ARENA
Australasian Registry of ECGs in National Athletes

Annual report 2026

November 2023 to November 2026

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In its first reporting period, ARENA brought together the screening records of 8,676 elite athletes from 54 sports, with the endorsement of the Australasian College of Sport & Exercise Physicians and Sports Medicine Australia.

8,676
athletes in the registry

54
sports represented

44%
female athletes

Registry figures as at 4 November 2026

Led by the University of Sydney · Hosted by the SAHMRI Registry Centre

arena.study@sydney.edu.au · ARENA website

Highlights, 2023 to 2026

In its first three years, ARENA has informed international ECG criteria, secured national funding to 2032 and been recognised in national recommendations.

2025 International Criteria	Two ARENA papers informed the updated criteria, including our study of female athletes, which shaped the new approach to anterior T-wave inversion. Several ARENA investigators were members of the IC25 steering committee and writing group. The criteria have been accepted in the *British Journal of Sports Medicine*.
Funding secured to 2032	ARENA is funded by the National Health and Medical Research Council through the Director's Investigator Grants, with an Emerging Leadership 2 grant awarded in 2026 extending funding to 2032.
Female athletes' ECGs	Our study of 4,423 athletes found isolated anterior T-wave inversion was more common in female and endurance athletes, and was not associated with cardiac disease.
International attention	The study was the subject of an invited editorial in the *Journal of the American Heart Association*, won the CSANZ Allied Health and Technology Prize in 2025, and has been cited 12 times (as at November 2026).
Qualified privilege	ARENA was declared a Commonwealth quality assurance activity in August 2025, protecting the confidentiality of athletes and clinicians.
National recognition	The ACSEP Cardiac Screening Position Statement 2024 welcomes ARENA, ARENA is listed on the Australian Register of Clinical Registries, and several national sports have written ARENA into their screening policies.
International coding	ARENA led to new cardiology codes in the Orchard Sports Injury and Illness Classification System, which is used by the IOC and FIFA.

Welcome from the Director

Welcome to the first annual report of the Australasian Registry of ECGs in National Athletes (ARENA).

Cardiac screening of elite athletes is recommended by most Australasian sporting organisations, and many of our national sports screen their athletes with a 12-lead ECG. However, until ARENA, these results were held separately by each sport and were not structured to be shared. Screening programs must be based on the best available evidence, and there are important gaps in that evidence, particularly for female athletes. ARENA was established to help fill those gaps, and builds on nine years of cardiac screening research with Australian and New Zealand sports.

Since ARENA launched in November 2023, we have received ethics approval and qualified privilege, established the registry with the SAHMRI Registry Centre, and collected screening records from 8,676 athletes across 54 sports. Our team has published two peer-reviewed papers, with a third accepted, and ARENA findings informed the 2025 International Criteria for ECG interpretation in athletes. These criteria may reduce the number of athletes who need further testing after a screening ECG.

I would like to thank the chief medical officers, team doctors and athletes who have shared their data with us, and our partners at SAHMRI, the Australasian College of Sport & Exercise Physicians and Sports Medicine Australia. Thank you for your generous support. We look forward to welcoming more sports to ARENA in the coming year.

Associate Professor Jessica Orchard

Director and Chief Investigator, ARENA

About ARENA

ARENA is a long-term registry of cardiac screening results and outcomes from elite athletes. It is led by the University of Sydney and hosted by the SAHMRI Registry Centre. It launched in Australia in November 2023, and every elite sport in Australia that screens athletes with an ECG is eligible to join.

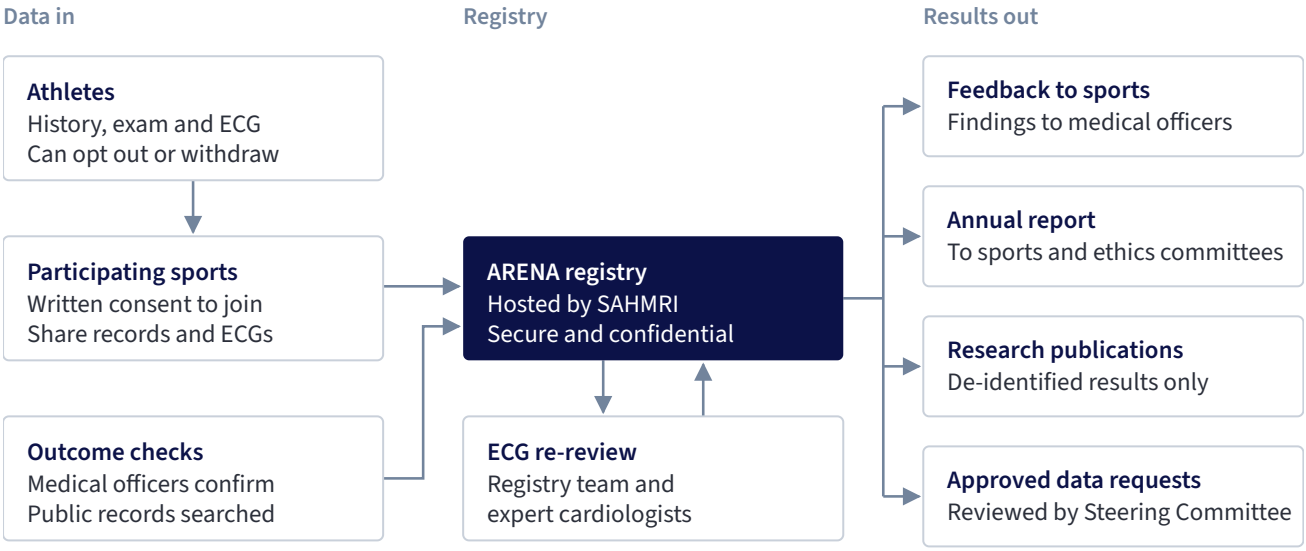
Our aims

ARENA aims to improve understanding of:

- how often conditions associated with sudden cardiac death are diagnosed in screened athletes
- how age, sex and other group characteristics affect accurate ECG interpretation, with a focus on female athletes
- the normal limits of the athlete's heart across sports, to set benchmarks for ECG interpretation
- major cardiovascular outcomes in screened athletes

How ARENA works

Participating sports share their athletes' cardiac screening records with ARENA. The registry team re-reviews every ECG against current international criteria, and sports cardiology experts review every abnormal ECG and cardiac diagnosis. Athletes can opt out or withdraw at any time, and are never identifiable in published results.



Who is in the registry

ARENA holds cardiac screening records of elite and professional athletes from 54 sports, including summer and winter Olympic and Paralympic sports, Commonwealth Games sports, Australian football, cricket and football (soccer).

Athletes	8,676
Female athletes	44%

Following athletes over time

Athletes are followed over time for cardiac diagnoses and major cardiac events. Outcomes are confirmed with each sport's Chief Medical Officer and through searches of public records.

Our first major analysis of outcomes in screened athletes is under way, and results will be reported first in a peer-reviewed publication.

Governance

ARENA is overseen by a Steering Committee and a working group. Both operate under terms of reference approved by their members. ARENA joined the SAHMRI Registry Centre in 2023, and the Director represents ARENA on the Registry Centre Advisory Group. A multidisciplinary investigator team supports them, with expertise in sports cardiology, sports medicine, genetic cardiology, cardiac imaging and epidemiology.

The Steering Committee also reviews every application for registry data. Applicants must provide study details, funding and ethics approval, and agree to secure data storage and the registry's authorship and publication requirements.

Who leads ARENA

Group	Members	Role
Director and Chief Investigator	A/Prof Jessica Orchard	Leads the registry
Investigators and clinical advisors	Prof Andre La Gerche, sports cardiologist and imaging specialist A/Prof Hari Raju, cardiologist and electrophysiologist Prof Rajesh Puranik, cardiologist and cardiac MRI expert Dr Simon Eggleton, cardiologist and imaging expert Mr Angus Davis, PhD candidate and cardiac nurse Dr Bruce Hamilton (NZ), sports physician Prof Rob Doughty (NZ), cardiologist Prof Jonathan Drezner (USA), sports physician and registry expert Prof John Orchard, sports physician	ECG review, clinical advice and analysis
SAHMRI Registry Centre	Data managers, registry managers and biostatisticians	Builds and hosts the registry; statistical analysis

Key dates

Nov 2023	ARENA launched in Australia, hosted by the SAHMRI Registry Centre
2024	Welcomed in the ACSEP Cardiac Screening Position Statement
Aug 2024	Protocol published in the *Journal of the American Heart Association*
End of 2024	First year: 4 national sporting organisations and more than 2,000 athlete screenings
Aug 2025	Declared a Commonwealth quality assurance activity (qualified privilege)
Sep 2025	First results paper published in the *Journal of the American Heart Association*
Nov 2025	Data received from the Australian Institute of Sport
Nov 2026	2025 International Criteria and our comparison of the 2017 and 2025 criteria accepted in the *British Journal of Sports Medicine*
Nov 2026	8,676 athletes from 54 sports in the registry

Endorsement, approvals and privacy

Endorsed by the Australasian College of Sport & Exercise Physicians

ARENA's protocol was developed with sporting bodies, team doctors and players' association representatives. It is endorsed by the Australasian College of Sport & Exercise Physicians (ACSEP) and Sports Medicine Australia. The ACSEP Position Statement on Pre-Participation Cardiac Evaluation in Young Athletes (2024) recommends that elite athletes have a focused history, examination and 12-lead ECG every two years from age 16 to 25. It also specifically encourages every sporting organisation with a screening program to pool its data and contribute to ARENA.

Approvals and funding

Item	Detail
University of Sydney Human Research Ethics Committee	Project No. 2023/551
Australian Institute of Sport Ethics Committee	Approval No. 20240601
Qualified privilege	Declared Commonwealth quality assurance activity under Part VC of the *Health Insurance Act 1973* (Cth), August 2025, for five years (renewable)
National registry listing	Australian Register of Clinical Registries (ACSQHC-ARCR-435)
Funding	NHMRC Investigator Grants: Emerging Leadership 1 (2023-2027) and Emerging Leadership 2 (2028-2032)

Qualified privilege and privacy

ARENA is a declared Commonwealth quality assurance activity under Part VC of the *Health Insurance Act 1973* (Cth). This legislative protection, known as qualified privilege, aims to encourage clinicians and organisations to take part in quality improvement activities. It:

- prohibits disclosure of information or documents created or known solely as a result of ARENA's activities, including to a court
- protects clinicians acting in good faith from civil liability as a result of taking part in ARENA
- protects the confidentiality of the athletes and clinicians involved

Athlete records are held securely by the SAHMRI Registry Centre. Only de-identified data are used for research, and athletes are never identifiable in published results. Information statements for athletes and sports, with full details, are on the ARENA website.

Research outputs

ARENA has three peer-reviewed papers (two published and one accepted), and one more in preparation.

Year	Output	Where	Status
2026	Electrocardiogram interpretation in athletes: comparison of the 2017 and updated 2025 International Criteria in a large dataset of elite athletes	*British Journal of Sports Medicine*	Accepted
2026	International Criteria (IC25) for ECG interpretation in athletes, co-authored by ARENA investigators	*British Journal of Sports Medicine*	Accepted
2026	ECG screening findings in an elite national football draft cohort, and the effect of the 2025 criteria	Manuscript	In preparation
2025	Isolated anterior T-wave inversion in elite athletes: prevalence and clinical relevance by sex and sporting discipline	*Journal of the American Heart Association*	Published
2024	Rationale and design of the Australasian Registry of Screening ECGs in National Athletes project	*Journal of the American Heart Association*	Published

The 2025 paper found that isolated anterior T-wave inversion (TWI) in leads V2-V3 was about four times more common in female athletes and five times more common in endurance athletes, and was not associated with cardiac disease. It was one of the key studies informing the updated approach to anterior TWI in female athletes in the 2025 International Criteria (IC25), and several ARENA investigators were members of the IC25 steering committee and writing group.

23
presentations since launch

9
international presentations

5
countries

ARENA research has been presented at meetings including a keynote at the ACSEP and Sports Medicine New Zealand conference (2023), invited talks at the 2025 International Summit on ECG Interpretation in Athletes in Seattle, ESC Congress 2026 and the APHRS Scientific Session 2026. Our team has also presented to the medical staff and athlete committees of national sports, including the Australian Institute of Sport and Cricket Australia.

Looking ahead

In the coming year, ARENA's focus is on:

- **Growing the registry:** welcoming more sports and continuing to add new screenings
- **Supporting sports:** continuing quality improvement work and confidential feedback for participating sports
- **Outcomes:** continuing to follow athletes over time, with our first major outcomes analysis under way
- **Under-represented athletes:** building the evidence on female and Paralympic athletes, who are under-represented in the research behind current ECG interpretation criteria
- **Current studies:** progressing our study of premature ventricular contractions in athletes
- **International collaboration:** working towards linking ARENA with the international ORCCA athlete outcomes registry

Acknowledgements

- **Athletes**, whose screening results are the foundation of the registry.
- **Participating sports**: the Chief Medical Officers, team doctors and medical staff who share their records and help confirm diagnoses and outcomes.
- **The Australasian College of Sport & Exercise Physicians and Sports Medicine Australia**, for endorsing ARENA and encouraging sports to take part.
- **Players' associations**, for reviewing the protocol, with particular thanks to Tim Cruickshank and Dr Georgia Redmayne.
- **The SAHMRI Registry Centre**, for planning, designing, building and hosting the registry, statistical analysis and registry management, with particular thanks to Courtney Cullen, Tamara Hooper, Michelle Lorimer and Cindy Turner.
- **The Steering Committee and working group**, and our consumer and athlete representatives, for their oversight and advice.
- **Our investigators and ECG reviewers**, including Dr Emma Buckthorpe and Kristin Thornton, for their time and expertise.
- **The National Health and Medical Research Council**, for funding ARENA through Investigator Grants 2016730 and 2050640.

Join or support ARENA

Any elite sport that screens athletes with an ECG can join ARENA. Sports that join receive:

- a second review of their athletes' ECGs and a check on completeness of follow-up
- on request, a confidential summary of their own screening results
- the opportunity to review draft publications involving their organisation
- the protections of qualified privilege

Medical staff may be eligible for continuing professional development points for taking part in clinical audit. Sports can register, and organisations can partner with or support ARENA, through the ARENA website.

Contact

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