



## RACP Foundation Research Awards

### YEAR 1 PROGRESS REPORT

<b>Project / Program Title</b>	Optimizing the genetic and forensic analysis of sudden cardiac death in young and middle-aged Australians	
<b>Name</b>	Dr Elizabeth Paratz	
<b>Award Received</b>	2019 RACP NHMRC J J Billings Scholarship	
<b>Report Date</b>	16 April 2020	
<b>Chief Investigator / Supervisor</b>	A/Prof Andre La Gerche	
<b>Administering Institution</b>	University of Melbourne	
<b>Funding Period</b>	Start Date:	1 January 2019
	Finish Date:	1 January 2022

#### PROJECT SUMMARY

**Background:** Approximately one thousand Victorians aged under fifty years old experience sudden cardiac arrest each year, resulting in death in approximately ninety percent of cases. There is currently no systematic multi-source case collection process to inform epidemiological monitoring or centralize best-practice care.

**Methods:** My PhD will primarily encompass constructing Australia's first comprehensive sudden cardiac death registry (the Unexplained Cardiac Death Project), enrolling all cases of sudden cardiac arrest/ death (SCA/D) in patients aged 1-50 years old in Victoria.

**Results:** Registry findings will generate novel insights into SCA/D causes, identifying variations in clinical care and outcomes. Family screening will be offered to all first-degree relatives of SCA/D patients.

**Conclusion:** Construction of the Unexplained Cardiac Death Project is anticipated to drive improved epidemiological understanding of SCA/D in Australia, and improved clinical outcomes.

#### PROJECT AIMS / OBJECTIVES

**Aim 1.** To provide the most accurate and contemporary description of the incidence of SCA/D in young and middle-aged Australians.

**Progress:** The Unexplained Cardiac Death Project Registry will be the most practical integrated registry design to capture the true rates of SCA/D in Victoria, Australia.

**Aim 2.** To define risk factors and outcomes for SCA/D in young and middle-aged Australians, including pre-defined special interest populations.

**Progress:** Special-interest populations such as pilots, females, rural and indigenous patients will have differing risk factors for cardiac arrest and differing clinical management and outcomes compared to the broader published experience.

**Aim 3.** To evaluate novel methods of forensic cardiac imaging to assist in post-mortem diagnosis of cause of sudden cardiac death.

**Progress:** Novel methods of forensic cardiac imaging such as post-mortem coronary artery calcium scores are under investigation, with projects already completed and published.

## SIGNIFICANCE AND OUTCOMES

### Significance

The research generated from this PhD will inform epidemiological understanding of the current burden of sudden cardiac death, informing healthcare allocation and economic priorities. Improving forensic and clinical evaluation will also assist rates of determining a diagnosis in cases of unexplained sudden cardiac death – this is of high clinical benefit to grieving families and assists in risk stratification for surviving family members.

Construction of the Unexplained Cardiac Death Project will create an ongoing highly valuable clinical resource and support further research.

Planned future research:

- I. Impact of 2020 Australian bushfires on rates of cardiac arrest and outcomes in regional Victoria
- II. Impact of COVID-19 pandemic on patterns of ambulance attendance for out of hospital cardiac arrest, management and clinical outcomes.

## PUBLICATIONS / PRESENTATIONS

### Publications

1. Paratz ED, Rowsell L, Zentner D, Parsons S, Morgan N, Thompson T, James P, Pflaumer A, Semsarian C, Smith K, Stub D, La Gerche A. Cardiac arrest and sudden cardiac death registries: systematic review of global coverage and data capture strategies. *Open Heart* 2020.
2. Paratz ED, Costello B, Rowsell L, Morgan N, Smith K, Thompson T, Semsarian C, Pflaumer A, James P, Stub D, La Gerche A, Zentner D, Parsons S. Coronary artery calcium score in a post-mortem population: feasibility and utility. **Submitted to European Journal of Preventive Cardiology.**

Papers in progress:

- I. Financial impact of sudden cardiac death and economic benefits of a clinical quality registry

**Brief overview:** Economic modelling of impact of cardiac death in terms of loss of productivity-adjusted life years. Assessment of impact of improving chain of survival by 5% improvement in outcomes and economic benefits.

**Current status:** Currently undertaking economic modelling and write-up.

- II. Clinical differences between survivors and non-survivors of out of hospital cardiac arrest

**Brief overview:** Comparison of patients enrolled in the UCDP registry in terms of any measurable differences between patients who die of their cardiac arrest versus those who survive. Variables assessed will be location of cardiac arrest (public vs private residence and rural

vs metropolitan), early defibrillation, bystander CPR provided, aetiology of cardiac arrest, age, and gender.

### III. Utility of family screening in all-cause cardiac death in young Australians

**Brief overview:** The role of family screening in unascertained cardiac death has been well-described. However, the yield of comprehensive family screening in all cases of sudden cardiac death in patients under 50 years old has not previously been described. We will describe the yield and health impact of family screening.

#### Conference Presentations

1. Paratz ED, Costello B, Rowsell L, Morgan N, Smith K, Thompson T, Semsarian C, Pflaumer A, James P, Stub D, La Gerche A, Zentner D, Parsons S. Coronary artery calcium score in a post-mortem population: feasibility and utility. Oral presentation 2019; Cardiac Society of Australia & New Zealand Conference, Adelaide, Australia. [Ralph Reader Prize Presentation]
2. Paratz ED, Rowsell L, Zentner D, Parsons S, Morgan N, Thompson T, James P, Pflaumer A, Semsarian C, Smith K, Stub D, La Gerche A. Cardiac arrest and sudden cardiac death registries: systematic review of global coverage and data capture strategies. Poster presentation. 2019; Cardiac Society of Australia & New Zealand Conference, Adelaide, Australia.

#### **ACKNOWLEDGEMENTS**

The support of the RACP JJ Billings Scholarship has been acknowledged in all published work to date and will continue to be acknowledged in current projects in progress.