

THE RHYTHM STRIP

The newsletter for Professionals in Cardiac Sciences Australia

Now welcoming readers from The Society of Cardiopulmonary Technology New Zealand

Winter 2025

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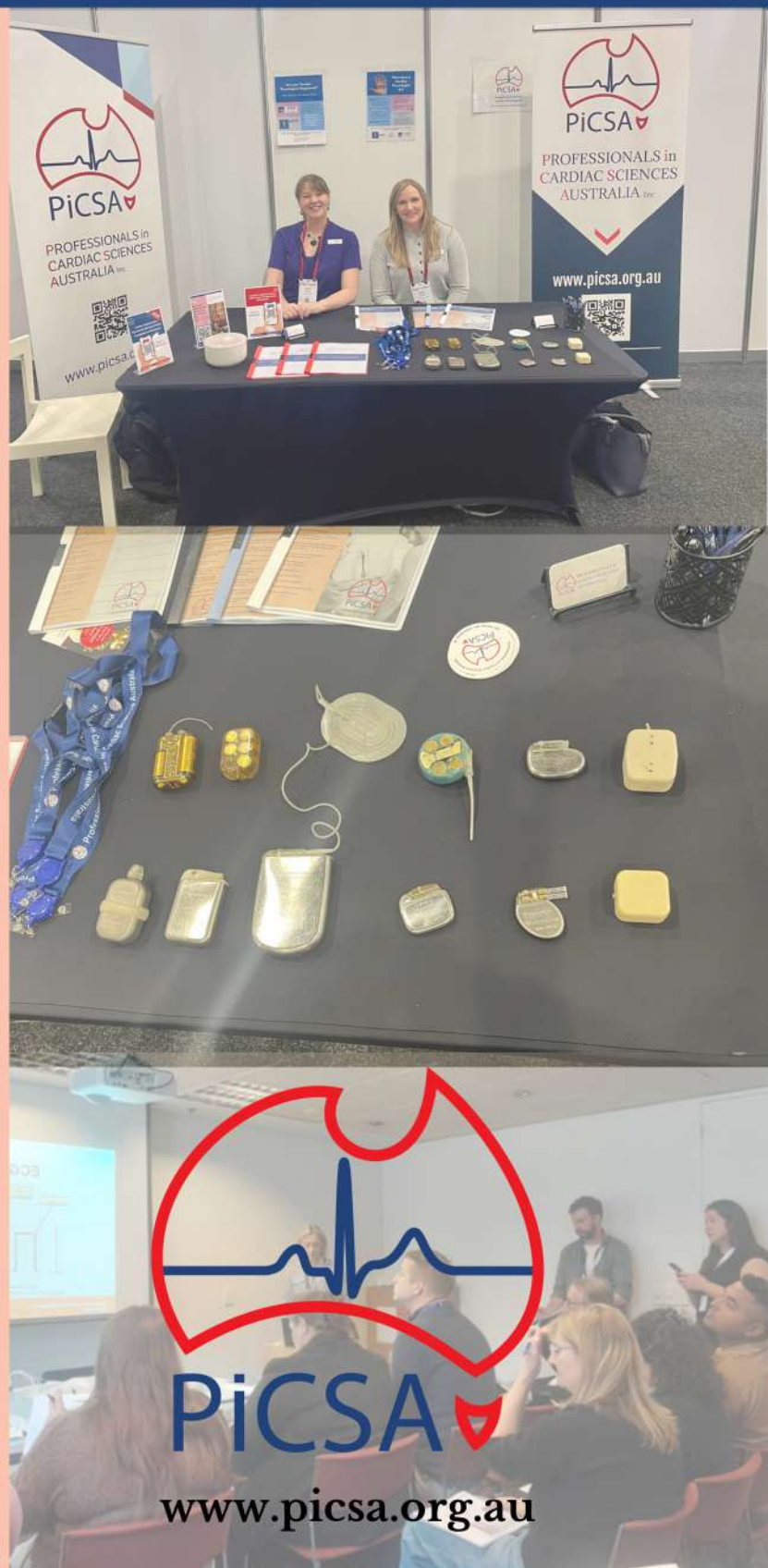
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PiCSA
www.picsa.org.au

Our Mission To support, represent, and advance the Cardiac Physiology profession.

Our Vision A skilled, recognised, and regulated Cardiac Physiology workforce meeting Australia's healthcare needs now and into the future.

Our Values

Clinical Excellence We lead the Cardiac Physiology profession to achieve the highest standards of patient care through evidence-based practice, ongoing education, and adherence to professional and ethical guidelines.

Visibility We advocate for the recognition of Cardiac Physiologists as a vital, distinct profession among policymakers, the healthcare community, and the public.

Empowerment We equip Cardiac Physiologists with the tools, resources and support to advance their roles and rights within healthcare. We actively influence systems and policies to enable our members to achieve their full potential.

Accountability We act with integrity, are open and transparent to our members, make evidence-informed decisions, encourage ethical behaviour at all levels across the profession, and accept responsibility for strategic actions and outcomes.

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From the Chair

Miriam Norman (TAS)



A message from Professionals in Cardiac Sciences Australia (www.picsa.org.au)

The Winter quarter has shown us two things very clearly:

- There's real momentum behind our profession.
- We still have a long way to go.

Across the country, cardiac physiologists are stepping up — delivering complex care, leading education, and helping health services run more efficiently. But our systems haven't yet caught up. Role definitions, pay structures, and recognition vary wildly between services, and that's holding everyone back — patients included.

A Seat at the Table

We're pleased to share that PiCSA has now achieved membership within Allied Health Professions Australia (AHPA) — the national peak body for allied health. This means cardiac physiology is finally recognised by the Australian Government as a legitimate allied health profession. It's a step forward that strengthens our voice with governments and policy makers. The AHPA website now includes information about PiCSA and a tidy description of the cardiac physiology profession (that we're featuring in our Winter newsletter).

Cardiac device competencies

PiCSA also launched Australia's first Competency Standards Framework for Cardiac Implantable Electronic Devices (CIEDs). This framework reflects national best practice and was developed in consultation with national and international experts. It aligns with international guidelines, setting clear standards for non-industry cardiac physiologists working in private and public settings, and is already helping to clarify roles, reduce ambiguity, and promote safe, team-based care.

Hearing from Every Corner

One of our most meaningful events this quarter was a national online meeting with senior cardiac physiology leaders from almost every state and territory. The message was clear: while the passion and talent are there, the support isn't always equal. Some teams are thriving, with clear career pathways and multidisciplinary integration. Others are struggling — short-staffed, siloed, and working without proper recognition or training time.

We'll keep amplifying these voices until we see change.

Contributing to Conferences

Our members supported the Heart Rhythm and Allied Health and Technology Councils of the Cardiac Society of Australia and New Zealand (CSANZ) to organise and deliver the CSANZ Allied Professional Heart Rhythm Education Day: a new cardiac physiology event attached to a long-established major national scientific meeting.

PiCSA also helped deliver the inaugural National Clinical Physiology Education Hub, which brought together professionals across four allied health disciplines — cardiac (PiCSA), respiratory (ANZSRS), neurophysiology (ANSA), and sleep (ANZSSA). Our ECG workshops were a highlight, providing a structured 3-hour course with hands-on training using a simulator generously provided by Virtual Know How.

Sonographer Scope of Practice

PiCSA has also contributed to the national Sonographer Scope of Practice initiative, led by the Australasian Sonographers Association (ASA). This important work is now open for feedback, and we invite our echo physiologists/cardiac sonographers to have their say:

<https://www.sonographers.org/article/feedback-open---draft-scope-of-practice-defines-entry-level-scope-for-australian-sonographers>

What's Next

We know that real progress doesn't happen overnight — but it does happen when enough people pull in the same direction.

We're working toward a future where cardiac physiologists are not only recognised, but supported:

With proper structures.

With national consistency.

With clear professional pathways.

We're not asking for special treatment — just fair and consistent recognition of the work that's already happening every day in hospitals and cardiac clinics across the country.

If you're reading this as a health leader, university educator, policy adviser, or union rep: we're ready to work with you. Let's make this profession — and the healthcare system around it — stronger for everyone.

Warm regards,

Miriam Norman

Chair, Professionals in Cardiac Sciences Australia (PiCSA)





Membership Report + Announcements

Tina Hetherington (QLD)

Professional Members 244
Early Career 30
Affiliate 18
Student 49
Life 2

PiCSA Membership

Growing Awareness Together

PiCSA membership numbers remain steady, and we're proud to see our community of cardiac physiologists continuing to stay connected and engaged. As we work to strengthen the profession and raise the profile of cardiac physiology across Australia, you, our members, play a vital role in helping us grow.

We encourage our current members to share your PiCSA experience with colleagues and help increase awareness of what the organisation offers. Whether it's recommending a membership to a co-worker, inviting them to an education meeting, or simply talking about PiCSA's role in supporting professional development, every conversation helps broaden our reach and strengthen our community.

As a member, you have access to a range of benefits designed to support your growth and career:

Anytime Access to Education

Enjoy PiCSA's online library of on-demand sessions, covering topics like echocardiography, pacing, electrophysiology, and CIEDs — learn when it suits you.

Connection & Collaboration

Be part of a growing network of peers, mentors, and leaders through education meetings, events, and special interest groups.

Professional Development

Stay ahead with CPD-accredited education and certificates to support your ongoing learning.

Your Voice in the Profession

PiCSA advocates nationally for the recognition of cardiac physiologists and the advancement of our role within allied health frameworks.

Coming Up

- The next PiCSA Education Meeting – Thursday 25th September
- PiCSA Annual General Meeting – Tuesday 28th October
- Advocacy updates and opportunities to get involved

By sharing your experience and encouraging colleagues to explore PiCSA membership, you're helping us build a stronger, more recognised profession.



Education Meetings



PiCSA EDUCATION MEETING

ECHOCARDIOGRAPHY

25 SEPTEMBER 2025,
7.00 PM AEST
ONLINE VIA ZOOM

REGISTER NOW

WWW.PICSA.ORG.AU/EVENTS



Tony Forshaw

*Diastolic Function:
Updated Guidelines*



Cathy West

*Pulmonary Veins: Not
All Shunts Are Holes*

FREE

CPET Mini-Series



ANZSRS

Australian and New Zealand Society of Respiratory Science Ltd
www.anzsrs.org.au

Cardiopulmonary Exercise Testing (CPET) Masterclass Series.

This virtual masterclass will feature five expert-led sessions designed to build confidence and competence in CPET practice—from preparing for and performing the test, to interpretation and paediatric considerations.

📅 Starting Tuesday 16th September
📍 Online | ⌚ Timings vary by region

💎 Registration is now open and is **FREE** for PiCSA members.
<https://www.trybooking.com/events/landing/1408438>

**Check your email for
the discount code
or log-in to the PiCSA
website**



From the Allied Health Professions Australia Website

<https://www.ahpa.com.au/cardiac-physiology>

Incase you missed it: PiCSA have been accepted as ordinary members of the Allied Health Professions Association. See Cardiac Physiologists recognised on the AHPA website!

Cardiac Physiology

Cardiac physiologists are healthcare scientists who specialise in diagnosing and treating heart disease. They work closely with doctors and other professionals, using technology to assess heart function, guide treatment decisions, and support safe, effective care.

Cardiac physiologists work directly with patients of all ages, ranging from babies to the elderly. They typically specialise in one or more of the following five key areas of practice:

1. **Non-invasive diagnostics:** Use tools like ECGs, ambulatory monitors, and treadmill stress tests to check heart rhythm and function.
2. **Cardiac catheterisation laboratory support:** Assist in procedures that look at the heart's blood vessels and pressures, including angiograms and valve repairs.
3. **Echocardiography (cardiac ultrasound/sonography):** Use ultrasound to capture detailed images of the heart, assessing structure, function, and blood flow to support diagnosis and ongoing clinical decision-making.
4. **Implantable cardiac devices:** Support the implantation and follow-up of devices like pacemakers and defibrillators, ensuring they work safely and effectively.
5. **Electrophysiology:** Provide technical support during electrophysiology studies and catheter ablation procedures, including advanced rhythm analysis, diagnostic pacing, and ablation delivery.

Where do cardiac physiologists practise?

Cardiac physiologists work in hospitals and private cardiology clinics. They may lead or contribute to specialised clinics and take part in education, research, or governance activities.

Education and training

Cardiac physiologists must complete a relevant bachelor's degree (typically in Clinical Physiology, Biomedical Science/Engineering, Health Science or a related field) from an accredited tertiary provider. Most entry pathways include clinical placements and supervised on-the-job training. Additional postgraduate qualifications and certifications are required for specialised areas, such as echocardiography or electrophysiology. Further details are outlined in [PiCSA's 2024 guidelines](#).

How are cardiac physiologists recognised?

Cardiac physiology operates as a self-regulated profession and is presently ineligible for regulation under Ahpra. Public recognition of cardiac physiologists is available through the following registries:

- **ASAR:** Required under Medicare for cardiac physiologists who perform echocardiography/cardiac sonography.
- **ACCP:** A voluntary registry for cardiac physiologists whose work includes non-echo specific duties (non-invasive testing, cath-lab, devices, and/or electrophysiology).

Professional body

Cardiac physiologists in Australia are represented by [Professionals in Cardiac Sciences Australia \(PiCSA\)](#). The echocardiography modality sits at the intersection of cardiac physiology and sonography. As such, cardiac physiologists who specialise in echocardiography are represented by both PiCSA and the [Australasian Sonographers Association \(ASA\)](#), which also represents [sonographers](#) more broadly.



**Allied Health
Professions
Australia**



PiCSA in Action: Education & Event Highlights

I'd like to express my gratitude to PiCSA and SHDA for our Trivia Night Lucky Door Prize of 2 tickets to the Structural Heart Disease Australia Left Heart Symposium in June 2025. The Left Heart Symposium was held at the historic Royal Prince Alfred Hospital in Sydney on a wonderfully sunny winter day.

The day started with presentations on advances in preoperative planning for mitral valve interventions, ischaemic MR management and advances in mitral valve TEER. This was followed by LAA anatomy, occlusion techniques and artificial intelligence in cardiac surgery. The day came to a close with presentations encompassing the pathophysiology of AS, TAVI/SAVR preoperative planning and journey of the TAVI. The highlight of the day for me was Prof Greg Scalia's presentation on Mitral ProTOE – I'm looking forward to implementing his techniques for mitral valve imaging.

Our team from Macquarie University Health express our thanks for this opportunity to learn and network at an exceptional event.

We are looking forward to the next PiCSA Trivia Night!

Bec Smith
Macquarie University Health

PiCSA at CSANZ 2025 – Showcasing Cardiac Physiology on the National Stage

What an incredible few days we had at the Cardiac Society of Australia and New Zealand (CSANZ) Annual Scientific Meeting 2025! PiCSA was delighted once again to host a booth at this year's event, and it was fantastic to meet and connect with so many cardiac physiologists, nurses, allied health professionals and doctors from across Australia and New Zealand.

One of the real highlights was seeing cardiac physiologists so strongly represented throughout the program. From delivering engaging presentations in the Allied Health Prize sessions, to sharing research through poster presentations, contributing expertise during the Heart Rhythm Education Day and Imaging Symposium, it was inspiring to witness the breadth of talent and innovation within our community.

CSANZ 2025 was a wonderful celebration of collaboration, research, and professional growth. PiCSA is proud to support and showcase the work of cardiac physiologists and looks forward to building on this momentum as we continue to advocate for our profession and strengthen our impact within the wider healthcare community.



PiCSA in Action: Education & Event Highlights

Australia and New Zealand Clinical Physiology Education Hub- A New Chapter for Clinical Physiology Education

The recent launch of the Australia and New Zealand Clinical Physiology Education Hub (ANZCPEH) Day marked a significant milestone for the clinical measurement profession, and PiCSA was proud to play an integral role in organising and delivering this landmark event.

This pioneering event brought together specialists from Sleep, Neurophysiology, Cardiac, and Respiratory for a unique program designed to bridge disciplines and foster collaboration. What began as a simple idea shared between colleagues grew into an inspiring initiative after months of careful planning, coordination, and commitment from the organising teams.

The success of ANZCPEH was made possible thanks to the hard work of our committees, the support of partnering professional societies, and the generosity of our guest speakers, who delivered insightful presentations, encouraged robust discussion, and shared practical knowledge to enhance everyday clinical practice.

More than just an education day, ANZCPEH became an opportunity to connect, collaborate, and learn beyond traditional discipline boundaries. The enthusiasm and engagement from participants demonstrated the value of coming together as one community, reinforcing our belief that progress happens when we move forward — together.



Attendee Feedback:

"I absolutely loved having all 4 disciplines together in one room. It is so clear how much overlap there is."

"The cross-pollination of disciplines was fabulous."

"Could we do this more than once a year?"

"I hope to see an event like this running every year or second year."

"This was a huge undertaking... commend everyone on a fantastic session."



CIEDs Competency Document

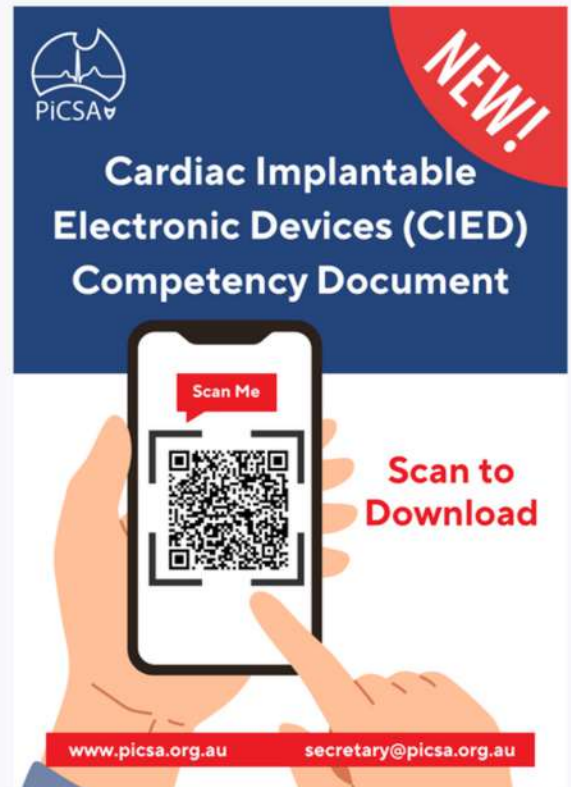
The PiCSA Board were pleased to announce the release of the Cardiac Implantable Electronic Devices Competency Document in July 2025

This competency document outlines the specific skills, knowledge, and behaviours required of Cardiac Physiologists working with Cardiac Implantable Electronic Devices (CIEDs) in Australia. It serves as a comprehensive tool for assessing proficiency, guiding professional growth, and ensuring quality patient care.

PiCSA gratefully acknowledges the contributions of the stakeholders who provided input during the development of this document. This includes thoughtful feedback from individual cardiologists, cardiac physiologists, professional associations, and device manufacturers.

This competency standards resource is a first edition, and PiCSA welcomes ongoing feedback to ensure it remains relevant, evidence-based, and reflective of best practice across diverse clinical settings.

The document can be viewed on the PiCSA website: <https://picsa.org.au/about/#core-documents>

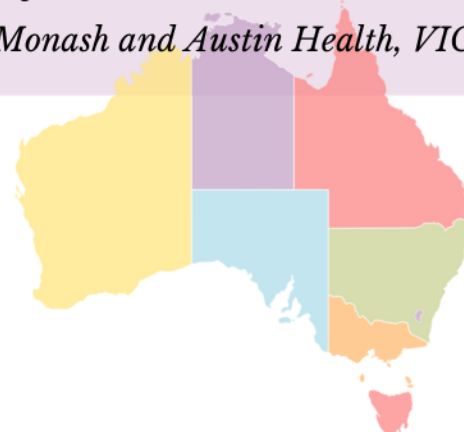


Strengthening the Cardiac Physiology Workforce: A National Perspective

A recap from PiCSA education session on Wednesday 25th of June 2025

Jenny Fong, Monash and Austin Health, VIC

The recent national meeting on the Cardiac Physiologist Workforce brought together representatives from across Australia to share updates, challenges, and strategies for progressing the profession. With presentations from every state and territory, the evening provided a clear snapshot of where we stand—and where we must go next.



1. Professional Recognition and Governance

The meeting opened with a presentation on Australia's complex allied health governance landscape, delivered by Luke Shanahan, PiCSA board member and Chief Cardiac Physiologist from Queensland. He provided a detailed overview of the health policy, legislative, and regulatory ecosystem operating across federal, state, and local levels. This included the clinical safety and quality requirements that apply to self-regulated professions like cardiac physiology, and how these intersect with professional practice standards.

Luke emphasised that regulation is essential not only for advancing professional status, but also for embedding safety, quality, and accountability across the workforce. He discussed the national review assessing the inclusion of self-regulated professions under the National Registration and Accreditation Scheme (NRAS). Audiology, recently reviewed through this process, was presented as a case study—with its progress offering potential insights and implications for the future direction of cardiac physiology.

He also highlighted the distinction between industrial awards and enterprise agreements, explaining how these mechanisms shape working conditions, remuneration, and avenues for professional advocacy at the state level.

2. Data Gaps and Workforce Shortages

PiCSA Chair Miriam shared a workforce snapshot, particularly noting challenges in quantifying non-echo cardiac physiologists due to the lack of mandatory registration. While Australia has roughly 2,000 accredited echo sonographers, the number of qualified cardiac physiologists in other modalities is vastly underreported—only around 100 are formally registered.

Benchmarking against New Zealand and international standards revealed significant workforce shortages in many states, particularly in Tasmania and the Northern Territory. The impact of these shortages is already evident in long outpatient waitlists and reduced access to timely diagnostic services in regional areas.

3. Pay Discrepancies and Award Variability

Alicia Donovan presented a comparative review of state awards, exposing vast inconsistencies in pay, role definitions, and career progression opportunities across Australia. Notably, there are variations between states on the definition of "entry level," making it difficult to directly compare remuneration across states. Job titles, classifications, and career structures also differ widely, complicating any national-level workforce planning.

Western Australia was noted for having a particularly flat career structure, while Victoria was recognised for incorporating educator roles into its health awards—a positive step towards formalising career pathways and supporting professional growth.

4. Emerging Themes from Across Australia

State representatives provided detailed updates, with several common threads emerging:

- **Training Gaps:** Almost all states reported a lack of structured early-career training pipelines. Most rely heavily on ad hoc or local hospital-based programs with little standardisation or cross-institutional alignment.
- **Injury and Retention:** High injury rates, especially among echo sonographers, continue to contribute to burnout. The need for cross-training and role flexibility was repeatedly highlighted as a key strategy to improve workforce sustainability.
- **Service Creep:** Concerns were raised over task-shifting and “creep” from other professional groups, with strong advocacy for protecting and recognising the advanced clinical skills of cardiac physiologists.
- **Remote Monitoring Pressures:** As home monitoring expands, the profession is absorbing more responsibility without corresponding increases in staffing or resources. Several states noted the reduction of industry support, especially following recent PBS changes.

5. Examples of Local Leadership

Despite the challenges, many local teams showcased progressive models worth celebrating:

- **Victoria:** A cohesive, multi-skilled team with strong internal training and mutual support. Their resistance to service creep and success in maintaining echo and pacing roles in the cath lab stood out.
- **Tasmania:** High voluntary registration rates and strong advocacy from local leaders have made Tasmania a national model in regulatory engagement, even while struggling with FTE shortages.
- **New South Wales:** Strong involvement in research, growing autonomy in remote device monitoring, and active advocacy in the current award reform process to address pay disparity and professional recognition.
- **Northern Territory:** Innovative service delivery across remote Aboriginal communities via outreach, despite having only a handful of physiologists to cover vast distances.
- **Queensland and SA:** Both are advancing career pathways through training frameworks and scope-of-practice projects, paving the way for future national credentialing models.
- **Western Australia:** A public workforce facing industrial action and role reclassification, with minimal industry reliance and active collaboration with the Department of Health to improve career structures and professional recognition.

6. The Path Forward

The meeting concluded with a unified call to action: build on the success of echo regulation to push for profession-wide recognition. This includes:

- Nationally standardised training and credentialing frameworks.
- Support for self-regulation.
- State and federal advocacy for award reform and pay parity.
- Stronger collaboration across states to share solutions and avoid duplication.

PICSA continues to drive these efforts and urges all professionals to register, join the association, and actively engage in advancing the profession. As Miriam noted in her closing, “We need to be excellent, be visible, and be united. The progress of echo helps pave the way for all of us—but we must lift each other up if we are to move forward together.”



Missed the meeting?
Scan the QR code to watch recording of meeting.



Reporting Diastolic Function in Special Populations: Interpretive Applications of the 2025 ASE Guidelines

One Echo Physiologist's Perspective in What the Updated Framework Offers in Practice

Sam Burgoyne, Advara HeartCare, WA

The topic of Diastolic assessment using echocardiography can make for interesting conversation among cardiac physiologists. Some people love it, some hate it, and some just find it downright confusing. From what I can gather among the cardiac physiologists in my network, there still seems to be differing views on how to interpret the guidelines, with lots of patients seeming to be lumped into the indeterminate grade. The ASE has just released new guidelines on assessing diastolic function, aiming to simplify and address the shortfalls of the 2016 ASE diastolic guidelines (from inclusion of new echo variables and epidemiological data). I thought I'd share how I've interpreted these new guidelines, specifically the special populations, and how I plan to document these interpretations in my echo reports.

First Steps

The first step I take (before I start scanning) is to look at the referral and think, could this patient have some degree of diastolic function, and is this something the referring doctor is querying? Some of the indications that get my brain thinking about diastolic function include any signs and symptoms of heart failure or HFpEF. As mentioned in the ASE guidelines, early symptoms of HFpEF include exertional dyspnoea, exercise intolerance, or fatigue. Having added risk factors, such as a history of obesity, hypertension, increased age, atrial fibrillation or diabetes, should raise your suspicions even more.

After this initial step, I then identify whether the patient fits in any of the excluded categories, or special populations. If they are a child, a normal pregnant woman, or a patient in an intraoperative setting, the ASE guidelines don't apply. If they have suboptimal image quality (2D, Doppler and / or Strain), the guidelines don't apply. If they have chronic atrial arrhythmia, mitral valve disease, anaemia, heart transplant (bi-atrial technique), hyperdynamic state, or athletic status, they may have left atrial enlargement, however, this left atrial enlargement in these cases may not be to do with diastolic dysfunction. If the 2D, Doppler or strain imaging is suboptimal, hence inaccurate, the guidelines don't apply. If they have valvular heart disease, heart transplant, pulmonary hypertension, atrioventricular block / bundle branch block / pacing, restrictive cardiomyopathy, hypertrophic cardiomyopathy, pericardial constriction, and/or AF, they are deemed a special population by the ASE guidelines and need differing assessment. Referring to Table 7 in the ASE document is helpful in providing information about what specific measurements are needed for each specific special population.

Consider - LA enlargement	• Chronic atrial arrhythmia • Mitral valve disease • Anaemia	• Heart transplant (bi-atrial technique) • Hyperdynamic state • Athletic status
Exclude	• Normal pregnant woman • Child	• Patient in intraoperative setting • Suboptimal image quality
Special Populations	• Valvular heart disease • Heart transplant • Pulmonary hypertension • AV block / Bundle Branch Block	• Restrictive cardiomyopathy • Hypertrophic cardiomyopathy • Pericardial constriction • Atrial fibrillation

Table 1: Summary of First Steps

Reporting Comments

These are some of the comments I now plan to use when reporting diastolic function in some of the specific populations (specifically LV filling pressures). I have come up with these from my interpretation of the specific special population recommendations mentioned in the ASE guidelines. For more detail regarding the actual measurements needed in special populations, refer to the 2025 ASE diastolic guidelines.

Valvular Heart Disease

Mitral Annular Calcification

In the context of mitral annular calcification, there is evidence of:

- normal LV filling pressure (normal E/A <0.8)
- elevated LV filling pressure (abnormal E/A >1.8)
- normal / elevated LV filling pressure (E/A $0.8 - 1.8$; normal IVRT >80 ms)

Mitral Regurgitation

In the context of mitral regurgitation, there is evidence of:

- normal LV filling pressure (IVRT >60 ms; Ar-A (<30 ms); IVRT/TE-e' ratio >5.6 ; E/e' <14 in rEF)
- elevated LV filling pressure (IVRT <60 ms; Ar-A (>30 ms); IVRT/TE-e' ratio <5.6 ; E/e' >14 in rEF)

Mitral Stenosis

In the context of mitral stenosis, there is evidence of:

- normal LV filling pressure (IVRT >60 ms; A vel <1.5 m/s; IVRT/TE-e' >4.2)
- elevated LV filling pressure (IVRT <60 ms; A vel >1.5 m/s; IVRT/TE-e' <4.2)

Aortic Regurgitation

In the context of aortic regurgitation, there is evidence of:

- normal LV filling pressure (LAVi <34 mL/m²; E/e' <14 ; LARS $>18\%$, TR Vmax <2.8 m/s)
- elevated LV filling pressure (LAVi >34 mL/m²; E/e' >14 ; LARS $<18\%$, TR Vmax >2.8 m/s)

Heart Transplant

In the context of heart transplant, there is evidence of:

- normal LV filling pressure (E/e' <7)
- elevated LV filling pressure (E/e' >14)
- normal / elevated LV filling pressure (E/e' between 7 - 14; normal SR_{IVR} <200 cm)
- normal / elevated LV filling pressure (no SR_{IVR}; normal TR Vmax <2.8 m/s)

Pulmonary Hypertension

In the context of moderate or severe pulmonary hypertension, there is evidence of:

- normal LV filling pressure (lateral E/e' <8)
- elevated LV filling pressure (lateral E/e' >13)
- indeterminate LV filling pressure (lateral E/e' 8-13)
- elevated PCWP when use combo of lateral E/e' with either mitral E/A ratio or LARS ($<16\%$)

Restrictive Cardiomyopathy

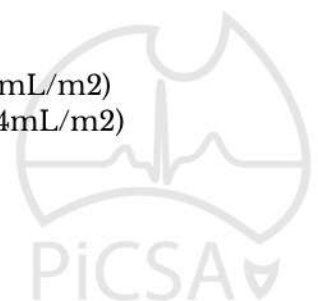
In the context of restrictive cardiomyopathy, there is evidence of:

- normal LV filling pressure (normal E/e' >14 ; DT >140 ms; E/A ratio <2.5 ; IVRT >50 ms)
- elevated LV filling pressure (E/e' >14 ; DT <140 ms; E/A ratio >2.5 ; IVRT <50 ms)

Hypertrophic Cardiomyopathy

In the context of hypertrophic cardiomyopathy, there is evidence of:

- normal LV filling pressure (E/e' <14 ; Ar-A <30 ms; TR Vmax <2.8 m/s; LAVi <34 mL/m²)
- elevated LV filling pressure (E/e' >14 ; Ar-A >30 ms; TR Vmax >2.8 m/s; LAVi >34 mL/m²)



Atrial Fibrillation

In the context of atrial fibrillation, there is evidence of:

- normal LV filling pressure (normal - DT >160 ms in rEF; Peak acceleration rate of mitral E velocity <1,900 cm/s²; IVRT >65 ms; DT of pulmonary venous diastolic Vmax >220ms; E/Vp ratio <1.4; Septal E/e' ratio <11; TR Vmax <2.8 m/s)
- elevated LV filling pressure (DT <160 ms in rEF; Peak acceleration rate of mitral E velocity >1,900 cm/s²; IVRT <65 ms; DT of pulmonary venous diastolic Vmax <220ms; E/Vp ratio >1.4; Septal E/e' ratio >11; TR Vmax >2.8 m/s)

Sinus Tachycardia

In the context of sinus tachycardia, there is evidence of:

- possible elevated LV filling pressure (IVRT <70ms; PV systolic filling fraction <40%; E/e' ratio > 14
- indeterminate diastolic function due to partially or completely fused E and A

Hopefully these examples help you with your reporting and understanding of diastolic function. It is a complex topic to measure, assess and report, so I'd highly encourage you to have conversations at your workplace about this to ensure you're on the same page as everyone in the team.

Reference:

Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography and for Heart Failure With Preserved Ejection Fraction Diagnosis: An Update From the American Society of Echocardiography. Nagueh, Sherif F. et al. Journal of the American Society of Echocardiography, Volume 38, Issue 7, 537 - 569



Rheumatic Heart Disease

Alex Kaethner, Strong Hearts, NT

Acute Rheumatic Fever (ARF) and Rheumatic Heart Disease (RHD) remain a public health crisis in Australia, New Zealand, and beyond. The causes of ARF/RHD are multifactorial and deserve a discussion much larger than this article is going to offer. These causes include socioeconomic inequities, inadequate housing, living conditions, and sub-optimal access to effective and culturally responsive health care. So, while we, as cardiac physiologists, have a huge role to play, we should remember that our ultrasound probe alone is not going to solve this issue. Being aware and raising awareness of this disease of disparity increasingly seems as important as detecting it.

This article aims to give a brief overview of the tools we have as cardiac physiologists in understanding and accurately diagnosing RHD. It will then offer some tips on how to use the guidelines and tools we have at hand to provide the best images and reports possible.

WHF Echo Guidelines Updates

In November 2023 the World Heart Federation (WHF) unveiled its updated echocardiographic guidelines published in Nature Reviews Cardiology ([link here- Nature article](#)). These guidelines define the minimum echocardiographic criteria needed to diagnose RHD- focusing on regurgitant jets and valve morphology. They also introduce a two-step diagnostic approach: screening criteria for non-experts in active case-finding contexts and confirmatory criteria for expert use to establish a definitive diagnosis.

They also present an updated, stage-based classification system stratifying RHD by risk of progression to advanced valvular disease (Stage A, B, C, and D) and incorporate weight-based measurements for regurgitation jet length, enhancing diagnostic precision.

Additionally, the guidelines offer recommendations for managing early-stage RHD and support task-sharing using handheld echocardiography and broader implementation in resource-constrained, RHD-endemic regions.

Australian ARF/RHD Guidelines Updates

In mid-2025, the 3rd edition of the Australian Guidelines for the Prevention, Diagnosis, and Management of Acute Rheumatic Fever and Rheumatic Heart Disease (ARF/RHD) was released by the Menzies School of Health Research in collaboration with the Heart Foundation of Australia ([link here – ARF and RHD Guideline](#)). This update aligns Australia with the WHF echo diagnostic criteria, enhancing echocardiographic accuracy and promoting earlier detection and grading of RHD severity. Importantly, the guideline embeds a cultural safety framework, emphasizing the inclusion of First Nations peoples at the centre of care—recognising the disproportionate burden of ARF and RHD within these communities—and aiming to address health inequities through culturally appropriate practices.

It covers all essential domains of ARF/RHD care—including primordial, primary, and secondary prevention, diagnosis, management, secondary prophylaxis, screening, care for women and girls, and the use of new technologies.



ASE RHD Guidelines

The American Society of Echocardiography (ASE) published the “Recommendations for the Use of Echocardiography in the Evaluation of Rheumatic Heart Disease” in January 2023 ([link here – ASE Evaluation of RHD](#)). This guideline underscores the critical role of echocardiography throughout the diagnostic and management continuum of RHD. The guidelines affirm that key structural indicators alongside comprehensive hemodynamic assessment, including evaluation of valve severity, chamber changes, and pulmonary artery pressures are key to accurate RHD assessment. The document additionally promotes the use of advanced imaging modalities—like 3D echocardiography and multiplanar 2D imaging—for enhanced anatomical and functional characterization.

So, we have a strong framework to help us when scanning and reporting the echos we perform on people with ARF & RHD, or suspected disease. But these documents, as good as they are, don't hold the probe, optimize the images, or write the reports for us. From experience in performing and viewing RHD echos across Australia and overseas, there are a few stand out tips and tricks to emphasis and share. These are not necessarily new concepts and indeed are things that we should be focused on in our scanning every day. In the setting of early ARF and RHD however, our images and reports play a big part in the decision on whether a child receives many years of penicillin or not. So being accurate and thorough is never more important.

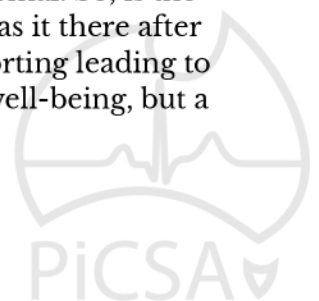
Reporting RHD

How we report RHD echos is just as important as the images themselves. This is equally true for reporting initial scans that can lead to a new diagnosis as it is for follow-up scans.

It is vital to describe the morphological findings accurately. The classic ‘thickened, mobile mitral valve leaflets’ is not good enough in the RHD setting. The WHF guidelines use terms like ‘anterior leaflet thickening’ or ‘excessive anterior leaflet tip motion during systole’. Specific departmental report terminology is, of course, something that should be decided upon by your department, but the more descriptive we can be when describing valve morphology, the better.

Being accurate and specific is also important when describing the amount of regurgitation present. This point is aimed at paediatric scans in the early stages of the disease. We have some cut-off lengths to use from the guidelines, so let's use them! For mitral regurgitation, for children under 30kg, the MR jet length cut-off is 1.5cm and 2.0cm for children over 30kg, so let's put that in the report. In this setting, the term ‘trivial mitral regurgitation’ is not actually very useful. It is possible to see ‘trivial mitral regurgitation’ in a child with no RHD. It is also possible to describe the mitral regurgitation as trivial in echo findings suggestive of Stage A RHD (and even Stage B RHD). So, let's get specific with jet lengths in early, or suspected RHD in children.

We stumble across situations like the following all too often. An ARF follow-up scan is performed on a 10-year-old. An initial echo was performed six months previously when the patient presented with polyarthralgia. The echo at the time was reported as normal, with trivial mitral regurgitation – no further details given. You now scan the patient six months later and in conversation they describe further joint pain. Now you see mitral regurgitation with an MR jet length of 2.3cm and a CW Doppler profile that meets criteria. In both echos, the valve morphology is normal. So, is the mitral regurgitation worse now and representative of the current symptoms? Or was it there after the first episode and reported sub-optimally? The worst case here is incorrect reporting leading to an increased risk of RHD progression. The best case is no impact on the patient's well-being, but a sonographer that is left looking sloppy. Either way, it is a situation to be avoided!



Imaging RHD

As with any time we perform an echo, 2D optimization is vital. The two usual suspects – 2D gain and frequency – can play a big role in the diagnosis, or misdiagnosis, of RHD. Flash your mind back to the WHF guidelines and recall that we are talking very small margins (millimetres) when deciding upon valve thickness. So, an image that is over-gained, or has suboptimal frequency setting (particularly in small children), has a high chance of incorrectly assessing the valve thickness. The requirement to switch off harmonic imaging has been removed from the guidelines. So now, more than ever, it is up to us to optimise well.

It should go without saying that our colour gain and frequency settings should be optimized. Colour gain that is too high or colour scale that is set too low can lead to overcalling the regurgitant jet length. And, of course, we can under call regurgitant jets with the reverse. These may seem simple but can be overlooked, especially in large volume, high-temperature screening type settings.

Don't forget the tricuspid valve. Too often we see tricuspid regurgitation assumed to be associated with significant left heart lesions – which, of course they often are. However, do not forget that the tricuspid valve leaflets themselves are also susceptible to RHD changes. So, make sure we give the tricuspid valve leaflets a thorough assessment as well. Moderate to severe tricuspid regurgitation is less likely to disappear post mitral valve surgery if the tricuspid valve itself is rheumatic.

Beware the eccentric mitral regurgitation! Often in early RHD we see very eccentric, posteriorly directed mitral regurgitation wrapping around the left atrium. With excessive anterior leaflet motion, the anterior leaflet closes behind the posterior leaflet causing this eccentric mitral regurgitation. This can be missed and requires thorough assessment with both probe manipulation ('sweeping' or 'panning') through the valve, as well as multi-view assessment (PLAX/PSAX/Apical) to ensure we provide a full and accurate interrogation.

Summary

So as always, let's continue to play a role in the journey of the patients we scan with compassion and understanding. For us it may be another scan on a long day, but for the patient it is a big experience, and might be a life altering moment. We owe it, not just to ourselves or our employers to excel, but to the patients who we are sitting alongside.

Join the ACCP to Elevate Your Career & Legitimise Your Profession

Accreditation and registration are essential for all Cardiac Physiologists, not just those specialising in Echo. If you work in Echo, your accreditation registry is the ASAR. However, if your expertise lies in ECG (non-invasive), Cath Lab, Cardiac Devices, and/or Electrophysiology, the Australian Council for Clinical Physiologists (ACCP) offers you similar recognition.

The ACCP is a mark of professionalism and helps establish national standards. By registering with the ACCP, you enhance your professional status and gain recognition from employers, patients, and professional bodies. Additionally, you can add the post-nominal "ACP – Cardiac" to your credentials.

The ACCP membership year aligns with the financial year. Visit the Australian Council for Clinical Physiologists website at <https://theaccp.org.au/> to learn more.

Supporting ACCP registration helps to improve patient safety and advances our profession as a whole. Together, let's elevate Cardiac Physiology to new heights.



CEPIA EGM series # 13

Rethinking of an Old Method

By Harley Cross (BAppSc (HMS), Grad Dip Cardiac EP, CEPIA)

Entrainment is the cornerstone of all good EP. It should always be used in conjunction with 3D activation mapping to help locate the critical isthmus of re-entrant tachycardia mechanisms such as scar VT and atrial flutters. Entrainment concepts can also be demonstrated in paroxysmal SVTs such as AVRT. Entrainment is a complex and fascinating topic, and one could spend an entire day discussing the nuances and findings of entrainment. Unfortunately, we do not have that luxury.

In a nutshell, entrainment is the continual termination and resetting of a tachycardia circuit by pacing at a faster pacing rate with the goal to accelerate the tachycardia to the pacing cycle length. This is commonly performed using fixed burst pacing 20-40ms faster than the tachycardia cycle length, however, occasionally we can demonstrate entrainment using a programmed extra stimulus beat (PES). Using a single PES may be a more favourable approach, especially if you perceive the risk of terminating the tachycardia with fixed burst pacing. Figure 1 below illustrates a single PES introduced during typical counter-clockwise atrial flutter in the lateral right atrium (Halo 3-4 marked red).



Figure 1: Counter-clockwise typical AFL. The Halo catheter is positioned around the tricuspid annulus while the CS catheter is positioned in the coronary sinus. A single paced beat is delivered from Halo 3-4 which accelerates the tachycardia (best seen in the CS catheter). The PPI = 366ms and the TCL = 294ms.

Before we move on, we must first touch on the post pacing interval – tachycardia cycle length (PPI – TCL). It is not the same as entrainment but could be thought of as the other side of the same coin. By using the principles of entrainment (manifest fusion, progressive fusion and concealed entrainment) and the PPI – TCL one can get an accurate sense of where the circuit is located and whether your catheter is within the critical isthmus. This is easier to demonstrate in the ventricle using the QRS complex rather than the P wave morphology for obvious reasons.

If entrainment pacing takes place from within the tachycardia circuit the PPI – TCL should be 0ms (we often allow up to 30ms in the real world). A schematic representation of PPI – TCL in and out of circuit can be seen in Figure 2. If pacing from a distant site, the time taken for the wavefront to enter the circuit and return back to the pacing catheter adds to the PPI. The further away from the circuit the longer the PPI.

We know that typical AFL requires the CTI to perpetuate, and the wavefront propagates around the tricuspid annulus. As such Halo 3-4 should be in the circuit, yet our PPI-TCL is 72ms. A long way from 0-30ms. How is this possible?

To answer this question, we need to approach how we measure the post pacing interval differently. Traditionally the PPI is measured on the same catheter from the last paced beat to the first return electrogram. In Figure 1 we can see that there is a change in the Halo pattern following the PES, this is due to antidromic activation of Halo 5-6 through to Halo 11-12. This wavefront terminates the tachycardia. However, the PES also causes downstream activation and acceleration of Halo 19-20 through to Halo 13-14 (resetting). Downstream activation in itself confirms re-entry. Figure 3 below depicts a schematic illustration of the antidromic wavefront and downstream activation.

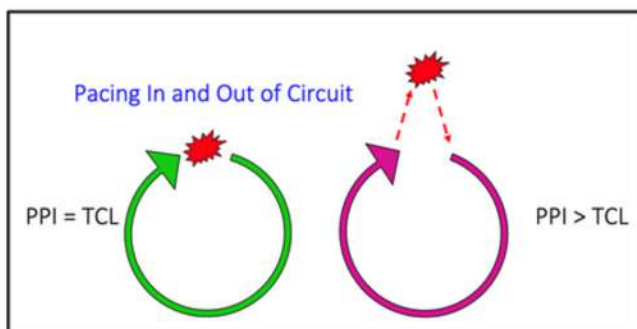


Figure 2: If pacing from within the tachycardia circuit the time taken for the last paced wavefront to circumvent the circuit and return to the pacing catheter will result in $PPI = TCL$. Pacing distant to the circuit results in $PPI > TCL$ because of the time taken to enter the circuit, circumvent the circuit and then return to the pacing catheter.

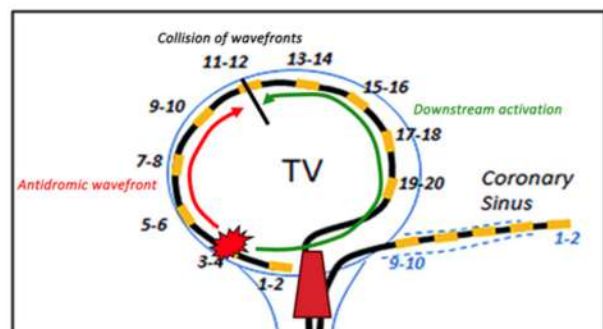


Figure 3: Pacing from Halo 3-4 during typical AFL. The red arrow represents antidromic activation of the lateral RA, the green arrow represents downstream activation of the remaining electrodes on the Halo catheter.

In order to obtain the more accurate PPI in this scenario we need to consider the effect the antidromic activation of the lateral RA has on tissue refractory. The lateral RA is still partially refractory by the time the orthodromic wavefront arrives having already propagated up the interatrial septum, over the roof of the RA before descending down the lateral RA. To overcome tissue latency, we need adjust the onset of our PPI measurement from Halo 3-4 to the point of last antidromic activation (Halo 11-12). The end of the PPI is still Halo 3-4. By doing this we can see that the corrected PPI - TCL is 4ms as seen in Figure 4. This new measurement accounts for the entire circuit (antidromic wavefront and accelerated wavefront) that travels around the tricuspid annulus while mitigating tissue refractory caused from the antidromic wavefront.

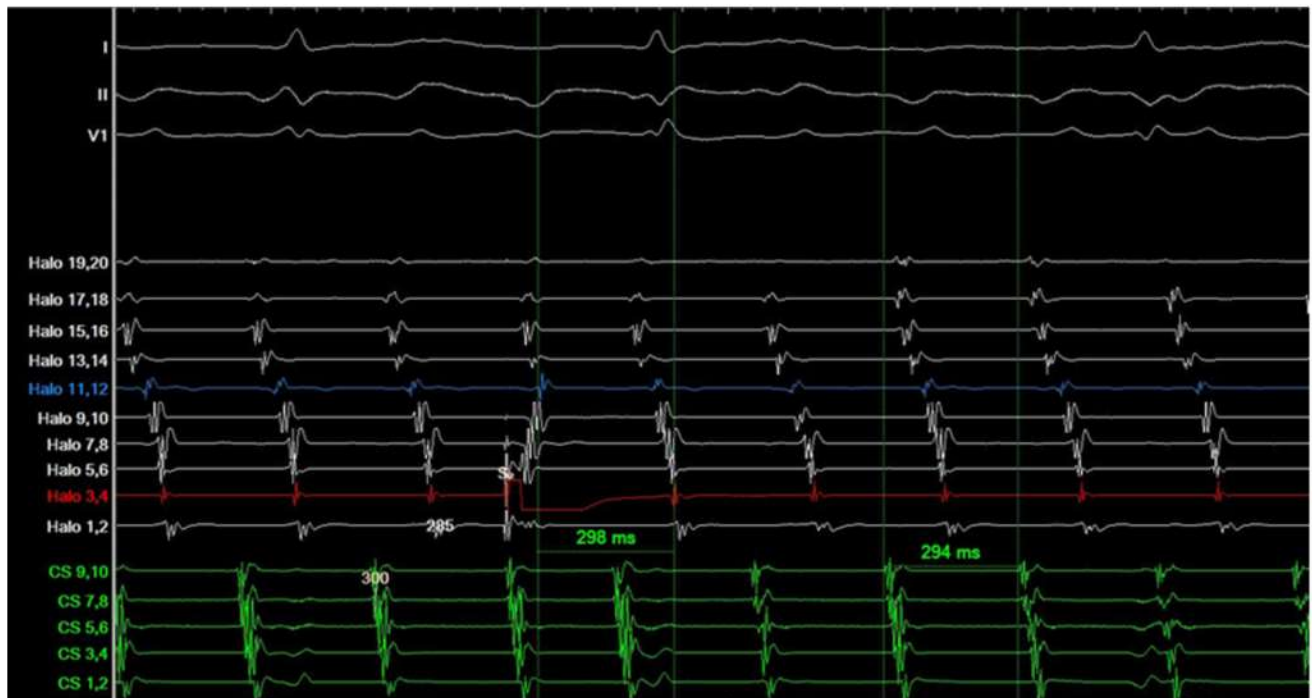
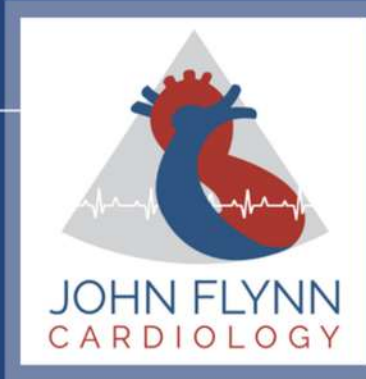


Figure 4: Corrected PPI from the point of wavefront collision (Halo 11-12) to Halo 3-4 now shows a PPI – TCL of 4ms. This new measurement accounts for the entire circuit while mitigating the effect of tissue refractory from the antidromic wavefront.

This finding was reproducible at different PES coupling intervals and the corrected PPI was always <5ms. This highlights a novel approach to a tried-and-true technique to traditional fixed burst pacing that may result in termination of the clinical tachycardia.

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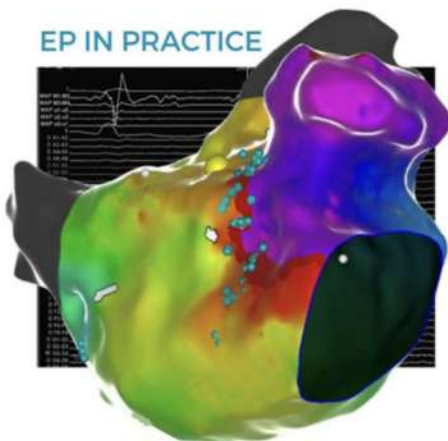
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Newsletter Article Submission deadlines

*Submissions are due on the 4th Sunday of the
2nd month of each season*

Spring 2025 Sunday 26th of October 2025

Summer 2026 Sunday 25th of January 2026

*Authors can claim CPD points for contributing to this newsletter.
Submissions should be emailed to secretary@picsa.org.au*



Boosting Visibility: Small Actions with Big Impact for all Cardiac Physiologists

One simple yet impactful way to boost the visibility, recognition, and regulation of the Cardiac Physiology profession is to proudly introduce ourselves using the recommended title: “**Cardiac Physiologist**.” Regardless of whether your employer has updated your award or statement of duties, this small action can have a big impact.

When we introduce ourselves correctly, we not only educate those around us about our professional identity but also build trust and understanding with our patients. It’s a simple phrase—“**Hello, my name is ..., and I am a Cardiac Physiologist**”—but it carries immense power to advance our profession.

Looking for other ways to increase visibility? Consider these ideas:

- **Display your title:** Add “Cardiac Physiologist” to your name badge, your email signature, and your business cards.
- **Be a role model:** Encourage colleagues to use the correct title, showing solidarity and professionalism. It’s ok to be more specific (e.g., “Cath Lab Physiologist”)
- **Engage on social media:** Post about your work using #CardiacPhysiologist to connect with peers and raise awareness. You can also use **both** #EchoPhysiologist and #CardiacSonographer if applicable.
- **Share your expertise:** Offer to speak at community events, webinars, or conferences to highlight our role in healthcare.
- **Collaborate across teams:** Use multidisciplinary meetings as an opportunity to clarify and promote the Cardiac Physiologist title.

More information can be found in on this page located on our website

<https://picsa.org.au/about/#core-documents>



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Proposed 2025 PiCSA Education Calendar

January	- ECG
February	- Echo
March	- Cath Lab
April	- EP + Pacing
May	- Trivia Night
June	- Professional Issues
July	- Devices
August	- ECG
September	- Echo
October	- Cath Lab
November	- EP + Pacing

Call for Volunteers!

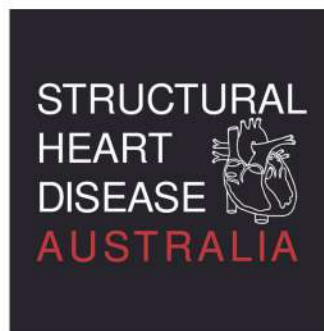
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Interested? Get in touch!

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