

MSAC Application 1828

**Review of devices used in
catheter-based cardiac ablation for the
treatment of patients with cardiac
arrhythmias**

PICO Set

Population

Describe the population in which the proposed health technology is intended to be used:

Cardiac arrhythmias are disorders of the heart's electrical system that result in abnormal heart rhythms and can significantly impact morbidity, quality of life and mortality. Arrhythmias are defined as brief episodes (paroxysmal), persistent, long-standing persistent or permanent. They are classified according to their origin in the heart, including ventricles (VA) and the atria and/or atrioventricular (AV) node (Heart Foundation Australia 2026).

The proposed health technology is intended for use in patients diagnosed with cardiac arrhythmias, specifically atrial fibrillation (AF), ventricular arrhythmia (VA), or supraventricular tachycardia (SVT) who are considered suitable candidates for catheter-based ablation procedures.

AF is the most common sustained arrhythmia and is characterised by disorganised electrical activity in the atria, resulting in an irregular and rapid ventricular response (Joglar et al. 2024). VAs arise from abnormal electrical activity within the ventricles and can range from benign ectopic beats to more serious forms such as ventricular tachycardia (VT) (Cronin et al. 2019). SVTs are a group of arrhythmias originating above the ventricles, including those involving the atria or AV node (Brugada et al. 2019). Together, these arrhythmia subtypes represent clinically important populations for whom catheter ablation may provide effective symptom control and reduction in arrhythmia burden.

AF affects 2–4% of the adult population in Australia, with prevalence increasing rapidly with age, reaching 9% for people aged over 80 years (Brieger et al. 2018). In addition to age, the prevalence of AF is influenced by a range of cardiovascular risk factors and comorbidities, including hypertension, heart failure, coronary artery disease, obesity, diabetes and chronic kidney disease. AF is the most common arrhythmia in clinical practice, often associated with an increased risk of heart failure, stroke and death. In 2022, AF contributed to 9.5% of all deaths (Australian Institute of Health and Welfare 2025). However, the true prevalence is likely underestimated due to the high occurrence of asymptomatic or subclinical AF. This presents a challenge for clinicians, as serious complications such as a stroke may arise before AF is detected and formally diagnosed (Brieger et al. 2018).

AF imposes a large and growing burden on healthcare resources. Between 10 and 30% of patients with AF are hospitalised each year, with the total number of AF-related hospitalisations in Australia increasing 6% annually over a 15-year period. This rate of growth exceeds that observed for other cardiovascular conditions (Wong et al. 2012). Hence, the societal and healthcare costs of AF will continue to escalate unless AF and its risk factors and complications are prevented and treated effectively.

Specify any characteristics of patients with the medical condition, or suspected of, who are proposed to be eligible for the proposed health technology, describing how a patient would be investigated, managed and referred within the Australian health care system in the lead up to being considered eligible for the technology:

Within the Australian healthcare system, patients commonly first present to a general practitioner, emergency department or general cardiology service with symptoms such as palpitations, dyspnoea, chest discomfort or rhythm abnormalities detected on examination or monitoring. Initial evaluation is guided by national and international clinical guidelines and begins with a comprehensive clinical assessment, including medical history, physical examination and a 12-lead electrocardiogram with ambulatory rhythm monitoring. Australian guidance also emphasises the

structured assessment of stroke risk, bleeding risk and cardiovascular comorbidities as a part of initial evaluation and treatment planning (Briege et al. 2018).

Following diagnosis, patients are managed according to arrhythmia type, severity of the condition and underlying heart disease. Initial management may include rate or rhythm control medicines, anticoagulation for eligible patients with AF, and treatment of underlying cardiovascular risk factors and comorbidities. Patients are referred to a cardiologist and, where appropriate, to a cardiac electrophysiologist when the arrhythmia remains symptomatic, recurrent, drug refractory, poorly tolerated, or when catheter ablation is considered an appropriate definitive treatment option (Briege et al. 2018; Kistler et al. 2024).

Before being considered eligible for catheter ablation, patients undergo specialist assessment to confirm arrhythmia mechanism, define the anatomical substrate and determine procedural appropriateness (Kistler et al. 2024). Patients most likely considered to be eligible are those with AF, SVT or VA (including VT). Australia's 2023 guidelines recommend cardiac ablation as first-line treatment compared to pharmacotherapy for the majority of patients with symptomatic AF (paroxysmal, persistent), AF patients with heart failure with reduced ejection fraction, and asymptomatic patients with certain characteristics. These guidelines are in line with global guidelines (NICE 2021; Van Gelder et al. 2024).

Provide a rationale for the specifics of the eligible population:

The eligible population is aligned with the existing Medical Benefits Schedule (MBS) item descriptors and does not represent an expansion of the currently funded population. Overall, these items apply to patients with clinically significant cardiac arrhythmias requiring catheter-based ablation, including supraventricular arrhythmias confined to a single atrial chamber, more complex atrial arrhythmias involving both atria (including AF), and ventricular arrhythmias such as VT. These item descriptors reflect clinically meaningful distinctions in arrhythmia type, anatomical location, and procedural requirements and ensures that patient selection is consistent with Australian clinical practice. Restricting the eligible population to those captured under existing MBS items ensures that cardiac ablation is applied to patients whom it is already considered appropriate based on symptom burden, arrhythmia recurrence, and suitability for invasive management, without extending access beyond current funding or clinical indications.

Intervention

Name of the proposed health technology:

Catheter-based cardiac ablation

Describe the key components and clinical steps involved in delivering the proposed health technology:

Catheter-based cardiac ablation is a minimally invasive electrophysiology procedure used to treat cardiac arrhythmias by destroying (ablating) abnormal electrical pathways or foci within the heart. Cardiac ablation can be delivered via radiofrequency ablation (RFA), cryoablation or pulsed field ablation (PFA) (Rivano et al. 2024). The most common applications include atrial fibrillation (AF), atrial flutter, supraventricular tachycardia (SVT) and ventricular tachycardia (VT) (Kistler et al. 2024).

Cardiac ablation procedure

Guidelines recommend catheter ablation as a first- or second-line treatment option for many arrhythmias, depending on the indication and patient profile (Hilu et al. 2025). Ablation is

delivered via a specialised catheter tip positioned precisely at the identified target site, creating localised lesions that electrically isolate or eliminate the arrhythmogenic tissue (Andrade 2023).

Vascular access is required to introduce catheters into the cardiac chambers for ablation. Access is typically obtained via the femoral vein or artery in the groin, established using standard percutaneous techniques (Triantafyllou et al. 2022). Sheaths are inserted to allow passage of multiple electrode catheters into the heart (Baykaner et al. 2020). For left-sided procedures (such as AF ablation), transseptal puncture is performed to access the left atrium through the interatrial septum (Baykaner et al. 2020).

Prior to ablation, electrophysiology studies and electroanatomical mapping are performed to identify the arrhythmia substrate (Kim et al. 2020). This involves placing diagnostic catheters at key intracardiac locations including the His bundle, coronary sinus and right ventricle, to record electrical signals (Kim et al. 2020). Three-dimensional electroanatomical mapping systems are used to construct detailed maps of the heart's electrical activity, identifying abnormal pathways, triggers, or scar tissue driving the arrhythmia (Kim et al. 2020).

Following energy delivery, repeat electrophysiology testing is performed to confirm procedural success. The patient is then monitored in a recovery or overnight ward setting, with catheters and sheaths removed and haemostasis achieved at the vascular access sites (Katritsis and Calkins 2012).

Cardiac catheter ablation is performed in a dedicated cardiac catheterisation laboratory equipped with fluoroscopy, electroanatomical mapping systems, intracardiac echocardiography and physiological monitoring. The procedure requires a multidisciplinary team including an interventional electrophysiologist, cardiac nurses, and radiographers or technologists. Accredited centres with appropriate procedural volumes are recommended to ensure safety and efficacy outcomes (Kalman et al. 2013).

Prescribed List Bundle for Cardiac Catheter Ablation

Table 1 outlines the specific technologies included in the current Prescribed List bundle for catheter ablation. The combined benefit for any combination of devices used within a single procedure is capped at \$6,399. Where the sum of individual device benefits exceeds this cap, a pro-rata formula is applied to calculate the benefit payable for each device. Note that other procedural consumables such as sheaths are not included in the Prescribed List bundle and are funded through separate hospital or other existing arrangements.

Table 1 Prescribed List Bundle for Cardiac Catheter Ablation

Product Group	Category	Product Subgroup
Radio Frequency Ablation	Catheter	08.18.01.01 - Irrigated Cardiac Ablation Catheter
		08.18.01.04 - Non-irrigated cardiac ablation catheter
		08.18.01.05 - Intracardiac Electrophysiology Catheter
	Mapping	08.18.01.03 - Mapping Catheter
	Patch	08.18.01.02 - Patch
Cryoablation	Catheter	08.18.02.01 - Ablation Catheter
	Mapping	08.18.02.02 - Mapping Catheter

Pulsed Field Ablation	Catheter and Mapping	08.18.03.01 - Ablation and Mapping Catheter
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Current MBS items for Cardiac Catheter Ablation

Several MBS items currently exist for cardiac catheter ablation and related electrophysiology services, sitting within Category 3 (Therapeutic Procedures), Group T8 (Surgical Operations), Subgroup 6 (Cardio-Thoracic). The key items are summarised in Table 2.

Table 2 MBS items for Cardiac Ablation

MBS item	Description	Schedule Fee	Benefit (75%)
38287	Ablation of arrhythmia circuit or focus or isolation procedure involving one atrial chamber	\$2,448.10	\$1,836.10
38290	Ablation of arrhythmia circuits or foci, or isolation procedure involving both atrial chambers and including curative procedures for atrial fibrillation	\$3,117.05	\$2,337.80
38293	Ventricular arrhythmia with mapping and ablation, including all associated electrophysiological studies performed on the same day	\$3,345.75	\$2,509.35

Source: Medicare Benefits Schedule

Abbreviations: MBS, Medicare Benefits Schedule

All ablation items are hospital-only services and require both anaesthesia and an assistant.

The existing MBS items cover three broad procedural categories: single-chamber atrial ablation (item 38287), bi-atrial ablation including curative procedures for atrial fibrillation (item 38290), and ventricular arrhythmia ablation with mapping (item 38293). While these items have remained largely unchanged since their introduction, the technology and clinical practice underpinning cardiac catheter ablation have evolved substantially since the last MSAC assessment in 2019.

Devices

The costs of devices and consumables used in cardiac ablation procedures are reimbursed separately through the Prescribed List bundle, currently set at \$6,399.

REDACTED.

Preliminary modelling shows that the devices would remain cost-effective at this price based on the updated clinical evidence, while supporting the financial sustainability of the procedure for private hospitals.

When cardiac catheter ablation was initially considered by MSAC in 2019, the standard procedural technology consisted primarily of conventional radiofrequency ablation catheters and basic electrophysiology mapping equipment. Since that time, the technology used to deliver ablation has expanded considerably, with several key innovations now forming part of routine procedural workflows to improve safety, procedural efficiency and long-term effectiveness. These

include irrigated tip catheters, pulsed field ablation catheters, high-density electroanatomical mapping systems, and intracardiac echocardiography.

Irrigated Tip Catheters

Modern ablation procedures utilise irrigated tip radiofrequency catheters, which deliver continuous saline irrigation at the catheter–tissue interface during energy delivery. This prevents excessive heat accumulation, reduces the risk of char and thrombus formation, and enables the creation of deeper, more durable lesions compared to non-irrigated predecessors (Müssigbrodt et al. 2015). Irrigated tip catheters are now considered standard of care in most ablation workflows, including AF and ventricular tachycardia procedures (Gorantla et al. 2023).

Pulsed Field Ablation Catheters

Pulsed field ablation (PFA) is a non-thermal energy modality that uses high-voltage electrical pulses to induce irreversible electroporation of cardiomyocytes (Chun et al. 2024). Unlike radiofrequency or cryoablation, PFA exploits the selective vulnerability of cardiac tissue and largely spares adjacent structures such as the oesophagus and phrenic nerve, offering a potentially improved safety profile (Iyengar et al. 2023). PFA catheters represent a significant advancement in single-shot pulmonary vein isolation for AF and are increasingly being adopted in Australian and international electrophysiology programmes (Lee et al. 2024; Reddy et al. 2025).

Electroanatomical Mapping Systems

High-density electroanatomical mapping systems are now an essential component of complex ablation procedures (Kim et al. 2020). These platforms construct three-dimensional representations of cardiac chambers, integrate electrical activation and voltage data, and guide catheter navigation in real time, reducing procedural reliance on fluoroscopy (Bazoukis et al. 2024). Mapping systems are particularly critical in substrate-based ablation for ventricular tachycardia and complex atrial arrhythmias, where precise delineation of scar and abnormal conduction pathways is required for procedural success (Bazoukis et al. 2024).

Intracardiac Echocardiography

Intracardiac echocardiography (ICE) has become an increasingly routine adjunct to catheter ablation, providing real-time intraprocedural imaging to guide transseptal puncture, confirm catheter contact and positioning, monitor for complications such as pericardial effusion, and reduce fluoroscopy exposure for both patients and operators (Goya et al. 2020). Observational data supports associations between ICE use and reductions in fluoroscopy time and dose, as well as lower rates of tamponade and arrhythmia-related readmission in ventricular tachycardia procedures (Goya et al. 2020).

Identify how the proposed technology achieves the intended patient outcomes:

Cardiac catheter ablation achieves its intended outcomes by directly targeting and eliminating the underlying electrophysiological substrate responsible for the arrhythmia, rather than suppressing symptoms through ongoing pharmacological therapy. By creating precise lesions at arrhythmogenic foci or circuits, the procedure aims to restore normal sinus rhythm and reduce or eliminate arrhythmia recurrence (Katrakis and Calkins 2012). This mechanism of action translates into clinically meaningful improvements in symptom burden, quality of life, and, in select populations, survival.

The clinical utility of catheter ablation is derived from this mechanism of action and the subsequent change in patient management it enables. Patients who achieve durable rhythm

control following ablation may be able to cease anti-arrhythmic drug therapy and anticoagulation, eliminating the long-term monitoring burden and toxicity risks associated with agents such as amiodarone. This represents a meaningful improvement in both treatment burden and quality of life compared with ongoing pharmacological management.

Catheter ablation also addresses an important treatment gap for patients who are refractory to, intolerant of, or have contraindications to anti-arrhythmic drug therapy. For these patients, ablation may represent the only available curative-intent option for achieving durable rhythm control (Kalman et al. 2013). The minimally invasive percutaneous approach, performed under conscious sedation or general anaesthesia with most patients discharged within one to two days, supports a favourable recovery profile relative to surgical alternatives and is associated with high patient acceptability (Katritsis and Calkins 2012).

Does the proposed health technology include a registered trademark component with characteristics that distinguishes it from other similar health components?

No

Explain whether it is essential to have this trademark component or whether there would be other components that would be suitable:

N/A

Are there any proposed limitations on the provision of the proposed health technology delivered to the patient (For example: accessibility, dosage, quantity, duration or frequency):

As per the current MBS items for cardiac ablation, there is no proposed limitation of the provision of the health service.

Provide details and explain:

N/A

If applicable, advise which health professionals will be needed to provide the proposed health technology:

There will be no changes to the current MBS items for cardiac catheter ablation. Cardiac catheter ablation would be requested by a treating cardiologist or electrophysiologist following clinical assessment and confirmation of an appropriate arrhythmia indication. Referral may also originate from a general practitioner or other specialist, with the procedure authorised and performed by a qualified electrophysiologist.

In line with the associated MBS training requirements, providers of the services associated with items 38287, 38290, and 38293 must meet the electrophysiologist fellowship training requirements described in the Cardiac Society of Australia and New Zealand (CSANZ) Expert Position Statement on Catheter and Surgical Ablation for Atrial Fibrillation, or equivalent (Kistler et al. 2024). This requirement reflects the technical complexity of the procedure and the need for specialist expertise to ensure patient safety and procedural efficacy.

The procedure must be performed in an accredited cardiac catheterisation laboratory within a hospital setting, as all ablation MBS items are designated hospital-only services. Delivery of the procedure requires a multidisciplinary team including a cardiac electrophysiologist to perform the ablation, a cardiac anaesthetist or anaesthetic team to administer and monitor sedation or general anaesthesia, cardiac nurses or catheterisation laboratory nurses to assist with procedural setup, patient monitoring, and post-procedural care, and a cardiac physiologist or

electrophysiology technologist to operate electroanatomical mapping systems, physiological monitoring equipment, and intracardiac echocardiography where used.

If applicable, advise whether delivery of the proposed health technology can be delegated to another health professional:

N/A

If applicable, advise if there are any limitations on which health professionals might provide a referral for the proposed health technology:

Patients should be referred by a cardiologist, cardiac electrophysiologist, or consultant physician with relevant expertise in the management of cardiac arrhythmias. Referral from a general practitioner may be appropriate in the first instance to initiate specialist review, however the decision to proceed to catheter ablation should be made by, or in consultation with, a specialist with appropriate expertise in arrhythmia management.

Is there specific training or qualifications required to provide or deliver the proposed service, and/or any accreditation requirements to support delivery of the health technology?

Yes

Provide details and explain:

Cardiac catheter ablation is a complex invasive electrophysiology procedure that requires specific specialist training, qualifications, and institutional accreditation for safe and effective delivery.

At the provider level, in line with the explanatory notes associated with MBS items 38287, 38290, and 38293, all providers performing cardiac catheter ablation must meet the electrophysiologist fellowship training requirements described in the CSANZ Expert Position Statement on Catheter and Surgical Ablation for Atrial Fibrillation, or equivalent (Kistler et al. 2024). This ensures that only appropriately credentialed specialists with demonstrated competency in electrophysiology and catheter-based procedures perform ablation services.

At the institutional level, cardiac catheter ablation must be performed in a hospital-based cardiac catheterisation laboratory with appropriate infrastructure, including fluoroscopy, electroanatomical mapping systems, intracardiac echocardiography capability, and physiological monitoring equipment. Facilities should meet the accreditation and credentialing standards set out by the CSANZ and relevant hospital credentialing bodies to ensure that appropriate procedural volumes, equipment and multidisciplinary staffing are maintained (Muller et al. 2021).

Supporting staff, including cardiac physiologists and electrophysiology technologists responsible for operating mapping and imaging systems, should hold relevant qualifications and demonstrated competency in the operation of the specific platforms used within their institution.

Indicate the proposed setting(s) in which the proposed health technology will be delivered:

- ☐ Consulting rooms
- ☐ Day surgery centre
- ☐ Emergency Department
- ☒ Inpatient private hospital
- ☒ Inpatient public hospital
- ☐ Laboratory

- ☐ Outpatient clinic
☐ Patient's home
☐ Point of care testing
☐ Residential aged care facility
☐ Other (please specify)

Is the proposed health technology intended to be entirely rendered inside Australia?

Yes

Provide additional details on the proposed health technology to be rendered outside of Australia:

N/A

Comparator

Nominate the appropriate comparator(s) for the proposed medical service (i.e. how is the proposed population currently managed in the absence of the proposed medical service being available in the Australian health care system). This includes identifying health care resources that are needed to be delivered at the same time as the comparator service:

Provide a name for your comparator:

Medical management with anti-arrhythmic drugs (AADs), with adjunctive anticoagulation therapy as clinically indicated.

AADs used for rhythm control in AF, VT, and SVT include a range of PBS-listed agents across multiple drug classes, as shown in Table 3.

Table 3 Anti-arrhythmic drugs

Class	Mechanism of action	Indication	Clinical role	Common examples
Class I (Sodium channel blockers)	Block fast sodium channels; slow conduction	Paroxysmal AF, selected SVTs (in patients without structural heart disease)	Rhythm control	Flecainide
Class II (Beta-blockers)	Block β -adrenergic receptors; reduce sympathetic activity	AF (rate control), SVT, ventricular arrhythmias	Primarily rate control; some rhythm stabilisation	Metoprolol, atenolol
Class III (Potassium channel blockers)	Prolong repolarisation; increase refractory period	AF, VT, selected SVTs	Rhythm control	Amiodarone, dronedarone, sotalol
Class IV (Calcium channel blockers)	Block L-type calcium channels; slow AV nodal conduction	AF (rate control), SVT	Rate control	Diltiazem, verapamil

Anticoagulation therapy is used adjunctively in patients with AF to reduce thromboembolic risk and is not itself an AAD. Anticoagulant options include warfarin and direct oral anticoagulants (DOACs) such as apixaban, rivaroxaban and dabigatran, all of which are PBS-listed for this indication.

Provide an identifying number for your comparator (if applicable):

The broader comparator encompasses the full range of rate and rhythm control agents and anticoagulation therapies available on the PBS for the management of AF, VT, and SVT. Specific agents proposed for use in the economic modelling are amiodarone 200 mg (PBS code 2343H) for rhythm control and warfarin 5 mg (PBS code 2211J) for anticoagulation, reflecting a commonly used pharmacological management approach in the modelled population (Holm et al. 2017).

Provide a rationale for why this is a comparator:

Medical management with anti-arrhythmic drugs (AADs) is the current standard of care for patients with cardiac arrhythmias in Australia and represents the primary comparator for this assessment. AADs are the most widely used and publicly funded treatment alternative to catheter ablation for patients with AF, VT, and SVT, and remain the default treatment pathway for patients who are unable to access ablation (Brieger et al. 2018).

For patients who are candidates for catheter ablation, the relevant clinical decision is whether to proceed with ablation or to continue pharmacological rhythm or rate control with AADs. AAD therapy therefore represents the direct clinical alternative against which the safety, effectiveness and cost-effectiveness of catheter ablation must be assessed. This is consistent with the comparator used across the randomised controlled trial evidence base informing this submission, where AAD therapy served as the active comparator in trials across the AF, AF with heart failure, and VT populations. This is also consistent with the previous applications.

Pattern of substitution – Will the proposed health technology wholly replace the proposed comparator, partially replace the proposed comparator, displace the proposed comparator or be used in combination with the proposed comparator?

- ☐ None (used with the comparator)
- ☒ Displaced (comparator will likely be used following the proposed technology in some patients)
- ☒ Partial (in some cases, the proposed technology will replace the use of the comparator, but not all)
- ☐ Full (subjects who receive the proposed intervention will not receive the comparator)

Outline and explain the extent to which the current comparator is expected to be substituted:

Eligible patients will receive cardiac catheter ablation as an alternative to continued medical management with anti-arrhythmic drugs (AADs), with the extent of substitution varying by arrhythmia indication and patient profile. Amiodarone is the most commonly used AAD in these populations, particularly in patients with structural heart disease or those who have failed other pharmacological options and represents the treatment most likely to be substituted in patients proceeding to ablation (Srinivasan et al. 2019).

Substitution of AAD therapy by ablation is not immediate or complete at the time of the procedure. Anticoagulation with warfarin is required for all patients for a minimum of two months following ablation, regardless of procedural success or failure, reflecting the periprocedural

thromboembolic risk period. During this time, some patients may also continue AAD therapy as a bridging strategy or to manage early post-ablation arrhythmia recurrence within the blanking period (Wang et al. 2023).

Beyond the post-procedural period, successful ablation is expected to result in cessation of long-term AAD therapy and, where clinically appropriate, discontinuation of anticoagulation, in patients who achieve and maintain sinus rhythm. For example, Scherr et al. (2015) reported that 64.7% of patients remained in sinus rhythm without antiarrhythmic drugs at median 58 months after the last ablation, while 9.3% maintained sinus rhythm after AAD reinitiation, and in Mesquita et al. (2018), 55% continued AAD therapy after the blanking period. Patients who experience arrhythmia recurrence following ablation may require reinstatement of AAD therapy or proceed to repeat ablation, meaning that substitution of the comparator may be partial or temporary in a proportion of patients.

Outcomes

List the key health outcomes (major and minor – prioritising major key health outcomes first) that will need to be measured in assessing the clinical claim for the proposed medical service/technology (versus the comparator):

- ☒ Health benefits
- ☒ Health harms
- ☒ Resources

Outcome description – please include information about whether a change in patient management, or prognosis, occurs as a result of the test information:

Cardiac catheter ablation directly changes patient management by replacing ongoing pharmacological rate or rhythm control with a procedural intervention aimed at eliminating the arrhythmogenic substrate. The decision to proceed with ablation, and the subsequent procedural outcomes, directly inform post-procedural management including decisions around continuation or cessation of AAD therapy and anticoagulation, the need for repeat ablation and longer-term arrhythmia monitoring and follow-up (Andrade 2023).

The primary intended outcome of catheter ablation is durable freedom from arrhythmia recurrence, which carries direct prognostic implications. Recurrent arrhythmia is a significant driver of repeat procedures, unplanned hospitalisations and long-term quality-of-life impairment. By achieving rhythm control, ablation reduces downstream healthcare utilisation and improves patient prognosis.

Efficacy Outcomes:

- Recurrent arrhythmia at 12 months
- Progression to persistent tachyarrhythmia at 36 months
- Freedom from arrhythmia recurrence (4-6 years)
- Freedom from arrhythmia recurrence (8-10 years)
- Repeat ablation rates

Safety Outcomes:

- All-cause mortality
- Stroke and cerebrovascular events

- Cardiac hospitalisation
- Serious adverse events

Patient Outcomes:

- Cessation of AAD therapy following ablation
- Cessation of anticoagulation following ablation

Healthcare system

- Utilisation
- Healthcare costs
- Cost-effectiveness
- Total cost to MBS, PBS and PL

Claims

In terms of health outcomes (comparative benefits and harms), is the proposed technology claimed to be superior, non-inferior or inferior to the comparator(s)?

- ☒ Superior
☒ Non-inferior
☐ Inferior

Please state what the overall claim is, and provide a rationale:

The use of cardiac ablation results in superior effectiveness compared with medical therapy with anti-arrhythmic drugs. The use of cardiac ablation results in noninferior safety compared with medical therapy with anti-arrhythmic drugs.

The primary mechanism through which ablation delivers patient benefit is the durable elimination of arrhythmia recurrence. Pooled evidence from randomised controlled trials, derived from an updated systematic literature review to be presented in the ADAR demonstrates a large and consistent reduction in recurrent arrhythmia at 12 months compared with anti-arrhythmic drug therapy. This effect is observed across a range of arrhythmia populations currently eligible to receive an ablation service: AF (RR 0.61, 95% CI: 0.55–0.68), AF with co-existing heart failure (RR 0.64, 95% CI: 0.50–0.81), and ventricular tachycardia (RR 0.62, 95% CI: 0.40–0.97). There was no observed statistical heterogeneity in the AF analysis, indicating that this benefit is robust and consistent across trials. Ablation also significantly reduces progression to persistent tachyarrhythmia at 36 months (RR 0.17, 95% CI: 0.08–0.37), reflecting its capacity to modify the disease course rather than merely manage symptoms.

Freedom from recurrent arrhythmia represents a critical clinical outcome, as recurrence significantly contributes to repeated interventions, unplanned hospital admissions, and ongoing detriments to quality of life (Kalman et al. 2013). By reducing recurrence, ablation directly reduces downstream healthcare utilisation and associated patient burden (Kalman et al. 2013). In a meta-analysis of long-term outcomes conducted to support this application, at four to six years, approximately 57% of participants remained arrhythmia free following ablation (95% CI: 0.48–0.66), and at eight to ten years, 42% remained free from recurrence (95% CI: 0.31–0.55). While arrhythmia-free survival declines over time and heterogeneity is present across studies, these findings demonstrate a durable treatment effect that supports longer-horizon economic modelling and substantiates the value of ablation as a curative-intent intervention.

In terms of mortality, the pooled intention-to-treat estimate across the broader AF population showed no statistically significant difference between ablation and medical therapy (RR 0.85, 95%

CI: 0.60-1.19), though the point estimate favoured ablation. Per-protocol analyses from the CABANA trial, which was subject to substantial treatment crossover of 27.5%, suggest a mortality advantage with ablation that was likely attenuated in the intention-to-treat analysis (HR 0.68, 95% CI: 0.47–0.99). In patients with AF and co-existing heart failure, a subgroup excluded from prior MSAC consideration, ablation was associated with a large and statistically significant reduction in all-cause mortality compared with medical therapy (RR 0.56, 95% CI: 0.41–0.75), with low heterogeneity across trials ($I^2 = 11\%$). This represents a clinically meaningful survival benefit in a population with high disease burden. Australian data indicates that approximately 10–11% of patients with AF undergoing ablation have heart failure, meaning this benefit is relevant to a substantial proportion of the eligible population (Ngo et al. 2022).

Ablation achieves its intended outcomes without increasing the risk of serious harm. Across randomised trials, ablation demonstrated no statistically significant difference in serious adverse events compared with medical therapy across all three arrhythmia populations: AF (RR 0.84, 95% CI: 0.60–1.15), AF with co-existing heart failure (RR 1.05, 95% CI 0.60-1.15), and VT (RR 0.92, 95% CI: 0.68-1.24). While the confidence intervals were wide across all populations, reflecting low event rates and limited statistical power, the point estimates were broadly consistent and did not suggest an excess risk of serious harm with ablation. Stroke events were rare in both treatment arms across all arrhythmia populations, with no significant difference detected. Longer-term cohort data further supports the favourable safety profile, with a pooled five-year rate of serious adverse events of 4% and stroke of 1% following ablation, notably lower than population-level estimates for the broader AF population, where ten-year cumulative stroke incidence reaches approximately 11%.

For patients treated with PFA, the emerging evidence suggests a potentially favourable profile relative to thermal ablation, though the current evidence remains limited by low event rates, wide confidence intervals and the predominance of non-inferiority study designs that constrain the ability to demonstrate superiority. For the primary efficacy outcome of recurrent arrhythmia at 12 months, the point estimate favoured PFA over thermal ablation in both randomised (RR 0.87, 95% CI: 0.71–1.07) and non-randomised studies (RR 0.85, 95% CI: 0.64-1.13), though neither reached statistical significance. For cardiac hospitalisation, non-randomised evidence demonstrated a statistically significant reduction favouring PFA (RR 0.37, 95% CI: 0.19-0.73), with the randomised trial point estimated directionally consistent. Importantly, PFA's tissue-selective mechanism of action, sparing adjacent oesophageal and phrenic nerve tissue, offers a potentially improved procedural safety profile, supporting its growing adoption as an alternative energy modality within contemporary practice (Iyengar et al. 2023). While current evidence does not yet demonstrate statistically significant superiority across major endpoints, the consistent direction of effect across efficacy and safety outcomes, combined with its mechanistic advantages, supports the interpretation that PFA is at least non-inferior and potentially superior to thermal ablation, with the evidence base expected to strengthen as longer-term comparative data mature. Overall, the evidence supports a claim of non-inferior safety for ablation relative to continued AAD therapy.

Why would the requestor seek to use the proposed investigative technology rather than the comparator(s)?

Cardiac arrhythmias, including AF, VT and SVT, are associated with significant morbidity, reduced quality of life and excess mortality in high-risk populations. Long-term pharmacological management with AADs represents the current standard of care for many patients. However, pharmacological management requires indefinite treatment and carries a substantial burden of drug-related adverse effects, treatment failure and ongoing arrhythmia recurrence.

AADs are associated with well-recognised tolerability and safety limitations (Park and Kim 2014). Amiodarone, the most commonly used agent for rhythm control in AF and VT, carries significant risks of end-organ toxicity including pulmonary, thyroid, hepatic and ocular complications with long-term use, limiting its suitability as a durable treatment strategy (Park and Kim 2014). A meaningful proportion of patients are refractory to or intolerant of AAD therapy, leaving them without effective rhythm control and at continued risk of arrhythmia-related complications including hospitalisation, haemodynamic compromise, and progressive cardiac remodelling.

Catheter ablation addresses this unmet need by offering the only curative-intent treatment pathway available to patients with symptomatic arrhythmias (Kalman et al. 2013). The clinical evidence base demonstrates that ablation achieves a large and consistent reduction in arrhythmia recurrence compared with AAD therapy across AF, AF with co-existing heart failure, and VT populations. Recurrent arrhythmia is a primary driver of repeat procedures, unplanned hospitalisations and long-term quality-of-life impairment (Kalman et al. 2013). By achieving durable rhythm control, ablation reduces downstream healthcare utilisation and its associated patient and health system burden.

Furthermore, in patients with AF and co-existing heart failure, ablation has been shown to deliver a large and statistically significant reduction in all-cause mortality compared with AAD therapy (RR 0.56, 95% CI: 0.41–0.75). This survival benefit represents a compelling clinical rationale for preferring ablation over continued medical management in this high-risk subgroup, where the consequences of ongoing arrhythmia burden are most severe.

Identify how the proposed technology achieves the intended patient outcomes:

Access to cardiac catheter ablation improves health outcomes for patients by providing a curative-intent treatment pathway that directly eliminates the arrhythmogenic substrate responsible for the cardiac arrhythmia, rather than managing symptoms through ongoing pharmacological therapy. Patients who achieve and maintain sinus rhythm following ablation experience meaningful improvements in arrhythmia recurrence, disease progression, quality of life, and survival in high-risk populations.

Ensuring that reimbursement levels adequately reflect the contemporary cost of delivering ablation is important to support patient access to these benefits. The proposed price increase would facilitate the continued availability and uptake of current-generation ablation technologies, which are associated with improved procedural safety, efficiency and long-term effectiveness. This would help ensure that patients are able to access cardiac catheter ablation in a timely and effective manner, reducing reliance on long-term pharmacological management and its associated risks and monitoring burden, ultimately improving clinical outcomes.

In terms of the immediate costs of the proposed technology (and immediate cost consequences, such as procedural costs, testing costs etc.), is the proposed technology claimed to be more costly, the same cost or less costly than the comparator?

- ☒ More costly
- ☐ Same cost
- ☐ Less costly

Provide a brief rationale for the claim:

The immediate cost of cardiac catheter ablation is greater than the immediate costs of medical management with anti-arrhythmic drugs. Catheter ablation is a complex, hospital-based procedure requiring a dedicated cardiac catheterisation laboratory, specialist multidisciplinary

staffing, general anaesthesia or conscious sedation, and multiple advanced disposable and capital components including electroanatomical mapping systems, ablation catheters, intracardiac echocardiography, and associated consumables. The procedure attracts MBS benefits under items 38287, 38290, or 38293, with schedule fees ranging from \$2,448.10 to \$3,345.75, and is additionally associated with anaesthetic fees, assistant fees, hospital admission costs, and Prescribed List device costs currently bundled at \$6,399. By contrast, ongoing management with AADs represents a comparatively low per-episode cost, consisting primarily of outpatient consultations and PBS-subsidised pharmacological therapy.

However, stakeholder feedback indicates that the cost of devices required to perform the procedure, may be higher in practice, with estimates ranging up to approximately \$10,400 per case (Catholic Health Australia correspondence to Hon. Mark Butler MP). Incorporation of this higher device cost into the economic model is not expected to materially impact cost-effectiveness outcomes, while better reflecting real-world hospital costs and supporting the financial sustainability of the procedure for private hospitals

Algorithms

Preparation for using the health technology

Define and summarise the clinical management algorithm, including any required tests or healthcare resources, before patients would be eligible for the proposed health technology:

Adult patients presenting with symptoms suggestive of a cardiac arrhythmia are assessed by a general practitioner or emergency physician, who initiates referral to a cardiologist or cardiac electrophysiologist for specialist evaluation.

Confirmation of the arrhythmia diagnosis is required before ablation can be considered. A cardiology consultation (MBS item 104) is undertaken to assess the patient and direct further investigation (Brieger et al. 2018). A 12-lead ECG (MBS item 11704) is performed to document the arrhythmia. Where the arrhythmia is paroxysmal and not captured on resting ECG, ambulatory cardiac monitoring is required. Transthoracic echocardiography is performed to assess cardiac structure and function and identify underlying structural heart disease (Brieger et al. 2018). Relevant blood tests including thyroid function, electrolytes, and renal function are obtained to exclude reversible secondary causes of arrhythmia.

In most patients, a trial of AAD therapy is initiated prior to referral for ablation, in line with current clinical guidelines (Brieger et al. 2018). For patients with AF, rate control and rhythm control strategies with AADs are typically trialled first (Brieger et al. 2018). For patients with VT, AAD therapy including amiodarone is the initial management approach in most cases. Catheter ablation is generally considered after one or more AADs have failed to achieve adequate arrhythmia control, are not tolerated due to adverse effects, or are contraindicated due to comorbidities or concomitant medications. In selected patient populations, ablation may be considered as a first-line treatment option where supported by current guidelines and patient preference.

Once a patient is deemed eligible for ablation, pre-procedural assessment is required to confirm suitability and optimise procedural planning (Brieger et al. 2018). This includes a cardiopulmonary assessment to confirm fitness for the procedure and anaesthesia, and anticoagulation assessment including an INR blood test (MBS item 65120) to assess and optimise anticoagulation status prior to the procedure. Cardiac computed tomography (MBS item 56301) or computed tomography angiography of the pulmonary veins may be undertaken to

characterise cardiac anatomy and cardiac magnetic resonance imaging may be indicated where scar substrate characterisation is required for VT procedures. Formal review and credentialing by an accredited cardiac electrophysiologist with appropriate fellowship training is required in line with the training requirements associated with MBS items 38287, 38290, and 38293.

Is there any expectation that the clinical management algorithm before the health technology is used will change due to the introduction of the proposed health technology?

No

Describe and explain any differences in the clinical management algorithm prior to the use of the proposed health technology vs. the comparator health technology:

N/A

Use of the health technology

Explain what other healthcare resources are used in conjunction with delivering the proposed health technology:

Catheter ablation is performed under anaesthesia, requiring a pre-anaesthesia consultation (MBS item 17610), anaesthesia initiation (MBS item 20410), and anaesthetist attendance throughout the procedure (MBS item 23075). A trans-oesophageal echocardiogram (MBS item 22051) may be performed peri-procedurally to exclude intracardiac thrombus prior to ablation and to guide catheter navigation.

The procedural MBS services include an electrophysiology study for mapping (MBS item 38212) and the cardiac ablation service itself, claimed under MBS item 38287 for single-chamber atrial ablation, MBS item 38290 for bi-atrial ablation including curative procedures for AF, or MBS item 38293 for ventricular arrhythmia ablation with mapping. A physician assistant is also engaged during the procedure (MBS item 51303). The mapping and ablation catheters and associated disposable components are reimbursed under the Prescribed List bundled price, currently set at \$6,399, however the true cost of these devices to hospitals is likely to be greater.

All patients require an inpatient hospital admission for the procedure, with hospitalisation costs captured under AR-DRG F24B for admissions without complications or AR-DRG F24A for admissions with complications.

Explain what other healthcare resources are used in conjunction with the comparator health technology:

Prior to initiating AAD therapy, patients require a cardiology consultation (MBS item 104) to confirm the arrhythmia diagnosis and determine the most appropriate pharmacological management strategy. A 12-lead ECG (MBS item 11704) is performed to document the arrhythmia and assess baseline cardiac conduction parameters. Baseline blood tests including serum potassium and liver function tests (MBS item 66509) and thyroid function tests (MBS item 66716) are required prior to commencing amiodarone, given its well-recognised potential for hepatic and thyroid toxicity with long-term use.

Ongoing medical management involves PBS-subsidised pharmacological therapy, primarily amiodarone 200 mg tablets (PBS code 2343H) for rhythm control across AF and VT indications, and warfarin 5 mg tablets (PBS code 2211J) for anticoagulation in patients with AF to mitigate thromboembolic risk. These costs are incurred on an ongoing annual basis for the duration of treatment, which in many patients represents an indefinite treatment commitment.

The long-term use of amiodarone requires regular structured monitoring to detect and manage end-organ toxicity. Annual follow-up resources include INR testing (MBS item 65120) to monitor anticoagulation in patients on warfarin, general practitioner consultations (MBS item 23) for ongoing care coordination and medication management, a 12-lead ECG (MBS item 11704) to monitor cardiac conduction, ophthalmology review (MBS item 10911) to screen for amiodarone-related corneal microdeposits and optic neuropathy, chest X-ray (MBS item 58500) to monitor for pulmonary toxicity, thyroid function testing (MBS item 66716) to detect amiodarone-induced thyroid dysfunction, hepatic liver function testing (MBS item 66509) to monitor for hepatotoxicity, and specialist cardiology consultation (MBS item 105) for ongoing arrhythmia review and management.

Describe and explain any differences in the healthcare resources used in conjunction with the proposed health technology vs. the comparator health technology:

The most significant difference between the two treatment pathways is the distribution of resource use over time. Catheter ablation is associated with a higher concentration of healthcare resource use in the immediate peri-procedural period, encompassing pre-procedural investigations, anaesthesia, specialist procedural staffing, hospital admission, and Prescribed List device costs. By contrast, AAD therapy incurs a lower upfront resource burden but generates substantial ongoing annual costs through indefinite pharmacological prescribing and the structured monitoring programme required for the safe long-term.

Another key difference between the two pathways is the monitoring burden associated with long-term AAD therapy. Amiodarone requires regular surveillance for end-organ toxicity across multiple organ systems, generating annual resource use across general practice, specialist cardiology, ophthalmology, radiology and pathology services (Campbell 2005). Other commonly used AADs also require monitoring, although typically less intensive; for example, sotalol and other QT-prolonging agents require periodic ECG monitoring and assessment of renal function, while flecainide requires monitoring for proarrhythmic risk and is generally restricted to patients without structural heart disease (Lavalle et al. 2021). Patients on warfarin additionally require regular INR monitoring. In contrast, patients who achieve successful rhythm control following ablation may be able to cease AAD therapy and anticoagulation after the initial post-procedural period, substantially reducing or eliminating these ongoing monitoring requirements over time.

Catheter ablation requires an inpatient hospital admission, representing a resource not incurred under the AAD comparator pathway in the absence of arrhythmia-related complications. However, successful ablation is expected to reduce arrhythmia-related unplanned hospitalisations over the longer term, partially offsetting the upfront admission cost.

A proportion of patients undergoing ablation will require repeat ablation procedures due to arrhythmia recurrence, estimated at approximately 25% by five years. Each repeat procedure incurs the full complement of lead-up, peri-procedural, and hospitalisation resources associated with the index procedure.

Clinical management after the use of health technology

Define and summarise the clinical management algorithm, including any required tests or healthcare resources, after the use of the proposed health technology:

Following the procedure, all patients require a minimum of three months of anticoagulation therapy regardless of procedural success, with associated PBS-subsidised pharmacological costs and outpatient INR monitoring where warfarin is used. Specialist outpatient follow-up and

ambulatory cardiac monitoring to assess rhythm outcomes are also expected during the post-procedural period. A proportion of patients will require repeat ablation procedures due to arrhythmia recurrence, incurring the full complement of lead-up, peri-procedural, and hospitalisation costs associated with the index procedure.

Define and summarise the clinical management algorithm, including any required tests or healthcare resources, after the use of the comparator health technology:

As the comparator health technology involves ongoing pharmacological therapy, this application considers ongoing monitoring as part of the intervention period described above. As such, no post-intervention period is described.

Describe and explain any differences in the healthcare resources used after the proposed health technology vs. the comparator health technology:

The primary difference in post-treatment resource use between the intervention and comparator relates to the cessation of ongoing pharmacological therapy and its associated monitoring in patients who achieve successful rhythm control following ablation. Patients who remain in sustained sinus rhythm after ablation may be able to cease amiodarone and warfarin therapy after the initial three-month post-procedural anticoagulation period, eliminating the annual resource burden associated with indefinite AAD prescribing, INR monitoring, ophthalmology review, chest X-ray, thyroid and liver function testing, and general practitioner and cardiology consultations for medication management. By contrast, patients managed with AADs in the comparator arm continue to incur this full annual monitoring burden for the duration of treatment, which in many patients is indefinite.

Patients who experience arrhythmia recurrence following ablation may require reinstatement of AAD therapy or referral for repeat ablation, in which case the annual monitoring costs of the comparator are reinstated, and the full peri-procedural resource costs of a repeat procedure are incurred.

Overall, the post-treatment resource profile of catheter ablation is therefore more favourable than that of continued AAD therapy in patients who achieve durable rhythm control, with the ongoing annual monitoring costs of the comparator representing a sustained resource burden that diminishes or is eliminated in successfully treated ablation patients over time.

Insert diagrams demonstrating the clinical management algorithm with and without the proposed health technology:

Figure 1 Clinical management algorithm for atrial fibrillation (no ablation)

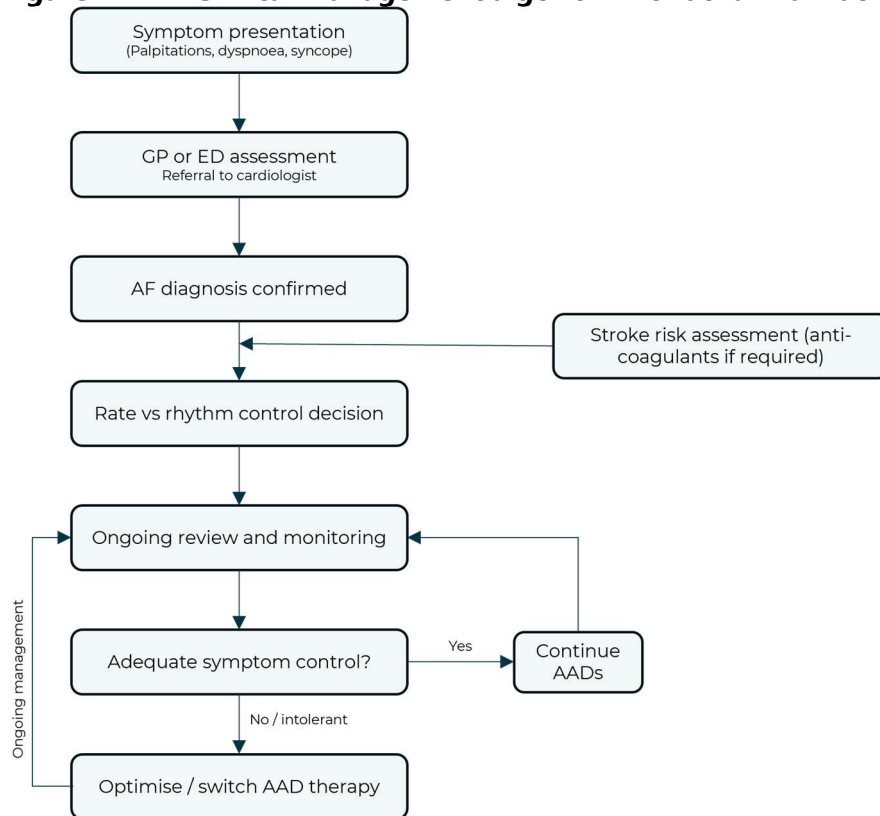
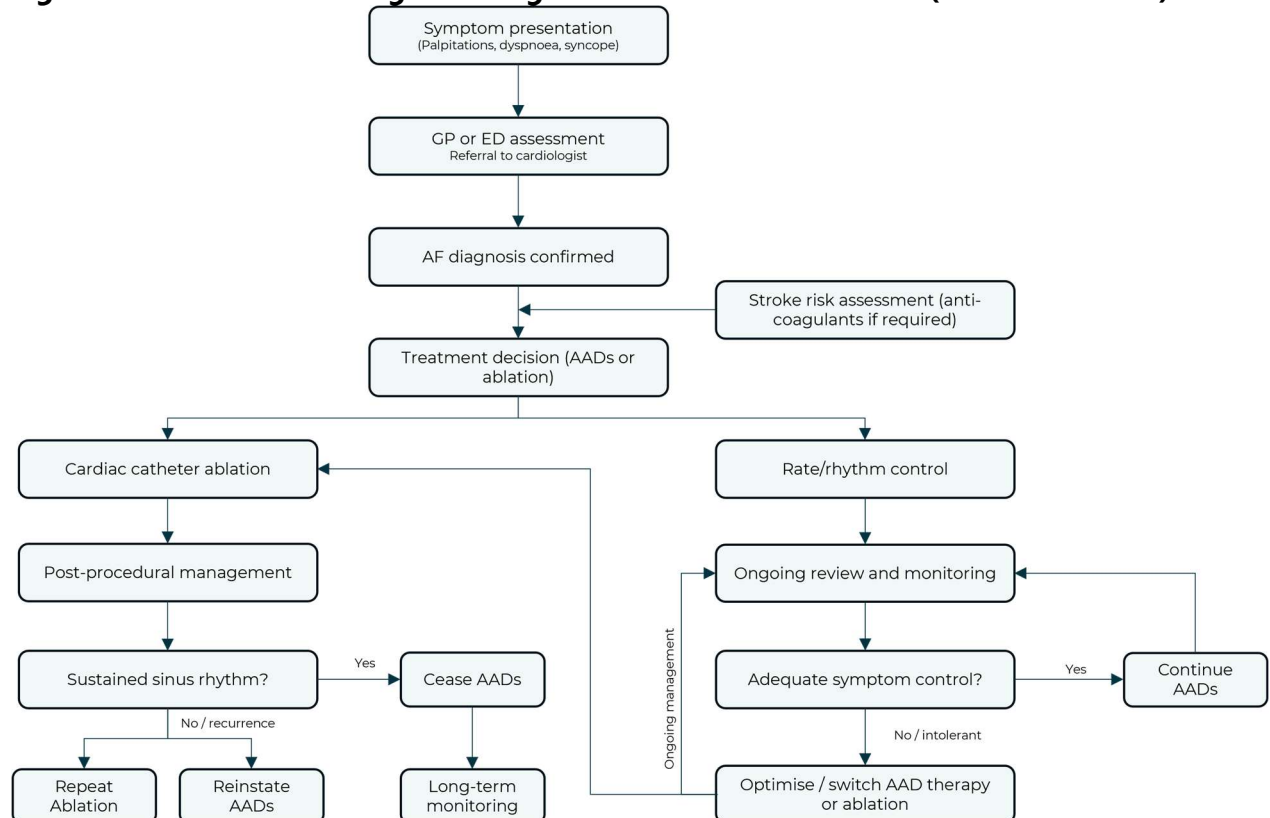


Figure 2 Clinical management algorithm for atrial fibrillation (cardiac ablation)



Summary of Evidence

Provide one or more recent (published) high quality clinical studies that support use of the proposed health service/technology. At 'Application Form lodgement',

RCTs

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
<i>Thermal ablation vs. medical therapy in atrial fibrillation</i>					
1.	RCT	ATTEST – Kuck KH, Lebedev DS, Mikhaylov EN et al. Catheter ablation or medical therapy to delay progression of atrial fibrillation: the randomized controlled atrial fibrillation progression trial (ATTEST).	RCT (N=255) in adults ≥60 years with paroxysmal AF/AT (post-recruitment). Compared radiofrequency ablation vs antiarrhythmic drugs for progression to persistent AF/AT.	Catheter ablation or medical therapy to delay progression of atrial fibrillation: the randomized controlled atrial fibrillation progression trial (ATTEST) - PubMed	08/03/2021
2.	RCT	AVATAR-AF – Kanagaratnam P, McCready J, Tayebjee M et al. Ablation versus anti-arrhythmic therapy for reducing all hospital episodes from recurrent atrial fibrillation.	RCT (N=321) in symptomatic paroxysmal AF (post-recruitment). Compared cryoballoon ablation vs antiarrhythmic drugs on hospitalisation and clinical outcomes.	Ablation versus anti-arrhythmic therapy for reducing all hospital episodes from recurrent atrial fibrillation: a prospective, randomized, multi-centre, open label trial - PubMed	30/03/2023
3.	RCT	CABANA – Packer DL, Mark DB, Robb RA et al. Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation.	Large RCT (N=2204) in symptomatic AF (post-recruitment). Compared catheter ablation vs drug therapy for mortality, stroke, bleeding, and cardiac arrest.	Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation: The CABANA Randomized Clinical Trial - PubMed	02/04/2019

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
4.	Secondary analysis of RCT	CABANA (HF subgroup) – Packer DL, Piccini JP, Monahan KH et al. Ablation Versus Drug Therapy for Atrial Fibrillation in Heart Failure: Results From the CABANA Trial.	Secondary analysis of RCT (N=2204 overall) in AF with heart failure (post-recruitment). Compared ablation vs drug therapy for clinical and rhythm outcomes.	Ablation Versus Drug Therapy for Atrial Fibrillation in Heart Failure: Results From the CABANA Trial - PubMed	06/04/2021
5.	RCT	CAMERA-MRI – Sugumar H, Prabhu S, Costello B et al. Catheter Ablation Versus Medication in Atrial Fibrillation and Systolic Dysfunction: Late Outcomes of CAMERA-MRI Study.	RCT (N=66) in persistent AF with systolic dysfunction (post-recruitment). Compared catheter ablation vs drug therapy on LV function and arrhythmia recurrence.	Catheter Ablation Versus Medication in Atrial Fibrillation and Systolic Dysfunction: Late Outcomes of CAMERA-MRI Study JACC: Clinical Electrophysiology	28/10/2020
6.	RCT	Cryo-FIRST – Kuniss M, Pavlovic N, Velagic V et al. Cryoballoon ablation vs. antiarrhythmic drugs: first-line therapy for patients with paroxysmal atrial fibrillation.	RCT (N=218) in paroxysmal AF (post-recruitment). Compared cryoballoon ablation vs antiarrhythmic drugs for arrhythmia recurrence and safety.	Cryoballoon ablation vs. antiarrhythmic drugs: first-line therapy for patients with paroxysmal atrial fibrillation - PubMed	18/07/2021
7.	RCT/ Trial registry entry	CryoSTOP PersAF – First-line catheter ablation for early treatment of Persistent Atrial Fibrillation.	Randomised study (N=130) in symptomatic persistent AF (status not clearly reported; likely completed). Compared cryoballoon ablation vs drug therapy for arrhythmia freedom and QoL.	Prot SAP 000.pdf	02/02/2022
8.	RCT	Ding 2022 – Ding J, Cheng A, Li P et al. Cryoballoon catheter ablation or drug therapy to delay progression of atrial fibrillation: A single-center randomized trial.	Single-centre RCT (N=204) in paroxysmal AF (post-recruitment). Compared cryoballoon ablation vs drug therapy to delay progression to persistent arrhythmia.	Cryoballoon catheter ablation or drug therapy to delay progression of atrial fibrillation: A single-center randomized trial - PubMed	19/10/2022

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
9.	RCT	EARLY-AF – Andrade JG, Wells GA, Deyell MW et al. Cryoablation or Drug Therapy for Initial Treatment of Atrial Fibrillation.	RCT (N=303) in symptomatic AF (post-recruitment). Compared first-line cryoablation vs drug therapy for arrhythmia recurrence and QoL outcomes.	Cryoablation or Drug Therapy for Initial Treatment of Atrial Fibrillation New England Journal of Medicine	16/11/2020
10.	Secondary analysis of RCT	EARLY-AF progression analysis – Andrade JG, Deyell MW, Macle L et al. Progression of Atrial Fibrillation after Cryoablation or Drug Therapy.	Secondary analysis of RCT (N=303) (post-recruitment). Assessed AF progression following cryoablation vs drug therapy.	Progression of Atrial Fibrillation after Cryoablation or Drug Therapy - PubMed	12/01/2023
11.	RCT	STOP-AF – Wazni OM, Dandamudi G, Sood N et al. Cryoballoon Ablation as Initial Therapy for Atrial Fibrillation.	RCT (N=203) in paroxysmal AF (post-recruitment). Compared cryoballoon ablation vs drug therapy as initial treatment for AF.	Cryoballoon Ablation as Initial Therapy for Atrial Fibrillation New England Journal of Medicine	16/11/2020
<i>Pulsed field ablation vs thermal ablation in atrial fibrillation</i>					
12.	RCT	ADVENT – Reddy VY, Gerstenfeld EP, Natale A et al. Pulsed Field or Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation.	RCT (N=305) in paroxysmal AF refractory to AADs (post-recruitment). Compared pulsed field ablation vs thermal ablation for efficacy and safety.	Pulsed Field or Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation New England Journal of Medicine	27/08/2023
13.	Secondary analysis of RCT	ADVENT arrhythmia burden analysis – Reddy VY, Mansour M, Calkins H et al. Pulsed Field vs Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation: Recurrent Atrial Arrhythmia Burden.	Secondary analysis of RCT (N=305) (post-recruitment). Compared arrhythmia burden following pulsed field vs thermal ablation.	Pulsed Field vs Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation: Recurrent Atrial Arrhythmia Burden JACC	18/05/2024

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
14.	Randomised trial protocol / design paper	BEAT-PAROX-AF – Erhard N, Frison E, Asselineau J et al. Comparing pulsed field electroporation and radiofrequency ablation for paroxysmal atrial fibrillation: design and rationale of the BEAT PAROX-AF randomized clinical trial.	Randomised trial design (N=292 planned). Patients with paroxysmal AF; recruitment status not reported. Compares pulsed field vs radiofrequency ablation.	Comparing pulsed field electroporation and radiofrequency ablation for the treatment of paroxysmal atrial fibrillation: design and rationale of the BEAT PAROX-AF randomized clinical trial - PMC	22/04/2024
15.	RCT	SINGLE SHOT CHAMPION – Reichlin T, Kueffer T, Badertscher P et al. Pulsed Field or Cryoballoon Ablation for Paroxysmal Atrial Fibrillation.	RCT (N=105) in paroxysmal AF (post-recruitment). Compared pulsed field vs cryoballoon ablation for recurrence, complications, and QoL.	Pulsed Field or Cryoballoon Ablation for Paroxysmal Atrial Fibrillation New England Journal of Medicine	30/07/2025
16.	RCT	SPHERE Per-AF – Anter E, Mansour M, Nair DG et al. Dual-energy lattice-tip ablation system for persistent atrial fibrillation: a randomized trial.	RCT (N=420) in persistent AF (post-recruitment). Compared pulsed field/dual-energy ablation vs radiofrequency ablation for procedural success and safety.	Dual-energy lattice-tip ablation system for persistent atrial fibrillation: a randomized trial Nature Medicine	17/05/2024
<i>Thermal ablation vs. medical therapy in atrial fibrillation with heart failure</i>					
17.	RCT	CASTLE-AF – Marrouche NF, Brachmann J, Andresen D et al. Catheter Ablation for Atrial Fibrillation with Heart Failure.	RCT (N=398) in AF with heart failure (post-recruitment). Compared catheter ablation vs drug therapy for mortality and HF hospitalisation.	Catheter Ablation for Atrial Fibrillation with Heart Failure - PubMed	01/02/2018
18.	RCT	CASTLE-HTx – Sohns C, Fox H, Marrouche NF et al. Catheter Ablation in End-Stage Heart Failure with Atrial Fibrillation.	RCT (N=97) in end-stage HF with AF (post-recruitment). Compared catheter ablation vs drug therapy for death, LVAD implantation, or transplant.	Catheter Ablation in End-Stage Heart Failure with Atrial Fibrillation New England Journal of Medicine	27/08/2023

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
19.	Secondary analysis of RCT	CASTLE-HTx two-year follow-up – Sohns C, Moersdorf M, Marrouche NF et al. Catheter Ablation in Patients With End-Stage Heart Failure and Atrial Fibrillation: Two-Year Follow-Up of the CASTLE-HTx Trial.	Two-year follow-up of CASTLE-HTx (N=97) assessing 2-year outcomes after catheter ablation versus medical therapy in end-stage heart failure with AF.	Catheter Ablation in Patients With End-Stage Heart Failure and Atrial Fibrillation: Two-Year Follow-Up of the CASTLE-HTx Trial Circulation	30/08/2024
20.	RCT	CAEFR-AF – Song Z, Wang SY, Qidong Z et al. Catheter ablation versus medical rate control for persistent atrial fibrillation in older heart failure patients with reduced ejection fraction.	RCT (N=89) in older patients with persistent AF and HFrEF (post-recruitment). Compared ablation vs medical therapy for LV function and HF outcomes.	Catheter ablation versus medical rate control for persistent atrial fibrillation in older heart failure patients with reduced ejection fraction - PubMed	12/08/2025
<i>Thermal ablation vs. medical therapy in ventricular tachycardia</i>					
21.	RCT	MANTRA-VT – Raatikainen P, Mäkynen H, Hartikainen J et al. Early substrate-based catheter ablation vs. antiarrhythmic drug therapy for ventricular tachyarrhythmias among patients with prior myocardial infarction.	RCT (N=58) in post-MI patients with ICD and VT/VF (post-recruitment). Compared substrate ablation vs drug therapy for VT/VF burden.	Early substrate-based catheter ablation vs. antiarrhythmic drug therapy for ventricular tachyarrhythmias among patients with prior myocardial infarction: the MANTRA-VT randomized trial - PubMed	07/10/2025
22.	RCT	PAUSE-SCD – Tung R, Xue Y, Chen M et al. First-Line Catheter Ablation of Monomorphic Ventricular Tachycardia in Cardiomyopathy Concurrent With Defibrillator Implantation: The PAUSE-SCD Randomized Trial.	RCT (N=121) in cardiomyopathy with VT (post-recruitment). Compared first-line catheter ablation vs drug therapy for recurrence, hospitalisation, and death.	First-Line Catheter Ablation of Monomorphic Ventricular Tachycardia in Cardiomyopathy Concurrent With Defibrillator Implantation: The PAUSE-SCD Randomized Trial Circulation	04/05/2022

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
23.	RCT	SURVIVE-VT – Arenal Á, Ávila P, Jiménez-Candil J et al. Substrate Ablation vs Antiarrhythmic Drug Therapy for Symptomatic Ventricular Tachycardia.	RCT (N=144) in symptomatic VT (post-recruitment). Compared substrate ablation vs antiarrhythmic drugs for cardiovascular death, ICD shocks, and hospitalisation.	Substrate Ablation vs Antiarrhythmic Drug Therapy for Symptomatic Ventricular Tachycardia - PubMed	19/04/2022
24.	RCT / Secondary Analysis	VANISH secondary analysis – Deyell MW, Steinberg C, Doucette S et al. Ventricular tachycardia characteristics and outcomes with catheter ablation vs. antiarrhythmic therapy: insights from the VANISH trial.	Secondary analysis of RCT (N=259 overall VANISH) (post-recruitment). Compared outcomes of ablation vs drug therapy in recurrent VT post-MI.	Ventricular tachycardia characteristics and outcomes with catheter ablation vs. antiarrhythmic therapy: insights from the VANISH trial - PubMed	21/07/2022
25.	RCT	VANISH2 – Sapp JL, Tang ASL, Parkash R et al. Catheter Ablation or Antiarrhythmic Drugs for Ventricular Tachycardia.	RCT (N=416) in VT with prior MI (post-recruitment). Compared catheter ablation vs drug therapy for death, VT storm, ICD shocks, and sustained VT.	Catheter Ablation or Antiarrhythmic Drugs for Ventricular Tachycardia - PubMed	20/02/2025

Identify yet-to-be-published research that may have results available in the near future (that could be relevant to your application).

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
1.	RCT	CAAD-VT – Kistler PM, Foisel S., Sanders P., Vos MA. et al. (2023). The CAAD-VT trial protocol: A prospective multicentre randomised controlled trial comparing catheter ablation versus medical therapy for	Randomised controlled trial (N=162) in patients with structural heart disease and ventricular tachycardia (ongoing). Compares catheter ablation versus antiarrhythmic drug therapy, with primary outcome of VT recurrence, VT storm, or death.	A Prospective, Multicentre Randomised Controlled Trial Comparing Catheter Ablation Versus Antiarrhythmic Drugs in Patients With Structural Heart Disease Related Ventricular Tachycardia: The CAAD-VT Trial Protocol - PubMed	Ongoing study

	Type of study design	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		ventricular tachycardia in patients with structural heart disease.			
2.	RCT	CASTLE-VT – Sohns C., Fink T., Crijns HJG., Costard-Jaeckle A. (2025). Preventive catheter ablation for ventricular arrhythmias in patients with end-stage heart failure referred for heart transplantation evaluation: Rationale for and design of the CASTLE-VT trial	Randomised controlled trial (planned N=160) in patients with end-stage heart failure and ventricular arrhythmias referred for transplant evaluation (ongoing). Compares prophylactic catheter ablation versus standard medical therapy, with primary outcome of mortality, urgent transplantation, or LVAD implantation.	Preventive catheter ablation for ventricular arrhythmias in patients with end-stage heart failure referred for heart transplantation evaluation: Rationale for and design of the CASTLE-VT trial - Sohns - 2025 - European Journal of Heart Failure - Wiley Online Library	Ongoing study

Non-randomised studies

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
Long-term follow up studies				
Bergau 2022 Germany	A frozen decade: Ten years outcome of atrial fibrillation ablation using a single shot device for pulmonary vein isolation	Data from N = 385 consecutive patients treated with Cryoballoon pulmonary vein isolation for symptomatic and drug refractory AF between 2005 and	A frozen decade: Ten years outcome of atrial fibrillation ablation using a single shot device for pulmonary vein isolation - Bergau - 2022 - Journal of Cardiovascular Electrophysiology - Wiley Online Library	03/05/2022

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		2012 were analyzed. Patients with a FU of ≥ 9 years after index CB-PVI were included.		
Kawaji 2022 Japan	Matched comparison of catheter ablation versus conservative management for atrial fibrillation	537 pairs of patients who received first-time catheter ablation (ablation group) or conservative management (conservative group). The primary outcome measure was a composite of cardiovascular death, HF hospitalization, ischemic stroke, or major bleeding.	Matched comparison of catheter ablation versus conservative management for atrial fibrillation Heart and Vessels Springer Nature Link	06/02/2022
Kettering 2017 Germany	Catheter ablation of atrial fibrillation facilitated by preprocedural three-dimensional transesophageal echocardiography: Long-term outcome	Evaluation of the long-term outcome of catheter ablation of atrial fibrillation (AF) facilitated by preprocedural three-dimensional (3-D) transesophageal	Catheter ablation of atrial fibrillation facilitated by preprocedural three-dimensional transesophageal echocardiography: Long-term outcome	28/07/2016

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		echocardiography.		
Kim 2020 South Korea	Atrial fibrillation and the risk of ischaemic strokes or intracranial haemorrhages: comparisons of the catheter ablation, medical therapy, and non-atrial fibrillation population	Comparison of 1629 patients with atrial fibrillation catheter ablation (Yonsei AF ablation cohort), 3258 with medical therapy [Korean National Health Insurance (NHIS) database], and 3258 non-AF subjects (NHIS database) following a 1:2:2 propensity score matching.	Atrial fibrillation and the risk of ischaemic strokes or intracranial haemorrhages: comparisons of the catheter ablation, medical therapy, and non-atrial fibrillation population EP Europace Oxford Academic	12/10/2026
Luo 2025 China	Long-term outcomes of cryoballoon versus robotic magnetic navigation guided radiofrequency ablation in patients with persistent atrial fibrillation	Long-term efficacy and clinical outcomes of catheter ablation performed with cryoballoon (CRYO) in comparison with robotic magnetic navigation (RMN) in patients with persistent atrial fibrillation (PersAF). A total of 200 patients with	Long-term outcomes of cryoballoon versus robotic magnetic navigation guided radiofrequency ablation in patients with persistent atrial fibrillation Scientific Reports	20/02/2025

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		symptomatic PersAF were prospectively enrolled and non-randomly assigned (1:1) to the CRYO or RMN guided-ablation group undergoing pulmonary vein isolation (PVI)		
Nielsen 2017 Denmark	Long-term efficacy of catheter ablation as first-line therapy for paroxysmal atrial fibrillation: 5-year outcome in a randomised clinical trial	5-yea follow-up of 245 patients from the Medical ANtiarrhythmic Treatment or Radiofrequency Ablation in Paroxysmal Atrial Fibrillation (MANTRA-PAF) trial	Long-term efficacy of catheter ablation as first-line therapy for paroxysmal atrial fibrillation: 5-year outcome in a randomised clinical trial Heart	26/07/2016
Pallisgaard 2020 Denmark	Catheter ablation and mortality, stroke and heart failure readmission with atrial fibrillation	2-year average treatment effect (ATE) of catheter ablation for AF on a composite endpoint of HF readmission, stroke and all-cause mortality at 1-year and 5-year landmark analyses (N=13,756	Catheter ablation and mortality, stroke and heart failure readmission with atrial fibrillation Open Heart	09/11/2020

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		patients from nationwide administrative registers in Denmark)		
R 2018 United Kingdom	Long Term Outcome and Pulmonary Vein Reconnection of Patients Undergoing Cryoablation and/or Radiofrequency Ablation: Results from The Cryo Versus RF Trial	203 patients who underwent first time PAF ablation in a randomized clinical trial comparing CRYO (67), RF (67) and COMBINED (69) approaches were followed up for 5 years	Long Term Outcome and Pulmonary Vein Reconnection of Patients Undergoing Cryoablation and/or Radiofrequency Ablation: Results from The Cryo Versus RF Trial	10-11/2018
Radauskaite 2023 Lithuania	Results of a 4-Year Follow Up of Patients with Paroxysmal and Persistent Atrial Fibrillation after Cryoablation	Observational, retrospective study of 94 patients who underwent a cryoablation procedure for paroxysmal or persistent AF from 2015 to 2017. The follow up was 51 ± 3 months.	Results of a 4-Year Follow Up of Patients with Paroxysmal and Persistent Atrial Fibrillation after Cryoablation	19/11/2023
Schiavone 2025 Italy	Very Long-Term Follow-Up of Pulmonary Vein	Prospective, multicenter study of 1,330 patients who	Very Long-Term Follow-Up of Pulmonary Vein Isolation Using Cryoballoon for Catheter Ablation for Atrial Fibrillation: An 8-Year Multicenter Experience	18/08/2025

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
	Isolation Using Cryoballoon for Catheter Ablation for Atrial Fibrillation: An 8-Year Multicenter Experience	underwent cryoballoon pulmonary vein isolation for symptomatic AF between 2012 and 2018 across 13 institutions. Follow-up was ≥ 5 years, with an 8-year event rate of 52.5% for AF/atrial tachycardia recurrence (N=1330).		
Souissi 2018 France	Catheter ablation reduces ventricular tachycardia burden in patients with arrhythmogenic right ventricular cardiomyopathy: insights from a north-western French multicentre registry	Prospective, multicenter registry of 49 patients with ARVC who underwent 92 radiofrequency ablation procedures for ventricular tachycardia between 1999 and 2015. Mean follow-up was 64 ± 51 months post-procedure and 49 ± 52 months post-last RFA.	Catheter ablation reduces ventricular tachycardia burden in patients with arrhythmogenic right ventricular cardiomyopathy: insights from a north-western French multicentre registry	01/02/2018

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
Svintsova 2023 Russia	Long-term follow-up in preschool children after radiofrequency catheter ablation of arrhythmias	Prospective, single-center study of 209 children aged 0–7 years who underwent 255 radiofrequency ablation procedures for various tachyarrhythmias. Overall procedural effectiveness was 94.7% with a recurrence rate of 21% over follow-up.	Long-term follow-up in preschool children after radiofrequency catheter ablation of arrhythmias	10/03/2023
Wu 2021 China	Long-term observation of catheter ablation vs. pharmacotherapy in the management of persistent and long-standing persistent atrial fibrillation (CAPA study)	Prospective, multicenter trial of 648 patients with persistent and long-standing persistent AF, randomised to RFCA (n=327) or pharmacotherapy (n=321) across 30 centers. Mean follow-up was 54.2 ± 10.6 months.	Long-term observation of catheter ablation vs. pharmacotherapy in the management of persistent and long-standing persistent atrial fibrillation	21/05/2021
You 2021 China	The Long-Term Results of Three Catheter Ablation	Prospective, single-center study of 238 patients with	The Long-Term Results of Three Catheter Ablation Methods in Patients With Paroxysmal Atrial Fibrillation: A 4-Year Follow-Up Study	14/10/2021

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
	Methods in Patients With Paroxysmal Atrial Fibrillation: A 4-Year Follow-Up Study	paroxysmal AF treated by radiofrequency ablation (n=106), cryoablation (n=66), or combined cryoablation and radiofrequency ablation (n=66). Median follow-up was 48 months.		
Pulsed field ablation vs thermal ablation				
Cho 2025 United States	Complications associated with pulsed field ablation vs radiofrequency catheter ablation of atrial fibrillation.	Retrospective analysis of 1,237 adverse event reports from the MAUDE database comparing pulsed field ablation (n=156 clinical complications, n=336 malfunctions) vs. radiofrequency ablation (n=315 clinical complications, n=430 malfunctions) catheters from January to July 2024.	Complications associated with pulsed field ablation vs radiofrequency catheter ablation of atrial fibrillation	01/09/2025

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
Della Rocca 2023 Belgium, Italy, France, United States	Pulsed electric field, cryoballoon, and radiofrequency for paroxysmal atrial fibrillation ablation: a propensity score-matched comparison	Prospective, multicenter propensity score-matched study of 1,572 paroxysmal AF patients undergoing first-time PVI via Farapulse PFA (n=174), cryoballoon (n=348), or radiofrequency (n=348). One-year follow-up was reported for arrhythmia recurrence outcomes.	Pulsed electric field, cryoballoon, and radiofrequency for paroxysmal atrial fibrillation ablation: a propensity score-matched comparison	28/12/2023
Dello Russo 2024 Italy	Pulsed field vs very high-power short-duration radiofrequency ablation for atrial fibrillation: Results of a multicenter, real-world experience	Observational, multicenter study of 534 consecutive patients with paroxysmal or persistent AF undergoing PFA (n=192) or very high-power short-duration radiofrequency ablation (n=342) between 2020 and	Pulsed field vs very high-power short-duration radiofrequency ablation for atrial fibrillation: Results of a multicenter, real-world experience	21/09/2024

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		2023. Median follow-up was 12 months.		
Embrey 2025 United States	Long-Term Outcome of Radiofrequency Versus Pulsed-Field Ablation in Atrial Fibrillation Patients Aged More Than 60 Years Undergoing Their First Catheter Ablation	Observational, multicenter study of 1,800 consecutive AF patients undergoing first-time PVI via PFA (n=562) or radiofrequency ablation (n=1,238), stratified by age >60 years (n=1,386) and ≤60 years (n=414). Follow-up was 12 months.	Long-Term Outcome of Radiofrequency Versus Pulsed-Field Ablation in Atrial Fibrillation Patients Aged More Than 60 Years Undergoing Their First Catheter Ablation	25/09/2025
Garaparti 2025 United States	Comparison of 30-day readmission and same-day discharge rates in patients undergoing pulsed field vs radiofrequency ablation for atrial fibrillation: A multicenter analysis	Prospective, multicenter study of 697 patients undergoing PFA (n=352) or radiofrequency ablation (n=345) for AF across 7 hospitals in 2024. Primary endpoint was 30-day readmission rate with 30-day follow-	Comparison of 30-day readmission and same-day discharge rates in patients undergoing pulsed field vs radiofrequency ablation for atrial fibrillation: A multicenter analysis	18/07/2025

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		up.		
Kueffer 2024 Switzerland	Pulsed-field vs cryoballoon vs radiofrequency ablation: Outcomes after pulmonary vein isolation in patients with persistent atrial fibrillation	Prospective, multicenter study of 533 consecutive patients with persistent AF undergoing first-time PVI via PFA (n=214), cryoballoon (n=190), or radiofrequency ablation (n=129). Follow-up was 12 months with 7-day Holter monitoring at 3, 6, and 12 months.	Pulsed-field vs cryoballoon vs radiofrequency ablation: Outcomes after pulmonary vein isolation in patients with persistent atrial fibrillation	21/08/2024
Lemoine 2024 Germany	Pulsed-field- vs. cryoballoon-based pulmonary vein isolation: lessons from repeat procedures	Prospective, multicenter study of 550 consecutive patients undergoing index PVI via PFA (n=191) or cryoballoon ablation (n=359), with repeat ablation analysis performed in 22 PFA (12%) and 44 CBA (12%) patients with symptomatic	Pulsed-field- vs. cryoballoon-based pulmonary vein isolation: lessons from repeat procedures	30/08/2024

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		recurrences.		
Maier 2025 Germany	Pulsed field ablation compared to thermal ablation techniques in atrial fibrillation: a German-wide in-hospital safety analysis	Retrospective, nationwide analysis of 95,927 patients with paroxysmal or persistent AF undergoing left atrial catheter ablation in Germany in 2023, comparing PFA (n=2,505), cryoballoon (n=30,766), and radiofrequency ablation (n=32,656). Only in-hospital outcomes were assessed.	Pulsed field ablation compared to thermal ablation techniques in atrial fibrillation: a German-wide in-hospital safety analysis	29/08/2025
Nakasone 2025 Belgium, Croatia, France, Italy, Greece, United States	Pulsed field ablation in the elderly via a pentaspline multielectrode catheter: safety, efficacy, and comparison with cryoballoon devices	Prospective, multicentre analysis of 419 AF patients over 75 undergoing catheter ablation at 4 European centres, comparing PFA via the Farapulse system (n=221) with second-generation cryoballoon ablation (n=198). Procedural	Pulsed field ablation in the elderly via a pentaspline multielectrode catheter: safety, efficacy, and comparison with cryoballoon devices	23/05/2025

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		details and 1-year AF/atrial tachycardia recurrence-free rates were assessed.		
Urbanek 2023 Germany	Pulsed Field Versus Cryoballoon Pulmonary Vein Isolation for Atrial Fibrillation: Efficacy, Safety, and Long-Term Follow-Up in a 400-Patient Cohort	Prospective, dual-centre analysis of 400 AF patients undergoing PVI, comparing PFA via a pentaspline catheter (n=200) with second-generation 28mm cryoballoon ablation (n=200). Procedural data and 1-year freedom from atrial tachyarrhythmia following a 3-month blanking period were assessed.	Pulsed Field Versus Cryoballoon Pulmonary Vein Isolation for Atrial Fibrillation: Efficacy, Safety, and Long-Term Follow-Up in a 400-Patient Cohort	16/07/2023
vandeKar 2024 Netherlands	Efficacy and safety of pulsed field ablation compared to cryoballoon ablation in the treatment of atrial fibrillation: a meta-analysis	Systematic review and meta-analysis of 11 studies encompassing 3,805 AF patients, comparing PFA with cryoballoon ablation for pulmonary vein isolation. Arrhythmia	Efficacy and safety of pulsed field ablation compared to cryoballoon ablation in the treatment of atrial fibrillation: a meta-analysis	29/05/2024

Study ID Country	Title of journal article or research project	Short description of research	Website link to journal article or research	Date of publication
		recurrence, periprocedural complications, total procedure time, and radiation exposure were assessed.		

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