

SCIENTIFIC STATEMENT

HRS/ACC Scientific Statement: Guiding Principles on Same-Day Discharge for Intracardiac Catheter Ablation Procedures



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ABSTRACT

Percutaneous catheter ablation in interventional cardiac electrophysiology has evolved over the past several decades. Technologic advances and evolving procedural strategies have improved procedural efficiencies, increased success rates, and lowered complication rates. These advances have increased the ability to treat more patients successfully; however, limitations to access have grown. Access challenges (exacerbated during the COVID-19 public health emergency) and economic pressures have driven a shift in practice trends to reduce hospitalization duration and optimize resource utilization. A same-day discharge (SDD) strategy has increasingly been used to address these challenges. Incorporating a SDD strategy has recently been supported by global clinical studies (demonstrating proof of concept) and real-world evidence/United States Centers for Medicare & Medicaid Services claims data (characterizing a low incidence of complications and need for readmission/emergency department visits). This document analyzes available global clinical data and real-world evidence examining the impact of a cardiac ablation SDD strategy on patient safety, patient access, operational efficiencies, and health care expenditures. Recommended best practices will also be characterized built on the foundation of a shared decision-making strategy that optimizes patient safety, comfort, and procedural outcomes. As clinical flow paradigms evolve with alternate sites of care (ie, ambulatory surgery centers), real-world registries to track outcomes should inform future decision-making. (JACC Clin Electrophysiol. 2025;11:2597-2609) © 2025 Heart Rhythm Society and American College of Cardiology. Published by Elsevier Inc on behalf of Heart Rhythm Society and Elsevier Inc on behalf of American College of Cardiology. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

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ABBREVIATIONS AND ACRONYMS

ACC = American College of Cardiology
AF = atrial fibrillation
ASC = ambulatory surgery center
CHA₂DS₂-VAsc = congestive heart failure, hypertension, age ≥75 (doubled), diabetes, stroke (doubled), vascular disease, age 65 to 74 and sex category (female)
CMS = Centers for Medicare & Medicaid Services
CPT = Current Procedural Terminology
cryo = cryoballoon
CV = cardiovascular
ED = emergency department
EF = ejection fraction
EP = electrophysiology
HRS = Heart Rhythm Society
LVEF = left ventricular ejection fraction
ONS = overnight stay
OPPS = Hospital Outpatient Prospective Payment System
PCI = percutaneous coronary intervention
PVC = premature ventricular complex
REAL-AF = Real-world Experience of Catheter Ablation for the Treatment of Paroxysmal and Persistent Atrial Fibrillation
RF = radiofrequency
SDD = same-day discharge
SVT = supraventricular tachycardia

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INTRODUCTION

PREAMBLE: AN EVOLVING GLOBAL LANDSCAPE IN PATIENT ACCESS IMPACTING THE DURATION AND SITE OF CLINICAL WORKFLOWS FOR INTRACARDIAC ABLATIONS. Percutaneous intracardiac catheter ablation in

interventional cardiac electrophysiology (EP) has evolved tremendously over the past 40 years. Novel technologies (eg, ultra-high-resolution intracardiac mapping and imaging, evolving catheter designs and ablative energy sources) and improved procedural strategies have reduced procedure times, increased procedural success rates, and lowered complication rates. These transformative advances have driven the diagnosis and treatment of “historically untreatable” arrhythmias in a progressively larger pool of patients.

This expanded pool of ablation-eligible patients has posed challenges to global health care systems regarding patient access, hospital/facility resources, and associated clinical/operational workflows. This challenge will only grow as the global population ages with increasing comorbidities and related arrhythmias. More recently, during the COVID-19 public health emergency, patient access issues drove changes to patient care paradigms involving clinical workflow strategies to support same-day discharges (SDDs) for intracardiac ablations worldwide. Ongoing economic pressures have necessitated a shift in practice trends to reduce hospital duration and increase resource efficiency. This has also led to considering the expansion of the sites of care beyond traditional hospital settings to ambulatory surgery centers (ASCs).

In response to these growing trends, the Heart Rhythm Society (HRS) and the American College of Cardiology (ACC) sought to review data and characterize the quality of care with SDD for intracardiac ablation procedures. This document was commissioned to examine shifting global practice trends, review literature and data supporting reduced hospitalization duration, and provide additional considerations for SDD for intracardiac ablation procedures agnostic to the site of care. In this clinical context, this statement provides a perspective that empowers shared clinical decision-making tailored to the individual patient but *does not prescribe* the length of stay after intracardiac catheter ablation procedures.

DEFINITIONS. The majority of intracardiac catheter ablations are considered elective and will be the focus of this document. These procedures are not classified based on the site where patient care is provided.

An **elective procedure** is defined as a procedure that can be performed at any time or date as determined between the physician and the patient (ie, it can be booked in advance rather than required to be performed without delay). A **SDD** is defined as a clinical circumstance when a patient presents on a particular calendar day, undergoes an elective EP study/ablation, is monitored after the procedure, and is discharged home that same calendar day.

An **overnight stay (ONS)** is defined as a clinical circumstance when a patient presents on a particular calendar day, undergoes an elective EP study/ablation, is monitored after the procedure but stays past midnight, and is discharged home the *next* calendar day (possibly due to a procedure ending later in the day, lack of transportation, need for additional monitoring/treatment, or lack of support at patient's home). An **outpatient procedure** is defined by the Centers for Medicare & Medicaid Services (CMS) as a reimbursement classification related to the status of a patient in the hospital for <2 midnights.

WORLDWIDE EXPERIENCE WITH SDD FOR INTRACARDIAC ABLATION THERAPY: GLOBAL CLINICAL STUDIES, UNITED STATES CLAIMS DATA, AND PHYSICIAN/PATIENT SURVEYS

GLOBAL CLINICAL STUDIES EXAMINING SDD FOR ATRIAL FIBRILLATION ABLATION THERAPY: DEMONSTRATING PROOF OF CONCEPT. Evidence for SDD for intracardiac ablations is growing as the EP community expands patient access while assuring excellent clinical outcomes. With the significant increase in atrial fibrillation (AF) ablation procedures performed worldwide, there has recently been a focus on demonstrating the quality of care with SDD for this procedure.

In Canada, Deyell et al¹ conducted a study involving 2 tertiary centers where all AF ablations from 2010 to 2014 underwent attempted SDD after a 3- to 8-hour observation period. Out of 3054 cases, SDD was achieved in 79.2% (ONS was based on the discretion of the treating team). Readmission at 30 days was 7.7% post-SDD vs 10.2% post-ONS without complications vs 19.5% post-ONS with complications. Overall subacute complication rates from postdischarge to 30 days were 0.37% in SDD vs 0.36% in ONS without complications vs 2.5% ONS with complications. In a small subgroup with emergency department (ED) data available, 19.3% of SDD patients had ED visits within the initial 30 days. This early study showed the feasibility of SDD of AF ablations, although several limitations were noted regarding the patient population and variable workflows.

In the United Kingdom, Creta et al² reported retrospective outcomes from a single center from 2016 to 2019 involving 2628 patients. Of 727 patients who achieved SDD (79.2% cryoballoon [cryo], 91.6% under conscious sedation), 1.8% had any complication and presentation to a hospital within 48 hours, and 0.7% required ≥1 day of hospitalization. Overall,

after SDD, 3.7% had any complication or presented to a hospital within 30 days.

In 2 analyses from U.S. claims databases, Field et al^{3,4} examined the Optum database for AF ablations in 2016 to 2020 (6600 cases; 25.2% SDD, mean age 66.6 years): a propensity-score match analysis was done 1:3 SDD-ONS, with no significant difference in 30-day postprocedure complication rates (4.7% SDD vs 3.8% ONS). The IBM MarketScan Commercial claims database showed similar results for this same period, 2016 to 2020 (9509 total AF ablation cases, age <65 years, 17% SDD): propensity-score match analysis 1:3 SDD-ONS showed no significant difference in 30-day postprocedure complication rates (2.7% SDD vs 2.8% ONS).

Several meta-analyses have been published examining SDD data. Rashedi et al⁵ examined SDD studies after AF ablation in the Cochrane library from inception up to August 2021, identifying 12 studies reporting 18,065 ablations, of which 40.5% were discharged on the same calendar day. The major complication rate was 1.1%, and the readmission rate from day of discharge to 1 to 4 months was 3.0% in planned SDD. There was no significant difference in major complication rates between the planned SDD group and ONS group. Jafry et al⁶ performed a meta-analysis of 10,102 patients in 8 observational studies and found no statistical difference between SDD and ONS in all studied outcomes, including postdischarge 30-day hospital visits, vascular/bleeding complications, stroke/transient ischemic attack/systemic embolism, and recurrent arrhythmias. Tang et al⁷ performed a meta-analysis of 26,488 patients undergoing AF ablation from 14 observational studies, with 9766 SDD (pooled success rate in SDD was 83.2%). Most studies were retrospective, so confounding factors may have influenced the results. There was no significant difference in 30-day complication rates or 30-day readmission between SDD and ONS.

Sahashi et al⁸ analyzed data from the National Readmission Database for 2016 to 2018, examining 30,776 patients after AF ablation with 1.42% SDD. In a 1:3 propensity-matched analysis, 30-day readmission was numerically but not significantly higher in SDD (12.7%) vs ONS (9.7%, $P = .47$). Overall health care cost was higher in ONS (\$25,237 SDD vs \$30,749 ONS, $P < .01$).

Recent studies in 2023 have examined the default strategy of SDD in smaller studies. Jimenez-Candil et al⁹ reported 617 patients with AF ablation from 2019 to 2022 from a single center in Spain where a systematic SDD strategy was implemented. SDD was achieved in 95% (with increasing proportions over

TABLE 1 CMS Claims Data for CY2022^a

CPT Code ^b	Total Procedures, n	Resulted in Inpatient Admission Within 1 day, n (%)	Resulted in Inpatient Admission Within 30 days, n (%)	Emergency Department Visit Within 1 day, n (%)
PCI-DES, single vessel (C9600)	97,817	2150 (2.2%)	8905 (9.1%)	1419 (1.5%)
PTCA, single vessel (92920)	9384	294 (3.1%)	1066 (11.4%)	189 (2.0%)
PM insertion, dual leads (33208)	42,475	824 (1.9%)	3052 (7.2%)	936 (2.2%)
PM gen change, dual (33228)	29,429	90 (0.3%)	1328 (4.5%)	119 (0.4%)
ICD implant (33249)	20,117	255 (1.3%)	1580 (7.9%)	65 (0.3%)
AV node ablation (93650)	8425	64 (0.8%)	831 (9.9%)	21 (0.2%)
SVT ablation (93653)	22,489	208 (0.9%)	1064 (4.7%)	46 (0.2%)
VT ablation (93654)	5792	74 (1.3%)	369 (6.4%)	6 (0.1%)
Add-on SVT/VT ablation (93655)	34,011	380 (1.1%)	2331 (6.9%)	65 (0.2%)
AF ablation (93656)	62,149	784 (1.3%)	4252 (6.8%)	82 (0.2%)
Add-on AF ablation (93657)	24,670	322 (1.3%)	1968 (8.0%)	—

^aData compiled from The Moran Group. ^bCPT codes are reported to third-party payors by physicians in the United States to describe the medical, surgical, and diagnostic procedures/services performed.

AF = atrial fibrillation; AV = atrioventricular; CMS = Centers for Medicare & Medicaid Services; CPT = Current Procedural Terminology; CY = calendar year; DES = drug eluting stent; ICD = implantable cardioverter defibrillator; PCI = percutaneous coronary intervention; PM = pacemaker; PTCA = percutaneous transluminal coronary angioplasty; SVT = supraventricular tachycardia; VT = ventricular tachycardia.

time), with similar rates in radiofrequency (RF) vs cryo. The 10-day incidence of urgent/unplanned medical care occurred in 11.3% after SDD; rehospitalization occurred in 1.7% and was similar to those hospitalized. There was no difference between RF and cryo. The Cleveland Clinic reported a single-center series evaluating 2142 consecutive patients with AF ablation from 2020 to 2021, in which 19% had SDD based on prespecified protocol.¹⁰ Of interest, patients in the SDD group tended to be younger and were more likely to be male, white, with lower CHA₂DS₂-VASc [congestive heart failure, hypertension, age ≥75 (doubled), diabetes, stroke (doubled), vascular disease, age 65 to 74 and sex category (female)] score and less likely to utilize warfarin. After propensity-score matching, there was a lower rate of major complications and higher patient satisfaction scores in the SDD group. There was no difference in readmissions, ED visits, or adverse events; the authors noted that the majority of “life-threatening” complications occurred intraprocedurally or within 6 hours after procedure.

The REAL-AF (Real-world Experience of Catheter Ablation for the Treatment of Paroxysmal and Persistent Atrial Fibrillation) study was a prospective multicenter study using prespecified SDD protocol eligibility criteria (stable anticoagulation, no bleeding history, left ventricular ejection fraction [EF] >40%, no pulmonary disease, no procedures within 60 days, and body mass index <35 kg/m²), in which operators prospectively determined whether patients undergoing AF ablation were candidates for SDD.¹¹ This study included 2332 patients with 85% meeting SDD criteria and 86.1% undergoing successful SDD. Within

30 days, SDD vs ONS groups had similar rates of complications (0.8% vs 1.1%) and readmissions (0.8% vs 0.9%). The EASY PVI randomized prospective trial of SDD was conducted at 3 U.S. centers in which 45 patients undergoing cryo AF ablation and meeting inclusion criteria (EF >40, creatinine clearance >50, CHA₂DS₂-VASc ≤3, <4 hours of general anesthesia time, no acute complications, and no early arrhythmia during 6-hour observation period) were randomized to SDD vs ONS.¹² There were no significant adverse events in either group, with 1 ED visit per group during the 30-day follow-up period.

REAL-WORLD EVIDENCE FROM THE UNITED STATES CMS CLAIMS DATABASE: LOW INCIDENCE OF INPATIENT READMISSION/ED VISITS WITH INTRACARDIAC ABLATION THERAPY. HRS/ACC obtained all CMS claims data from the calendar year 2021 to 2022 for cardiovascular (CV) procedures under the Hospital Outpatient Prospective Payment System (OPPS). More specifically, we examined outcomes between intracardiac ablation and other CV procedures already deemed appropriate for SDD based on inclusion in the ASC covered procedure list (ie, percutaneous coronary interventions [PCIs] and cardiac implantable electronic devices). OPPS data were analyzed using Current Procedural Terminology (CPT) codes to examine the number of procedures performed, 1- and 30-day inpatient readmission rates, and ED visits within 1 day of hospital discharge after the index procedure. Findings are summarized in [Table 1](#).

For interventional cardiac procedures already considered appropriate for ASC, the 30-day

readmission rates were 7% to 11% and ED visits within 1 day were 2% to 3%. In contrast, supraventricular tachycardia (SVT) ablations had rates of 5% and 0.2%, respectively. When looking at the 62,149 procedures for AF ablation, the 30-day readmissions were 6.8% and the ED visits within 1 day were 0.2%. Of note, the 30-day readmission rate increased to 8% when CPT code 93657 (additional ablation for AF) was billed as an add-on code. This suggests that additional ablation increases the risk for readmission.

Available CMS claims data strongly suggest that 1-day/30-day readmission and ED visit within 1-day rates for intracardiac ablations are *lower* vis-à-vis PCI and cardiac implantable electronic devices (the latter 2 procedures already with reimbursement coverage in CMS' ASC Covered Procedure List). However, the absence of data on patient comorbidities, clinical presentation, or facility characteristics limits data analysis. Moreover, it is plausible that the assessment of readmissions might have been underappreciated with the interpretation of limited available CMS claims data (ie, limited information regarding possible readmission diagnosis codes in instances where readmission was required).

PATIENT AND PHYSICIAN SURVEYS: WORLDWIDE EXPERIENCE OF SDD FOR INTRACARDIAC ABLATION THERAPY AND PERCEIVED BENEFITS. In Germany, the FAST AFA study surveyed patients' willingness (between 2021 and 2022) to consider SDD after AF ablation.¹³ Of 248 patients who completed the survey (mean age 61.8 years, 33.9% female), 50% expressed willingness to have SDD with perceived benefits including increased comfort, shorter waiting times, and cost-efficiency.

The European Heart Rhythm Association surveyed its physician members (245 respondents across 35 European hospitals) to examine the length of stay for elective EP procedures in 2023.¹⁴ SDD after ablation was reported in 5.7% of AF cases, 10.7% of left-side ablation cases, and 17.5% of right-side ablation cases. Of note, heterogeneous country-specific reimbursement coverage policies within the EU might be 1 reason for the lower percentage of SDD. For example, a 2-midnight hospitalization requirement for coverage in specific areas would theoretically exert downward pressures on SDD rates.

In 2023, HRS surveyed its physician members (705 respondents, 94% based in the United States) regarding current practices of SDD in ASCs.¹⁵ SDD was reported in 90% of right-side SVT/flutter ablation cases, 80% of right-side premature ventricular complex (PVC) ablation cases, 76% of AF/left-side SVT/flutter ablation cases, and 62% of left-side PVC

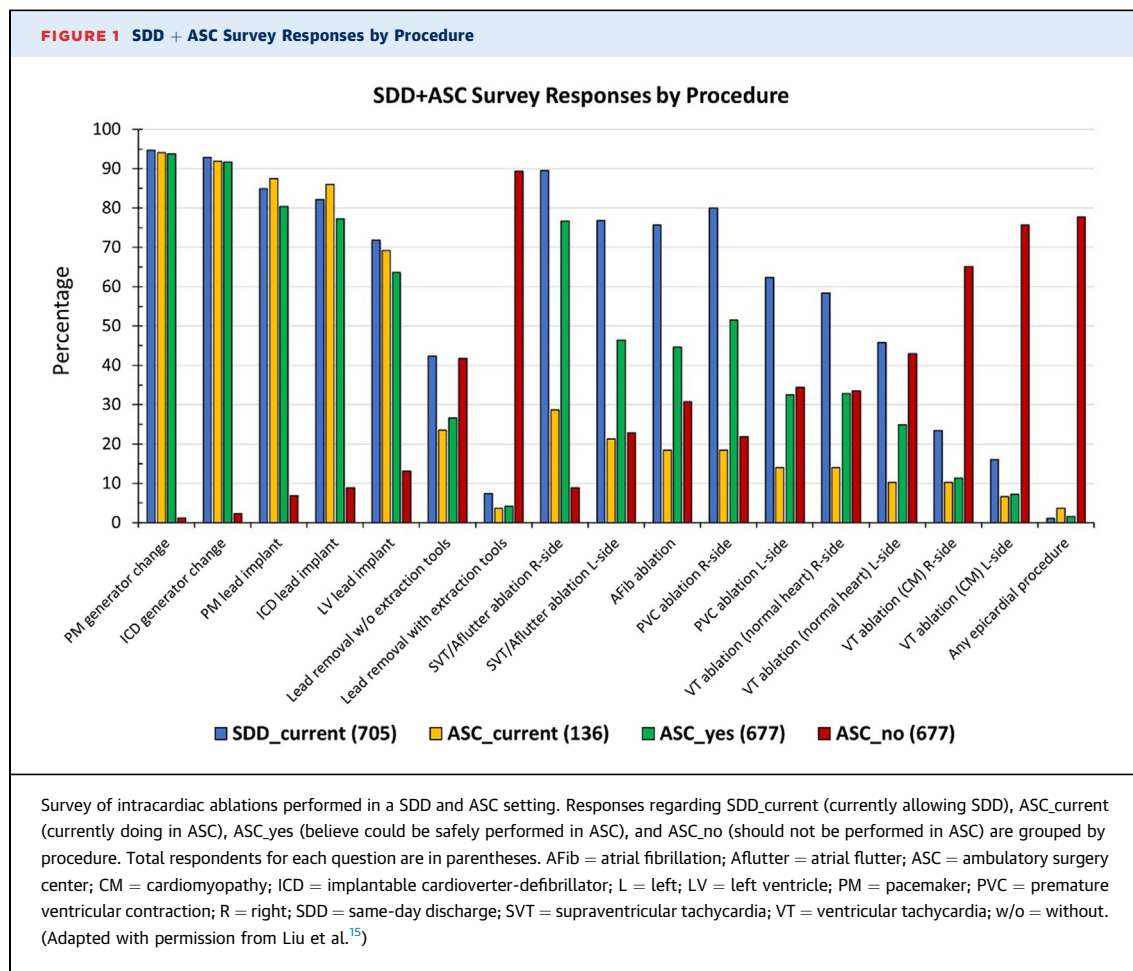
ablation cases (Figure 1). Similar SDD rates were reported across all U.S. regions and operator experience levels. The survey also indicated a majority (77%-94%) of practicing EPs believed right-sided SVT/flutter ablations were appropriate for ASC, while nearly half (45%) indicated AF ablations could be safely performed in ASCs.

GUIDING CLINICAL PRINCIPLES FOR IMPLEMENTATION OF A SDD PROTOCOL FOR INTRACARDIAC ABLATIONS

Best practices for implementing a SDD protocol following catheter ablation procedures require careful consideration and scrutiny of baseline patient factors during preprocedural screening, procedural planning, and postprocedure management. The first step in initial screening for patient eligibility for SDD is identifying the type of catheter ablation procedure. The majority of patients undergoing routine catheter ablation of cavotricuspid isthmus-dependent atrial flutter, atrioventricular nodal reentrant tachycardia, accessory pathways, and focal atrial tachycardias have been candidates for SDD for many years.¹⁶ In contrast, owing to the increased complexity of AF ablation procedures, patient selection for SDD following catheter ablation of AF requires heightened scrutiny with more specific considerations. Data on patient selection for SDD following catheter ablation of ventricular arrhythmias are limited.

Eligibility criteria investigated in studies of prospective SDD patient screening protocols after AF ablation have included stability of anticoagulation use, absence of bleeding history, absence of systolic heart failure with specific left ventricular ejection fraction (LVEF) cut-offs, absence of pulmonary disease, body mass index <35 kg/m², and proximity of patient residence to a hospital.^{11,17,18} These studies demonstrated that 79% to 85% of patients who underwent screening for SDD met eligibility criteria. Of these preselected "eligible" patients, 86% to 91% were successfully discharged on the same day. Factors associated with unsuccessful SDD following AF ablation included older age, female sex, increased CHA₂DS₂-VASc and HAS-BLED (Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly, Drugs/Alcohol Concomitantly) scores, heart failure, decreased LVEF, increased left atrial size, and persistent AF.¹¹ Potential patient eligibility criteria for SDD following AF ablation are summarized in Table 2.

Social support from a family member or friend is also a requisite consideration, irrespective of the type of cardiac catheter ablation procedure considered for



SDD. Social support ensures an independent party is available for assistance with transportation and postprocedure care, surveillance for recovery and early detection of complications, and assistance with

basic needs at the patient’s home (or any location of recovery, understanding this is not always “home”). In the REAL-AF registry study, social issues accounted for 70% of cases where patients who initially planned for SDD ultimately required an ONS.¹¹ These issues included patient preference, inadequate social support, and the distance from the patient’s home to the hospital. These data suggest that social *and* clinical factors are equally significant considerations in determining the appropriateness of SDD following cardiac catheter ablations.

Procedure duration, complexity, and risk; type of anesthesia employed; time to recovery from anesthesia and ability to voluntarily void; best procedural safety practices; and vascular hemostasis strategy are all relevant procedural considerations with SDD for cardiac catheter ablation procedures. Depending on the availability of nurses and ancillary support staff to monitor and discharge patients, procedure termination after specific times in the later hours of a calendar day may render patients ineligible for SDD.¹⁸ The prolonged duration of catheter ablation

TABLE 2 Proposed Patient Eligibility Criteria for Same-Day Discharge Following Catheter Ablation of Atrial Fibrillation	
Patient Criteria	Comments
Absence of decompensated heart failure	Monitor volume status in patients with history of heart failure due to reduced or preserved left ventricular ejection fraction
Absence of significant pulmonary disease	Caution in patients with asthma, chronic obstructive pulmonary disease, interstitial lung disease, or obstructive sleep apnea
Absence of unstable medical comorbidities likely to require acute management postprocedure	Provide more monitoring in patients with poorly controlled conditions such as diabetes mellitus, renal disease, hypertension, etc.
Absence of significant bleeding diathesis	Strict attention to vital signs and hemostasis in patients with significant bleeding history or disorders of coagulation
Proximity of patient’s home/place of recovery to hospital	Caution in patients who live a substantial distance from the hospital
Presence of social support	Includes designated family member or friend to provide transport to and basic assistance at patient home

TABLE 3 Discharge Criteria Checklist for Same-Day Discharge Following Catheter Ablation

Criteria	Comments
Absence of procedural or postprocedural complications	Consider predischarge limited bedside echocardiogram to rule out presence of an effusion after complex procedures if intracardiac echocardiography was not performed
Hemodynamic stability	Ensure protocol designates parameters for acceptable vital signs for discharge
Vascular hemostasis	Ensure safe removal of figure-of-eight suture (if placed) prior to discharge
Successful ambulation	Includes hemostasis, lack of concerning discomfort, and gait stability
Tolerance of oral intake	Ensure good control of postanesthesia nausea
Spontaneous micturition	Consider patient, anesthesia and medication factors to determine need for indwelling urinary catheter placement preprocedure
Confirmation of social support	Designated person to assist with transportation and assistance with recovery
Comprehensive discharge instructions provided to patient and caregiver	Detailed instructions for monitoring for postprocedure complications and use of new medications (eg, colchicine, proton pump inhibitors, antiarrhythmic drugs if required) and contact information to reach on-call members of the procedure care team with questions and/or concerns; follow-up visit arranged and appropriate medications prescribed

procedures impacts patient recovery time (due to extended administration of anesthetic agents) and time to potential discharge from the facility. Conversely, administering short-acting anesthetic agents such as propofol and minimizing intravenous fluids can facilitate rapid recovery after cardiac catheter ablation.¹⁹ Optimal procedural safety practices, such as ultrasound guidance for vascular access, minimize vascular access complications that can impede safe SDD.¹⁸ Moreover, adjunctive imaging with intracardiac echocardiography provides optimal visualization for transseptal access and catheter manipulation/ablation while providing real-time monitoring for the development of pericardial effusions. Finally, strategies for vascular hemostasis (including vascular closure devices or figure-of-eight sutures) can affect the required bed rest post-procedure duration. A validated standardized post-procedure protocol (for assessing adequate hemostasis and appropriateness for discharge) and a predetermined follow-up plan should be established before patient dismissal from the facility. Patients should understand how to access on-call clinicians after discharge if necessary and the instructions for possible emergencies.

Establishing standardized discharge criteria is paramount to safe SDD following intracardiac catheter ablation. A checklist for safe discharge should include the absence of procedural or postprocedural complications, vascular access bleeding, or hemodynamic instability. The checklist should also include successful ambulation, spontaneous micturition, tolerance of oral intake, and information regarding access to the on-call physician (Table 3).^{11,18} Before dismissal from the facility, the patient and accompanying family or support member should receive comprehensive discharge instructions regarding new medications and postprocedure care.

The use of a standardized SDD protocol that incorporates the triad of patient screening, procedural optimization, and a standardized discharge strategy has been shown in prospective studies to result in a high rate of successful SDD coupled with an acceptably low rate of readmissions (1%–2% at 30 days).^{11,18} Successful implementation of a SDD protocol requires extensive organization, close coordination of patient screening, enhanced communication with patients and caregivers, and efficient handling of hospital logistics. As increasing clinical demands limit physician availability, some have proposed a model focused on nurse-led protocols (including but not limited to next-day telephonic follow-up) with oversight by a dedicated ambulatory cardiac nurse coordinator for the implementation of SDD protocols.¹⁸

IMPLEMENTATION OF A SDD STRATEGY FOR INTRACARDIAC ABLATION THERAPY TO EXPAND PATIENT ACCESS, DRIVE NEW SITES OF CARE, AND REDUCE COSTS

Worldwide growing demand for intracardiac ablation procedures and device implantations notwithstanding, patient access has remained constrained.²⁰ Access to cardiac EP services has historically been limited to large, specialized centers or health care systems. In Canada, wait times of up to 211 days have been reported for EP procedures.²¹ Anecdotal reports of similar challenges have increasingly emerged in the United States, particularly in rural areas limited to smaller critical access facilities. Significant gaps in arrhythmia care are also well known across Asia-Pacific, Middle East, Africa, and South America. This has exacerbated regional disparities in patient access. Locco et al²² highlight disparities in outcomes among Medicare patients receiving treatment for CV and cerebrovascular conditions, with patients living

in a rural area experiencing increased morbidity attributed to limited access to care. Given the resource-intensive nature of cardiac arrhythmia services (identification of highly trained staff, high cost of capital equipment and EP technologies), cardiac EP programs have traditionally only existed in larger health care systems. Costs have remained a significant barrier to smaller health care facilities.

Strategies to reduce health care facility costs and increase revenues by facilitating patient throughput could improve patient access. Implementation of a SDD strategy avoids routine overnight observation after elective procedures, resulting in operational efficiencies at the hospital/facility level. SDD initiatives have demonstrated their integral role in ensuring patient access to cardiac EP procedures. During the COVID-19 public health emergency (when access to inpatient services was severely limited), many facilities worldwide demonstrated proof of this concept by modeling novel clinical workflows to preserve patient access. The SDD strategy became one of the primary mechanisms to ensure patient access to essential EP services.

In the United States, understanding the economics of SDD requires distinguishing between inpatient and outpatient status, as defined in the 2-midnight rule set forth by CMS.²³ From the CMS perspective, both SDD and an ONS after an elective procedure (ie, 23-hour observation) are considered “outpatient” services. Hospitals receive the same reimbursement under the OPPS Ambulatory Payment Classification regardless of whether a patient is discharged on the same calendar day as an elective procedure or admitted for overnight observation and discharged the next calendar day. As such, the facility/hospital does not receive incremental reimbursement for the costs of ONS. The additional operating expenses incurred by ONS reduce the margin/profit for the facility. A SDD strategy reduces operating expenses associated with ONS, representing significant cost-savings for the facility.

Modeling potential cost-savings for hospitals is complicated and subject to significant geographic variability in fair market value assessments. SDD after elective PCI has been performed for over a decade, and coverage for elective PCI in ASCs was approved by CMS in 2019. For elective PCI cases performed from 2009 to 2012, SDD was associated with reduced hospital operating expenses of \$3502 (95% confidence interval \$3486-\$3902).²⁴ In a separate analysis of SDD after PCI for procedures performed from 2006 to 2015, SDD was associated with hospital savings of >\$5000 per procedure, with the majority of the savings

coming from 2 major drivers of hospital cost: (1) room and board and (2) central supply.²⁵

Data are also available on potential cost-savings associated with SDD for AF ablation. In a study examining national administrative data for AF ablations performed from 2016 to 2018, only 1.4% of patients were discharged on the same day. In this highly selected population, SDD was associated with significantly lower hospital costs vs ONS (\$25,237 ± \$14,036 vs \$30,749 ± \$16,383, $P < .01$), which represents an ~\$5000 reduction in facility operating expenses per procedure. However, there was a nonsignificant higher 30-day readmission rate in the SDD group (12.7% vs 9.7%).⁸ Other studies have *not* demonstrated a higher readmission rate associated with SDD for AF ablation.¹ Several other smaller, retrospective studies have also demonstrated cost-savings associated with SDD after AF ablation. However, many of these studies have performed limited analysis using average ONS hospitalization costs (as opposed to granular, patient-level data on actual costs associated with the ONS).²⁶⁻²⁸

Overall, these data suggest that the estimated cost-savings associated with SDD appear similar for PCI and AF ablation (~\$5000 per procedure).^{8,25} Elective PCI provides a validated framework (for over a decade) when incorporating a SDD strategy for intracardiac catheter ablation procedures. With continued inflationary price pressures and increases in hospital operating expenses over the coming years, the potential savings accrued with a SDD strategy will become of greater importance in contemporary EP practice.²⁹

A SDD strategy can also reduce out-of-pocket costs to the patient. These estimates are more difficult to model given the variability in different types of insurance coverage, deductibles, and limits on out-of-pocket costs. Medicare patients who are observed overnight after an elective procedure can incur significant out-of-pocket costs, the extent of which will differ between traditional Medicare and Medicare Advantage plans. For Medicare Part B (which covers outpatient hospital services), patients generally pay a copayment for hospital services, the magnitude of which varies based on the service provided. SDD can significantly reduce the burden of out-of-pocket copayments for outpatient services.³⁰ Importantly, out-of-pocket copayments for patients with Medicare Part B cannot exceed the deductible for inpatient service. However, total copayments for all outpatient services can exceed the inpatient deductible. As such, the patient cost might be impacted by additional outpatient services. Similar out-of-pocket cost considerations also apply to private insurance coverage,

although the details can vary significantly based on the nature of the coverage plan. In addition to copayment considerations, SDD after AF ablation and other invasive CV procedures has also been associated with improved patient satisfaction and quality of life, which might be influenced by avoiding the financial stresses (and other encumbrances) associated with an ONS.³¹

PERFORMANCE OF INTRACARDIAC ABLATIONS IN ASCs: AN EVOLVING PARADIGM

Although the purpose of this paper is not to provide *a priori* justification for the performance of cardiac ablations in the ASC setting, the SDD principles discussed do have relevance to cardiac ablation procedures performed outside the hospital environment. As of calendar year 2024, cardiac catheter ablation procedures are being covered in the ASC setting by several private payors in the United States in defined geographies. Worldwide experience-based data on catheter ablation procedures and from pandemic-era practices (including the Hospitals Without Walls Program during the COVID-19 public health emergency) have empirically suggested that select cardiac catheter ablations may be safely performed in the ASC setting in appropriately selected patients as adjudicated by physician judgment (with case selection determined by physician factors, facility considerations, and patient social support factors/coexisting clinical conditions).^{32,33} Moreover, analysis of both claims and clinical data (in the context of SDD) has suggested that cardiac catheter ablation procedures (often performed in the context of SDD) have lower complication rates vs other cardiac procedures already included in the CMS ASC covered procedure list (ie, PCI, cardiac implantable electronic device procedures).

As this landscape evolves (rife with economic incentives for multiple stakeholders), using real-world registries and quality measures to track outcomes in real time will be critical to inform future decision-making by authorities and assist with shared decision-making between the patient and physician. Importantly, available data for SDD have largely been examined in a hospital setting, but the safety of SDD outside a hospital environment needs further clarification. To that end, widespread use of registries designed to evaluate care in the ASC environment will be important in transparently tracking real-world outcomes in real time.

To mitigate procedural complications in the ASC setting, preexisting operational clinical workflows

must be validated and rigorously scrutinized to safeguard patient care. Moreover, the decision to commute patient status to medical observation or an inpatient admission might be more complex in an ASC environment (vs in a hospital environment). This required decision for patient transfer for an ONS to another facility might be obfuscated by patient expectations, transportation, and relationships with the inpatient facility. Before undertaking a SDD strategy outside a hospital environment, clinicians should establish well-considered ironclad plans for rescue for anticipatable failure modes/complications, pre-established memoranda of understanding, and transfer agreements with inpatient facilities.

ETHICAL CONSIDERATIONS IN SHARED DECISION-MAKING BETWEEN THE PATIENT AND PHYSICIAN

The patient's best interests and preferences should always be of utmost importance to the operating physician and facility. Although SDD might economically benefit facilities and public/private payors (who might view reimbursement through the lens of the shortest length of stay and lowest resource utilization), it is incumbent upon both the operating physician and patient to share decision-making so as to optimize safety, patient comfort, and procedural outcomes.

SUMMARY AND THE PATH FORWARD

An expanding pool of ablation-eligible patients has posed access challenges to global health care systems. Access challenges (exacerbated during the COVID-19 public health emergency) and economic pressures have driven a shift in practice trends to reduce hospitalization duration and optimize resource utilization. This has necessitated an evolution in clinical flow paradigms to include alternate sites of care (ie, ASCs and office-based laboratories). To that end, a SDD strategy could result in significant operational efficiencies at the hospital/facility level, improvement in patient access, improvement in the patient's perceived benefit, and result in reduction in overall health care expenditures and resource utilization.

When considering a SDD strategy, a shared decision-making process between the patient and physician should occur (without influence from financial or other external pressures) focused on patient safety, comfort, and procedural outcomes. A SDD protocol should require careful consideration and scrutiny of baseline patient factors during pre-procedural screening, procedural planning, and

postprocedure management. Well-considered plans should be established for rescue for anticipatable failure modes/complications and transfer to inpatient facilities (when the procedure is performed in an ASC). Successful implementation of a SDD protocol requires considerable facility organization and logistics that intentionally support close coordination of care with patients and their caregivers. As such, social support is a requisite consideration irrespective of the type of cardiac catheter ablation procedure considered for SDD.

HRS and ACC support principles of evidence-based health care. Incorporating a SDD strategy has been supported by available global clinical studies (demonstrating proof of concept) and real-world evidence/U.S. CMS claims data (characterizing a low incidence of complications and need for readmission/ED visits). As clinical flow paradigms evolve with alternate sites of care (ie, ASCs), use of real-world registries and quality measures to track outcomes in real time will help inform future decision-making by global competent authorities and assist with shared decision-making between the patient and physician.

RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES. Members of the writing group were asked to disclose financial relationships from the 12 months prior to their nomination. Author disclosures are included in [Appendix 1](#). The HRS and ACC have rigorous policies and methods to ensure that documents are developed without bias or improper influence. The complete policies on relationships with industry and other entities (RWI) can be found online. The work of the writing committee was supported exclusively by HRS and ACC without commercial support. Writing group members contributed as volunteers and did not receive any payment from HRS or ACC. This document reflects primarily expert consensus opinion. The draft manuscript was peer reviewed in September 2024 and the document was revised to address pertinent comments. Reviewer disclosures are included in [Appendix 2](#). The writing group unanimously approved the final version of the document.

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APPENDIX 2 Reviewers' Disclosures of Relationships With Industry and Other Entities

Author	Employment	Honoraria/Speaking/ Consulting	Speakers Bureau	Research ^a	Fellowship Support ^a	Ownership/ Partnership/ Principal/ Majority Stockholder	Stock or Stock Options	Intellectual Property/ Royalties	Other
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