

Table S1. Current recommendations and knowledge gaps to address gender disparities in arrhythmias treatment. Data recommendations extracted from the Position Statement of the European Heart Rhythm Association.¹

Specific Arrhythmias	Recommendations specific for women	Rationale / considerations	Knowledge Gaps
Channelopathies	In all LQTS women beta-blocker therapy should be continued during pregnancy & post-partum <hr/> Automatic external defibrillator or wearable defibrillator should be considered in high-risk women with QTc>500ms when ICD is not otherwise indicated or accepted by patient	Women with LQTS are at increased risk for 9 months post-partum, particularly in LQTS2	Any pro-arrhythmic roles for oestradiol & an antiarrhythmic effect of progesterone (animal studies have found this)
Cardiomyopathies	Women with hypertrophic cardiomyopathy are at equal risk of ventricular arrhythmias	Women tend to be older at diagnosis, more frequently symptomatic & high risk of heart failure, death or stroke	How cardiac function in hypertrophic cardiomyopathy is affected by pregnancy

Paroxysmal Supraventricular tachycardia (PSVT)	Symptoms suggestive of PSVT should undergo ambulatory monitoring	Women have a 2-3 times higher risk of AVNRT, experience worse quality of life, delays in access to ablation and are more likely to be offered medical therapy.	Understanding the sex differences in the prevalence of AVNRT, FAT and ORT
	Symptomatic women with documented PSVT need equal access to ablation	PSVT is more common in the luteal phase of the menstrual cycle.	
	When symptoms are strongly suggestive of PSVT without documentation, an electrophysiological study may be offered		Any relationship between female sex, psychological stress and PSVT.
	A second electrophysiological study may be advised to time with the first days of menstrual cycle if the first study did not detect PSVT		Difference in PSVT symptoms between women and men
Atrial Fibrillation (AF)	Women with symptomatic AF should	Women with AF are: older, have more	Sex differences in

	be offered timely access to AF ablation if medically appropriate	severe symptoms, are less likely to undergo electrical cardioversion or offered an ablation, more likely to undergo AV nodal ablation for AF, have a significantly higher rate of life-threatening adverse events on rhythm control therapy and more likely to develop SND resulting in a pacemaker for brady arrhythmias	substrate for paroxysmal and persistent AF Sex differences in progression rates from paroxysmal to persistent AF Testing safer catheter techniques to minimize AF ablation risks in women
Stroke risk & anticoagulation therapy	Female sex is a stroke modifier (rather than an independent risk factor) Women with ≥ 1 additional stroke risk factor should be considered for OAC. DOACs are recommended in	Female sex is associated with greater stroke severity and permanent disability. Warfarin may be less well controlled in women and even with good control anti-coagulation with VKA women have a greater residual stroke risk	Sex-specific differences in treatment patterns, stroke & bleeding risk in AF with contemporary therapies

	preference to VKA.		
Safety & efficacy of antiarrhythmic drug therapy (AAD)	Counselling on the risk & symptoms associated with torsades de pointes	Women are at greater risk of developing acquired LQT in class IA and III anti-arrhythmic drugs than men	Understanding underlying biology for the sex-specific differences in adverse events in AAD
	Periodic evaluation to confirm AAD treatment		
	Women with HF or pathological LVH should be offered amiodarone. Other AAD should be avoided		
	ECG monitoring for heart rate & QT prolongation should be considered: during AAD initiation, it should be considered 1-2 weeks after increases; during long-term AAD therapy it should be considered every year		Specific secondary analyses of anti-arrhythmic therapies by sex need inclusion in AAD studies
	Class IA or III AAD should not be prescribed in women with prolonged		

	<p>QTc (>500ms) or with significant SND</p> <p>or AVD without a functioning pacemaker</p>		
ICD	Women are less likely to be referred for ICD therapy	ICD studies and registries have insufficient numbers of women to determine sex-differences	Women require inclusion in studies and registries to determine sex-differences
		Women are less likely to have a primary event and are more likely to survive a primary event	The role of sex-specific differences making women with structural heart disease less susceptible to ventricular arrhythmias
Cardiac Resynchronization Therapy (CRT)	Women with LBBB and QRS > 130ms & LVEF <35% despite optimal medical therapy are highly likely to respond to CRT and should be referred	Women are more likely to benefit from CRT but less likely to be referred. Fewer women have CRT indication as more have HFmrEF or HFpEF.	To further refine criteria for CRT implantation in women, including value of separate inclusion criteria for women

Sufficient number of women need inclusion in studies/registries to ensure adequate statistical power and analysis

Lead Extraction	High volume centres with more experienced operators should be preferred	Female sex is a risk factor for major complications due to thinner cardiac walls
------------------------	---	--

Abbreviations: AVNRT, atrioventricular nodal reentry tachycardia; AV, atrio-ventricular; SND, sinus node dysfunction; OAC, oral anticoagulation; DOACs, direct oral anticoagulants; VKA, vitamin K antagonists; HF, heart failure; LVH, left ventricular hypertrophy; ECG, electrocardiogram; QTc, corrected QT; AVD, atrio-ventricular dysfunction; LQT, long QT; ICD, implanted cardiac defibrillator; HFpEF, heart failure with preserved ejection fraction; HFmrEF, heart failure with mid-range ejection fraction; LBBB, left bundle branch block.

Table S2. Arrhythmia Generic Knowledge Gaps & Research recommendations. Adapted from *Zeitler et al.*²

Overarching Arrhythmia Disparities	Knowledge Gap	Research recommendations
Epidemiology	Incidence & prevalence of arrhythmia related disease in underrepresented	Data collection in studies should differentiate sex & gender

	gender minorities & those undergoing gender-affirming therapies	
Arrhythmia interventions safety & effectiveness	Sex related procedural relative risks & mitigating actions to increase procedural safety in women/ transgender/gender-affirming therapies	Evidence based strategies to harness big data collection through national & international datasets on sex & gender & procedural safety
	Sex-specific risk of anti-arrhythmic medications management in women	
Inequalities in care	Factors influencing women's underdiagnosis, misdiagnosis & delays in therapy (particularly the role of anxiety)	Studies investigating factors influencing both health care providers & women's experiences with recommended strategies to address inequalities. Recommendation for mixed methods data.
Clinical Trial Designs	Targeted strategies to increase women with arrhythmias in clinical trials	Studies investigating reasons for scarce enrolment & participation of women with development of targeted strategies. Recommendations for mixed method data collection & PPI with women representatives in trials

	group
How to translate electrophysiological sex-specific differences into clinical trials	Consensus group working in clinical trials for targeted data collection & strategies reporting

Abbreviations: PPI, personal and public involvement.

Table S3. Percentage prevalence of cardiovascular medication prescription in women and men at high risk of or with established cardiovascular disease in primary care worldwide. Adapted from *Zhao et al.*³

Medication	Women	Men
Aspirin	41%	56%

Statins	60%	63%
Antihypertensives	68%	69%

1. Linde C, Bongiorni MG, Birgersdotter-Green U, et al. Sex differences in cardiac arrhythmia: a consensus document of the European Heart Rhythm Association, endorsed by the Heart Rhythm Society and Asia Pacific Heart Rhythm Society. *Europace* 2018; 20: 1565-1565ao. DOI: 10.1093/europace/euy067.
2. Zeitler EP, Poole JE, Albert CM, et al. Arrhythmias in Female Patients: Incidence, Presentation and Management. *Circ Res* 2022; 130: 474-495. 20220217. DOI: 10.1161/CIRCRESAHA.121.319893.
3. Zhao M, Woodward M, Vaartjes I, et al. Sex Differences in Cardiovascular Medication Prescription in Primary Care: A Systematic Review and Meta-Analysis. *J Am Heart Assoc* 2020; 9: e014742. 20200520. DOI: 10.1161/JAHA.119.014742.