Washington State Health Care Authority

Health Technology Assessment

Catheter Ablation Procedures For Supraventricular Tachyarrhythmia

Including Atrial Flutter & Atrial Fibrillation

Draft Report – Peer Review

April 18, 2013

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RESPONSES TO DRAFT REPORT

Spectrum Research is an independent vendor contracted to produce evidence assessment reports for the Washington HTA program. For transparency, all comments received during the public comment period are included in this response document. Comments related to program decisions, process, or other matters not pertaining to the evidence report are acknowledged through inclusion only.

This document responds to peer reviews from the following parties:

Draft Report

1. Jeanne Poole, MD; University of Washington, Harborview Medical Center, Seattle, Washington
2. Ramakota Reddy, MD; Sacred Heart Medical Center, Eugene, Oregon; Mackenzie-Willamette Hospital, Springfield, Oregon; Holy Family Hospital, Valley Hospital and Medical Center, Spokane, Washington

Specific responses pertaining to each comment are included in Table 1.

	Comment	Response
Jeanne Poole, MD		
Background	Specific comments:	
Page 41	The use of a pacemaker in atrial flutter is not an option as an 'alternative' to rhythm control. Pacemaker therapy is used to support bradycardia when rate or rhythm control results in symptomatic bradycardia, or in the small percentage of patients that will require AVJ ablation and pacemaker implantation as the only solution to an inability to suppress the rhythm and control its rate.	*Thank you. The reference to using pacemakers for treatment of atrial flutter has been removed.*
Page 42	Regarding pretreatment of AF patients with an antiarrhythmic drug prior to cardioversion, the term should be that patients "can" be pre-treated. It is *not* usual practice for first time AF undergoing CV but can, and often is an approach for recurrent AF in patients where an AAD plus CV strategy is being pursued.	*Thank you. We have changed the wording as suggested.*
Page 42	Final paragraph regarding the treatment of AVNRT and AVRT. The reference is to the pediatric literature. [3]. It is not true that the initial approach in older children and adults is an antiarrhythmic drug approach other than a trial using a beta blocker or calcium channel blocker. To subject a child or adult who is otherwise healthy to the significant risk of Class I or Class III antiarrhythmic drugs is unacceptable. As the authors noted earlier, catheter ablation is considered first line therapy for patients with WPW. Also, note that ibutilide is an <u>intravenous</u> agent and is not used for acute therapy of either AVRT or AVNRT. It is used occasionally to achieve acute cardioversion for atrial fibrillation or atrial flutter.	*Thank you. The reference has been corrected and the information has been corrected based on the ACC/AHA/ESC Guidelines (Blomstrom-Lundqvist 2003).*
Page 43	Second paragraph. It should be noted that the Cox-Maze surgery as a *stand-alone* procedure is infrequently performed in the U.S., and the high success rates have been limited to a small number of highly skilled surgeons for whom the results are not necessarily reproducible. Young	*Thank you. We have added a sentence to indicate that standalone Cox-Maze surgery is very infrequently performed in the US.*

	Comment	Response
	surgeons emerging currently will not likely have had the opportunity to be trained in this procedure. Also, there is a paucity of contemporary data from the surgical literature which can truly determine the success rates of RF -maze (or other energy sources) procedures performed by surgeons at the time of mitral valve surgery. These patients generally have significant covariates such as moderate to severe left atrial enlargement and left ventricular dysfunction where outcomes will be significantly modulated by those clinical factors.	
Page 45	The 4th paragraph. Adverse effects of AAD therapy should include increased risk of sudden cardiac death.	*Thank you. We have added heart failure based on the ACC/AHA/ESC Practice Guidelines for AF (Fuster et al., 2011), although sudden cardiac death was not listed in that practice guideline as a major side effect associated with AADs.*
Results		
Page 129	*Pulmonary vein isolation (PVI) Versus Anti-Arrhythmic Drugs (AADs)* The later tables summarizing the Key Questions starting on page 252, include the differences in patient cohorts, specific type of ablation procedure, outcomes and follow up. Significant clinical trial data exists examining the question of catheter ablation in patients with AF. This reflects the more recent era in which this question has been asked, both for the contemporary emphasis on larger and randomized or case-matched studies, compared with rhythms studied in earlier decades of electrophysiology as a discipline. Unlike congenital SVTs (AVNRT and AVRT) or typical atrial flutter, AF is a more complex arrhythmia which generally occurs in the setting of cardiac (or other organ system) disease. AF is a major public health problem affecting millions of Americans. The occurrence of the rhythm portends poor outcomes in	*Thank you for your comments.*

	Comment	Response
	heart failure, increases stroke risks and accounts for significant hospitalizations and cost and reduces the quality of life for those affected. For many, it is the difference between being able to engage in otherwise important activities of life, such as gainful occupation and health-promoting exercise. Antiarrhythmic drugs have consistently been disappointing, and for most patients, the choice of safe medication is limited, with new drugs failing to demonstrate safety or efficacy beyond what is currently in use. The arduous task of research and development, clinical trial assessment of efficacy and safety to ultimately achieve FDA approval for new pharmaceuticals is daunting, at a minimum. Therefore, it is not surprising that much effort has been expended to identify non-pharmaceutical approaches to the management of AF, paralleling the evolution of procedure or device-based therapy for arrhythmias of all types. The clinical trial results summarized in this document generally favor ablation over other approaches despite significant differences in patients studied (paroxysmal, persistent) and how outcomes were measured. While there are no mortality data available from any large randomized trial, the nonrandomized data are also favorable. The NIH/NHLBI on-going CABANA trial as previously noted, will examine a mortality endpoint in older patients with comorbidities. While the initial application of catheter ablation for AF was limited to highly selected patients with low co-morbid factors, the success rates in the hands of well-trained operators has resulted in extending the procedure to patients with highly symptomatic AF with greater co-morbid factors.	
Page 160	As noted earlier, caution should be exercised when comparing catheter ablation of AF to the Cox Maze stand-alone surgery or combined with mitral valve surgery.	*Thank you for your comments.*

	Comment	Response
Page 163	*Atrial Flutter* As the authors have summarized, limited long-term randomized data is available for comparison of catheter ablation of atrial flutter compared with an antiarrhythmic drug or alternate approach. The application of catheter ablation to this rhythm developed early in the discipline of electrophysiology as the mechanism of common isthmus dependent, right atrial macro-reentrant atrial flutter was identified. The difficulty in medically managing atrial flutter is the common experience of those trying to care for these patients. Rate control is extremely difficult and antiarrhythmic drugs have generally been associated with similarly poor, long-term results as with AF. Atrial flutter can present as a de novo rhythm, or one associated with cardiac or other organ system disease. It can also be a precipitant of AF, such that control of atrial flutter will significantly and favorably impact AF occurrence. While limited randomized data are available, the high success rates reported from non-randomized trials and those comparing different energy delivery strategies should be considered. These studies demonstrate success rates, regardless of method of ablation, in ranges of 80 to 90% or higher. These studies are noted on page 185.	*Thank you for your comments.*
Page 169	*Catheter ablation for treatment of AVNRT and AVRT associated with an accessory AV pathway (including WPW).* As discussed earlier, these congenital arrhythmias were some of the earliest SVT rhythms studied. These high rate (including life threatening) arrhythmias most often occur in young, and otherwise healthy individuals. The limitations of taking daily antiarrhythmic drugs include both adverse effects and lack of efficacy. While the decades of	*Thank you for your comments.*

	Comment	Response
	experience caring for these patients are not reflected in the same weight of trial evidence as considered for AF, it is simply the case that these rhythms are curable with catheter ablation. This is reflected in the high level of recommendation provided to catheter ablation therapy found in the medical practice guidelines. Among the studies included for review, is a long term follow-up study by D'Este et al, [reference 23] examining 93 patients, of which 18 patients underwent ablation and were still arrhythmia free ~ a decade later. The other study with long-term follow up is that of Goldberg et al [reference 30] showing 100% acute success in 39 patients with either AVNRT or an accessory AV pathway and improved symptoms at 5 years compared with medically treated patients. The remainder of the studies are either registry series, smaller numbers, or comparator studies to thoracotomy (not relevant) or cyroablation (both RFA and cryoablation were association with > 80 to 90% acute success).	
Page 171	Why is the term "skeletonization" therapy used? This is not a term generally used and could be confusing. It would be better to simply state that the comparison is to an open surgical approach. While the comparison to a surgical approach is of historical interest, there is otherwise no value. Patients would not be subjected to the morbidity and mortality of open heart surgery to cure WPW or AVNRT in contemporary medical therapy. There are unlikely to be many surgeons still practicing who are skilled in these surgical procedures.	*Thank you. We have changed this term to "open perinodal dissection surgery" throughout.*
Page 189	*Comparison of PVI to other AF ablation approaches* When considering the comparators of ostial PVI to other AF ablation approaches, several points should be considered. 1) Segmental ostial PVI was the initial approach to left atrial AF ablation. Attempts to reduce pulmonary vein stenosis led to the investigation of other	*Thank you for your comments.*

	Comment	Response
	approaches, primarily wide area circumferential ablation. Other approaches also were studied and incorporated as ways to understand AF mechanisms, explore differences in AF maintenance in variable patients, and improve success rates. Thus, while circumferential PVI remains the mainstay of ablation, a number of different approaches are used by different operators. This may include: circular mapping catheter-guided ablation, the lasso-guided approach or wide area circumferential ablation (used by most expert ablation centers). The various approaches may find high success in individual operators and/or be adjunctive approaches to improve efficacy in certain patients. Thus, direct comparisons may have less importance as one versus another is not necessarily the manner in which these different therapies are considered or incorporated in clinical use.	
Page 238	*QOL and Cost Effectiveness* The authors provide a compendium of studies available to examine QOL measures and cost effectiveness. The author's carefully note that*, catheter ablation for SVTs is cost effective but this should be interpreted based upon how society is willing to consider cost for quality of life*. This is a critical issue and a full analysis of this question would and should require significant input from physicians caring for these patients if the cost benefit of an ablative approach is questioned by policy makers.	*Thank you for your comments.*
Concluding comments	This document provides important summaries of clinical studies addressing the technology of catheter ablation to mitigate or cure supraventricular tachyarrhythmias. These rhythms range from the congenital de novo rhythms utilizing accessory AV or dual AV nodal pathways to persistent atrial fibrillation in the setting of advanced cardiac disease. While the quality of many of these studies has been called into question in this document, the overall efficacy of catheter	*Thank you for your comments.*

	Comment	Response
	ablation is compelling. The interpretation of these studies can only be made in the context of the historical development of electrophysiology, the weight of clinical experience with alternate therapies (surgical approaches and antiarrhythmic drugs), the specific arrhythmias and patients considered and the recommendations from consensus documents and medical practice guidelines. "Sound clinical judgment" as acknowledged by the authors of this document, also weighs significantly in favor of ablation for many of these patients even when the "quality" of the clinical trial is lacking. It is imperative that any further consideration of these studies and this technology as it pertains to considerations of reimbursement be supplemented by physician representation and discourse regarding the appropriate use of catheter ablation. Furthermore, input should be sought from the Heart Rhythm Society and the American College of Cardiology. Adequate notification to physicians in Washington State should be undertaken with specific plans for professional representation.	
Ramakota Reddy, MD		
Page 8	I had no idea what skeletonization surgery was for arrhythmias! It is a somewhat bizarre comparator to catheter ablation. I have been in the field for almost 20 years and I have to admit that I had to look up skeletonization to figure out what it referred to. I doubt there is a surgeon in the country (or world) who has done one for treatment of AVNRT in the last decade or more.	*Thank you for your comments. This term has been defined and its use minimized throughout the report to avoid confusion.*
Page 126-8	As I would expect, it was found that RCT's on SVT, WPW and (to a lesser extent) atrial flutter were difficult to find and not of excellent quality. I would caution that this should not be interpreted as suggesting that catheter ablation is not well proven	*Thank you for your comments.*

	Comment	Response
	for these conditions. In fact, ablation has proven to be so obviously effective and relatively safe that large scale studies were never really contemplated for these arrhythmias. Much of the efficacy and safety data came from registries and personal experience and the data now is even better than registries suggest. It would now be almost too mundane to publish a series of 300 patients ablated for aflutter with <2% complications and >90% efficacy. These statements do NOT apply to ablation for atrial fibrillation. A-fib ablation is and should be subject to much greater scrutiny and appropriate RCT's than the other arrhythmias for a number of reasons outlined in the document.	
	The conclusions are generally valid for atrial fibrillation. For the other arrhythmias, they are also generally valid, but please see my comments above that the absence of data is not really relevant.	*Thank you for your comments.*
	The report would have been **MUCH** easier to review and use if it was organized in such a way that each of the arrhythmias had its own major section, with the key questions as sub sections rather than the other way around. As it reads now, the preponderance of recent studies and techniques around atrial fibrillation make the other arrhythmias look like footnotes on every key question. For example Key question 2 only has to do with atrial fibrillation and is pretty irrelevant to the other arrhythmias. If the results section were rewritten in this way, I would rate the quality of the report as superior.	*Thank you for your comments. We will consider this organization for future reports.*
Gerhard Muelheims, MD, FACC		

	Comment	Response
No comments were received.		

April 8, 2013

Robin E. Hashimoto, PhD
Spectrum Research, Inc.

Re: Catheter Ablation Procedures for Supraventricular Tachycardias (SVTA) including atrial flutter and atrial fibrillation

General Comments:

This document is a comprehensive review of clinical trial data meeting pre-specified author criteria for trial quality. It examines the efficacy, safety, quality of life and cost effectiveness of catheter ablation to treat supraventricular tachycardia (SVT), including atrial fibrillation (AF).

The extent of the document (over 300 pages with the appendix and over 100 references) limits an exhaustive critical review of each reference cited. I have however read the document and reviewed either the abstract or entire study cited and have provided below, a commentary on a number of points.

Overall, the authors are to be commended on this undertaking. The ultimate use of the information in this document is the critical issue. While the data included are important, they must be interpreted in the context of clinical practice guidelines, clinical experience and the progressive development of catheter ablation as a therapy for treatment of arrhythmias.

In many ways, the review of the clinical trials related to ablation of SVTs parallels the field of Electrophysiology. The historical development of ablation as a preferred treatment strategy must be considered. The early years (1970s and 1980s) were characterized by invasive electrophysiology studies which defined and described the normal electrical conduction system and gave birth to the initial understanding of abnormal reentrant and atrial based supraventricular arrhythmias. The application of ablation technology to the cure of certain SVTs followed initial approaches using open cardiac surgery procedures, which while adding to the basic understanding of these rhythm mechanisms, was associated with significant morbidity and mortality. Additionally, the reentrant arrhythmias were poorly suited to study with the randomized clinical trial model. Often the patient had intermittent and infrequent rhythm episodes, which would require either urgent care at the time of its event or subjecting the patient to daily doses of rhythm controlling medications to try to control an event that might occur only a few times per year. Many of these rhythms present in younger age groups (teens and 20s) making the tolerance of medications such as beta blockers or calcium channel blockers difficult, due to unacceptable side effects (impotence, depression, weight gain, fatigue, exercise heart rate limitations). Similarly, subjecting young individuals to a thoracotomy approach was ultimately considered inappropriate once a catheter based approach was available. The wide variation in presentation of the rhythms, the prolonged follow-up time that would be required and difficulty in adequately “matching” or controlling for adequate and similar clinical factors would make a robust, large, long follow-up and adequately powered randomized clinical trial approach difficult. What *is* known is that the collective experience of 4 decades of electrophysiologic experience, the reported and

clinically observed remarkable cure rate for these rhythms using catheter ablation, along with a low adverse event rate has resulted in ablative therapy preferable as first or second line therapy. The definition of evidence-based medical therapy incorporates both the best scientific evidence available and best physician judgment [Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *British Medical Journal*. 1996; 312(7023):71-72].

In contrast, AF is a rhythm most often occurring in the setting of significant cardiac or other organ system disease. Patients often have frequent episodes. The use of antiarrhythmic drug therapy has a long history of examination in clinical trials, including the AFFIRM trial [AFFIRM Investigators NEJM 347:1825,2002] which used a mortality endpoint to study rate or rhythm control (using antiarrhythmic drugs). A difference in mortality was not observed between the two treatment strategies. However, a sub-study of AFFIRM [Circulation 2004; 109:1509-1513] is suggestive or improved survival if patients can actually achieve maintenance of sinus rhythm. Non randomized trials using catheter ablation to achieve sinus rhythm also suggest mortality may be decreased. Mortality will be evaluated in the ongoing NIH/NHLBI trial randomizing older AF patients with significant co-morbidities to a treatment strategy of catheter ablation compared with rate or rhythm controlling medications [Catheter Ablation Versus Anti-arrhythmic Drug Therapy for Atrial Fibrillation Trial (CABANA) NCT00911508]. Regardless of the mortality question improving symptoms and quality of life persist as important goals of AF therapy, including prevention of stroke. Antiarrhythmic drugs have in general, been disappointing and associated with poor rhythm control and/or significant side effects. [Crjins HJ et al, Am J Cardiol 1991, 68: 335–41, Kober L et al, N Engl J Med 2008; 358:2678-2687]

Whether or not an individual patient with their particular SVT should have catheter ablation as the first or second line of therapy v. treatment with antiarrhythmic medications is completely dependent upon the clinical presentation. The frequency of arrhythmia occurrence, the heart rate of the rhythm, the patient's symptoms, and the impact on driving, job safety, risk for injury etc. are all important considerations. Other considerations include the risk of taking an antiarrhythmic medication, which is not trivial. The congenital reentrant SVTs are potentially curable rhythms using catheter ablation. The majority of these patients should be offered a curative medical therapy when available over a palliative one. That is just common sense and good medical practice. Catheter ablation for the atrial based rhythms (atrial fibrillation, atrial flutter, atrial tachycardia) will be driven by patient symptoms, location of rhythm (in the case of atrial tachycardia and atrial flutter) and ongoing studies examining treatment strategies.

The discipline of Clinical Cardiac Electrophysiology is an American Board of Internal Medicine subspecialty which requires physicians to undergo advanced and specialized training beyond three years of a general Cardiovascular Disease fellowship training program. Catheter ablation is an important aspect of this training which trains physicians in the procedural skill as well as patient evaluation and management to understand and execute the highest level of patient care.

<u>Specific comments</u>:

Page 41. The use of a pacemaker in atrial flutter is not an option as an 'alternative' to rhythm control. Pacemaker therapy is used to support bradycardia when rate or rhythm control results in symptomatic

bradycardia, or in the small percentage of patients that will require AVJ ablation and pacemaker implantation as the only solution to an inability to suppress the rhythm and control its rate.

Page 42. Regarding pretreatment of AF patients with an antiarrhythmic drug prior to cardioversion, the term should be that patients "can" be pre-treated. It is *not* usual practice for first time AF undergoing CV but can, and often is an approach for recurrent AF in patients where an AAD plus CV strategy is being pursued.

Final paragraph regarding the treatment of AVNRT and AVRT. The reference is to the pediatric literature. [3]. It is not true that the initial approach in older children and adults is an antiarrhythmic drug approach other than a trial using a beta blocker or calcium channel blocker. To subject a child or adult who is otherwise healthy to the significant risk of Class I or Class III antiarrhythmic drugs is unacceptable. As the authors noted earlier, catheter ablation is considered first line therapy for patients with WPW. Also, note that ibutilide is an <u>intravenous</u> agent and is not used for acute therapy of either AVRT or AVNRT. It is used occasionally to achieve acute cardioversion for atrial fibrillation or atrial flutter.

Page 43, Second paragraph. It should be noted that the Cox-Maze surgery as a *stand-alone* procedure is infrequently performed in the U.S., and the high success rates have been limited to a small number of highly skilled surgeons for whom the results are not necessarily reproducible. Young surgeons emerging currently will not likely have had the opportunity to be trained in this procedure. Also, there is a paucity of contemporary data from the surgical literature which can truly determine the success rates of RF - maze (or other energy sources) procedures performed by surgeons at the time of mitral valve surgery. These patients generally have significant covariates such as moderate to severe left atrial enlargement and left ventricular dysfunction where outcomes will be significantly modulated by those clinical factors.

Page 45. The 4th paragraph. Adverse effects of AAD therapy should include increased risk of sudden cardiac death.

RESULTS Section: Page 129

Pulmonary vein isolation (PVI) Versus Anti-Arrhythmic Drugs (AADs)

The later tables summarizing the Key Questions starting on page 252, include the differences in patient cohorts, specific type of ablation procedure, outcomes and follow up. Significant clinical trial data exists examining the question of catheter ablation in patients with AF. This reflects the more recent era in which this question has been asked, both for the contemporary emphasis on larger and randomized or case-matched studies, compared with rhythms studied in earlier decades of electrophysiology as a discipline. Unlike congenital SVTs (AVNRT and AVRT) or typical atrial flutter, AF is a more complex arrhythmia which generally occurs in the setting of cardiac (or other organ system) disease. AF is a major public health problem affecting millions of Americans. The occurrence of the rhythm portends poor outcomes in heart failure, increases stroke risks and accounts for significant hospitalizations and cost and reduces the quality of life for those affected. For many, it is the difference between being able to engage in otherwise important activities of life, such as gainful occupation and health-promoting exercise. Antiarrhythmic drugs have consistently been disappointing, and for most patients, the choice of safe medication is limited, with new drugs failing to demonstrate safety or efficacy beyond what is currently in use. The arduous task of research and development, clinical trial assessment of efficacy and safety to ultimately achieve FDA approval for new pharmaceuticals is daunting, at a minimum. Therefore, it is not surprising that much effort has been expended to identify non-pharmaceutical

approaches to the management of AF, paralleling the evolution of procedure or device-based therapy for arrhythmias of all types.

The clinical trial results summarized in this document generally favor ablation over other approaches despite significant differences in patients studied (paroxysmal, persistent) and how outcomes were measured. While there are no mortality data available from any large randomized trial, the nonrandomized data are also favorable. The NIH/NHLBI on-going CABANA trial as previously noted, will examine a mortality endpoint in older patients with comorbidities. While the initial application of catheter ablation for AF was limited to highly selected patients with low co-morbid factors, the success rates in the hands of well-trained operators has resulted in extending the procedure to patients with highly symptomatic AF with greater co-morbid factors.

Page 160. As noted earlier, caution should be exercised when comparing catheter ablation of AF to the Cox Maze stand-alone surgery or combined with mitral valve surgery.

Page 163 Atrial Flutter

As the authors have summarized, limited long-term randomized data is available for comparison of catheter ablation of atrial flutter compared with an antiarrhythmic drug or alternate approach. The application of catheter ablation to this rhythm developed early in the discipline of electrophysiology as the mechanism of common isthmus dependent, right atrial macro-reentrant atrial flutter was identified. The difficulty in medically managing atrial flutter is the common experience of those trying to care for these patients. Rate control is extremely difficult and antiarrhythmic drugs have generally been associated with similarly poor, long-term results as with AF. Atrial flutter can present as a de novo rhythm, or one associated with cardiac or other organ system disease. It can also be a precipitant of AF, such that control of atrial flutter will significantly and favorably impact AF occurrence. While limited randomized data are available, the high success rates reported from non-randomized trials and those comparing different energy delivery strategies should be considered. These studies demonstrate success rates, regardless of method of ablation, in ranges of 80 to 90% or higher. These studies are noted on page 185.

Page 169 Catheter ablation for treatment of AVNRT and AVRT associated with an accessory AV pathway (including WPW).

As discussed earlier, these congenital arrhythmias were some of the earliest SVT rhythms studied. These high rate (including life threatening) arrhythmias most often occur in young, and otherwise healthy individuals. The limitations of taking daily antiarrhythmic drugs include both adverse effects and lack of efficacy. While the decades of experience caring for these patients are not reflected in the same weight of trial evidence as considered for AF, it is simply the case that these rhythms are curable with catheter ablation. This is reflected in the high level of recommendation provided to catheter ablation therapy found in the medical practice guidelines.

Among the studies included for review, is a long term follow-up study by D'Este et al, [reference 23] examining 93 patients, of which 18 patients underwent ablation and were still arrhythmia free ~ a decade later. The other study with long-term follow up is that of Goldberg et al [reference 30] showing 100% acute success in 39 patients with either AVNRT or an accessory AV pathway and improved symptoms at 5 years compared with medically treated patients. The remainder of the studies are either

registry series, smaller numbers, or comparator studies to thoracotomy (not relevant) or cyroablation (both RFA and cryoablation were association with > 80 to 90% acute success).

Page 171. Why is the term "skeletonization" therapy used? This is not a term generally used and could be confusing. It would be better to simply state that the comparison is to an open surgical approach. While the comparison to a surgical approach is of historical interest, there is otherwise no value. Patients would not be subjected to the morbidity and mortality of open heart surgery to cure WPW or AVNRT in contemporary medical therapy. There are unlikely to be many surgeons still practicing who are skilled in these surgical procedures.

Page 189. Comparison of PVI to other AF ablation approaches

When considering the comparators of ostial PVI to other AF ablation approaches, several points should be considered. 1) Segmental ostial PVI was the initial approach to left atrial AF ablation. Attempts to reduce pulmonary vein stenosis led to the investigation of other approaches, primarily wide area circumferential ablation. Other approaches also were studied and incorporated as ways to understand AF mechanisms, explore differences in AF maintenance in variable patients, and improve success rates. Thus, while circumferential PVI remains the mainstay of ablation, a number of different approaches are used by different operators. This may include: circular mapping catheter-guided ablation, the lasso-guided approach or wide area circumferential ablation (used by most expert ablation centers). The various approaches may find high success in individual operators and/or be adjunctive approaches to improve efficacy in certain patients. Thus, direct comparisons may have less importance as one versus another is not necessarily the manner in which these different therapies are considered or incorporated in clinical use.

Page 238 QOL and Cost Effectiveness

The authors provide a compendium of studies available to examine QOL measures and cost effectiveness. The author's carefully note that*, catheter ablation for SVTs is cost effective but this should be interpreted based upon how society is willing to consider cost for quality of life*. This is a critical issue and a full analysis of this question would and should require significant input from physicians caring for these patients if the cost benefit of an ablative approach is questioned by policy makers.

Concluding Comments:

This document provides important summaries of clinical studies addressing the technology of catheter ablation to mitigate or cure supraventricular tachyarrhythmias. These rhythms range from the congenital de novo rhythms utilizing accessory AV or dual AV nodal pathways to persistent atrial fibrillation in the setting of advanced cardiac disease. While the quality of many of these studies has been called into question in this document, the overall efficacy of catheter ablation is compelling. The interpretation of these studies can only be made in the context of the historical development of electrophysiology, the weight of clinical experience with alternate therapies (surgical approaches and antiarrhythmic drugs), the specific arrhythmias and patients considered and the recommendations from

consensus documents and medical practice guidelines. "Sound clinical judgment" as acknowledged by the authors of this document, also weighs significantly in favor of ablation for many of these patients even when the "quality" of the clinical trial is lacking.

It is imperative that any further consideration of these studies and this technology as it pertains to considerations of reimbursement be supplemented by physician representation and discourse regarding the appropriate use of catheter ablation. Furthermore, input should be sought from the Heart Rhythm Society and the American College of Cardiology. Adequate notification to physicians in Washington State should be undertaken with specific plans for professional representation.

Sincerely,

Jeanne E. Poole, MD

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Comprehensive Evidence-Based Health Technology Assessment
Peer Review Form

Thank you for your willingness to read and comment on the Comprehensive Evidence-Based Health Technology Assessment Review for hip resurfacing. Your contribution and time are greatly appreciated.

This form can be filled out electronically on your personal computer. Enter your identification information and comments directly into the shaded areas; use the **TAB** key to move from field to field. Please enter the section, page, and line numbers where relevant. The shaded comment field will expand as you type, allowing for unlimited text. You have been provided comment fields in each section. Should you have more comments than this allows for, please continue with a blank page. Additionally, we are very interested in your evaluation of the ease of use of our Peer Review Form. Please use the last field to enter suggestions for improvement.

When the Peer Review form is complete, save it to your hard drive and return as an e-mail attachment to robin@specri.com

If you have questions or concerns please contact Robin Hashimoto, PhD at the email above.

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INTRODUCTION Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Overview of topic is adequate?
- Topic of assessment is important to address?
- Public policy and clinical relevance are well defined?

Page 1 Line

Good review of the types of arrhythmias. The ones that you put in bold are the most commonly ablated tachycardias. I suspect this is the reason they are in bold, although I don't see where that is said in the document text.

Page 8 Line

I had no idea what skeletonization surgery was for arrhythmias! It is a somewhat bizarre comparator to catheter ablation. I have been in the field for almost 20 years and I have to admit that I had to look up skeletonization to figure out what it referred to. I doubt there is a surgeon in the country (or world) who has done one for treatment of AVNRT in the last decade or more.

BACKGROUND Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Content of literature review/background is sufficient?

Page All Line

Very comprehensive and complete review of the literature

REPORT OBJECTIVES & KEY QUESTIONS Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Aims/objectives clearly address relevant policy and clinical issue?
- Key questions clearly defined and adequate for achieving aims?

Page All Line

The Key questions are well stated and relevant.

METHODS Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Method for identifying relevant studies is adequate?
- Criteria for the inclusion and exclusion of studies is appropriate?
- Method for Level of Evidence (LoE) rating is appropriate and clearly explained?
- Data abstraction and analysis/review are adequate?

Page 119 Line

Appropriate criteria for inclusion and exclusion were used. All relevant studies (and then some) were found, so the methods for identifying studies was adequate.

Page 124 Line

Data abstraction described here (and seen in the appendixes) is comprehensive and complete.

Page 126-8 Line

As I would expect, it was found that RCT's on SVT, WPW and (to a lesser extent) atrial flutter were difficult to find and not of excellent quality. I would caution that this should not be interpreted as suggesting that catheter ablation is not well proven for these conditions. In fact, ablation has proven to be so obviously effective and relatively safe that large scale studies were never really contemplated for these arrhythmias. Much of the efficacy and safety data came from registries and personal experience and the data now is even better than registries suggest. It would now be almost too mundane to publish a series of 300 patients ablated for aflutter with <2% complications and >90% efficacy.

These statements do NOT apply to ablation for atrial fibrillation. A-fib ablation is and should be subject to much greater scrutiny and appropriate RCT's than the other arrhythmias for a number of reasons outlined in the document.

RESULTS Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Amount of detail presented in the results section appropriate?
- Key questions are answered?
- Figures, tables and appendices clear and easy to read?
- Implications of the major findings clearly stated?
- Have gaps in the literature been dealt with adequately?
- Recommendations address limitations of literature?

Page All Line

The amount of detail is generally appropriate, although quite comprehensive. There are some pivotal papers and many fringe papers in the field and it would be difficult for a review such as this to be able to fairly separate these out. That being said, I think all of the pivotal trials have been included and were considered of high quality.

Page All Line

The figures and tables are clear and easy to read.

Page All Line

Gaps and limitations in the literature were dealt with adequately, although I would express some concern again that inadequate data for rhythms other than atrial fibrillation should NOT be interpreted as critical of the technique. The evolution and extremely positive experience with ablation for SVT, WPW and flutter made consideration of RCT's somewhat unnecessary. This changed with atrial fibrillation and

the number of trials regarding atrial fibrillation is more reflection of the fact that this rhythm is not as obviously well treated with ablation as the other rhythms are, and that comparisons to AAD's and surgery are necessary.

CONCLUSIONS Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Are the conclusions reached valid?

Page All Line

The conclusions are generally valid for atrial fibrillation. For the other arrhythmias, they are also generally valid, but please see my comments above that the absence of data is not really relevant.

OVERALL PRESENTATION and RELEVANCY Comments

While reviewing this section please keep the following questions in mind, but please comment on any point:

- Is the review well structured and organized?
- Are the main points clearly presented?
- Is it relevant to clinical medicine?
- Is it important for public policy or public health?

Page All Line

This is all very relevant to public policy and all of the points are clearly presented

Page All Line

The report would have been **MUCH** easier to review and use if it was organized in such a way that each of the arrhythmias had its own major section, with the key questions as sub sections rather than the other way around. As it reads now, the preponderance of recent studies and techniques around atrial fibrillation make the other arrhythmias look like footnotes on every key question. For example Key question 2 only has to do with atrial fibrillation and is pretty irrelevant to the other arrhythmias. If the results section were rewritten in this way, I would rate the quality of the report as superior.

QUALITY OF REPORT

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Superior ☐
Good X
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