Australian Government

Department of Health

Application Form

Transcatheter occlusion of the left atrial appendage for patients with non-valvular atrial fibrillation

(New and/or Amended Request for Public Funding)

PART 1 – APPLICANT DETAILS

1. Applicant details (primary and alternative contacts)

Corporation / partnership details (where relevant): Joint application by Abbott Australasia and Boston Scientific
Corporation name: Boston Scientific
ABN: 45071 676 063
Business trading name: Boston Scientific Pty Ltd
Corporation name: Abbott Australasia Pty Ltd.
ABN: 95 000 180 389
Business trading name: Abbott Vascular

Primary contact name REDACTED

Primary contact numbers
Business: REDACTED
Mobile: REDACTED
Email: REDACTED

Alternative contact name: REDACTED

Alternative contact numbers
Business: REDACTED
Email: REDACTED

2. (a) Are you a lobbyist acting on behalf of an Applicant?

☒ Yes
☐ No

(b) If yes, are you listed on the Register of Lobbyists?

☒ Yes
☐ No

PART 2 – INFORMATION ABOUT THE PROPOSED MEDICAL SERVICE

3. Application title

Transcatheter occlusion of the left atrial appendage (LAA) for patients with non-valvular atrial fibrillation (NVAF) who have relative contraindications to oral anticoagulant therapy (OAT)

4. Provide a succinct description of the medical condition relevant to the proposed service (no more than 150 words – further information will be requested at Part F of the Application Form)

Atrial Fibrillation (AF) is the most common sustained cardiac arrhythmia and a key risk factor for ischaemic strokes. A thrombus can form when blood becomes trapped in the LAA due to fibrillation. When the thrombus becomes dislodged it migrates through the arterial system towards the brain, resulting in vascular occlusion from the thromboembolism which may cause an ischemic stroke. Ischemic strokes can lead to a large number of complications including hemi-paralysis, speech deficits, dysphasia, and even death.

5. Provide a succinct description of the proposed medical service (no more than 150 words – further information will be requested at Part 6 of the Application Form)

The medical service is the percutaneous insertion of a left atrial appendage closure (LAAC) device to occlude the left atrial appendage (LAA) in patients with non-valvular atrial fibrillation (NVAF). The LAA is the primary source for thromboembolism in patients with NVAF. The procedure aims at preventing stroke and systemic thromboembolism by closing off the LAA permanently to avoid the formation and migration of emboli to the brain.

The implantation procedure uses standard transseptal techniques. The access sheath and delivery catheter permit device placement in the LAA via femoral venous access and inter-atrial septum crossing into the left atrium. The device is unsheathed when in the appropriate position.

The procedure is performed under local or general anaesthesia by an interventional cardiologist or cardiac electrophysiologist in a catheterisation laboratory under guidance of fluoroscopy and TOE. The procedure takes approximately 60 minutes.

6. (a) Is this a request for MBS funding?

☒ Yes
☐ No

(b) If yes, is the medical service(s) proposed to be covered under an existing MBS item number(s) or is a new MBS item(s) being sought altogether?

☒ Amendment to existing MBS item(s)
☐ New MBS item(s)

(c) If an amendment to an existing item(s) is being sought, please list the relevant MBS item number(s) that are to be amended to include the proposed medical service:

The relevant MBS item number is 38276, which has been listed on the MBS since 1 November 2017.

(d) If an amendment to an existing item(s) is being sought, what is the nature of the amendment(s)?

i. ☐ An amendment to the way the service is clinically delivered under the existing item(s)
ii. ☒ An amendment to the patient population under the existing item(s)
iii. ☐ An amendment to the schedule fee of the existing item(s)
iv. ☐ An amendment to the time and complexity of an existing item(s)
v. ☐ Access to an existing item(s) by a different health practitioner group
vi. ☐ Minor amendments to the item descriptor that does not affect how the service is delivered
vii. ☐ An amendment to an existing specific single consultation item

viii. ☐ An amendment to an existing global consultation item(s)
ix. ☐ Other (please describe below):

(e) If a new item(s) is being requested, what is the nature of the change to the MBS being sought?

i. ☐ A new item which also seeks to allow access to the MBS for a specific health practitioner group
ii. ☐ A new item that is proposing a way of clinically delivering a service that is new to the MBS (in terms of new technology and / or population)
iii. ☐ A new item for a specific single consultation item
iv. ☐ A new item for a global consultation item(s)

(f) Is the proposed service seeking public funding other than the MBS?

☐ Yes
☒ No

(g) If yes, please advise:

N/A

7. What is the type of service:

☒ Therapeutic medical service
☐ Investigative medical service
☐ Single consultation medical service
☐ Global consultation medical service
☐ Allied health service
☐ Co-dependent technology
☐ Hybrid health technology

8. For investigative services, advise the specific purpose of performing the service *(which could be one or more of the following)*:

N/A

i. ☐ To be used as a screening tool in asymptomatic populations
ii. ☐ Assists in establishing a diagnosis in symptomatic patients
iii. ☐ Provides information about prognosis
iv. ☐ Identifies a patient as suitable for therapy by predicting a variation in the effect of the therapy
v. ☐ Monitors a patient over time to assess treatment response and guide subsequent treatment decisions

9. Does your service rely on another medical product to achieve or to enhance its intended effect?

☐ Pharmaceutical / Biological
☒ Prosthesis or device
☐ No

10. (a) If the proposed service has a pharmaceutical component to it, is it already covered under an existing Pharmaceutical Benefits Scheme (PBS) listing?

☐ Yes
☐ No
N/A

(b) If yes, please list the relevant PBS item code(s):

N/A

(c) If no, is an application (submission) in the process of being considered by the Pharmaceutical Benefits Advisory Committee (PBAC)?

☐ Yes (please provide PBAC submission item number below)
☐ No

N/A

(d) If you are seeking both MBS and PBS listing, what is the trade name and generic name of the pharmaceutical?

Trade name: N/A
Generic name: N/A

11. (a) If the proposed service is dependent on the use of a prosthesis, is it already included on the Prostheses List?

☒ Yes
☐ No

(b) If yes, please provide the following information (where relevant):

Billing code(s): BS332
Trade name of prostheses: WATCHMAN
Clinical name of prostheses: Left atrial appendage closure device (includes access sheath and delivery system)
Other device components delivered as part of the service: N/A

Billing code(s): SJ395
Trade name of prostheses: Amplatzer left atrial appendage closure device
Clinical name of prostheses: Amplatzer Amulet Occluder, Amplatzer Cardiac Plug. Nitinol wire mesh
Other device components delivered as part of the service: N/A

(c) If no, is an application in the process of being considered by a Clinical Advisory Group or the Prostheses List Advisory Committee (PLAC)?

☐ Yes
☐ No

(d) Are there any other sponsor(s) and / or manufacturer(s) that have a similar prosthesis or device component in the Australian market place which this application is relevant to?

☒ Yes
☐ No

(e) If yes, please provide the name(s) of the sponsor(s) and / or manufacturer(s):

Johnson & Johnson Medical Pty Ltd has a device, 1. Coherex WaveCrest™, which is registered for use in Australia as a LAA occluder, however, the device is not listed on the prosthesis list.

12. Please identify any single and / or multi-use consumables delivered as part of the service?

WATCHMAN
Single use consumables: The WATCHMAN LAA Closure Technology consists of the Access System (Access Sheath and Dilator) and Delivery System (Delivery Catheter and LAA Closure Device). The Access System and Delivery System permit device placement in the LAA via femoral venous access and inter-atrial septum crossing into the left atrium.
Multi-use consumables: N/A

AMULET
Single use consumables: The Amplatzer LAAC System consists of the Amplatzer Amulet Device or Amplatzer Cardiac Plug (LAAC device), Amplatzer Amulet Delivery Sheath (delivery system) and Amplatzer Guidewire. The delivery system and guidewire are single use items integral to the placement of the LAAC device via femoral venous access and inter-atrial septum crossing into the left atrium.
Multi-use consumables: N/A

PART 3 – INFORMATION ABOUT REGULATORY REQUIREMENTS

13. (a) If the proposed medical service involves the use of a medical device, in-vitro diagnostic test, pharmaceutical product, radioactive tracer or any other type of therapeutic good, please provide the following details:

Type of therapeutic good: Medical device
Manufacturer's name: Boston Scientific Corporation / AGA Medical Corporation / Coherex Medical Inc
Sponsor's name: Boston Scientific Pty Ltd / Abbott Medical Australia Pty Ltd / Johnson & Johnson Medical Pty Ltd

(b) Is the medical device classified by the TGA as either a Class III or Active Implantable Medical Device (AIMD) against the TGA regulatory scheme for devices?

☒ Class III
☐ AIMD
☐ N/A

14. (a) Is the therapeutic good to be used in the service exempt from the regulatory requirements of the *Therapeutic Goods Act 1989*?

☐ Yes (If yes, please provide supporting documentation as an attachment to this application form)
☒ No

(b) If no, has it been listed or registered or included in the Australian Register of Therapeutic Goods (ARTG) by the Therapeutic Goods Administration (TGA)?

☒ Yes (if yes, please provide details below)
☐ No

Details of the medical devices listed on the ARTG for the proposed medical service is provided in Table 1. There are four cardiac occluders listed on the ARTG (WATHMAN, AMPLATZER Amulet, AMPLATZER Cardiac Plug, Coherex WaveCrest) with their delivery kits.

Table 1 Medical devices listed on the ARTG for the proposed medical service

ARTG number	Description	Intended purpose	Sponsor
216434	**Cardiac occluder** The WATCHMAN LEFT ATRIAL APPENDAGE (LAA) Closure Technology consists of the Access System & Delivery System (Delivery Catheter and LAA Closure Device). This System permits Device placement in the LAA via femoral venous access and inter-atrial septum crossing into the left atrium. The WATCHMAN Device is a self-expanding nitinol structure with a porous membrane on the proximal face. The Device is constrained within the Delivery System until deployment in the LAA	The WATCHMAN LAA Closure Technology is intended to prevent thrombus embolization from the left atrial appendage and reduce the risk of life-threatening bleeding events in patients with non-valvular atrial fibrillation who are eligible for anticoagulation therapy or who have a contraindication to anticoagulation therapy.	Boston Scientific Pty Ltd
216435	**Delivery kit** WATCHMAN Access System is made up of Access Sheath and Dilator, the	The WATCHMAN Access System is intended to provide vascular and transseptal access for the	Boston Scientific Pty Ltd

ARTG number	Description	Intended purpose	Sponsor
	system is advanced over guidewire into left atrium (LA). As Access Sheath nears center of LA, Dilator is held down and advancement of Access Sheath into initial position in LA or ostium of LUPV. Dilator & Guidewire then removed to leave behind Access Sheath, ready for WATCHMAN™ LAA Closure Device	WATCHMAN Left Atrial Appendage Closure Device with Delivery System.	
310680	**Delivery kit** The WATCHMAN TruSeal Access System (Access Sheath and Dilator) is compatible with components of all WATCHMAN Left Atrial Appendage Closure Devices. The WATCHMAN TruSeal Access System is available in multiple curve shapes to assist with placement of the sheath into the Left Atrial Appendage for preparation of WATCHMAN LAA Closure Devices	The WATCHMAN TruSeal Access System is intended to provide vascular and transseptal access for all WATCHMAN Left Atrial Appendage Closure Devices with Delivery Systems.	Boston Scientific Pty Ltd
216398	**Cardiac occluder** The device is constructed from a nitinol mesh and consists of a lobe and a disc connected by a central waist. Polyester patches are sewn into both the lobe and disc to facilitate occlusion. The lobe has stabilizing wires to improve device placement and retention. The device has threaded screw attachments at each end for connection to the delivery and loading cables. The device has radiopaque markers at each end and at the stabilizing wires that permit visibility during fluoroscopy.	The AMPLATZER Amulet Left Atrial Appendage Occluder is a percutaneous transcatheter device intended to prevent thrombus embolization from the left atrial appendage (LAA) in patients who have nonvalvular atrial fibrillation.	Abbott Medical Australia Pty Ltd
162137	**Cardiac occluder** A transcatheter, self-expanding device constructed from a nitinol mesh and consists of a lobe and a disc connected by a central waist. The lobe has stabilising wires for device placement and retention. The device has threaded screw attachments at each end for connection to the delivery and loading cables. The device has radiopaque markers at each end and at the stabilising wires	The AMPLATZER Cardiac Plug is a percutaneous transcatheter device intended to prevent thrombus embolization from the left atrial appendage (LAA) in patients who have nonvalvular atrial fibrillation.	Abbott Medical Australia Pty Ltd
230575	**Cardiac occluder** The System permanently occludes the Left Atrial Appendage (LAA). The System consists of an occluder and	The Coherex WaveCrest Left Atrial Appendage Occlusion System is intended to be used for occlusion of the Left Atrial Appendage in patients	Johnson & Johnson Medical Pty Ltd

ARTG number	Description	Intended purpose	Sponsor
	anchors (comprising the implant) and delivery system. The delivery system consists of a delivery catheter with loading device and control handle that actuates the anchors through the catheter to detach the Implant from the System. The Implant is constrained in the Delivery Sheath (packaged separately) until deployment in the LAA. After positioning, anchors are extended and implant detached.	who have all of the following: Non-valvular paroxysmal, persistent, or permanent atrial fibrillation, LAA anatomy amenable to treatment by percutaneous techniques, and Risk factors for potential thrombus formation in the LAA.	
230576	**Delivery kit** The sheath and dilator which are packaged together are advanced over the guide-wire into the patient through the transeptal puncture until the tip is seen to be in the mid portion of the left atrium. The implant is advanced inside the delivery sheath and is detached using the delivery system handle under fluoroscopy. Once the implant is in place the delivery system is retracted into the sheath and removed from the patient	The Coherex WaveCrest Left Atrial Appendage Occlusion System delivery sheath is used to constrain the LAA implant which is intended to be used for occlusion of the Left Atrial Appendage in patients who have all of the following: Non-valvular paroxysmal, persistent, or permanent atrial fibrillation, LAA anatomy amenable to treatment by percutaneous techniques, and Risk factors for potential thrombus formation in the LAA.	Johnson & Johnson Medical Pty Ltd

15. If the therapeutic good has not been listed, registered or included in the ARTG, is the therapeutic good in the process of being considered for inclusion by the TGA?

☐ Yes (please provide details below)
☐ No

N/A
Date of submission to TGA:
Estimated date by which TGA approval can be expected:
TGA Application ID:
TGA approved indication(s), if applicable:
TGA approved purpose(s), if applicable:

16. If the therapeutic good is not in the process of being considered for listing, registration or inclusion by the TGA, is an application to the TGA being prepared?

☐ Yes (please provide details below)
☐ No

N/A
Estimated date of submission to TGA:
Proposed indication(s), if applicable:
Proposed purpose(s), if applicable:

PART 4 – SUMMARY OF EVIDENCE

17. **Provide an overview of all key journal articles or research published in the public domain related to the proposed service that is for your application (limiting these to the English language only).** ***Please do not attach full text articles, this is just intended to be a summary.***

	Type of study design*	**Title of journal article or research project (including any trial identifier or study lead if relevant)**	**Short description of research (max 50 words)****	**Website link to journal article or research (if available)**	**Date of publication*****
1.	Patient-level meta-analysis of 2 RCTs	**Meta-analysis** Reddy et al 2017. 5-Year Outcomes After Left Atrial Appendage Closure: From the PREVAIL and PROTECT AF Trials. J Am Coll Cardiol. 2017 Dec 19;70(24):2964-2975.	A meta-analysis of the PROTECT AF and PREVAIL utilising 5 year outcomes data comparing LAAC with warfarin in treatment of patients with NVAF, demonstrated that LAAC with Watchman provides stroke prevention in nonvalvular atrial fibrillation comparable to warfarin, with additional reductions in major bleeding, particularly haemorrhagic stroke, and mortality.	https://www.ncbi.nlm.nih.gov/pubmed/29103847	2017
2.	RCT, OL	**PROTECT AF / NCT00129545** Reddy VY et al. 2015. Percutaneous left atrial appendage closure vs warfarin for atrial fibrillation: a randomized clinical trial. JAMA. 2014 Nov 19;312(19):1988-98	The RCT comparing LAAC vs warfarin in NVAF patients demonstrated that after 3.8 years of follow up, LAAC was superior in the prevention of the combined outcome of stroke, systemic embolism and cardiovascular death, as well as cardiovascular and all-cause mortality.	https://www.ncbi.nlm.nih.gov/pubmed/25399274?dopt=Abstract	2015

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
3.	RCT, OL	**PREVAIL / NCT01182441** Belgaid et al. 2016. Prospective randomized evaluation of the watchman left atrial appendage closure device in patients with atrial fibrillation versus long-term warfarin therapy: The PREVAIL trial. Int J Cardiol. 2016 Sep 15;219:177-9.	The PREVAIL trial was designed to show non-inferiority of LAAC vs warfarin. The trial met the safety endpoint and demonstrated that LAAC is non-inferior to warfarin for the prevention of post procedural stroke.	https://www.ncbi.nlm.nih.gov/pubmed/27343417	2016

** Categorise study design, for example meta-analysis, randomised trials, non-randomised trial or observational study, study of diagnostic accuracy, etc.*

***Provide high level information including population numbers and whether patients are being recruited or in post-recruitment, including providing the trial registration number to allow for tracking purposes.*

**** If the publication is a follow-up to an initial publication, please advise.*

18. Identify yet to be published research that may have results available in the near future that could be relevant in the consideration of your application by MSAC (limiting these to the English language only). *Please do not attach full text articles, this is just intended to be a summary.*

	Type of study design*	Title of research (including any trial identifier if relevant)	Short description of research (max 50 words)**	Website link to research (if available)	Date***
1	RCT, OL	PRAGUE-17 Left Atrial Appendage Closure vs. Novel Anticoagulation Agents in Atrial Fibrillation	This study aims to compare LAAC (Amulet™ or WATCHMAN™) versus NOACs in patients with NVAF in patients with history of significant bleeding, or cardioembolic event or a high risk based on CHA_2DS_2-$VAS_C \geq 3$ and HAS-BLED ≥2. Expected enrolment of 400 patients	NCT02426944	Recruiting Estimated study completion date: May 2020
2	RCT, OL	CLOSURE-AF Left Atrial Appendage CLOSURE in Patients With Atrial Fibrillation Compared to Medical Therapy	This study aims is to establish the clinical benefit LAAC in patients with NVAF at high risk of stroke (CHA_2DS_2-VASc Score ≥2) as well as high risk of bleeding as compared to best medical care (including NOACs when eligible). Expected enrolment of 1512 patients	NCT03463317	Recruiting Estimated study completion date: February 2023

	Type of study design*	Title of research (including any trial identifier if relevant)	Short description of research (max 50 words)**	Website link to research (if available)	Date***
3	RCT, OL	ELIGIBLE Efficacy of Left atrial Appendage Closure After GastroIntestinal BLEeding	The study set out to compare OAT with LAAC NVAF patients who have experienced gastrointestinal bleeding. The study was first posted in 2012 and has status unknown, suggesting the study is not going ahead.	NCT01628068	Status unknown
4	RCT, OL	Prevention of Stroke by Left Atrial Appendage Closure in Atrial Fibrillation Patients After Intracerebral Hemorrhage	This trial aims to compare LAAC using the Amulet™ versus medical management (OAT including NOACs or antiplatelets) in patients with NVAF who have experienced a prior stroke. Estimated enrolment 750 patients	NCT02830152	Recruiting Estimated study completion date: February 2030

** Categorise study design, for example meta-analysis, randomised trials, non-randomised trial or observational study, study of diagnostic accuracy, etc.*

***Provide high level information including population numbers and whether patients are being recruited or in post-recruitment.*

****Date of when results will be made available (to the best of your knowledge).*

PART 5 – CLINICAL ENDORSEMENT AND CONSUMER INFORMATION

19. **List all appropriate professional bodies / organisations representing the group(s) of health professionals who provide the service (please attach a statement of clinical relevance from each group nominated):**

    Professional bodies / organisations have confirmed clinical relevance of the service as part of Application 1347 and 1347.1. This is an expansion of the current MBS item code for LAAC. As such, provision of further justification of clinical relevance is not considered required for this application. Nevertheless, a statement from the Cardiac Society of Australia and New Zealand (CSANZ) supporting the clinical need of LAAC in the proposed patient population will be forwarded.

20. **List any professional bodies / organisations that may be impacted by this medical service (i.e. those who provide the comparator service):**

    The professional body, Cardiac Society of Australia and New Zealand (CSANZ), represents the professionals providing the comparator service (management) and the intervention service (procedure).

21. **List the consumer organisations relevant to the proposed medical service (please attach a letter of support for each consumer organisation nominated):**

    As per Q.19, consumer organisation support was provided as part of Applications 1347 and 1347.1, thus not required.

22. **List the relevant sponsor(s) and / or manufacturer(s) who produce similar products relevant to the proposed medical service:**

    All relevant sponsor(s) who produce cardiac occluder devices are listed in Table 1. There are no other relevant sponsors or manufacturers.

23. **Nominate two experts who could be approached about the proposed medical service and the current clinical management of the service(s):**

    Name of expert 1: REDACTED

    Telephone number(s): REDACTED

    Email address: REDACTED

    Justification of expertise: REDACTED

    Name of expert 2: REDACTED

    Telephone number(s): REDACTED

    Email address: REDACTED

    REDACTED

PART 6 – POPULATION (AND PRIOR TESTS), INTERVENTION, COMPARATOR, OUTCOME (PICO)

PART 6a – INFORMATION ABOUT THE PROPOSED POPULATION

24. Define the medical condition, including providing information on the natural history of the condition and a high level summary of associated burden of disease in terms of both morbidity and mortality:

Atrial fibrillation (AF) is a condition characterised by disorganised atrial activity without discrete p-waves on a 12 lead electrocardiogram. It is caused by a malfunction in the sequence of electrical impulses controlling the rate and order of contraction of the chambers of the heart. AF is the most common form of irregular heart rhythm. A minority (10%) of AF cases occur in people with rheumatic mitral valve disease, a prosthetic heart valve, or mitral valve repair; this is described as valvular AF. The other 90 per cent of AF is described as NVAF (Ang et al 1998). AF is associated with substantial morbidity and mortality from heart failure, stroke, and other thromboembolic complications (Lip 2003). AF affects quality of life across areas of physical, mental, social, and functional measures. Patients with asymptomatic AF have lower global life satisfaction compared with healthy subjects (Savelieva et al 2011).

Th death rate of atrial fibrillation has seen a steady increase in the last decade with a t total of 1552 Australians having lost their lives due to atrial fibrillation in 2009 increasing to a total of 2953 lives lost in 2018 (Australian Bureau of Statistics [ABS] 2018). These figures do not account for deaths caused by AF related conditions (ie, stroke, heart failure), thus are likely to underestimate the true numbers. Costs of AF to the Australian economy are at least $1.25 billion (AUD) per annum through medical costs, costs of long-term care for those with a disability, and lost productivity (Price Waterhouse Coopers 2010).

In 2015, 1.7% of the Australian population (~397,000) had experienced a stroke at some time in their life (Australian Institute in Health of Health and Welfare [AIHW]: cardiovascular disease 2019). People disabled by stroke are more likely to need ongoing assistance with activities of daily living compared with people disabled by other diseases. For example, those disabled by stroke were twice as likely to need ongoing assistance with these activities as those whose disability was caused by coronary heart disease (42.1% compared with 21.6%) (AIHW: Heart, stroke and vascular diseases 2004).

The symptoms of AF can include palpitations, dizziness, chest pain and shortness of breath, often noticed as an inability to tolerate exercise. However, approximately 10–30 per cent of people with AF have no symptoms; many of these people are not diagnosed and thus do not receive appropriate treatment for stroke risk (Department of Health and ageing (DoHA): review of anticoagulation therapies in atrial fibrillation 2012).

Based on the National Heart Foundation (NHF) of Australia and the Cardiac Society of Australia and New Zealand (CSANZ) Australian clinical guidelines for the diagnosis and management of AF (2018), the stroke risk of patients with NVAF in Australia is assessed using a modified version of the CHA_2DS_2-VAS, namely CHA_2DS_2-VA, which does not take into account sex (the former gives one point for female sex). The sexless score is recommended to avoid the cumbersome practice of selecting different thresholds for males and females when recommending anticoagulation. The definition and points in the CHA_2DS_2-VA is provided in Table 2.

Table 2 Definition and points in the CHA_2DS_2-VA score

Score	Points	Definition
C	1	Congestive heart failure—recent signs, symptoms or admission for decompensated heart failure; this includes both HFrEF and HFpEF, or moderately to severely reduced systolic left ventricular function, whether or not there is a history of heart failure
H	1	History of hypertension, whether or not BP is currently elevated
A2	2	Age ≥ 75 years
D	1	Diabetes

Score	Points	Definition
S2	2	History of prior stroke or TIA or systemic thromboembolism
V	1	Vascular disease, defined as prior myocardial infarction or peripheral arterial disease or complex aortic atheroma or plaque on imaging (if performed)
A	1	Age 65–74 years

AF=atrial fibrillation; BP=blood pressure; HFpEF=heart failure with preserved ejection fraction; HFrEF=heart failure with reduced ejection fraction; TIA=transient ischaemic attack.
Source: National Heart Foundation (NHF) of Australia and the Cardiac Society of Australia and New Zealand (CSANZ) (2018) Table 3 pg. 1235.

25. Specify any characteristics of patients with the medical condition, or suspected of, who are proposed to be eligible for the proposed medical service, including any details of 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 service:

Proposed patient population:
Patients with NVAF assessed by a non-interventional and interventional physician as has having contraindication to life-long oral anticoagulation therapy, and is at increased risk of thromboembolism demonstrated by:
(a) a prior stroke (whether of an ischaemic or unknown type), transient ischaemic attack or non-central nervous system systemic embolism; or
(b) at least 2 of the following risk factors:
(i) an age of 65 years or more;
(ii) hypertension;
(iii) diabetes mellitus;
(iv) heart failure or left ventricular ejection fraction of 35% or less (or both);
(v) vascular disease (prior myocardial infarction, peripheral artery disease or aortic plaque)

A contraindication to lifelong anticoagulation is defined as:
i) a previous major bleeding complication, or
ii) a blood dyscrasia, or
iii) a vascular abnormality predisposing to potentially life-threatening haemorrhage, or
iv) anaemia, or
v) prior gastrointestinal bleed, or
vi) thrombocytopenia, or
vii) haematological malignancy, or
viii) traumatic intracranial haemorrhage

Currently, to be eligible for LAAC on the MBS, patients must have NVAF and be at increased risk of stroke (CHA_2DS_2-VA ≥ 2) and have a contraindication to lifelong oral anticoagulation, here referred to as 'absolute' contraindication to OAT. The proposed patient population in this application is the same as those who are currently eligible for LAAC on the MBS with the exception that patients have 'relative' contraindication to OAT, rather than 'absolute' contraindication to lifelong OAT. The eligibility criteria for MBS item code 38276 is as follows with contraindications to lifelong anticoagulation defined in explanatory note (TN.8.132).

38276 Transcatheter occlusion of left atrial appendage, and cardiac catheterisation performed by the same practitioner, for stroke prevention in a patient who has non-valvular atrial fibrillation and a contraindication to life-long oral anticoagulation therapy, and is at increased risk of thromboembolism demonstrated by: (a) a prior stroke (whether of an ischaemic or unknown type), transient ischaemic attack or non-central nervous system systemic embolism; or (b) at least 2 of the following risk factors: (i) an age of 65 years or more; (ii) hypertension; (iii) diabetes mellitus; (iv) heart failure or left ventricular ejection fraction of 35% or less (or both); (v) vascular disease (prior myocardial infarction, peripheral artery disease or aortic plaque) Multiple Operation Rule (Anaes.) (Assist.) Fee: $926.90 Benefit: 75% = $695.20
Explanatory Note (TN.8.132) A contraindication to lifelong anticoagulation is defined as: i) a previous major bleeding complication experienced whilst undergoing treatment with oral anticoagulation therapy, ii) a blood dyscrasia, or iii) a vascular abnormality predisposing to potentially life-threatening haemorrhage The procedure is performed as a hospital service.

The use of OAT for prevention of stroke in NVAF patients is based on a patient's stroke risk, relative to any comorbid conditions that might carry significant risk of bleeding. Such characteristics are referred to as relative contraindications. Relative contraindications represent patient characteristics that put them at higher risk for bleeding and may result in withholding OAT, given the balance of risk to benefit of treatment (Steinberg et al 2015).

The 'absolute' contraindication to lifelong anticoagulation as per explanatory note (TN.8.132) were defined in the Stakeholder meeting for Application 1347 (MSAC Application 1347 Stake holder meeting minutes 5 June 2015). This stakeholder meeting *"considered that relative contraindications were more difficult to establish particularly whether there was true intolerance to therapy or just reflected patient preference"* (p.2). To mitigate this, the Applicant has sought local expert advice to formulate a specific list of contraindications that do not reflect patient preference.

The study by Steinberg et al (2015) defines relative contraindications as advanced age (85 years or older), evidence of dementia, gastrointestinal haemorrhage, thrombocytopenia, anaemia, haematological malignancy and traumatic intracranial haemorrhage. Other sources are broadly similar, however also include recent history recurrent iatrogenic falls in patient at higher bleeding risk as a relative contraindication, whilst acknowledging that risk of fall is not a contraindication to OAT per se (Buckinghamshire Formulary NHS[1]. The definitions used by Steinberg et al (2015) were adapted based on local expert advice, to ensure only contraindications pertaining to patients bleeding risk were included. As such, age ≥ 85 years and dementia were not considered specific to patients bleeding risk per se and were not included in the list.

26. Define and summarise the current clinical management pathway *before* patients would be eligible for the proposed medical service (supplement this summary with an easy to follow flowchart [as an attachment to the Application Form] depicting the current clinical management pathway up to this point):

[1] http://www.bucksformulary.nhs.uk/docs/ContraindicationsOralAnticoag%26Anti-plateletsAFPrimaryCare.pdf (accessed 28 October 2019)

The current clinical management pathway for stroke prevention in AF, based on the NHF of Australia and CSANZ (2018) guidelines for AF, is provided in Figure 1. The pathway considers both NVAF and valvular AF, however, the focus of this Application is NVAF.

As previously mentioned, in this guideline the CHA_2DS_2-VA score is recommended for predicting stroke risk in AF and determines management of patients. In patients with a score of zero, oral anticoagulation or antiplatelets are not recommended, rather these patients will be re-evaluated annually to review their score. Patients with a CHA_2DS_2-VA score of 1 are considered for OAT to prevent stroke and systemic embolism (note the guidelines refer to oral anticoagulant [OAC] which is interchangeable with OAT). The guidelines specifically recommend that *"[w]hen oral anticoagulation is initiated in patients with NVAF, an NOAC – apixaban, dabigatran, or rivaroxaban – is recommended in preference to warfarin"* (p.1237). Antiplatelets are not recommended for stroke prevention of NVAF patients irrespective of their CHA_2DS_2-VA score.

For patients with a CHA_2DS_2-VA score of ≥ 2 who are not contraindicated for anticoagulation, OAT is recommended with NOACs being preferred. For patients with clear contraindications to OAT, LAAC should be considered. This pathway is consistent with the MBS listing for LAAC with the guidelines citing MSAC Application 1347.1, with reference to effectiveness and cost-effectiveness of LAAC versus placebo to support this positioning of LAAC.

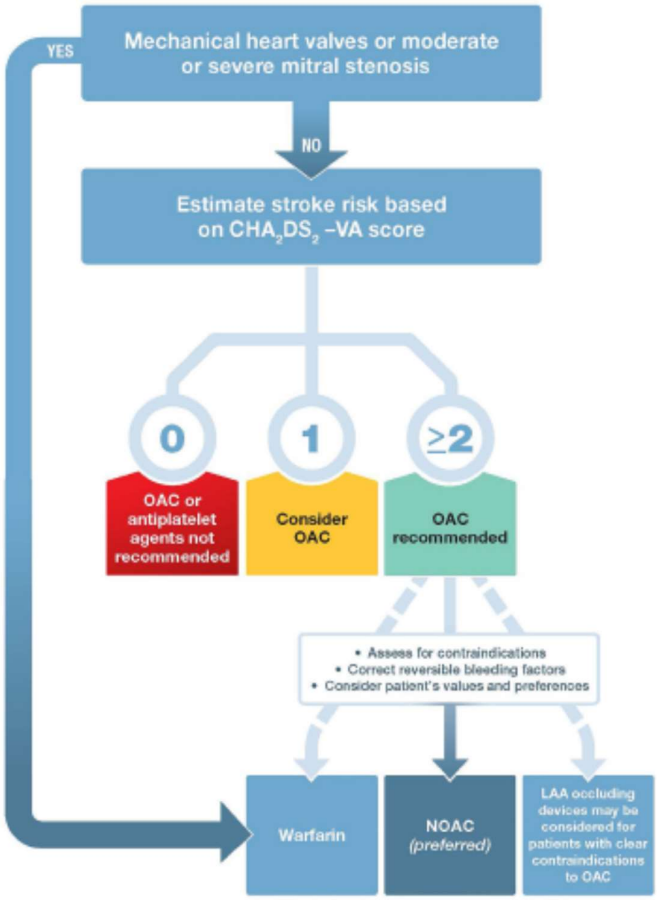

Figure 1 Management of stroke prevention in AF

OAC=oral anticoagulant; NOAC=non-vitamin K oral anticoagulant; LAA left atrial appendage.
Source: Source: National Heart Foundation (NHF) of Australia and the Cardiac Society of Australia and New Zealand (CSANZ) (2018) Figure 6 pg. 1238.

The proposed clinical management pathway for stroke prevention in AF is provided in Figure 2. Currently in Australia, patients with NVAF with CHA_2DS_2-VA ≥ 2 are eligible for LAAC if they have an absolute contraindication to OAT, as defined in the notes of the MBS item 38276. It is proposed that patients assessed as having 'relative' contraindications to OAT as defined in Q.25 will be eligible for LAAC. These patients are currently managed on NOACs as the preferred treatment option, or warfarin. Patients who have no contraindication to OAT will continue to be managed on OAT (NOACs or warfarin).

Stroke prevention management with NOACs or warfarin is a lifelong commitment, with the effectiveness of OAT dependent on medication adherences. Real world medication adherence with OAT is suboptimal, ranging from 32.3–67.7% with warfarin (Zhao et al 2017; de Andres-Nogales et al 2015) to 75.6% with NOACs (Shehab et al 2019). Non-adherence to OAT is associated with poorer clinical outcomes, especially in patients with CHA_2DS_2-VASc ≥ 2 in whom risk of stroke has been found to increase significantly with non-adherence (Yao et al 2016). Reimbursing LAAC for the proposed patient population on the MBS would thus provide an alternate, one procedure, treatment option associated with superior safety (less risk of bleeding) and effectiveness relative to OAT (Reddy et al 2017), that is not dependent on compliance.

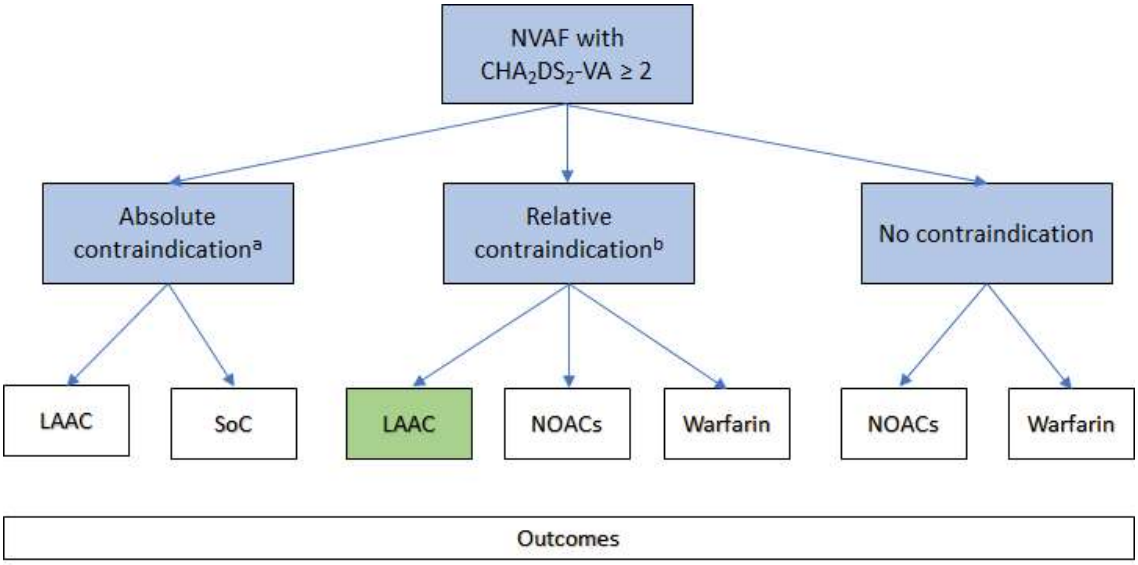

Figure 2 Proposed clinical management pathway for stroke prevention in patients with AF

LAAC=left atrial appendage closure; NOAC= Non-Vitamin K antagonist oral anticoagulants; SoC=standard of care.
[a]Absolute contraindications = contraindication to lifelong anticoagulation is defined as (notes TN.8.132 of MBS item 38276):
i) a previous major bleeding complication experienced whilst undergoing treatment with oral anticoagulation therapy,
ii) a blood dyscrasia, or
iii) a vascular abnormality predisposing to potentially life-threatening haemorrhage.
[b] Defined as: i) a previous major bleeding complication, or ii) a blood dyscrasia, or iii) a vascular abnormality predisposing to potentially life-threatening haemorrhage, or iv) anaemia, or v) prior gastrointestinal bleed, or vi) thrombocytopenia, or vii) haematological malignancy, or viii) traumatic intracranial haemorrhage

PART 6b – INFORMATION ABOUT THE INTERVENTION

27. Describe the key components and clinical steps involved in delivering the proposed medical service:

The LAA is the primary source for thromboembolism in patients with NVAF. The percutaneous insertion of an implantable device to occlude the LAA may be performed to reduce thromboembolism in patients with NVAF. The procedure aims at preventing stroke and systemic thromboembolism by closing off the LAA permanently to avoid the formation and migration of emboli to the brain.

There are currently four devices registered for use to perform the LAAC procedure in Australia, WATCHMAN™ (Boston Scientific), the AMPLATZER™ Cardiac Plug (St Jude Medical), the AMPLATZER™ Amulet (St Jude Medical) and the Coherex WaveCrest™ (Johnson and Johnson).

Devices such as AtriClip (Australian Register of Therapeutic Goods (ARTG) 175070) are also used for LAA exclusion. However, the procedures associated with these devices are not comparable with the transcatheter LAA occlusion devices, as AtriClip is implanted under direct visualisation in conjunction with other open cardiac surgical procedures. AtriClip and similar devices are excluded from this resubmission, as specified in the Final Protocol for Application 1347 and consistent with Application 1347.1.

The intervention for the purpose of this resubmission is transcatheter occlusion of the LAA. In the Final Protocol for MSAC Application 1347, PASC agreed that from a clinical perspective, all LAA occlusion devices are similar and for the purposes of the assessment report, it is appropriate to group all technologies in a generic approach. Indeed, in the PSD, MSAC *"noted that there was insufficient basis to compare across available LAAC devices in terms of their comparative safety and comparative effectiveness* (MSAC Application 1347 PSD November 2014).

Whilst the WATCHMAN, AMPLATZER Cardiac Plug, AMPLATZER Amulet devices are listed on the prosthesis list, the Coherex WaveCrest device is not. For completeness details of all four devices are provided below.

LAA occluders

WATCHMAN™

The WATCHMAN LAA Closure Technology consists of the Access System (Access Sheath and Dilator) and Delivery System (Delivery Catheter and LAA Closure Device). The Access System and Delivery System permit device placement in the LAA via femoral venous access and inter-atrial septum crossing into the left atrium. The WATCHMAN device is a self-expanding nitinol structure with a porous membrane on the proximal face (Figure 3). The device is constrained within the Delivery System until deployment in the LAA. The device is available in 5 sizes from 21 to 33 mm.

The WATCHMAN LAA Closure device is designed to be permanently implanted at or slightly distal to the ostium (opening) of the LAA. The WATCHMAN LAA Closure Technology is intended to reduce the risk of thromboembolism from the LAA in patients with NVAF who:

- Are at increased risk for stroke and systemic embolism based on $CHADS_2$ or CHA_2DS_2-VAS_c scores and are recommended for anticoagulation therapy;
- Are deemed by their physicians to be suitable for warfarin; and
- Have an appropriate rationale to seek a non-pharmacologic alternative to warfarin, considering the safety and effectiveness of the device compared to warfarin[*].

[*]Specific factors may include one or more of the following: i) a history of major bleeding while taking therapeutic anticoagulation therapy; ii) the patient's prior experience with oral anticoagulation (if applicable), which may include an inability to maintain a stable therapeutic International Normalized Ratio (INR) or inability to comply with regular INR monitoring AND unavailability of an approved alternative anticoagulation agent; iii) a medical condition, occupation, or lifestyle placing the patient at high risk of major bleeding secondary to trauma; iv) the presence of indication(s) for long-term warfarin use, other than non-valvular atrial fibrillation (e.g. mechanical heart valve, hypercoagulable states, recurrent deep venous thrombosis.

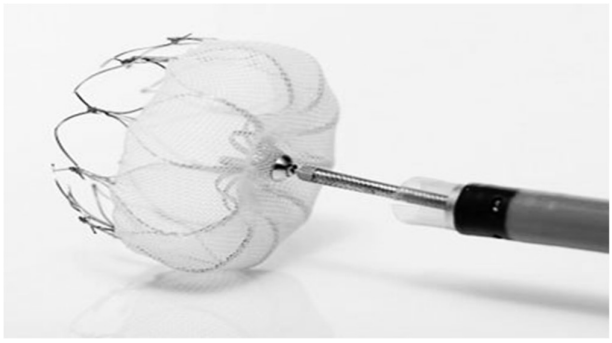

Figure 3 WATCHMAN™ LAA occluder

Source: Cardiac Rhythm News <www.CardiacRhythmNews.com>

AMPLATZER Cardiac Plug™

The AMPLATZER Cardiac Plug™ (Abbott Australia Pty Ltd) is a transcatheter self-expanding nitinol device for use in cardiac structures. The AMPLATZER™ Cardiac Plug™ consists of a small proximal disc, a central polyester patch, and a larger disc with hooks to anchor the device in the LAA. (Figure 4). The device is constrained within the Delivery System until deployment in the LAA.

The lobe has stabilising wires to improve device placement and retention. The device has threaded screw attachments at each end for connection to the delivery and loading cables. The device has radiopaque markers at each end and at the stabilising wires which permit visibility during fluoroscopy to facilitate accurate device placement.

It is designed to provide optimal occlusion with full cross-sectional orifice coverage of the LAA, regardless of the LAA anatomy and is delivered via AMPLATZER™ TORQVUE™ Delivery systems designed specifically for use with this device.

The AMPLATZER Cardiac Plug™ device is available in eight different sizes (16mm to 30mm) to accommodate the size of the LAA. The AMPLATZER™ Cardiac Plug is intended for use in cardiac structures that do not involve the septal wall, but which require closure or occlusion. The AMPLATZER™ Cardiac Plug is intended to prevent thrombus embolization from the LAA in patients with NVAF.

Figure 4 AMPLATZER Cardiac Plug™ LAA occluder

Source: Cardiac Rhythm News <www.CardiacRhythmNews.com>

AMPLATZER Amulet™

The AMPLATZER Amulet™ Left Atrial Appendage Occluder is a percutaneous transcatheter device intended to prevent thrombus embolization from the LAA in patients who have NVAF.

The device is constructed from a nitinol mesh and consists of a lobe and a disc connected by a central waist. Polyester patches are sewn into both the lobe and disc to facilitate occlusion. The lobe has stabilising wires to improve device placement and retention. The device has threaded screw attachments at each end for connection to the delivery and loading cables. The device has radiopaque markers at each end and at the stabilising wires that permit visibility during fluoroscopy to facilitate accurate device placement. The device is constrained within the Delivery System until deployment in the LAA.

It is designed to provide optimal occlusion with full cross-sectional orifice coverage of the LAA, regardless of the LAA anatomy and is delivered via AMPLATZER™ TORQVUE™ Delivery systems designed specifically for use with this device. The AMPLATZER Amulet™ device is available in eight different sizes (16mm to 34mm) to accommodate the size of the LAA.

Coherex WaveCrest™

The Coherex WaveCrest Left Atrial Appendage Occlusion System (Johnston and Johnston) is intended to be used for occlusion of the left atrial appendage in patients who have all of the following: non-valvular paroxysmal, persistent, or permanent AF, LAA anatomy amenable to treatment by percutaneous techniques, and risk factors for potential thrombus formation in the LAA (Figure 5).

The system consists of the following components: 1) the occluder, 2) the anchors, and 3) the delivery system. The system is designed to be used exclusively with the Coherex WaveCrest Left Atrial Appendage Occlusion System Delivery Sheath, which is packaged and delivered separately. The occluder and anchors comprise the implantable components of the system and together for the Coherex WaveCrest Implant. The delivery system for the implant consists of a delivery catheter with a loading device and a proximal control handle. The control handle is designed to actuate the anchors through the catheter and to detach the implant from the system.

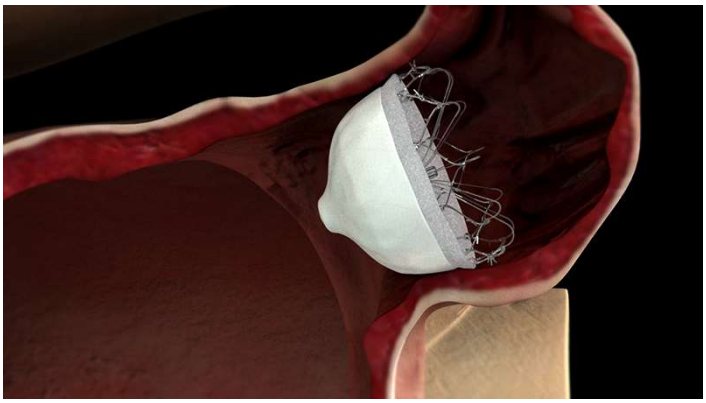

Figure 5 Coherex WaveCrest ™ LAA occluder

Key steps of the intervention

Patients are pre-screened with transoesophageal echocardiogram (TOE) to ensure eligibility for the procedure (absence of thrombus and appendage size/morphology suitable for occlusion). Appendage measurements should be taken and the appropriate size device selected as per the directions for use (DFUs) of the respective devices.

The proposed medical service is provided in a public or private hospital. The procedure is performed under local or general anaesthesia by an interventional cardiologist or cardiac electrophysiologist in a

catheterisation laboratory under guidance of fluoroscopy and TOE. The procedure takes approximately 60 minutes, which includes pre-, intra- and post-service components (see below).

- Pre-service component: 5—10 min. The physician will review patient notes and acquire patient consent for the procedure.
- Intra-service component: mean LAA occlusion procedure time is 51.5 ± 27.7 minutes (Reddy et al 2013).
- Post-service component: 5 minutes. This may include procedures notes.

The implantation procedure uses standard transseptal techniques. The access sheath and delivery catheter permit device placement in the LAA via femoral venous access and inter-atrial septum crossing into the left atrium. The device is unsheathed when in the appropriate position. Several criteria are assessed prior to final release of the device including position, seal and device stability. A device can be repositioned or removed prior to its final release if criteria for permanent placement are not met. In general, patients stay overnight in the hospital after the procedure and are discharged the following day. Patients may also require additional pre-discharge imaging services (e.g. pre-discharge chest x-ray or transthoracic echocardiogram [TTE]).

Postoperatively, patients should begin antiplatelet medication to achieve optimal results. The appropriate dose and duration of antiplatelet therapy post-procedure is manufacturer specific. In general terms, patients will be managed on dual antiplatelet therapy for a minimum of 3 months (aspirin and clopidogrel) and maintained on aspirin for at least 12 months. Follow up examination with TOE is performed at six weeks to evaluate the LAA seal. A physician may choose to perform additional TOE procedures if any complications are suspected.

28. Does the proposed medical service include a registered trademark component with characteristics that distinguishes it from other similar health components?

The proposed medical service does not include a registered trademark component, however, the occluder devices inserted during the proposed procedure do have registered trademarks.

29. If the proposed medical service has a prosthesis or device component to it, does it involve a new approach towards managing a particular sub-group of the population with the specific medical condition?

The proposed medical service, LAAC, using LAA occluder prostheses, is currently used and reimbursed for patients with NVAF on the MBS. Thus, the procedure does not represent a new approach towards managing patients with NVAF as such, however, the proposal for funding would allow a subgroup of patients who currently don't have access to the procedure to undergo LAAC. That is, it is proposed that patients with relative contraindications to OAT who are currently not eligible for LAAC will be able to access the procedure.

30. If applicable, are there any limitations on the provision of the proposed medical service delivered to the patient (i.e. accessibility, dosage, quantity, duration or frequency):

Accessibility to the LAAC procedure is limited by referral to an interventional cardiologist, availability of an accredited operator and equipped facility including a catheterisation laboratory.

The LAA occluder is designed to be implanted permanently into the heart. It is therefore expected that the majority of patients will only receive a single procedure in their lifetime. However, in rare circumstances (e.g. embolization or infection) device removal may be required. This is achieved as a peripheral transcatheter procedure or in an open cardiac procedure. If removal is needed, an interventional cardiologist and/or cardiac surgeon can perform the removal.

31. If applicable, identify any healthcare resources or other medical services that would need to be delivered at the same time as the proposed medical service:

The health care resources delivered at the same time as the proposed medical service includes local or general anaesthesia, and the procedure requires fluoroscopy and TOE guidance. Access to a catheterisation laboratory is also required.

32. If applicable, advise which health professionals will primarily deliver the proposed service:

Interventional cardiologist or cardiac electrophysiologist

33. If applicable, advise whether the proposed medical service could be delegated or referred to another professional for delivery:

Not applicable.

34. If applicable, specify any proposed limitations on who might deliver the proposed medical service, or who might provide a referral for it:

The delivery of the service, as addressed in Q.32 is limited to interventional cardiologist, cardiac electrophysiologist or cardiac surgeon. The referring physicians are typically cardiologists but may include other relevant physicians treating the patient for AF.

35. If applicable, advise what type of training or qualifications would be required to perform the proposed service, as well as any accreditation requirements to support service delivery:

Cardiologists who intend to perform transcatheter occlusion of LAA using the device undergo a comprehensive training program, which is provided by the manufacturers. The requirements to participate in this program are as follows:

- Proficiency in trans-septal skills and left sided procedures
- Access to surgical back-up
- Willingness to complete the LAA Closure Training Program
- Committed to routine implantations to maintain skill set.

Initial proctoring is provided by a physician experienced in LAAC and/or a clinical specialist. To be considered an independent treating cardiologist, both the trainee and proctor must agree that there is an appropriate level of skill in implanting the device which is normally achieved following the successful completion of 5-10 procedures under supervision pending skill set.

36. (a) Indicate the proposed setting(s) in which the proposed medical service will be delivered (select <u>ALL</u> relevant settings):

- ☒ Inpatient private hospital (admitted patient)
- ☒ Inpatient public hospital (admitted patient)
- ☐ Private outpatient clinic
- ☐ Public outpatient clinic
- ☐ Emergency Department
- ☐ Private consulting rooms - GP
- ☐ Private consulting rooms – specialist
- ☐ Private consulting rooms – other health practitioner (nurse or allied health)
- ☐ Private day surgery clinic (admitted patient)
- ☐ Private day surgery clinic (non-admitted patient)
- ☐ Public day surgery clinic (admitted patient)
- ☐ Public day surgery clinic (non-admitted patient)
- ☐ Residential aged care facility
- ☐ Patient's home
- ☐ Laboratory
- ☐ Other – please specify below

(b) Where the proposed medical service is provided in more than one setting, please describe the rationale related to each:

The procedure is performed as an inpatient service, either in the public or public hospital setting.

37. Is the proposed medical service intended to be entirely rendered in Australia?

- ☒ Yes
- ☐ No – please specify below

PART 6c – INFORMATION ABOUT THE COMPARATOR(S)

38. 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 (including identifying health care resources that are needed to be delivered at the same time as the comparator service):

The proposed main comparator for LAAC in the proposed patient population, patients with NVAF with relative contraindication to OAT, is non-vitamin K antagonist oral anticoagulants (NOAC) as these agents are the preferred treatment option in the proposed patient population (refer to algorithms in Q26; NHF of Australia and CSANZ [2018]). Warfarin is an alternate treatment option in these patients, thus is included as an additional comparator (refer to algorithms in Q26; NHF of Australia and CSANZ [2018]).

Warfarin has a general listing on the pharmaceutical benefits scheme (PBS) whereas the NOACs are restricted to stroke prevention in NVAF patients with CHA_2DS_2-VA ≥ 1. There are three NOACs listed on the PBS for stroke prevention in NVAF: apixaban, dabigatran and rivaroxaban, restriction provided in Table 3. Rivaroxaban was listed on a cost-effectiveness basis versus warfarin, with apixaban and dabigatran cost-minimised to rivaroxaban.

Table 3 PBS restriction for NOACs for prevention of stroke

PBS restriction for NOACs
Prevention of stroke or systemic embolism Patient must have non-valvular atrial fibrillation Patient must have one or more risk factors for developing stroke or systemic embolism: (i) Prior stroke (ischaemic or unknown type), transient ischaemic attack or non-central nervous system (CNS) systemic embolism; (ii) age 75 years or older; (iii) hypertension; (iv) diabetes mellitus; (v) heart failure and/or left ventricular ejection fraction 35% or less.

39. Does the medical service (that has been nominated as the comparator) have an existing MBS item number(s)?

☐ Yes (please list all relevant MBS item numbers below)
☒ No

As previously noted, NOACs are listed on the PBS for stroke prevention in patients with NVAF, and warfarin has a general listing on the PBS.

40. Define and summarise the current clinical management pathway/s that patients may follow *after* they receive the medical service that has been nominated as the comparator (supplement this summary with an easy to follow flowchart [as an attachment to the Application Form] depicting the current clinical management pathway that patients may follow from the point of receiving the comparator onwards, including health care resources):

The current clinical management pathways that patients follow after they receive the comparator treatments is provided in Figure 6. The main health care resources consumed from the point of receiving the comparator is monitoring of bleeding risk and treatment adherences.

According to the NHF of Australia and CSANZ (2018) guidelines for AF, patients prescribed pharmacotherapy including OAT should have their treatment adherence and persistence regularly monitored, although the guidelines do not specify the time interval at which patients should be monitored. Non-compliance with NOACs is a particular concern given the rapid offset of action, thus potentially increasing the risk of stroke in these patients (NHF of Australia and CSANZ 2018).

Whilst patients treated with NOACs do not require specific monitoring in terms of bleeding risk, patients treated with warfarin require regular monitoring of their international normalised ratio (INR) to ensure adequate anticoagulation whilst balancing the risk of bleeding. Further details of the healthcare resources associated with INR monitoring is provided below.

Patients with relative contraindication to OAT treated with NOACs or warfarin may experience a major bleeding complication, a blood dyscrasia or develop a vascular abnormality predisposing them to potentially life-threatening haemorrhage, thus becoming eligible for LAAC based on the current MBS reimbursement).

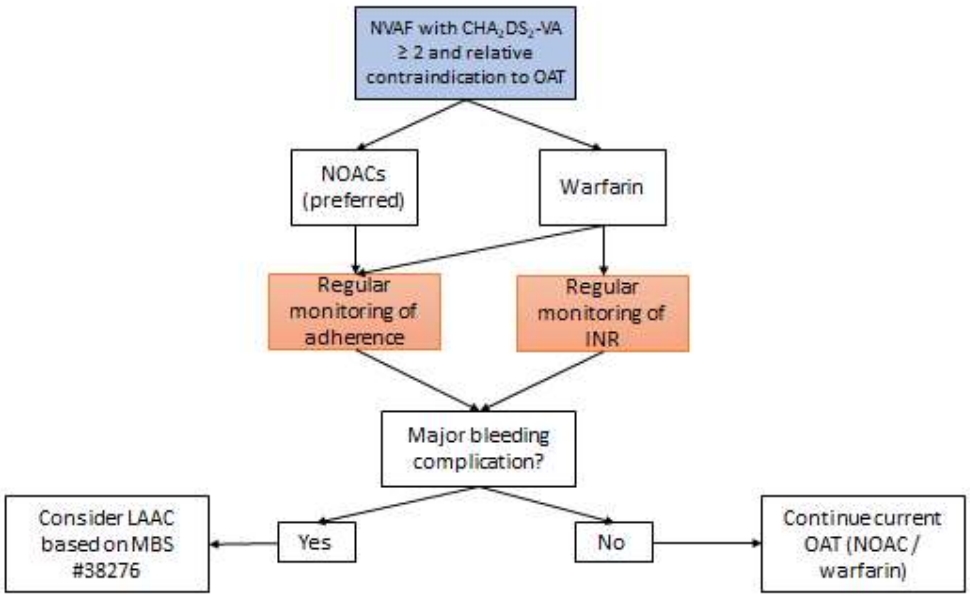

Figure 6 Current management pathway from the point of receiving the comparators onwards

INR=international normalised ratio; OAT=oral anticoagulant therapy; LAAC=left atrial appendage closure; MBS=Medicare Benefits Schedule; NOACs=non-vitamin K antagonist oral anticoagulants.

INR monitoring

Given the narrow therapeutic window of warfarin, regular monitoring of INR is required to ensure adequate anticoagulation whilst minimising the risk of bleeding. According the to the warfarin product information (PI) (Coumadin), the therapeutic range is considered INR 2-3, with bleeding risk increasing significantly with an INR of 4. The bleeding risk of INR 2-3 is 1.3% (De Caterina et al 2007). Thus, regular INR measurement is required for the duration of warfarin therapy. The approaches to monitoring in Australia include:

- General practitioner (GP) led management
- Anticoagulation clinic
- Pathology service-led care (using validated computerised dosing algorithms)
- Point of care (POC) testing (including patient self-management using coagulometers (NHF CZANZ 2018)

When commencing treatment, patients treated with warfarin are recommended to have daily checks of prothrombin time (PT) until the patient is stable and a therapeutic range is reached (Warfarin PI). The PT is used to calculate the INR. Patients maintained on warfarin require continuous monitoring, at an interval of every 1-4 weeks (Warfarin PI).

POC devices using finger-prick capillary blood sampling allows for convenient and efficient INR measurement in the clinical practice setting and for self-management in the patient's home.

POC devices, ie coagulometers, and required consumables, e.g. test strips are not reimbursed via MBS and as such comes at a cost to the practice or patient. The healthcare resources required for INR measurement of patients treated with warfarin depends on the model of care used (as described above). There are several coagulometers registered for use in Australia. POC testing is generally most relevant in the on-going monitoring of patients who are stable.

Costs associated with INR monitoring when warfarin is prescribed includes pathology collection and testing, and general practitioner consultations as reimbursed. It is estimated that the annual cost of monitoring INR to ensure therapeutic targets range is $445 per patient per year. Alternatively, POC monitoring by the patient would mean purchasing of the coagulometer, such as CoaguChek (estimated at $700/device) and test strips (estimated at $150 per 24 strips) as these devices and consumables are not reimbursed on the MBS.

Row	Variable	Input	Source
A	Patient episode initiation: Initiation of a patient episode by collection of a specimen for 1 or more services	$5.95	MBS item 73928
A	Prothrombin time (including INR): pathology services	$13.70	MBS item 65120
C	Number of INR test required per year	20	Deloitte Access Economics 2011
D	Number of GP visits required per year	3	MSAC application 1071; every 6th test
E	GP professional attendance	$17.50	MBS item 3
F	Annual cost of monitoring	$445.5	(A + B) × C +(D × E)

41. (a) Will the proposed medical service be used in addition to, or instead of, the nominated comparator(s)?

☐ In addition to (i.e. it is an add-on service)
☒ Instead of (i.e. it is a replacement or alternative)

(b) If instead of (i.e. alternative service), please outline the extent to which the current service/comparator is expected to be substituted:

Clinicians must weigh up the risks and benefits of administrating OAT to NAVF patients with high risk of stroke, especially where there are few alternative therapies for prevention of thromboembolism. Thus, use of warfarin and NOACs remains high in NVAF patients with relative or absolute contraindications to OAT as has been reported in O'Brien et al., (2014), in which 30.3% of patients with OAT contraindications were taking warfarin or dabigatran and Steinberg et al., (2017), in which approximately 55% of AF patients with a high risk of bleeding used warfarin. It is expected that among NVAF patients with relative OAT contraindications, there will be moderate substitution of OAT including warfarin and NOAC in the long term (life-time treatment). The superior safety and effectiveness of LAAC versus OAT in these patients support moderate rates of substitution (Reddy et al 2017).

It should be noted that postoperatively a proportion of patients would be administered a form of OAT for a period of time up to 12 months post-implant.

42. Define and summarise how current clinical management pathways (from the point of service delivery onwards) are expected to change as a consequence of introducing the proposed medical service, including variation in health care resources (Refer to Question 39 as baseline):

Listing LAAC for the proposed patients with relative contraindications to OAT provides patients and physicians with a 'one procedure' treatment alternative to NOACs and warfarin. The main differences in terms of health care resources from the point of service in using LAAC rather than NOACs and warfarin, as illustrated in Figure 7, include:

- Monitoring of adherence is not required. NOACs and warfarin require long term treatment, with effectiveness dependent on adherence. In contrast, LAAC is a once off procedure, thus effectiveness is not dependent on compliance.
- Monitoring of INR is not required. Regular, ongoing INR monitoring is relevant to all patients prescribed warfarin to ensure adequate coagulation whilst balancing the risk of bleeding. Monitoring will continue for as long as the patient is treated with warfarin.
- Reduction in major bleeding events and improved survival with LAAC relative to OAT (Reddy et al 2017), thus providing superior outcomes to patients.
- Patients undergoing LAAC have the potential of experiencing procedural complications such as procedure related cardiac perforation or pericardial tamponade. However, based on the key clinical evidence, the rates of procedure related events are relatively low.

The resources required for the LAAC procedure itself are provided in Q51.

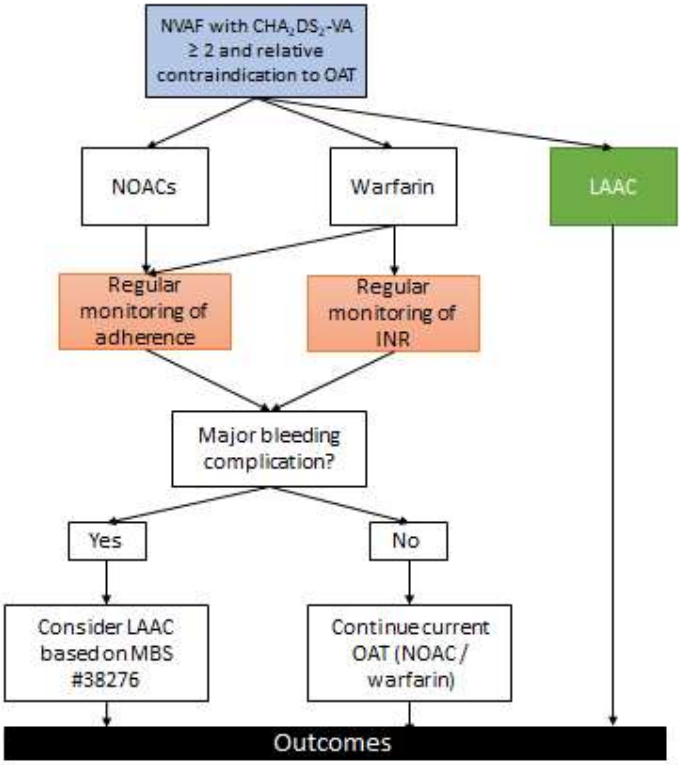

Figure 7 *Proposed management pathway from the point of receiving the comparators and proposed service*

INR=international normalised ratio; OAT=oral anticoagulant therapy; LAAC=left atrial appendage closure; MBS=Medicare Benefits Schedule; NOACs=non-vitamin K antagonist oral anticoagulants.
Proposed service is marked in green n the algorithm.

PART 6d – INFORMATION ABOUT THE CLINICAL OUTCOME

43. Summarise the clinical claims for the proposed medical service against the appropriate comparator(s), in terms of consequences for health outcomes (comparative benefits and harms):

Relative to the comparators, NOACs and warfarin, LAAC is associated with superior safety (in terms of bleeding) and superior effectiveness in terms of cardiovascular mortality.

44. Please advise if the overall clinical claim is for:

☒ Superiority
☐ Non-inferiority

45. Below, list the key health outcomes (major and minor – prioritising major key health outcomes first) that will need to be specifically measured in assessing the clinical claim of the proposed medical service versus the comparator:

Safety Outcomes:

Major bleeding events (procedural and post-procedural)

Procedural adverse events with LAAC

Post procedural adverse events with LAAC vs comparators

Clinical Effectiveness Outcomes:

Effectiveness outcomes to be measured include:

Primary effectiveness

- Stroke rate (ischaemic stroke and haemorrhagic stroke)
- All-cause mortality
- Cardiovascular mortality
- Health-related quality of life (HRQoL)

Secondary effectiveness

- Procedure success i.e. successful transcatheter occlusion of LAA

PART 7 – INFORMATION ABOUT ESTIMATED UTILISATION

46. Estimate the prevalence and/or incidence of the proposed population:

The LAAC procedure (MBS item number: 38276) was listed on the MBS in November 2017. The number of reimbursed MBS services for the LAAC procedure over time since its listing is provided in Figure 8. There was rapid uptake of the LAAC procedure in the first 4 months of listing after which the LAAC market entered a period of stabilised growth. Four hundred and twenty-one LAAC procedures have been reimbursed by the MBS between September 2018 and August 2019. It is estimated that in the second year of listing approximately 500 LAAC procedures will be reimbursed by the MBS and remain relatively stable in subsequent years.

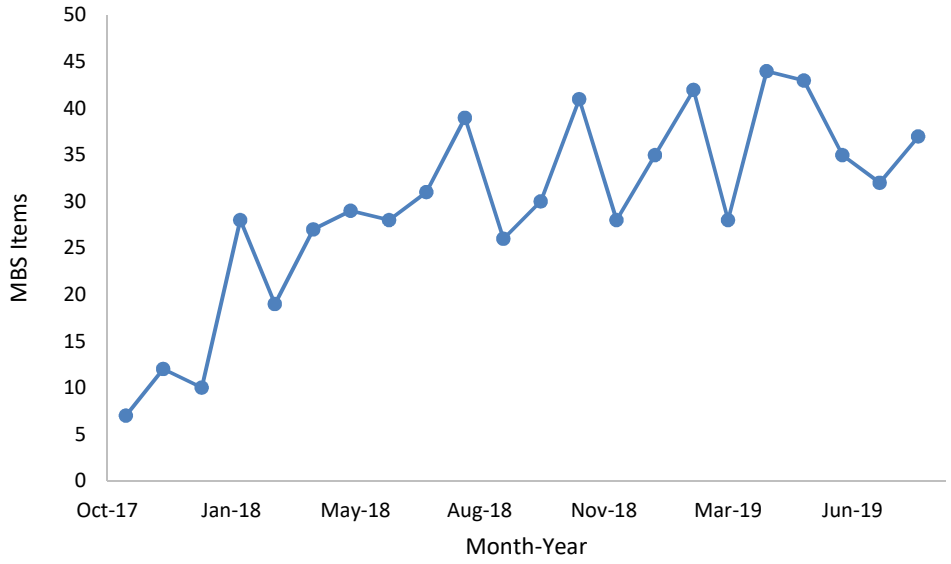

Figure 8 MBS items for the LAAC procedure (MBS Item: 38276)

Abbreviations: MBS, Medicare benefits schedule
Source: Medicare Statistics, link:
http://medicarestatistics.humanservices.gov.au/statistics/do.jsp?_PROGRAM=%2Fstatistics%2Fmbs_item_standard_report&DRILL=ag&group=38276&VAR=services&STAT=count&RPT_FMT=by+time+period+and+state&PTYPE=month&START_DT=201401&END_DT=201908

The MSAC Application 1347.1, in which LAAC received a positive recommendation by MSAC, used an epidemiological approach to estimate the eligible patient population in Australia based on the current restriction (i.e. CHA_2DS_2-VA ≥2 AND lifelong absolute contradiction to OAT). A revised epidemiological model is presented in this application based on updated epidemiological estimates presented in the Drug Utilisation Sub-Committee (DUSC) review of actual vs. predicted use of NOACs (June 2016) and results from the Tasmanian Atrial Fibrillation (TAF) study (Bista et al 2017; Alamneh et al 2017).

The prevalence of NVAF and stroke risk distribution, is substantiated by a relatively robust set of epidemiological inputs derived from Australian epidemiological studies. According to the report by the Department of Health and Ageing (DoHA) in 2012, the prevalence of AF in Australia is 1–2% (DoHA: review of anticoagulation therapies in atrial fibrillation 2012, Section 5.2; Go et al 2001; Miyasaka et al 2006; Sturm et al 2002), although prevalence estimates sharply increase with age and the number of people with stroke is also expected to increase significantly as the population ages. The DUSC review of NOAC utilisation (June 2016) and an Australian study by Ball et al., (2015) applied age specific AF prevalence rates to project AF prevalence based on both population growth and the age distribution of

the Australian population. This application applies age specific prevalence rates reported in Sturm et al., (2002), a multicentre, observational study measuring prevalence of various conditions in 16,148 patients aged 30 years or older attending general practices across Australia during 2000. Age specific prevalence rates from Strum et al., (2002) were also applied in the epidemiological model reported in the DUSC review of NOACS (June 2016).

The proportion of AF patients with NVAF and the stroke risk distribution among NVAF patients is based on results of the TAF Study reported in Bista et al., (2017) and Alamneh et al., (2017). The TAF study is a retrospective study that enrolls patients from 3 different hospitals in Tasmania: The Royal Hobart Hospital (RHH), Launceston General Hospital (LGH), and North West Regional Hospital (NWRH). Bista et al., 2017, reviewed the medical records of 2502 patients admitted between January 1, 2011, and June 30, 2012, and diagnosed with valvular or NVAF at discharge (AR-DRG code 148: atrial fibrillation or flutter). The study found that 88.6% of patients with AF had NVAF and 63.56% of patients had a $CHADS_2$ ≥2 and 88.50% had a CHA_2DS_2-VAS ≥2. Alamneh et al., (2017) reviewed hospital records of 2310 AF patients admitted to RHH between January 2011 and July 2015. The study found that 56.5% of patients had a $CHADS_2$ ≥2 and 85.7% had a CHA_2DS_2-VAS ≥2. The proposed population for MBS funding specifies that a $CHA2DS_2$-VA score ≥2 to be eligible for LAAC procedure (that is, sexless CHA_2DS_2-VAS), hence stroke risk based on CHA_2DS_2-VAS overestimate the eligible population. The estimate from Bista et al., (2017) based on $CHADS_2$ is used in the model as it resembles a reasonable midpoint within the range reported in the TAF Study (56.5% - 88.5%).

Table 4 summarises the most appropriate epidemiological inputs for estimating the prevalence of NVAF patients with high risk of stroke in the Australian population.

Table 4 Epidemiological inputs for estimating the prevalence of NVAF patients with high risk of stroke in the Australian population

Parameter	Estimate	Source
AF prevalence- by age category		
40-49	1%	Sturm et al. (2002), Figure 3 pg.314 (presented as cited in NOACS DUSC review (2015), Appendix B)
50-59	1.50%	
60-69	4.20%	
70-79	10.90%	
≥80	14.80%	
Proportion of AF population with NVAF	88.58%	Bista 2017 pg. 2 (144/1261)
Stroke risk distribution in NVAF		
CHADS2≥2	63.56%	Bista 2017, Table 1

Abbreviations: AF, atrial fibrillation; NOAC, novel oral anti-coagulants; NVAF, non-valvar atrial fibrillation; MBS, Medicare benefits schedule

It is proposed eligibility of LAAC is for patient with a 'relative' contraindication to life-long OAT, as defined in Q.25. Patients considered eligible for LAAC must also meet certain anatomical suitability criteria for the LAAC.

The rate of relative contraindication in the patient population is derived from Steinberg et al., (2015), a retrospective cohort study using a 5% sample of Medicare standard analytic files and corresponding denominator files from the US Centers for Medicare & Medicaid Services for 84,799 AF patients from 2009 through 2010. Steinberg et al (2015) define relative contraindications as advanced age (85 years or older), evidence of dementia, gastrointestinal haemorrhage, thrombocytopenia, anaemia, haematological malignancy and traumatic intracranial haemorrhage. Of the total cohort, 47.0% of patients were found to have a relative contraindication to OAT, with the distribution of relative contraindications provided in Table 5. The application excludes patients with relative contraindications not related to bleeding risk (dementia, age > 85 years) which results in approximately 31% of patients having relative contraindications related to bleeding risk. The application accepts that there is likely to be patient overlap

among bleeding related contraindications and hence the estimate applied in the application model is considered an approximate value.

Table 5 Distribution of relative contraindications in Steinberg et al., (2016)

Condition	Patients, n (%) (N = 84,799)
Relative contraindication to OAT	39,592 (47.0)
Age > 85 years	22,451 (26.5)
Anaemia	13,527 (16.0)
Prior gastrointestinal bleed	7973 (9.4)
Dementia	7102 (8.4)
Thrombocytopenia	2568 (3.0)
Haematological malignancy	1791 (2.1)
Traumatic intracranial haemorrhage	170 (0.2)
Relative contraindication related to bleeding risk	Approximately 31%

O'Brien et al., (2014) also reported rates of event-related and patient-related contraindications (as an approximation of relative contraindications) in 10,130 patients from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF) between June 2010 and August 2011. Contraindications to OAC therapy were documented by the provider at the baseline enrolment visit and documented in the medical record. This study reported an overall contraindication rate of 13.1% (both event and patients related contraindications). The lower rate of contraindications reported in O'Brien et al., (2014) compared to Steinberg et al., (2015) reflects the wide range of contraindication rates reported in the literature which have been reported from less than 20% to more than 50% (Flaker et al., 1999; Smith et al., 1999; Bradley et al., 2000;Kalra et al., 2000; Kakkar et al., 2013).

Rates of relative contraindications reported in Steinberg are used in the model over those presented in O'Brien because Steinberg utilised data from an inpatient and outpatient setting while O'Brien was restricted to an outpatient setting. Also, although documented contraindications were collected separately in O'Brien from information on current treatment regimens, it is possible that the decision to treat influenced the reporting of a contraindication.

Finally, it is anticipated that there will be a higher rate of contraindications in patients eligible for LAAC due to the higher disease severity and more prevalent comorbidity in this patient population. This is supported by findings from O'Brien et al., (2014) in which the odds ratio of having a contraindication was 1.22 (95%CI 1.02-1.48) times more likely in patient with prior stroke and patients with contraindications had a higher mean $CHADS_2$ score (2.5 vs 2.2) and were more likely to be classified as high stroke risk ($CHADS_2 \geq 2$; 76.5% vs 70.5% respectively).

Not all patients with a relative contraindication to OAT will be referred to an interventional physician. This reflects the preference of the referring physician and the patient in terms of favouring intervention (ie LAAC, once off) or ongoing management (NOACs or warfarin), particularly given these measures are preventative. It is difficult to estimate the proportion of patients that will referred for LAAC. This estimate is partially informed by the DUSC review of NOACs utilisation (June 2016, pg. 22) which reported that in 2015, approximately 5% of prescriptions initiating anticoagulant therapy were written by cardiologists, which suggests that referral for consideration of LAAC would be limited by physician referral. It is estimated that access to a referring specialist would be higher among a higher risk patient population and hence the application model assumes that 30% of NVAF patients with high stroke risk and contradictions to OAT will be referred for LAAC. This estimate will be subject to further consideration and wider consultation with key opinion leaders in an SBA.

As described in Fountain et al (2006), a number of patients contraindicated to OAT and dual antiplatelet therapy (DAPT) would likely be considered unsuitable for the LAAC procedure by the treating interventional cardiologist. Fountain et al (2006) reviewed the screening log for each patient screened for the PROTECT-AF trial and documented the reasons patients were deemed ineligible for LAAC. The data relating to screening exclusion criteria were utilised to estimate the proportion of patients with NVAF that would meet anatomical suitability criteria for LAAC. Application of these exclusion criteria to the

number of presenting patients resulted in 84.6% of patients with NVAF being anatomically suitable for LAAC in Australia.

Table 6 summarises the most appropriate epidemiological inputs for estimating the proposed patient population eligible for LAAC based on the expanded restriction.

Table 6 Epidemiological inputs for estimating the prevalence of NVAF patients with high risk of stroke in the Australian population

Parameter	Estimate	Source
Rate of relative contraindications	31.0%	Steinberg et al., (2015) Table 2
Proportion of patients referred for LAAC to interventional physician	30%	Assumption
Proportion of patients suitable for LAAC surgery	84.6%	Fountain et al., (2006), Table 2[a]

Abbreviations: DUSC, drug utilisation sub-committee; LAAC, left atrial appendage closure.

a. Patients were considered anatomically unsuitable for LAAC if they had mechanical valve or long-term warfarin needed, prior echocardiogram demonstrated unsuitable anatomy, atrial septal defect, atrial septal repair, or closure device or if left atrial appendage was obliterated

47. Estimate the number of times the proposed medical service(s) would be delivered to a patient per year:

The proposed medical service is intended to be delivered once only. Data from EWOLUTION informed the average number of devices required per implantation attempt (1.07). Use of more than one occluder may occur due to incorrect measurement of the LAA (i.e. initial occluder is the wrong size), or failure to correctly deploy the initial device.

48. How many years would the proposed medical service(s) be required for the patient?

As stated in Q.47, the proposed medical service is to be a once off service.

49. Estimate the projected number of patients who will utilise the proposed medical service(s) for the first full year:

Table 7 presents estimates of the total patient population eligible for LAAC for the first year of listing. Based on these estimates there are approximately 308,719 patients with NVAF and high stroke risk (CHA_2DS_2-VA ≥2) in Australia of which it is estimated that approximately 18,000 (or approx. 6%) patients are eligible for LAAC.

Table 7 Estimated number of patients eleigble for LAAC in the first years of listing

Parameter	2020 (1ST year)	Source
Australian Population Projections- by age		
40-49	3,298,867	ABS Series B
50-59	3,102,387	ABS Series B
60-69	2,665,658	ABS Series B
70-79	1,861,189	ABS Series B
≥80	1,040,201	ABS Series B
AF prevalence-by age		
40-49 – 1.0%	32,989	Table 4
50-59 – 1.5%	46,536	Table 4
60-69 – 4.2%	111,958	Table 4
70-79 – 10.9%	202,870	Table 4

Parameter	2020 (1ST year)	Source
≥80 – 14.8%	153,950	Table 4
Proportion of AF patients with NVAF– 88.58%	485,688	Table 4
Proportion of NVAF patients with CHA2DS2-VA≥2 – 63.56%	308,719	Table 4
Proportion of patients with relative CI to OAT – 31.0%	94,777	Table 6
Proportion of patients referred for LAAC - 30%	28,433	Table 6
Proportion of patients suitable for LAAC therapy – 84.6%	24,054	Table 6
Total number of patients eligible for LAAC	24,054	

Abbreviations: AF, atrial fibrillation; LAAC, left atrial appendage closure; NVAF, non-valvar atrial fibrillation

50. Estimate the anticipated uptake of the proposed medical service over the next three years factoring in any constraints in the health system in meeting the needs of the proposed population (such as supply and demand factors) as well as provide commentary on risk of 'leakage' to populations not targeted by the service:

Expected uptake among the eligible patient populations would be limited by the number of centres and accredited operators able to provide the LAAC procedure. The procedure requires access to a catheterisation laboratory.

MSAC have previously highlighted how limited supply of complex cardiovascular procedures can regulate uptake. For example, in the case of TAVI "MSAC noted concerns that the size of the inoperable patient population may be underestimated ... However, MSAC anticipated that the uptake would be limited by the number of centres and operators accredited to perform the procedure." (MSAC Application 1361.2 PSD, March 2016, p. 4). It is estimated that there are currently REDACTED centres that are performing LAAC in Australia. This indicates that the number of centres performing LAAC in Australia is likely to limit access to the procedure, while acknowledging there is potential to increase capacity within existing centres.

Cumulative uptake of LAAC in the eligible population is estimated to start at REDACTED% in the first year of listing and increase to REDACTED% and REDACTED% in the second and third years respectively. Table 8 outlines the number of patients expected to be treated with LAAC in the first three years of listing. The estimations will be confirmed in the Applicant Developed Assessment Report (ADAR).

Table 8 Estimated number of patients treated with LAAC in the first three years of listing

Parameter	2020	2021	2022	Source
	(1st year)	(2nd year)	(1st year)	
Australian Population Projections- by age				
40-49	3,298,867	3,312,913	3,341,850	ABS Series B
50-59	3,102,387	3,135,246	3,163,674	ABS Series B
60-69	2,665,658	2,720,714	2,775,799	ABS Series B
70-79	1,861,189	1,933,106	1,996,750	ABS Series B
≥80	1,040,201	1,070,732	1,106,955	ABS Series B
AF prevalence-by age				
40-49 – 1.0%	32,989	33,129	33,419	Table 4
50-59 – 1.5%	46,536	47,029	47,455	Table 4
60-69 – 4.2%	111,958	114,270	116,584	Table 4
70-79 – 10.9%	202,870	210,709	217,646	Table 4

Parameter	2020	2021	2022	Source
≥80 – 14.8%	153,950	158,468	163,829	Table 4
Proportion of AF patients with NVAF– 88.58%	485,688	499,244	512,821	Table 4
Proportion of NVAF patients with CHA_2DS_2-VA≥2 – 63.56%	308,719	317,335	325,965	Table 4
Proportion of patients with relative CI to OAT – 31.0%	94,777	97,422	100,071	Table 6
Proportion of patients referred for LAAC - 30%	28,433	29,227	30,021	Table 6
Proportion of patients suitable for LAAC therapy – 84.6%	24,054	24,726	25,398	Table 6
Total number of patients eligible for LAAC	24,054	24,726	25,398	
Cumulative uptake rates	REDACTED	REDACTED	REDACTED	Assumption
Total number of patients treated with LAAC	REDACTED	REDACTED	REDACTED	

PART 8 – COST INFORMATION

51. Indicate the likely cost of providing the proposed medical service. Where possible, please provide overall cost and breakdown:

The total cost of providing the LAAC procedure is estimated at $19,973.80 as detailed in Table 9.

Table 9 Total cost of providing LAAC procedure

Resource	Provider of resource	Price per unit of resource	Quantity	Source
Medical Services – screening prior to intervention				
Non-intra-operative transesophageal echocardiography	Cardiologist	$275.50	1	MBS Item 55118
Cardiology consultation	Cardiologist	$77.90	1	MBS Item 116
Anaesthesiology for transoesophageal echocardiography	Anaesthesiologist	$120.60	1	MBS Item 21936
Administration of anaesthesia for 15 mins or less	Anaesthesiologist	$20.10	1	MBS Item 23010
Medical Services – intervention				
Transcatheter occlusion of LAA	Cardiologist	$926.90	1	MBS Item 38276
Intra-operative transesophageal echocardiography	Anaesthesiologist	$180.90	1	MBS Item 22051
Initiation of management of anaesthesia for cardiac catheterisation	Anaesthesiologist	$140.70	1	MBS Item 21941
Intra-arterial cannulation when performed in association with the administration of anaesthesia	Anaesthesiologist	$80.40	1	MBS Item 23043
Intra-arterial cannulation when performed in association with the administration of anaesthesia	Anaesthesiologist	$80.40	1	MBS Item 22025
Blood pressure monitoring	Anaesthesiologist	$60.30	1	MBS Item 22012
Medical Services – post intervention follow-up within six months				
Cardiology consultation	Cardiologist	$77.90	3	MBS Item 116
Non-intra-operative transesophageal echocardiography	Cardiologist	$275.50	3	MBS Item 55118
Anaesthesiology for transesophageal echocardiography	Anaesthesiologist	$120.60	3	MBS Item 21936
Administration of anaesthesia for 15 mins	Anaesthesiologist	$20.10	3	MBS Item 23010
Prostheses Costs				
LAA occluder	Prostheses	$11,400	1.07	Occluder Device and Delivery System – SOURCE PROSTHESIS LIST
Hospital Services				
Hospital procedure and admission costs e.g. OR, accommodation, nursing, allied health etc.	Hospital	$6,116.00		AR-DRG: F42B - prosthesis cost
Total Cost Per Patient (excluding occluder and Hospital Stay)		$2,457.80		
Total cost of LAAC procedure/patient-		**$19,973.80**		

52. Specify how long the proposed medical service typically takes to perform:

The procedure is performed under local or general anaesthesia by an interventional cardiologist or cardiac electrophysiologist in a catheterisation laboratory under guidance of fluoroscopy and TOE. The procedure takes approximately 60 minutes, which includes pre-, intra- and post-service components (see below).

- Pre-service component: 5—10 min. The physician will review patient notes and acquire patient consent for the procedure.
- Intra-service component: mean LAA occlusion procedure time is 51.5 ± 27.7 minutes (Reddy et al 2013).
- Post-service component: 5 minutes. This may include procedures notes.

53. If public funding is sought through the MBS, please draft a proposed MBS item descriptor to define the population and medical service usage characteristics that would define eligibility for MBS funding.

The MBS item descriptor and proposed associated explanatory notes for the LAAC procedure is provided in Table 10. The proposed item fee and descriptor is identical to the current MBS item for LAAC. The proposed changes refer to the definition of contraindication in the explanatory notes.

The notes to the current MBS item descriptor stipulate patients must have (absolute) contraindications to life-long OAT, defined as: i) a previous major bleeding complication experienced whilst undergoing treatment with oral anticoagulation therapy, ii) a blood dyscrasia, or iii) a vascular abnormality predisposing to potentially life threatening haemorrhage.

The proposed notes stipulate that patients must have a relative contraindication to life-long OAT as defined in Table 10.

Table 10 MBS item descriptor and proposed explanatory notes for LAAC

Category 3 – THERAPEUTIC PROCEDURE
38276 Proposed item descriptor: Transcatheter occlusion of left atrial appendage, and cardiac catheterisation performed by the same practitioner, for stroke prevention in a patient who has non-valvular atrial fibrillation and a contraindication to life-long oral anticoagulation therapy, and is at increased risk of thromboembolism demonstrated by: (a) a prior stroke (whether of an ischaemic or unknown type), transient ischaemic attack or non-central nervous system systemic embolism; or (b) at least 2 of the following risk factors: (i) an age of 65 years or more; (ii) hypertension; (iii) diabetes mellitus; (iv) heart failure or left ventricular ejection fraction of 35% or less (or both); (v) vascular disease (prior myocardial infarction, peripheral artery disease or aortic plaque) Fee: $926.90 Benefit: 75% = $695.20
TN.8.132 Transcatheter occlusion of left atrial appendage for stroke prevention (item 38276) Explanatory Note A contraindication to lifelong anticoagulation is defined as: i) a previous major bleeding complication, or ii) a blood dyscrasia, or iii) a vascular abnormality predisposing to potentially life-threatening haemorrhage, or iv) anaemia, or v) prior gastrointestinal bleed, or vi) thrombocytopenia, or vii) haematological malignancy, or

viii) traumatic intracranial haemorrhage

The procedure is performed as a hospital service.

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