



2024 CODING AND REIMBURSEMENT FOR

# Cardiac Ablation and Left Atrial Appendage Management

AtriCure

## 2024 Coding and Reimbursement Considerations

### Introduction

This information is shared for educational purposes and current as of January 2024. Healthcare providers are solely responsible for the accuracy of codes selected for the services rendered and reported in the patient's medical record. AtriCure does not assume responsibility for coding decisions, nor recommend codes for specific cases. Items and services that are billed to payers must be medically necessary and supported by appropriate documentation. AtriCure does not promote the off-label use of its devices. While a code may exist describing certain procedures and/or technologies, this does not guarantee payment by payers.

### Product Offerings

AtriCure product offering includes Bipolar Radiofrequency (RF) and Cryoablation surgical ablation devices; the AtriClip® Left Atrial Appendage Management System (LAAM); Epi-Sense® coagulation device, LARIAT® suture delivery device and cryoICE® Cryo Nerve Block (cryoNB).

**Table 1. Physician Coding and Reimbursement\***

Current Procedure Terminology (CPT®) are codes describing the procedure during the patient visit. CPT codes that may be appropriate for procedures used in conjunction with cardiac ablation surgery, catheter ablation or LAAM are included below.

CPT**	Description	CY 2024 Physician Work Relative Value Units (RVUs)***	CY 2024 Physician Total RVU	CY 2024 National Payment Rates
<b>Cardiac Surgical Ablation</b>				
33250	Operative ablation of supraventricular arrhythmogenic focus or pathway without cardiopulmonary bypass	25.90	42.78	\$1,206
33251	Operative ablation of supraventricular arrhythmogenic focus or pathway with cardiopulmonary bypass	28.92	48.07	\$1,574
33254	Operative tissue ablation and reconstruction of atria, limited (e.g., modified Maze procedure)	23.71	40.21	\$1,317
33255	Operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); without cardiopulmonary bypass	29.04	47.73	\$1,563
33256	Operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); with cardiopulmonary bypass	34.90	56.51	\$1,850
*33257	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s), limited (e.g., modified Maze procedure)	9.63	17.25	\$565
*33258	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s), extensive (e.g., Maze procedure); without cardiopulmonary bypass	11.00	19.16	\$627
*33259	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s), extensive (e.g., Maze procedure); with cardiopulmonary bypass	14.14	25.06	\$821
33265	Endoscopy, surgical; operative tissue ablation and reconstruction of atria, limited (e.g., modified Maze procedure); without cardiopulmonary bypass	23.71	40.18	\$1,316
33266	Endoscopy, surgical; operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); without cardiopulmonary bypass	33.04	54.20	\$1,775
<b>Mitral Valve Surgery</b>				
33420	Valvotomy mitral valve; closed heart	25.79	42.63	\$1,396
33422	Valvotomy mitral valve; open heart, with cardiopulmonary bypass	29.73	48.85	\$1,600
33425	Valvuloplasty, mitral valve, with cardiopulmonary bypass	49.96	80.23	\$2,627
33426	Valvuloplasty, mitral valve, with cardiopulmonary bypass; with prosthetic ring	43.28	70.08	\$2,295
33427	Valvuloplasty, mitral valve, with cardiopulmonary bypass; radical reconstruction, with or without ring	44.83	71.66	\$2,346
33430	Replacement, mitral valve, with cardiopulmonary bypass	50.93	82.37	\$2,697
<b>Aortic Valve Surgery</b>				
33390	Valvuloplasty, aortic valve, open, with cardiopulmonary bypass; simple (i.e., valvotomy, debridement, debulking, and/or simple commissural resuspension)	35.00	56.48	\$1,849
33391	Valvuloplasty, aortic valve, open, with cardiopulmonary bypass; complex (e.g., leaflet extension, leaflet resection, leaflet reconstruction, or annuloplasty)	41.50	66.94	\$2,192
33405	Replacement, aortic valve, open, with cardiopulmonary bypass; with prosthetic valve other than homograft or stentless valve	41.32	66.76	\$2,186
33406	Replacement, aortic valve, open, with cardiopulmonary bypass with allograft valve (freehand)	52.68	84.81	\$2,777
33410	Replacement, aortic valve, open, with cardiopulmonary bypass with stentless tissue valve	46.41	74.68	\$2,445
33411	Replacement, aortic valve; with aortic annulus enlargement, noncoronary sinus	62.07	98.40	\$3,222
33412	Replacement, aortic valve with transventricular aortic annulus enlargement (Konno procedure)	59.00	91.94	\$3,011
33413	Replacement, aortic valve; by translocation of autologous pulmonary valve with allograft replacement of pulmonary valve (Ross procedure)	59.87	94.24	\$3,086



**Table 1. Physician Coding and Reimbursement** *continued*

CPT*	Description	CY 2024 Physician Work Relative Value Units (RVUs)***	CY 2024 Physician Total RVU	CY 2024 National Payment Rates
<b>CABG</b>				
33533	Coronary artery bypass, using arterial graft(s); single arterial graft	33.75	55.09	\$1,804
33534	Coronary artery bypass, using arterial graft(s); 2 arterial grafts	39.88	64.69	\$2,118
33535	Coronary artery bypass, using arterial graft(s); 3 arterial grafts	44.75	71.87	\$2,353
33536	Coronary artery bypass, using arterial graft(s); 4 or more arterial grafts	48.43	77.44	\$2,536
<b>Surgical LAAM and Select Imaging Studies</b>				
33267	Exclusion of left atrial appendage, open, any method	18.50	30.80	\$1,009
*33268	Exclusion of left atrial appendage, concomitant, any method	2.50	3.79	\$124
33269	Exclusion of left atrial appendage, thoracoscopic, any method	14.31	24.50	\$802
93312.26	Transesophageal echocardiogram; complete	2.30	3.11	\$102
*93662.26	Intracardiac echocardiography during therapeutic/diagnostic intervention	1.44	2.05	\$67
<b>Electrophysiology Cardiac Ablation, Percutaneous LAAM and Select Imaging Studies</b>				
33340	Percutaneous transcatheter closure of the left atrial appendage with endocardial implant, including fluoroscopy, transseptal puncture, catheter placement, left atrial angiography, left atrial appendage angiography, when performed, and radiological supervision and interpretation	14.00	22.84	\$748
33999	Unlisted procedure, cardiac surgery	At payer discretion		
93312.26	Transesophageal echocardiogram; complete	2.30	3.11	\$102
*93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture	3.73	6.06	\$198
93600.26	Bundle of His recording	2.12	3.38	\$111
93602.26	Intracardiac recording	2.12	3.32	\$109
93603.26	Right ventricular pacing and recording	2.12	3.32	\$109
*93613	Intracardiac EP 3-dimensional mapping	5.23	8.52	\$279
93621.26	With left atrial pacing and recording from coronary sinus or left atrium	1.50	2.39	\$78
93622.26	With left ventricular pacing and recording	3.10	4.93	\$161
93631.26	Intra-operative epicardial and endocardial pacing and mapping to localize the site of tachycardia or zone of slow conduction for surgical correction	7.59	11.49	\$376
93653	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathway, accessory atrioventricular connection, cavo-tricuspid isthmus or other single atrial focus or source of atrial re-entry	15.00	24.42	\$800
93654	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of ventricular tachycardia or focus of ventricular ectopy including left ventricular pacing and recording, when performed	18.10	29.42	\$963
*93655	Intracardiac catheter ablation of a discrete mechanism of arrhythmia which is distinct from the primary ablated mechanism, including repeat diagnostic maneuvers, to treat a spontaneous or induced arrhythmia	5.50	8.95	\$293
93656	Comprehensive electrophysiologic evaluation including transseptal catheterizations, insertion and repositioning of multiple electrode catheters with intracardiac catheter ablation of atrial fibrillation by pulmonary vein isolation, including intracardiac electrophysiologic 3-dimensional mapping, intracardiac echocardiography including imaging supervision and interpretation, induction or attempted induction of an arrhythmia including left or right atrial pacing/recording, right ventricular pacing/recording, and His bundle recording, when performed	17.00	27.69	\$907
*93657	Additional linear or focal intracardiac catheter ablation of the left or right atrium for treatment of atrial fibrillation remaining after completion of pulmonary vein isolation	5.50	8.96	\$293
*93662.26	Intracardiac echocardiography during therapeutic/diagnostic intervention	1.44	2.05	\$67

\*Atrial appendage ligation, plication, or AtriClip is included in mitral valve and Maze procedures and should not be reported separately when performed in the same session as these procedures.

\*\*\*The facility payment is the physician's professional fee in a facility setting. Average national rates are unadjusted by Geography Practice Cost Index. Payment rates reflect a conversion factor of \$32.7442 (effective first quarter 2024).

+Indicates a secondary add-on procedure code to be listed with primary procedure code.

**Limited operative ablation:** Surgical isolation of triggers of supraventricular dysrhythmias by operative ablation that isolates the pulmonary veins or other anatomically defined triggers in the left or right atrium.

**Extensive operative ablation:** Services in limited ablation definition and additional ablation of atrial tissue to eliminate supraventricular dysrhythmias. This must include operative ablation that involves either the right atrium, the atrial septum or left atrium in continuity with the atrioventricular annulus.

**Table 2. Endocardial Ablation Grid**

Procedure/Services Included with Ablations	SVT ABLATION (93653)			VT ABLATION (93654)			AF ABLATION (93656)		
	Inherent	Bundled	Not Bundled; sometimes performed	Inherent	Bundled	Not Bundled; sometimes performed	Inherent	Bundled	Not Bundled; sometimes performed
Insert/reposition multiple catheters	X			X			X		
Transseptal catheterization(s) (93462)			X			X	X		
Induction or attempted induction of arrhythmia with right atrial pacing and recording	X			X				X	
Intracardiac ablation of arrhythmia	X			X			X		
SVT ablation	X								
VT ablation				X					
AF ablation							X		
Intracardiac 3D mapping (93613)		X			X			X	
Right ventricular pacing and recording (93603)		X			X			X	
Left atrial pacing and recording from coronary sinus or left atrium (93621)		X			X			X	
His bundle recording (93600)		X			X			X	
Intracardiac recording (93602)	X			X			X		
Left ventricular pacing and recording (93622)					X				
Intracardiac echocardiography (93662)			X			X		X	
Additional linear or focal intracardiac catheter ablation of the left or right atrium (93657)									X
Intracardiac catheter ablation of a discrete mechanism of arrhythmia which is distinct from the primary ablated mechanism (93655)			X			X			X

**Table 3. Inpatient Facility Coding and Reimbursement**

The site of service depends on the patient's chief complaint, clinical presentation and is solely determined by the admitting physician. The ICD-10-CM (Internal Classification of Disease, Tenth Revision, Clinical Modification) Diagnosis Code(s) and primary ICD-10-PCS (procedure coding system(s)) determine the MS-DRG (Medicare Severity Diagnosis Related Group).

MS-DRG*	Description	FY 2024 Weighting System	FY 2024 Arithmetic Mean LOS	FY 2024 Inpatient National Standardized Prospective Payment
<b>Cardiac Valve</b>				
212	Concomitant aortic and mitral valve procedures (three procedures must be met)	10.77	15.7	\$75,412
216	Cardiac valve and other major cardiothoracic procedures with cardiac catheterization with MCC	9.71	14.5	\$67,953
217	Cardiac valve and other major cardiothoracic procedures with cardiac catheterization with CC	6.37	7.1	\$44,567
218	Cardiac valve and other major cardiothoracic procedures with cardiac catheterization without CC/MCC	5.70	3.1	\$39,886
219	Cardiac valve and other major cardiothoracic procedures without cardiac catheterization with MCC	7.71	10.7	\$53,991
220	Cardiac valve and other major cardiothoracic procedures without cardiac catheterization with CC	5.24	6.3	\$36,721
221	Cardiac valve and other major cardiothoracic procedures without cardiac catheterization without CC/MCC	4.65	4.0	\$32,548
<b>CABG</b>				
231	Coronary bypass with PTCA with MCC	8.12	12.0	\$56,819
232	Coronary bypass with PTCA without MCC	5.95	8.3	\$41,650
233	Coronary bypass with cardiac catheterization or open ablation with MCC	7.80	12.8	\$54,610
234	Coronary bypass with cardiac catheterization or open ablation without MCC	5.20	8.6	\$36,394
235	Coronary bypass without cardiac catheterization with MCC	5.88	9.5	\$41,174
236	Coronary bypass without cardiac catheterization without MCC	4.04	6.3	\$28,295
<b>Cardiac Surgical Ablation</b>				
228	Other cardiothoracic procedures with MCC	5.04	9.1	\$35,279
229	Other cardiothoracic procedures without MCC	3.18	3.4	\$22,262
<b>Percutaneous Catheter Ablation</b>				
273	Percutaneous intracardiac procedures with MCC	3.90	5.5	\$27,285
274	Percutaneous intracardiac procedures without MCC	3.24	1.5	\$22,691

CC = comorbidity or complication, MCC = major complication or comorbidity, w/o = without, PTCA = percutaneous transluminal coronary angioplasty.  
\*Source: FY 2024 Medicare inpatient rates based upon Final Rule release. Conversion Factor = \$7,001.60

**Table 4. Outpatient Hospital Reimbursement**

CPT	Procedure Description	CY 2024 Comprehensive APC*	CY 2024 APC Title	CY 2024 Medicare National Standardized APC Payment (HOPPS)
<b>Percutaneous Catheter Ablation</b>				
93653	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathway, accessory atrioventricular connection, cavo-tricuspid isthmus or other single atrial focus or source of atrial re-entry	5213	Level 3 EP Procedure	\$22,653
93654	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of ventricular tachycardia or focus of ventricular ectopy including left ventricular pacing and recording, when performed			
93656	Comprehensive electrophysiologic evaluation including transeptal catheterizations, insertion and repositioning of multiple electrode catheters with intracardiac catheter ablation of atrial fibrillation by pulmonary vein isolation, including intracardiac electrophysiologic 3-dimensional mapping, intracardiac echocardiography including imaging supervision and interpretation, induction or attempted induction of an arrhythmia including left or right atrial pacing/recording, right ventricular pacing/recording, and His bundle recording, when performed			

**Table 5. Common ICD-10 codes used during LAAM, cardiac surgery and EP ablation procedures**

ICD-10 CM	Diagnosis Description
I47.1	Supra ventricular tachycardia
I47.11	Inappropriate sinus tachycardia, so stated
I48.0	Paroxysmal atrial fibrillation
I48.1	Persistent atrial fibrillation
I48.11	Longstanding persistent atrial fibrillation
I48.19	Other persistent atrial fibrillation
I48.2	Chronic atrial fibrillation
I48.20	Chronic atrial fibrillation, unspecified
I48.21	Permanent atrial fibrillation
I48.3	Typical atrial flutter
I48.4	Atypical atrial flutter
I48.91	Unspecified atrial fibrillation
I48.92	Unspecified atrial flutter
I49.8	Other specified cardiac arrhythmias
G90.A	Postural orthostatic tachycardia syndrome [POTS]
R00.0	Tachycardia unspecified
R55	Syncope and collapse
ICD-10 PCS	Procedure Description
02563ZZ	Destruction of right atrium, percutaneous
02564ZZ	Destruction of right atrium, percutaneous endoscopic
02560ZZ	Destruction of right atrium, open
02573ZZ	Destruction of left atrium, percutaneous
02574ZZ	Destruction of left atrium, percutaneous endoscopic
02570ZZ	Destruction of left atrium, open
02583ZZ	Destruction, conduction mechanism, percutaneous
02584ZZ	Destruction, conduction mechanism, percutaneous endoscopic
02580ZZ	Destruction, conduction mechanism, open
025S0ZZ	Destruction of right pulmonary vein, open
025S3ZZ	Destruction of right pulmonary vein, percutaneous
025S4ZZ	Destruction of right pulmonary vein, percutaneous endoscopic
025T0ZZ	Destruction of left pulmonary vein, open
025T3ZZ	Destruction of left pulmonary vein, percutaneous
025T4ZZ	Destruction of left pulmonary vein, percutaneous endoscopic
02B70ZK	Excision of left atrial appendage, open
02B73ZK	Excision of left atrial appendage, percutaneous
02B74ZK	Excision of left atrial appendage, percutaneous endoscopic
02L73DK	Occlusion of left atrial appendage with intraluminal device, percutaneous
02L74DK	Occlusion of left atrial appendage with intraluminal device, percutaneous endoscopic
02L73ZK	Occlusion of left atrial appendage, percutaneous
02L74ZK	Occlusion of left atrial appendage, percutaneous endoscopic
02L70CK	Occlusion of left atrial appendage with extraluminal device, open
02L73CK	Occlusion of left atrial appendage with extraluminal device, percutaneous
02L74CK	Occlusion of left atrial appendage with extraluminal device, percutaneous endoscopic

**Open approach:** An open approach is defined as cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the procedure.

**Percutaneous approach:** A procedure performed via a percutaneous approach (character value 3) is one in which there is entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach the site of the procedure.

**Percutaneous endoscopic approach:** Percutaneous endoscopic approach (character value 4) is defined as entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach and visualize the site of the procedure.



## Peer-Reviewed Evidence

Clinical evidence in support of surgical cardiac ablation and left atrial appendage surgical closure, includes, but is not limited to, the following peer-reviewed publications. Citations are available upon request.

### Cardiac surgical ablation with/without concomitant cardiac surgery (CABG, MVR, AVR)

- Ad, N. et al. (2012). Surgical ablation of atrial fibrillation trends and outcomes in North America. *J Thorac Cardiovasc Surg*, 144(5):1051-60.
- Amin, A.K. et al. (2022). Healthcare Utilization and Costs in Patients with Atrial Fibrillation before and after Hybrid Ablation. *Journal of Atrial Fibrillation and EP*, 15(6).
- Badhwar, V. et al. (2017). The Society of Thoracic Surgeons 2017 clinical practice guidelines for the surgical treatment of atrial fibrillation. *Ann Thorac Surg*, 103(1):329-41.
- Badhwar, V. et al. (2017). Surgical ablation of atrial fibrillation in the United States: Trends and propensity matched outcomes. *Ann Thorac Surg*, 104(2):493-500.
- DeLurgio, D.B. et al. (2020). Hybrid Convergent Procedure for the Treatment of Persistent and Long-Standing Persistent Atrial Fibrillation: Results of CONVERGE Clinical Trial. *Circ Arrhythm Electrophysiol*, 13(12):e009288.
- Doll, N. et al. (2023). Efficacy and safety of hybrid epicardial and endocardial ablation versus endocardial ablation in patients with persistent and longstanding persistent atrial fibrillation: A randomised, controlled trial. *EClinicalMedicine*, 61(102052).
- Gillinov, A.M. et al. (2015). Surgical ablation of atrial fibrillation during mitral-valve surgery. *N Engl J Med*, 372(15):1399-409.
- Musharbash, F.N. et al. (2018). Performance of the Cox-maze IV procedure is associated with improved long-term survival in patients with atrial fibrillation undergoing cardiac surgery. *J Thorac Cardiovasc Surg*, 155(1):159-70.
- Philpott, J.M. et al. (2015). The ABLATE trial: safety and efficacy of Cox Maze-IV using a bipolar radiofrequency ablation system. *Ann Thorac Surg*, 100(5):1541-8.
- Rankin J.S. et al. (2020). Surgical ablation of atrial fibrillation concomitant to coronary-artery bypass grafting provides cost-effective mortality reduction. *J Thorac Cardiovasc Surg*, 160(3): 675-86.

### Concomitant cardiac surgery with either (CABG, MVR, AVR) and surgical left atrial appendage management

- Caliskan, E. et al. (2018). Epicardial left atrial appendage AtriClip occlusion reduces the incidence of stroke in patients with atrial fibrillation undergoing cardiac surgery. *Europace*, 20(7):e105-14.
- Elbadawi, A. et al. (2017). Impact of left atrial appendage exclusion on cardiovascular outcomes in patients with atrial fibrillation undergoing coronary artery bypass grafting (From the National Inpatient Sample Database). *Am J Cardiol*, 120(6):953-8.
- Friedman, D.J. et al. (2018). Association between left atrial appendage occlusion and readmission for thromboembolism among patients with atrial fibrillation undergoing concomitant cardiac surgery. *JAMA*, 23;319(4):365-74.
- Mehaffey, J.H., et al. (2023). Surgical ablation of atrial fibrillation is associated with improved survival compared with appendage obliteration alone: An analysis of 100,000 Medicare beneficiaries. *J Thorac Cardiovasc Surg*, Epub ahead of print.
- Park-Hansen, J. et al. (2018). Adding left atrial appendage closure to open heart surgery provides protection from ischemic brain injury six years after surgery independently of atrial fibrillation history: the LAACS randomized study. *J Cardiothorac Surg*, 23;13(1):53.
- Soltész, E.G. et al. (2021). Improved outcomes in CABG patients with atrial fibrillation associated with surgical left atrial appendage exclusion. *J Card Surg*, 36(4):1201-8.
- Whitlock, R.P. et al. (2021). LAAOS III Investigators. Left Atrial Appendage Occlusion during Cardiac Surgery to Prevent Stroke. *N Engl J Med*, 384(22):2081-91.

## Additional Sources

CPT® is a registered trademark of the American Medical Association

\*\*Source: American Medical Association. CPT 2024 Professional Edition.

The facility payment is the physician's professional fee in a facility setting. Average national rates are unadjusted by Geography Practice Cost Index. Payment rates reflect a conversion factor of \$32.7375 (effective first quarter 2024).

CC = comorbidity or complication, MCC = major complication or comorbidity, w/o = without, PTCA = percutaneous transluminal coronary angioplasty.

\*\*Source: FY 2024 Medicare inpatient rates based upon Final Rule release. Conversion Factor = \$7,001.60

CY 2024 Medicare outpatient rates based upon Final Rule release.

FY24 AMA ICD-10 PCS codebook

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