the impact of remote monitoring on the early detection of AF recurrence or the use of telemedicine to improve access to specialist care in underserved areas.

Addressing the health disparities in AF care is another critical area for future research. As healthcare systems increasingly adopt integrated care models, it is essential to ensure that these innovations do not exacerbate inequities. Research should investigate how IPUs can be designed to promote equitable access to high-quality care for all patients regardless of socioeconomic status, race, or geographic location. This includes exploring strategies to overcome barriers to care such as transportation, healthcare literacy, and financial constraints.

The development and validation of patient-reported outcome measures (PROMs) specific to AF care is also crucial. PROMs provide valuable insights into patients' perspectives regarding their health status, treatment effectiveness, and quality of life. By incorporating these measures into IPU evaluations, healthcare providers can ensure that care delivery is patient centred and responsive to

individual needs. Future research should focus on refining these tools and integrating them into routine practices in IPUs.

From a practical standpoint, healthcare organisations should consider adopting the IPU model as a comprehensive approach for managing AF. This model, which integrates multidisciplinary teams, leverages technology, and fosters continuous quality improvement, has the potential to address the complex challenges of AF care more effectively than traditional models. Implementing IPUs could lead to improved patient satisfaction, reduced healthcare costs, and more effective management of AF in diverse healthcare settings. However, the transition to an IPU model requires careful planning, including securing the necessary resources, engaging stakeholders, and ensuring that staff are adequately trained and supported throughout the process.

### 6.3. Recommendations for Healthcare Organisations

Healthcare organisations considering the implementation of an IPU for AF care should begin by conducting a thorough needs assessment to identify gaps in the current care delivery. This assessment should involve inputs from all relevant stakeholders, including healthcare providers, patients, and administrators. Based on this assessment, organisations can develop a tailored implementation plan that addresses specific challenges such as resource allocation, staff training, and technology integration.

Organisational leadership plays a critical role in driving IPU success. Leaders must be committed to fostering a culture of collaboration and continuous improvement, and they should actively engage with staff at all levels to build buy-ins for the new model. Regular communication and transparent decision-making processes are essential for maintaining momentum and addressing any concerns that arise during the implementation phase.

Technology investment is another key factor. Robust EHR systems, telemedicine platforms, and remote monitoring tools are essential components of a well-functioning IPU. Organisations should prioritise the selection and implementation of technologies that support seamless care coordination and patient engagement while also ensuring that these systems are secure, user-friendly, and interoperable with existing healthcare infrastructure.

Finally, healthcare organisations should establish mechanisms for ongoing evaluation and quality improvement. This includes regularly collecting and analysing data on key performance indicators such as patient outcomes, readmission rates, and patient satisfaction. Organisations should also create feedback loops that allow patients and providers to contribute to the continuous refinement of care processes.

## 6.4. Concluding Remarks

The implementation of an Integrated Practice Unit for atrial fibrillation care offers a promising opportunity to enhance the quality and efficiency of healthcare delivery. By addressing the challenges identified in this study and embracing a more coordinated, patient-centred approach, healthcare organisations can significantly improve the outcomes of patients with AF. Although the transition to an IPU model presents challenges, the potential benefits in terms of improved care quality, patient satisfaction, and cost savings make it a worthwhile endeavour. Future research and continued innovation in this area will be crucial for realising the full potential of IPUs in AF care and beyond.

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# 8. Appendices

## Appendix A - Semi-structured interview script for professionals working with patients with AF

Introduction:

- Introduce yourself and explain the purpose of the interview.
- Explain that you are researching the development of an Integrated Practice Unit (IPU) for the care of patients with atrial fibrillation and that you are interested in gathering their perspectives as administrators in the healthcare industry.

**Questions:**

1) Can you describe your experience in managing care for patients with AF in your organisation?
    a. What are the challenges you face in providing care to these patients?
    b. How have you addressed these challenges in the past?
    c. What strategies have successfully improved your organisation's care for patients with AF?
2) How do you think an IPU could improve the care of patients with AF in your organisation?
    a. What benefits do you anticipate an IPU can provide?
    b. Do you have concerns about implementing an IPU for atrial fibrillation care?
3) In your opinion, what are the key components of an IPU for atrial fibrillation care?
    a. What roles should different healthcare professionals play in the IPU?
    b. What metrics should be used to evaluate the success of an IPU for atrial fibrillation care?
4) What are your thoughts on the potential challenges of implementing an IPU for atrial fibrillation care in your organisation?
    a. What resources are necessary to successfully implement an IPU for atrial fibrillation care?
    b. How do you plan to address the potential resistance from healthcare professionals or patients?
5) Do you have any additional insights or recommendations for developing and implementing an IPU for atrial fibrillation care in your organisation?

Closing:

6) We thank the stakeholders for their time and participation in this study.
7) Ask if there is anything else they would like to add or if there are any additional resources or contacts they would recommend for further research.
8) End the interview.

**Appendix B - Scripts of semi-structured exploratory interviews with patients with atrial fibrillation:**

1. Introduction and consent
    - Introduction of the interviewer and purpose of the interview
    - Explanation of the consent process and assurance of confidentiality
2. Demographic and medical information
    - General demographic information (age, gender, race/ethnicity, education, occupation, etc.)
    - Medical history, including atrial fibrillation diagnosis, type of atrial fibrillation, comorbidities, and medications
3. Experience with atrial fibrillation
    - How did you become aware of your atrial first?
    - How has atrial fibrillation affected your daily life?
    - What are the most challenging aspects of living with atrial fibrillation?
    - How have you managed your atrial fibrillation? What treatments have you tried?
    - What has been your experience with healthcare providers and the healthcare system regarding your atrial fibrillation care?
    - What do you think can be improved in the care of patients with AF?
4. Lifestyle and self-care
    - How do you manage your symptoms at home?
    - How do you feel about the lifestyle changes you have made to manage your atrial fibrillation?
    - How do you manage stress in your life and do you feel like it has an impact on your atrial fibrillation?
5. Information and education
    - What kind of information have you received regarding AF and its management?
    - Have you found this information helpful?
    - Have you found this easy to understand?
    - Do you have any unanswered questions about your condition or management?
6. Communication with healthcare providers
    - How would you rate the communication between you and your healthcare provider?
    - Have you ever felt that your concerns have not been addressed by healthcare providers?
    - Have you ever felt that you did not have enough time to discuss your concerns with your healthcare provider?
    - Have you ever felt that you were not sufficiently involved in decisions about your care?

7. Final thoughts
    - Is there anything else you would like to share about your experiences with atrial fibrillation?
    - Do you have any suggestions for improving the care of patients with AF?
8. Conclusion and gratitude
    - Recap of the interview and thanking the patient for their time and insights

**Appendix C - Questionnaires for professionals working with patients with AF**

1) How many years of experience do you have working with atrial fibrillation patients? (Closed-answer: less than 1 year, 1-5 years, 5-10 years, more than 10 years)
2) What types of healthcare providers are involved in the care of patients with AF in your organisation? (Open-answer)
3) What are the biggest challenges that you face when treating patients with AF? (Open-answer)
4) Have you or your organisation implemented changes to improve the care of patients with AF?
    a. Yes
    b. No
5) If so, what changes were made? (Open answer)
6) If not, what barriers have prevented your organisation from implementing changes to improve the care of patients with AF? (Open answer)
7) How familiar are you with the concept of an Integrated Practice Unit (IPU)?
    a. Very familiar
    b. Somewhat familiar
    c. Not very familiar
    d. Not familiar at all
8) Have you ever worked in or collaborated with an IPU for the care of patients with atrial fibrillation?
    a. Yes
    b. No
9) If you have worked in an IPU model for the treatment of patients with atrial fibrillation, what was the most significant benefit of this approach? (Open-answer)
10) If you have not worked in an IPU model for the treatment of atrial fibrillation patients, what benefits do you believe this model could bring to patient care? (Open-answer)
11) In your opinion, what are the key benefits of using an IPU to care for patients with AF? (Open answer)
12) What are the main challenges or barriers to implementing an IPU in the care of patients with AF? (Open answer)
13) How do you think an IPU model could change the current care delivery for patients with AF? (Open-answer)
14) How do you think an IPU for the care of patients could improve patient outcomes?
    a. By standardizing care protocols
    b. By improving care coordination

c. By reducing care variation
d. By improving patient engagement and education
e. Other (please specify)

15) How do you think an IPU for the care of patients with AF could impact healthcare costs?
    a. By reducing unnecessary care
    b. By reducing hospital readmissions
    c. By reducing emergency department visits
    d. By improving medication adherence
    e. Other (please specify)
16) In your opinion, what are the most important factors to consider when designing an IPU for care of patients with AF?
    a. Staffing
    b. Organization and workflow
    c. Care protocols and guidelines
    d. Data analytics and performance metrics
    e. Patient education and engagement
    f. Other (please specify)
17) What is the ideal team composition for an IPU focused on the care of patients with AF? (Open-answer)
18) What types of data/metrics do you believe are important for evaluating the performance of an IPU focused on the care of patients with AF? (Open-answer)
19) In your opinion, which specific measures would be most useful for evaluating the quality of care provided by an IPU for atrial fibrillation? (Closed-answer, multiple choice options such as patient outcomes, readmission rates, cost savings, patient satisfaction, etc.)
20) Do you believe that incorporating patient-reported outcome measures (PROMs) is important for evaluating the effectiveness of an IPU in atrial fibrillation care? (Closed-answer, yes or no)
21) What other sources of data or information would be valuable in evaluating the success of an IPU for atrial fibrillation? (Open-answer)
22) How frequently should data/metrics be collected and analysed to evaluate the performance of an IPU for atrial fibrillation? (Closed-answer, options such as monthly, quarterly, annually, etc.)
23) How frequently should these metrics be monitored?
    a. Monthly
    b. Quarterly
    c. Annually
24) Which stakeholders should be involved in evaluating IPU performance?

a. Physicians
b. Nurses
c. Patients and their families
d. Hospital administrators

25) How should the data be analysed and reported to stakeholders?
    a. In regular meetings
    b. In quarterly reports
    c. In an annual report
    d. In a dashboard accessible to all stakeholders
26) What challenges do you anticipate in collecting and analysing data/metrics for an IPU focused on atrial fibrillation care? (Open-answer)
27) Would you recommend using benchmarking or comparison data from other IPUs to evaluate the performance of an IPU for atrial fibrillation? (Closed-answer, yes or no)
28) Do you believe that an IPU model for the treatment of patients with AF could be implemented in your organisation? (Closed-answer: yes or no)
29) If yes, what would be the biggest challenge in implementing this model in your organisation? (Open-answer)
30) If not, what do you think are the barriers to implementing this model in your organisation? (Open-answer)

**Appendix D - Questionnaire/survey for patients with AF**

1. How long have you been diagnosed with atrial fibrillation?
    - Less than 1 year
    - 1-5 years
    - More than 5 years
2. Have you experienced any symptoms related to your atrial fibrillation? Please check all that apply.
    - Palpitations (fluttering in the chest)
    - Fatigue
    - Shortness of breath
    - Chest pain or discomfort
    - Dizziness or lightheadedness
    - Fainting or near fainting
    - Other (please specify): _____
3. What types of treatments have you received for your atrial fibrillation? Please check all that apply.
    - Medications
    - Cardioversion (shock treatment)
    - Catheter ablation
    - Surgery
    - Other (please specify): _____
4. Have you experienced any side effects from your atrial fibrillation treatment? Please check all that apply.
    - Nausea or vomiting
    - Dizziness or lightheadedness
    - Fatigue or weakness
    - Headaches
    - Difficulty sleeping
    - Other (please specify): _____
5. How satisfied are you with your current treatment of atrial fibrillation?
    - Very satisfied
    - Somewhat satisfied
    - Neither satisfied nor dissatisfied
    - Somewhat dissatisfied

- Very dissatisfied

6. Have you received education or information about managing your atrial fibrillation? Please check all that apply.
    - Lifestyle changes (e.g., diet, exercise)
    - Medication management
    - Understanding and managing symptoms
    - Avoiding triggers for atrial fibrillation
    - Other (please specify): _____
7. Have you experienced any challenges or difficulties in managing atrial fibrillation? Please check all that apply.
    - Difficulty understanding treatment options
    - Difficulty adhering to medication regimen
    - Difficulty making lifestyle changes
    - Difficulty recognizing and managing symptoms
    - Other (please specify): _____
8. How has atrial fibrillation affect quality of life?
    - Very negatively
    - Somewhat negatively
    - No effect
    - Somewhat positively
    - Very positively
9. How often do you see a healthcare provider for your atrial fibrillation?
    - Monthly or more often
    - Every 3-6 months
    - Annually
    - Less than annually
    - Never
10. Have you ever participated in support groups or communities for people with atrial fibrillation?
    - Yes
    - No
11. How important is it for you to be actively involved in your care and decision-making process?
    - Very important
    - Somewhat important
    - Not very important
    - Not at all important

12. How frequently would you like to receive updates on your treatment plan from your healthcare team?
    - Weekly
    - Every other week
    - Monthly
    - Every other month
    - Quarterly
    - Annually
    - Other (please specify)
13. What types of support or resources do you feel are necessary to help you manage your condition and maintain your overall health and wellbeing?
14. How do you prefer receiving information about your condition and treatment options?
    - In-person consultations with healthcare providers
    - Online patient portals or websites
    - Printed educational materials
    - Support groups
    - Other (please specify)
15. Is there anything else you would like to share about your experiences with the care you have received for your atrial fibrillation?

## Appendix E – Results of the interviews with the health professionals

**Table 1.**

*Challenges Faced In Managing Care For Atrial Fibrillation Patients*

| Challenge | Frequency |
|---|---|
| Lack of patient education and awareness | 11 |
| Limited access to specialist care | 9 |
| Coordination among healthcare professionals | 8 |
| Adherence to medication and treatment plan | 6 |
| Cost of treatment and medication | 4 |
| Management of comorbidities | 3 |
| Limited use of technology in managing patient records | 2 |

**Table 2.**

*Strategies To Address Challenges In Managing Care For Atrial Fibrillation Patients*

| Strategy | Frequency |
|---|---|
| Patient education and awareness programs | 11 |
| Collaboration and coordination among healthcare professionals | 10 |
| Use of technology to improve patient care and management | 7 |
| Access to specialist care and multidisciplinary teams | 6 |
| Medication management and adherence support | 4 |
| Identification and management of comorbidities | 2 |

**Table 3**.

*Key Components Of An IPU For Atrial Fibrillation Care*

| Component | Frequency |
|---|---|
| Multidisciplinary team of healthcare professionals | 13 |
| Patient education and awareness programs | 12 |
| Use of technology to improve patient care and management | 9 |

| Component | Frequency |
|---|---|
| Access to specialist care and resources | 8 |
| Standardized treatment and medication protocols | 5 |
| Ongoing monitoring and follow-up of patient progress | 4 |

**Table 4.**

*Potential Challenges Of Implementing An IPU For Atrial Fibrillation Care*

| Challenge | Frequency |
|---|---|
| Limited resources and funding | 10 |
| Resistance from healthcare professionals or patients | 7 |
| Difficulty in implementing changes in healthcare systems | 6 |
| Lack of buy-in from hospital administration | 5 |
| Integration with existing care models and workflows | 4 |
| Limited patient awareness and education | 3 |

## Appendix F – Results of the surveys from the healthcare professionals

**Table 5.**

*Years Of Experience Working With Atrial Fibrillation Patients*

| Years of Experience | Number of Respondents |
|---|---|
| Less than 1 year | 2 |
| 1-5 years | 7 |
| 5-10 years | 8 |
| More than 10 years | 15 |

**Table 6.**

*Healthcare Providers Involved In The Care Of Atrial Fibrillation Patients*

| Healthcare Providers | Number of Respondents |
|---|---|
| Cardiologists | 29 |
| Electrophysiologists | 24 |
| Internists | 18 |
| Primary care | 14 |
| Pharmacists | 6 |
| Nurses | 3 |
| Other | 4 |

**Table 7.**

*Biggest Challenges In Treating Atrial Fibrillation Patients*

| Challenge | Number of Respondents |
|---|---|
| Managing stroke risk and anticoagulation therapy | 28 |
| Achieving rate or rhythm control | 23 |
| Patient adherence to medication and lifestyle changes | 21 |
| Coordinating care across different specialties and healthcare settings | 19 |

| Challenge | Number of Respondents |
|---|---|
| Diagnosis and detection of atrial fibrillation | 13 |
| Managing comorbidities and other health issues | 12 |
| Patient education and engagement | 9 |
| Resource allocation and healthcare costs | 7 |
| Physician and patient communication | 6 |
| Limited treatment options for certain patient populations (e.g. elderly, those with comorbidities) | 5 |
| Lack of guidelines or protocols for treatment | 3 |
| Limited access to specialized care | 2 |
| Other | 4 |

**Table 8.**

*Implementation Of Changes To Improve The Care Of Atrial Fibrillation Patients*

| Response | Number of Respondents |
|---|---|
| Yes | 26 |
| No | 6 |

***Table 9***.

*Changes Made To Improve The Care Of Atrial Fibrillation Patients*

| Changes Made | Number of Respondents |
|---|---|
| Development or implementation of guidelines or treatment protocols | 17 |
| Use of electronic health records or other technology for care coordination | 12 |
| Increased patient education and engagement | 10 |
| Multidisciplinary care teams or collaborations with other healthcare providers | 8 |
| Use of patient-reported outcome measures (PROMs) | 5 |

| Changes Made | Number of Respondents |
|---|---|
| Improved communication or care coordination among healthcare providers or across healthcare settings | 4 |
| Changes in anticoagulation therapy or management of stroke risk | 3 |
| Other | 7 |

**Table 10.**

*Barriers To Implementing Changes To Improve The Care Of Atrial Fibrillation Patients*

| Barriers | Number of Respondents |
|---|---|
| Limited resources or funding for implementation | 18 |
| Resistance to change among healthcare providers or patients | 13 |
| Lack of guidelines or evidence-based practices | 12 |
| Difficulty coordinating care across different healthcare settings or specialties | 10 |
| Limited access to specialized care or resources | 6 |
| Insufficient time or workload constraints among healthcare providers | 5 |

**Table 11.**

*How Familiar Are You With The Concept Of An Integrated Practice Unit (IPU)?*

| Response Option | Frequency | Percentage |
|---|---|---|
| Very familiar | 9 | 69.2% |
| Somewhat familiar | 4 | 30.8% |
| Not very familiar | 0 | 0% |
| Not familiar at all | 0 | 0% |

**Table 12.**

*Have You Ever Worked In Or Collaborated With An IPU To Care For Patients With Atrial Fibrillation?*

| Response Option | Frequency | Percentage |
|---|---|---|
| Yes | 3 | 23.1% |
| No | 10 | 76.9% |

**Table 13.**

*If You Had Worked In An IPU Model For The Treatment Of Patients With Atrial Fibrillation, What Was The Most Significant Benefit Of This Approach?*

| Response Option | Frequency | Percentage |
|---|---|---|
| Improved care coordination | 2 | 66.7% |
| Standardized care protocols | 1 | 33.3% |
| Reduced care variation | 0 | 0% |
| Improved patient engagement and education | 0 | 0% |
| Other (please specify) | 0 | 0% |

**Table 14.**

*If You Have Not Worked In An IPU Model For The Treatment Of Atrial Fibrillation Patients, What Benefits Do You Believe This Model Could Bring To Patient Care?*

| Response Option | Frequency | Percentage |
|---|---|---|
| Improved care coordination | 12 | 92.3% |
| Standardized care protocols | 11 | 84.6% |
| Reduced care variation | 9 | 69.2% |
| Improved patient engagement and education | 7 | 53.8% |
| Other (please specify) | 0 | 0% |

**Table 15.**

*In Your Opinion, What Are The Key Benefits Of Using An IPU To Care For Patients With AF?*

| Key Benefits | Count | Percentage |
|---|---|---|
| Improved care coordination | 29 | 90.6% |
| Standardized care protocols | 27 | 84.4% |
| Reduced care variation | 22 | 68.8% |
| Improved patient education and engagement | 20 | 62.5% |
| Improved patient outcomes | 19 | 59.4% |
| Reduced healthcare costs | 17 | 53.1% |
| Improved healthcare provider satisfaction | 9 | 28.1% |

**Table 16.**

*What Are The Main Challenges Or Barriers To Implementing An IPU In The Care Of Patients With AF?*

| Barriers | Count | Percentage |
|---|---|---|
| Resistance to change | 29 | 90.6% |
| Lack of financial resources | 22 | 68.8% |
| Lack of staff resources | 18 | 56.3% |
| Inadequate data analytics infrastructure | 12 | 37.5% |
| Insufficient patient engagement | 10 | 31.3% |
| Lack of physician buy-in | 9 | 28.1% |
| Lack of leadership support | 9 | 28.1% |

**Table 17.**

*How Do You Think An IPU Model Could Change The Current Care Delivery For Patients With AF?*

| Answer Options | Number of Respondents |
|---|---|
| By improving care coordination | 26 |
| By standardizing care protocols | 22 |
| By reducing care variation | 19 |
| By improving patient engagement and education | 17 |

| Answer Options | Number of Respondents |
|---|---|
| Other | 3 |

**Table 18.**

*How Do You Think An IPU For The Care Of Patients Could Improve Patient Outcomes?*

| Answer Options | Number of Respondents |
|---|---|
| By standardizing care protocols | 27 |
| By improving care coordination | 25 |
| By reducing care variation | 17 |
| By improving medication adherence | 13 |
| Other | 2 |

**Table 19.**

*How Do You Think An IPU For The Care Of Patients With AF Could Affect Healthcare Costs?*

| Answer Options | Number of Respondents |
|---|---|
| By reducing hospital readmissions | 26 |
| By reducing unnecessary care | 22 |
| By reducing emergency department visits | 17 |
| By improving medication adherence | 9 |
| Other | 2 |

**Table 20.**

*In Your Opinion, What Are The Most Important Factors To Consider When Designing An IPU For Care Of Patients With AF?*

| Answer Options | Number of Respondents |
|---|---|
| Care protocols and guidelines | 27 |
| Staffing | 23 |
| Organization and workflow | 20 |
| Data analytics and performance metrics | 17 |

| Answer Options | Number of Respondents |
|---|---|
| Patient education and engagement | 14 |
| Other | 1 |

**Table 21.**

*What Is The Ideal Team Composition For An IPU That Focuses On The Care Of Patients With AF?*

| Answer Options | Number of Respondents |
|---|---|
| Cardiologists | 31 |
| Electrophysiologists | 26 |
| Nurses | 26 |
| Primary care physicians | 21 |
| Pharmacist | 12 |
| Patient navigators | 5 |
| Other | 1 |

**Table 22.**

*What Types Of Data/Metrics Do You Believe Are Important For Evaluating The Performance Of An IPU Focused On The Care Of Patients With AF?*

| Data/Metric | Number of Responses |
|---|---|
| Patient outcomes | 28 |
| Readmission rates | 31 |
| Cost savings | 24 |
| Patient satisfaction | 26 |
| Healthcare utilization | 18 |
| Quality of life | 15 |
| Medication adherence | 13 |
| Care coordination | 11 |

**Table 23.**

*In Your Opinion, Which Specific Measures Would Be Most Useful For Evaluating The Quality Of Care Provided By An IPU For Atrial Fibrillation?*

| Measure | Number of Responses |
|---|---|
| Patient outcomes | 30 |
| Readmission rates | 32 |
| Cost savings | 22 |
| Patient satisfaction | 28 |
| Healthcare utilization | 18 |
| Quality of life | 16 |
| Medication adherence | 11 |
| Care coordination | 8 |

**Table 24.**

*Do You Believe That Incorporating Patient-Reported Outcome Measures (Proms) Is Important In Evaluating The Effectiveness Of An IPU In Atrial Fibrillation Care?*

| Response | Number of Responses |
|---|---|
| Yes | 27 |
| No | 5 |

**Table 25**.

*What Other Sources Of Data Or Information Would Be Valuable For Evaluating The Success Of An IPU For Atrial Fibrillation?*

| Data/Information | Number of Responses |
|---|---|
| Health economic outcomes | 20 |
| Patient-reported outcomes | 17 |
| Clinical outcomes | 16 |
| Process outcomes | 15 |
| Quality of care measures | 13 |
| Patient engagement and satisfaction | 12 |

| Data/Information | Number of Responses |
|---|---|
| Utilization and access | 10 |
| Cost and resource utilization | 9 |
| Clinical decision support | 5 |
| Care team member satisfaction | 4 |

**Table 26.**

*How Frequently Should Data/Metrics Be Collected And Analysed To Evaluate The Performance Of An IPU For Atrial Fibrillation?*

| Response | Number of Responses |
|---|---|
| Monthly | 4 |
| Quarterly | 14 |
| Annually | 13 |
| Continuously | 1 |

**Table 27.**

*How Frequently Should These Metrics Be Monitored?*

| Response | Number of Responses |
|---|---|
| Monthly | 7 |
| Quarterly | 16 |
| Annually | 9 |

**Table 28.**

*Which Stakeholders Should Be Involved In Evaluating IPU Performance?*

| Stakeholder | Number of Responses |
|---|---|
| Physicians | 31 |
| Nurses | 29 |
| Patients and their families | 27 |
| Hospital administrators | 26 |

**Table 29.**

*How Should The Data Be Analysed And Reported To Stakeholders?*

| Method | Number of Responses |
|---|---|
| In regular meetings | 20 |
| In quarterly reports | 17 |
| In an annual report | 11 |
| In a dashboard accessible to all stakeholders | 9 |

**Table 30.**

*What Challenges Do You Anticipate In Collecting And Analysing Data/Metrics For An IPU Focused On Atrial Fibrillation Care?*

| Challenge | Number of respondents |
|---|---|
| Data collection and management | 27 |
| Data quality and accuracy | 26 |
| Staff training and education | 16 |
| IT infrastructure and support | 15 |
| Resistance to change from staff | 12 |
| Limited resources | 11 |
| Lack of standardized metrics | 9 |
| Difficulty in integrating data from different sources | 7 |
| Patient privacy concerns | 6 |

**Table 31.**

*Would You Recommend Using Benchmarking Or Comparison Data From Other Ipus To Evaluate The Performance Of An IPU For Atrial Fibrillation?*

| Response | Number of respondents |
|---|---|
| Yes | 20 |
| No | 11 |
| Not sure | 1 |

**Table 32.**

*Do You Believe That An IPU Model For The Treatment Of Patients Could Be Implemented In Your Organisation?*

| Response | Number of respondents |
|---|---|
| Yes | 24 |
| No | 7 |
| Not sure | 1 |

**Table 33.**

*If Yes, What Would Be The Biggest Challenge In Implementing This Model In Your Organisation?*

| Challenge | Number of respondents |
|---|---|
| Resistance to change from staff | 19 |
| Lack of resources | 18 |
| Limited support from administration | 11 |
| Difficulty in integrating care across departments | 9 |
| Lack of buy-in from patients | 8 |
| IT infrastructure challenges | 6 |
| Lack of clear protocols and guidelines | 4 |
| Data management and analysis challenges | 3 |
| Legal and regulatory barriers | 2 |

**Table 34.**

*If Not, What Do You Think Are The Barriers To Implementing This Model In Your Organisation?*

| Barrier | Number of respondents |
|---|---|
| Lack of resources | 4 |
| Resistance to change from staff | 3 |
| Inadequate infrastructure | 3 |
| Lack of administrative support | 2 |
| Insufficient patient demand | 1 |

| Barrier | Number of respondents |
|---|---|
| No perceived need for change | 1 |
| Not applicable (already implemented) | 1 |

## Appendix G – Results of the interviews with the atrial fibrillation patients

**Table 35.**

*Demographic And Medical Information*

| Topic | Summary |
|---|---|
| Age | Ranged from 45-75 years old |
| Gender | 6 male, 3 female |
| Education | 4 had a college degree or higher |
| Occupation | 3 retired, 3 full-time workers, 2 part-time workers, 1 disabled |

**Table 36.**

*Experience With Atrial Fibrillation*

| Topic | Summary |
|---|---|
| Awareness of Condition | All participants were aware of their condition |
| First Awareness of Condition | 3 participants were diagnosed during a routine checkup, 2 noticed symptoms and sought medical attention, 4 experienced a sudden episode |
| Impact on Daily Life | All participants reported some impact on their daily life, including fatigue, difficulty with physical activity, and medication side effects |
| Challenging Aspects | Participants reported challenges related to symptom management, medication side effects, and the unpredictability of episodes |
| Treatment | All participants were taking medication, with some having undergone additional treatments such as cardioversion or ablation |
| Experience with Healthcare Providers | Some participants reported positive experiences, while others reported feeling dismissed or rushed during appointments |

**Table 37.**

*Lifestyle And Self-Care*

| Topic | Summary |
|---|---|
| Symptom Management | Participants reported various strategies for managing symptoms, including rest, hydration, and avoiding triggers |
| Lifestyle Changes | Participants reported making lifestyle changes such as reducing caffeine and alcohol consumption and increasing physical activity |
| Stress Management | Participants reported using stress-management techniques such as meditation and deep breathing |

**Table 38.**

*Information And Education*

| Topic | Summary |
|---|---|
| Information Received | Participants reported receiving information from various sources, including healthcare providers, online resources, and support groups |
| Helpfulness of Information | Participants generally found the information helpful, although some reported difficulty understanding medical jargon |
| Unanswered Questions | Some participants reported having unanswered questions about their condition and its management |

**Table 39.**

*Communication with Healthcare Providers*

| Topic | Summary |
|---|---|
| Communication | Some participants reported positive experiences with communication with healthcare providers, while others reported feeling rushed or dismissed |
| Involvement in Decisions | Participants varied in their level of involvement in decisions about their care |

**Table 40.**

*Final Thoughts*

| Topic | Summary |
|---|---|
| Suggestions for Improvement | Participants suggested improving communication and education about atrial fibrillation, as well as more individualized and holistic approaches to treatment |

## Appendix H – Results of the surveys from the atrial fibrillation patients

**Table 41.**

*How long have you been diagnosed with atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Less than 1 year | 14 | 29.2% |
| 1-5 years | 18 | 37.5% |
| More than 5 years | 16 | 33.3% |
| Total | 48 | 100% |

**Table 42.**

*Have you experienced any symptoms related to your atrial fibrillation? Please check all that apply.*

| Response | Frequency | Percentage |
|---|---|---|
| Palpitations | 38 | 79.2% |
| Fatigue | 23 | 47.9% |
| Shortness of breath | 22 | 45.8% |
| Chest pain/discomfort | 9 | 18.8% |
| Dizziness/lightheadedness | 15 | 31.3% |
| Fainting/near fainting | 6 | 12.5% |
| Other | 2 | 4.2% |
| Total | 48 | 100% |

**Table 43.**

*What types of treatments have you received for your atrial fibrillation? Please check all that apply.*

| Response | Frequency | Percentage |
|---|---|---|
| Medications | 43 | 89.6% |
| Cardioversion | 13 | 27.1% |

| Response | Frequency | Percentage |
|---|---|---|
| Catheter ablation | 11 | 22.9% |
| Surgery | 2 | 4.2% |
| Other | 3 | 6.3% |
| Total | 48 | 100% |

**Table 44.**

*Have you experienced any side effects of atrial fibrillation treatment? Please check all that apply.*

| Response | Frequency | Percentage |
|---|---|---|
| Nausea/vomiting | 8 | 16.7% |
| Dizziness/lightheadedness | 12 | 25.0% |
| Fatigue/weakness | 7 | 14.6% |
| Headaches | 7 | 14.6% |
| Difficulty sleeping | 7 | 14.6% |
| Other | 3 | 6.3% |
| Total | 48 | 100% |

**Table 45.**

*How satisfied are you with your current treatment of atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Very satisfied | 11 | 22.9% |
| Somewhat satisfied | 28 | 58.3% |
| Neither satisfied nor dissatisfied | 6 | 12.5% |
| Somewhat dissatisfied | 2 | 4.2% |
| Very dissatisfied | 1 | 2.1% |
| Total | 48 | 100% |

**Table 46.**

*Have you received education or information about managing atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Lifestyle changes | 35 | 72.9% |
| Medication management | 41 | 85.4% |
| Understanding and managing symptoms | 28 | 58.3% |
| Avoiding triggers for atrial fibrillation | 22 | 45.8% |
| Other | 8 | 16.7% |

**Table 47.**

*Have you experienced any challenges in managing atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Difficulty understanding treatment options | 14 | 29.2% |
| Difficulty adhering to medication regimen | 20 | 41.7% |
| Difficulty making lifestyle changes | 21 | 43.8% |
| Difficulty recognizing and managing symptoms | 25 | 52.1% |
| Other | 5 | 10.4% |

**Table 48.**

*How does atrial fibrillation affect the quality of life?*

| Response | Frequency | Percentage |
|---|---|---|
| Very negatively | 10 | 20.8% |
| Somewhat negatively | 24 | 50.0% |
| No effect | 9 | 18.8% |
| Somewhat positively | 4 | 8.3% |
| Very positively | 1 | 2.1% |

**Table 49.**

*How often do you see a healthcare provider for your atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Monthly or more often | 16 | 33.3% |
| Every 3-6 months | 18 | 37.5% |
| Annually | 8 | 16.7% |
| Less than annually | 3 | 6.3% |
| Never | 3 | 6.3% |

**Table 50.**

*Have you participated in a support group or community for people with atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 7 | 14.6% |
| No | 41 | 85.4% |

**Table 51.**

*How important is it for you to be actively involved in your care and decision-making process?*

| Response | Frequency | Percentage |
|---|---|---|
| Very important | 30 | 62.5% |
| Somewhat important | 13 | 27.1% |
| Not very important | 3 | 6.3% |
| Not at all important | 2 | 4.2% |
| Total | 48 | 100% |

**Table 52.**

*How frequently would you like to receive updates on your treatment plan from your healthcare team?*

| Response | Frequency | Percentage |
|---|---|---|
| Weekly | 1 | 2.1% |
| Every other week | 1 | 2.1% |
| Monthly | 18 | 37.5% |
| Every other month | 6 | 12.5% |
| Quarterly | 11 | 22.9% |
| Annually | 9 | 18.8% |
| Other | 2 | 4.2% |
| Total | 48 | 100% |

**Table 53.**

*What types of support or resources do you feel are necessary to help you manage your condition and maintain your overall health and well-being?*

| Response | Frequency | Percentage |
|---|---|---|
| Access to educational resources on AFib | 32 | 66.7% |
| Support groups for AFib patients | 18 | 37.5% |
| Assistance with lifestyle changes (diet, exercise) | 25 | 52.1% |
| Access to mental health resources | 12 | 25% |
| Access to financial resources | 5 | 10.4% |
| Other | 3 | 6.3% |
| Total | 48 | 100% |

**Table 54.**

*How do you prefer to receive information regarding your condition and treatment options?*

| Response | Frequency | Percentage |
|---|---|---|
| In-person consultations with healthcare providers | 28 | 58.3% |
| Online patient portals or websites | 11 | 22.9% |
| Printed educational materials | 16 | 33.3% |
| Support groups | 10 | 20.8% |
| Other | 2 | 4.2% |
| Total | 48 | 100% |

**Table 55.**

*Is there anything else you would like to share about your experiences with the care you have received for your atrial fibrillation?*

| Response | Frequency | Percentage |
|---|---|---|
| No additional comments | 37 | 77.1% |
| Appreciation for healthcare providers | 5 | 10.4% |
| Desire for more information/education | 4 | 8.3% |
| Frustration with side effects of medication | 2 | 4.2% |
| Total | 48 | 100% |

## Appendix I - Action plan for establishing an IPU for atrial fibrillation:

### *Introduction*

Atrial fibrillation (AF) is the most common cardiac arrhythmia affecting millions of people worldwide. It is associated with significant morbidity, mortality, and healthcare costs. Patients with AF require specialised care that is often fragmented and not well coordinated, leading to suboptimal outcomes and increased healthcare utilisation. Therefore, we propose establishing an Integrated Practice Unit (IPU) for AF at [name of an academic university hospital]. This will bring together a multidisciplinary team of healthcare providers to provide coordinated evidence-based care to patients with AF.

As a leading academic medical centre with a strong cardiology and electrophysiology department, our hospital is uniquely positioned to establish an IPU for AF to provide high-quality, patient-centred care to a diverse patient population. Additionally, we will integrate research and academic plans into the IPU, enabling us to conduct innovative research, train the next generation of healthcare providers, and disseminate knowledge and best practices to the broader healthcare community.

The goals of the IPU for AF are as follows:

- Improve patient outcomes and quality of life
- Reduce healthcare costs by optimising resource utilisation
- Provide coordinated, evidence-based care that is personalised to each patient's needs
- Facilitate communication and collaboration among members of the healthcare team
- Conduct innovative research and disseminate knowledge and best practices to the broader healthcare community.

By establishing an IPU for AF at [name of academic university hospital], we aim to improve the care and outcomes of patients with AF while also advancing the field of cardiology and electrophysiology through research and education.

### *Goals and Objectives*

The goals of the Integrated Practice Unit (IPU) for atrial fibrillation (AF) at [name of academic university hospital] are to provide high-quality, patient-centred care to patients with AF while also advancing the field of cardiology and electrophysiology through research and education. To achieve these goals, we identified the following objectives:

1. **Improve Patient Outcomes**: The IPU for AF aims to improve patient outcomes by providing evidence-based, coordinated care tailored to each patient's needs. To achieve this objective, we will:

- Develop standardised diagnostic and treatment protocols for AF that are based on the latest evidence and guidelines
- Establish a multidisciplinary team of healthcare providers, including cardiologists, electrophysiologists, nurses, pharmacists, and other specialists, who will work together to provide coordinated care to patients with AF
- Implement care coordination tools, such as electronic health records, telehealth, and patient portals, to facilitate communication and collaboration among members of the healthcare team
- Monitoring patient outcomes and adjusting treatment plans to optimise outcomes and quality of life.

2. **Reduce Healthcare Costs**: The IPU for AF aims to reduce healthcare costs by optimising resource utilisation and minimising unnecessary testing and procedures. To achieve this objective, we will:
   - Develop standardised diagnostic and treatment protocols for AF that emphasise cost-effective care
   - Implement shared decision-making tools that help patients and healthcare providers make informed decisions about care that balance effectiveness with cost
   - Monitor healthcare utilisation and identify opportunities to optimise resource utilisation and reduce costs.
3. **Provide Coordinated, Evidence-Based Care:** The IPU for AF aims to provide coordinated, evidence-based care that is personalised for each patient's needs. To achieve this objective, we will:
   - Develop standardised diagnostic and treatment protocols for AF that are based on the latest evidence and guidelines
   - Establish a multidisciplinary team of healthcare providers, including cardiologists, electrophysiologists, nurses, pharmacists, and other specialists, who will work together to provide coordinated care to patients with AF
   - Implementing care coordination tools such as electronic health records, telehealth, and patient portals facilitates communication and collaboration among healthcare team members.
4. **Facilitate Communication and Collaboration Among Members of the Healthcare Team**: The IPU for AF aims to facilitate communication and collaboration among team members to ensure that patients receive comprehensive and coordinated care. To achieve this objective, we will:
   - Establish regular team meetings and communication channels to facilitate information sharing and collaboration among members of the healthcare team

- Implement care coordination tools, such as electronic health records, telehealth, and patient portals, to facilitate communication and collaboration among members of the healthcare team
- Encourage a culture of collaboration and teamwork among members of the healthcare team.

5. **Conduct Innovative Research and Disseminate Knowledge and Best Practices:** The IPU for AF aims to advance the field of cardiology and electrophysiology through innovative research and dissemination of knowledge and best practices. To achieve this objective, we will:
    - Conduct innovative research on AF, including clinical trials, observational studies, and translational research
    - Participate in national and international collaborative research initiatives
    - Disseminate knowledge and best practices through publications, conferences, and educational programmes.

By achieving these objectives, we aimed to establish an IPU for AF at [name of academic university hospital] that provides high-quality, patient-centred care to patients with AF while advancing the field of cardiology and electrophysiology through research and education.

### *SWOT Analysis*

SWOT analysis of an IPU for atrial fibrillation in an academic university hospital setting

#### Strengths:

- Access to specialised, high-quality care from a multidisciplinary team of healthcare providers
- Ability to integrate the latest research and evidence-based guidelines into clinical practice
- Strong institutional support for research and education in the field of cardiology and electrophysiology
- Experienced and knowledgeable staff, including cardiologists, electrophysiologists, nurses, pharmacists, and other specialists
- Advanced diagnostic and treatment technologies, such as cardiac imaging, electrophysiology, and ablation procedures.

#### Weaknesses:

- Potential for high healthcare costs associated with specialised care and advanced technologies

- Risk of patient overload due to the increasing prevalence of atrial fibrillation
- Possible communication barriers between healthcare providers are due to differences in professional backgrounds and clinical priorities.

**Opportunities:**

- Development of innovative treatment approaches, including personalised medicine and precision medicine
- Collaboration with national and international organisations to advance research and clinical care
- Implementation of telemedicine and remote monitoring technologies to improve patient access and follow-up care
- Potential for increased funding opportunities for research and education in cardiology and electrophysiology.

**Threats:**

- Increasing competition from other healthcare providers and institutions offering specialised care for atrial fibrillation
- Regulatory changes and reimbursement policies that could impact funding and resource allocation for the IPU
- Limited public awareness and understanding of atrial fibrillation leads to delayed diagnosis and treatment.

The SWOT analysis suggests that the IPU for atrial fibrillation has several strengths, including access to specialised, high-quality care and a strong research and education infrastructure. However, there are also several challenges, including the potential for high healthcare costs and patient overloads. The IPU has several opportunities to advance the fields of cardiology and electrophysiology through innovative treatment approaches and collaboration with national and international organisations. Finally, the IPU must be aware of several threats, including increasing competition from other healthcare providers, regulatory changes, and limited public awareness of atrial fibrillation.

### *Scope and Patient Population*

The scope of the IPU for atrial fibrillation at [name of an academic university hospital] is to provide comprehensive, multidisciplinary care for patients with atrial fibrillation. The IPU will serve adult

patients of all ages with atrial fibrillation, including those with paroxysmal, persistent, and long-standing persistent atrial fibrillation.

The IPU offers a range of diagnostic and treatment services including

1. **Initial assessment and evaluation**: Comprehensive evaluation of the patient's medical history, physical examination, electrocardiogram, echocardiogram, and laboratory tests, with special attention paid to identifying underlying conditions and risk factors.
2. **Noninvasive and invasive diagnostic procedures**: Noninvasive diagnostic procedures, such as cardiac imaging studies, 24-hour Holter monitoring, and exercise stress testing, will be offered to assess the extent and severity of atrial fibrillation. Invasive diagnostic procedures, such as electrophysiological studies and cardiac catheterisation, may be used to evaluate the electrical activity of the heart and identify and treat any underlying cardiac conditions.
3. **Medical management**: The IPU will offer medical management of atrial fibrillation, including rate and rhythm control, anticoagulation therapy, and management of comorbidities.
4. **Interventional procedures**: The IPU offers a range of interventional procedures, such as catheter ablation, electrical cardioversion, and left atrial appendage closure, to treat atrial fibrillation and its complications.
5. **Rehabilitation and lifestyle modification**: The IPU provides rehabilitation services, including physical therapy and exercise programs, to help patients recover and improve their quality of life. Lifestyle modification services, including smoking cessation, weight loss, and stress management, will also be offered to help reduce the risk of future cardiac events.

In addition to patient care, IPU will focus on research and education. The IPU will conduct clinical trials and research to evaluate new treatments and diagnostic technologies for atrial fibrillation. The IPU also provides educational resources for healthcare providers and patients, including seminars, webinars, and educational materials. Integrating research and education into clinical care will help advance the field of cardiology and electrophysiology and improve outcomes in patients with atrial fibrillation.

### *Multidisciplinary Team:*

The IPU for atrial fibrillation at [name of academic university hospital] will bring together a multidisciplinary team of healthcare professionals with specialised training and expertise in diagnosing, treating, and managing atrial fibrillation. The team consist of the following members:

1. **Cardiologists**: Cardiologists with expertise in electrophysiology and cardiac imaging will provide the initial assessment, diagnosis, and management of atrial fibrillation. They will work

with patients to develop personalised treatment plans and oversee their overall care within the IPU.

2. **Electrophysiologists**: Electrophysiologists with specialised training will perform diagnostic and therapeutic procedures, such as electrophysiological studies and catheter ablation, to treat atrial fibrillation and other cardiac arrhythmias.
3. **Nurses**: Nurses with expertise in cardiology and electrophysiology provide ongoing patient care, including monitoring vital signs, administering medications, and coordinating care with other healthcare providers.
4. **Pharmacists**: Pharmacists with expertise in cardiovascular pharmacology manage medication therapies for patients with atrial fibrillation, including anticoagulation therapy and antiarrhythmic medications.
5. **Nutritionists**: Nutritionists will provide nutritional counselling and education to help patients make dietary modifications to reduce the risk of cardiovascular disease and improve their overall health.
6. **Rehabilitation specialists**: Rehabilitation specialists such as physical therapists and exercise physiologists provide exercise programs and other rehabilitative services to help patients recover from cardiac events and improve their cardiovascular health.
7. **Social workers**: Social workers provide emotional support and counselling to help patients and their families cope with the psychological and social impacts of AF.

A multidisciplinary team will collaborate to provide comprehensive, patient-centred care for patients with atrial fibrillation. They will develop personalised treatment plans based on each patient's unique needs and provide ongoing support and education to help patients manage their condition and improve their quality of life. By bringing together a team of healthcare professionals with diverse skills and expertise, the IPU can provide the highest level of care for patients with atrial fibrillation.

It is important to consider the involvement of other medical specialists in the care of patients with atrial fibrillation, particularly those with underlying medical conditions that require additional expertise. The inclusion of other medical specialists depends on the individual needs of each patient and their specific medical history. Examples of medical specialists who may be involved in the care of patients with atrial fibrillation include:

1. **Internal medicine physicians**: Internal medicine physicians may be involved in the care of patients with multiple medical conditions, including diabetes, hypertension, and hyperlipidaemia, which can contribute to the development and progression of atrial fibrillation.
2. **Endocrinologists**: Endocrinologists may be involved in caring for patients with thyroid diseases that can increase the risk of developing atrial fibrillation.

3. **Pulmonologists**: Pulmonologists may be involved in caring for patients with chronic obstructive pulmonary disease (COPD) or obstructive sleep apnoea (OSA), which are associated with an increased risk of atrial fibrillation.
4. **Neurologists**: Neurologists may be involved in caring for patients with a history of stroke or other neurological conditions, which can be complications of atrial fibrillation.

Including these and other medical specialists in caring for patients with atrial fibrillation will help ensure that each patient receives comprehensive, coordinated care that addresses all their medical needs. A multidisciplinary team can work together to develop a personalised treatment plan that considers each patient's unique medical history and risk factors and includes input from all relevant medical specialists.

### *Care Pathway:*

The care pathway for patients with atrial fibrillation [name of academic university hospital] will be designed to provide comprehensive, coordinated care tailored to each patient's needs. The pathway includes the following components.

1. **Initial assessment**: Patients with suspected or confirmed atrial fibrillation will undergo an initial assessment by a cardiologist or an electrophysiologist. This will include thorough medical history, physical examination, and diagnostic tests such as electrocardiography (ECG) and echocardiography.
2. **Diagnosis**: Patients with confirmed atrial fibrillation will receive a formal diagnosis, and their condition will be classified according to the type and severity of atrial fibrillation.
3. **Risk stratification** Patients will undergo risk stratification to determine the risk of stroke and other complications associated with atrial fibrillation. This will include assessment of factors such as age, comorbidities, and other risk factors.
4. **Treatment planning**: Based on the patient's diagnosis and risk stratification, a personalised treatment plan will be developed, including medication therapy, catheter ablation, and other procedures.
5. **Medication management**: Patients who require medication therapy will receive ongoing medication management to ensure optimal dosing, side effect monitoring, and therapy compliance.
6. **Procedural management**: Patients undergoing catheter ablation or other procedures receive ongoing post-procedural care and follow-up management.

7. **Lifestyle modifications**: Patients will be encouraged to make lifestyle modifications, such as quitting smoking, maintaining a healthy diet, and engaging in regular exercise, to improve their cardiovascular health and reduce their risk of complications.
8. **Patient education**: Patients and their families will receive ongoing education about atrial fibrillation, its management, and adherence to treatment and lifestyle modifications.
9. **Follow-up**: Patients will receive ongoing follow-up care to monitor their response to treatment, assess complications, and adjust their treatment plans as needed.

The care pathway should be designed to promote efficient and effective care, reduce variability in care, and improve patient outcomes. This will be regularly reviewed and updated to incorporate new evidence-based practices and technological advances.

### *Care Coordination Tools*

To ensure that care for patients with atrial fibrillation is well-coordinated and delivered efficiently, the following care coordination tools will be utilised:

1. **Electronic health records (EHRs)**: EHRs capture and store patient data including medical history, diagnostic test results, and treatment plans. EHRs will be accessible to all care team members and will facilitate patient information sharing across specialties.
2. **Care teams and huddles:** Multidisciplinary care teams will be established for patients with atrial fibrillation, including cardiologists, electrophysiologists, nurses, pharmacists, and other relevant healthcare providers. Regular **team huddles** will be held to review patient progress, coordinate care plans, and address barriers to care.
3. **Clinical pathways and protocols**: Clinical pathways and protocols will be developed to ensure that patients receive evidence-based standardised care tailored to their needs. These pathways outline the recommended diagnostic tests, medications, procedures, and lifestyle modifications based on the patient's diagnosis and risk stratification.
4. **Patient portals**: Patients have access to a portal to view their medical records, schedule appointments, and communicate with healthcare providers. The portal will also provide patients with educational resources and tools to support the self-management of their condition.
5. **Referral management**: Patients who require referral to other medical specialists are referred through an electronic referral system. The system tracks the status of each referral and ensures that patients receive timely follow-up care.

6. **Performance metrics and quality improvement**: Performance metrics and quality improvement initiatives should be established to monitor patient outcomes and identify areas for improvement in care delivery. Regularly reviewing metrics will allow for adjustments to the care pathway to optimise patient outcomes and streamline care delivery.

By utilising these care coordination tools, the care team can effectively coordinate care for patients with atrial fibrillation and ensure that each patient receives comprehensive care that addresses all their medical needs.

### *Training and Education:*

Training and education for multidisciplinary care teams are key components of atrial fibrillation IPU. The following initiatives will be implemented to ensure that all care team members are equipped with the necessary knowledge and skills to provide high-quality care to patients with atrial fibrillation.

1. **Continuing education**: All care team members are required to participate in continuing education opportunities to stay up-to-date on the latest research, treatments, and technologies related to atrial fibrillation. These opportunities may include conferences, webinars, online courses, and onsite training sessions.
2. **Interdisciplinary training**: Interdisciplinary training sessions are held to promote collaboration and communication among care team members. These sessions will allow team members to learn from one another and share best practices for care delivery.
3. **Simulation training**: Simulation training will provide hands-on training for procedures, such as catheter ablation. These sessions will allow the care team members to practice their skills in a safe and controlled environment.
4. **Patient education**: Patients and their families will receive education about atrial fibrillation and its management from all the care team members. Care team members will be trained to communicate complex medical information in a manner that is easy for patients to understand.
5. **Research and academic opportunities**: care team members can participate in research and academic activities related to atrial fibrillation. These activities may include conducting research, presenting at conferences, and publishing scholarly articles.

The atrial fibrillation IPU can deliver high-quality, patient-centred care informed by the latest research and evidence-based practices, by providing comprehensive training and education to the care team.

### *Monitoring and Evaluation*

A comprehensive monitoring and evaluation plan should be established to ensure that the atrial fibrillation IPU achieves its goals and objectives. The following initiatives were implemented.

1. **Patient satisfaction surveys**: Patients will be surveyed to assess their satisfaction with the care they receive from an IPU. Feedback will be used to improve the patient experience and identify areas for improvement.
2. **Clinical outcome metrics**: Clinical outcome metrics will be established to monitor patient outcomes such as stroke rates, hospital readmissions, and mortality rates. These metrics will be tracked and analysed to identify areas for improvement in care delivery.
3. **Quality improvement initiatives** should be established to identify and address areas of improvement in care delivery. These initiatives may include process improvements, clinical pathways, protocol changes, and staff education and training.
4. **Peer review** Regular peer review sessions will be conducted to assess the quality of care delivered by the IPU. These sessions allow care team members to learn from one another and share best practices.
5. **Cost analysis**: The cost of care delivered by the IPU will be analysed to ensure that care is delivered efficiently and cost-effectively.
6. **Research and academic activities**: The IPU will conduct research studies and participate in academic activities to contribute to the body of knowledge related to atrial fibrillation care delivery. These activities will be evaluated to assess their impact on patient outcomes and care delivery.

By monitoring and evaluating the atrial fibrillation IPU on an ongoing basis, the care team will be able to identify areas for improvement in care delivery and adjust to optimise patient outcomes and streamline care delivery.

### *Business scorecard for the atrial fibrillation IPU*

#### Financial Dimension:

- **Revenue**: Track the revenue generated by the IPU through patient care activities, including consultations, diagnostic tests, and treatments. We set a revenue target for the IPU based on historical revenue data and projected growth rates.
- **Expenses**: Monitor the expenses of running the IPU, including salaries, equipment costs, and supplies. Set an expense target to ensure that the IPU operates within the budget and achieves profitability.

- **Profit margin**: The profit margin of the IPU is calculated by subtracting expenses from revenue and dividing by revenue. We set a target profit margin to ensure that the IPU operates efficiently and generates healthy return on investment.

### Patient Dimension:

- **Patient satisfaction** surveys were conducted to assess patient satisfaction with care received from the IPU. Set a target satisfaction score to ensure that patients receive high-quality care and that the IPU meets their expectations.
- **Mortality rate**: The mortality rate of patients treated with IPU was tracked. We set a target mortality rate to ensure that the IPU delivers high-quality care, which leads to positive patient outcomes.
- **Hospital readmission rate**: The rate at which patients are readmitted to the hospital after receiving care from the IPU. Setting a target readmission rate to ensure that patients receive effective care reduces the need for readmission.

### Internal process dimensions

- **Time to treatment**: The time it takes for patients to receive treatment from the IPU, from initial consultation to procedure or medication administration. Set a target time for treatment to ensure that patients receive timely care that maximises the chances of positive outcomes.
- **Procedure completion rate**: The rate at which the procedures are completed successfully by the IPU is monitored. The target completion rate was set to ensure that the procedures were performed safely and effectively.
- **Compliance with clinical protocols**: The percentage of patients for whom the care team followed the clinical protocols was tracked. Setting a target compliance rate to ensure that care is delivered consistently and following best practices.

### Learning and growth dimensions

- **Staff education and training**: Monitor the participation of care team members in education and training activities such as conferences, workshops, and continuing education courses. Set a target participation rate to ensure that the care team continually develops skills and knowledge.

- **Research studies conducted**: Tracking the number of studies conducted by the IPU and the impact of these studies on the field of atrial fibrillation care. We set a target number of studies and impact levels to ensure that the IPU contributes to advancing knowledge in the field.
- **Innovation**: The introduction of new technologies, techniques, and processes into the care delivery model of IPU. We set a target innovation level to ensure that the IPU continuously improves its care delivery model and achieves the best possible patient outcomes.

By tracking and analysing these metrics across the four dimensions of the business scorecard, the care team can identify areas for improvement and take action to optimise care delivery and achieve the goals and objectives of the IPU.

### *Continuous Improvement*

#### Quality Improvement Initiatives

The care team will develop and implement quality improvement initiatives that address the most critical areas of improvement within the IPU. These initiatives focus on enhancing patient outcomes, improving patient satisfaction, and optimising operational efficiency. Examples of quality improvement initiatives that will be addressed include the following.

- Standardising clinical protocols and procedures
- Implementing evidence-based care pathways
- Enhancing communication and collaboration among care team members
- Improving patient education and engagement
- Reducing wait times and improving access to care
- Implementing data-driven quality improvement initiatives that use analytics and performance metrics to identify areas for improvement

#### Root Cause Analysis:

The care team will conduct root-cause analyses to identify the underlying causes of the problems and inefficiencies within the IPU. Root-cause analysis involves investigating incidents, errors, or problems to determine the underlying factors contributing to them. By conducting root cause analyses, the IPU can identify opportunities for process improvement and implement solutions that address underlying issues.

### Lean Six Sigma:

The care team will implement Lean Six Sigma methodologies to optimise operational efficiency and reduce waste within the IPU. Lean Six Sigma is a data-driven approach to process improvement that involves identifying and eliminating waste, reducing variability, and optimising processes to improve efficiency and quality. By implementing Lean Six Sigma, the IPU can reduce costs, improve patient outcomes, and increase staff satisfaction.

### Continuous Education and Training

The IPU will provide continuous education and training to the care team to ensure that they are up-to-date on the latest developments in the field of atrial fibrillation care. This includes providing training on new procedures, technologies, and best practices as well as continuing education opportunities that allow care team members to stay current with the latest research and clinical guidelines.

### Performance Monitoring and Reporting:

Monitor and report the performance of the IPU using various performance metrics, including patient outcomes, patient satisfaction, operational efficiency, and financial performance. The IPU leadership team should regularly review these metrics to identify areas for improvement and develop strategies to optimise care delivery.

### Continuous Innovation:

IPU leadership encourages a culture of continuous innovation within the IPU by encouraging the development and implementation of new technologies, procedures, and care models. This includes collaboration with industry partners, conducting research studies, and leveraging data analytics to identify new opportunities for innovation and improvement.

The IPU can optimise its care delivery model by implementing continuous improvement strategies, improving patient outcomes, and enhancing the overall patient experience.