

Spring 2023

GP Connect

Supporting best practice in cardio-metabolic health



From the editor – Dr Gunjan Aggarwal

Specialising in general adult cardiology and non-invasive cardiac imaging, particularly echocardiography and cardiac computed tomography (CT).

Welcome to the spring edition of GP Connect 2023. This issue provides updates on pulse field ablation, testosterone replacement therapy and nutraceuticals.

Dr Bill Petrellis provides updates on a new technological breakthrough in the field of electrophysiology. He discusses the utility of pulsed field ablation as a novel method of cardiac ablation.

There are also updates on the safety of testosterone replacement therapy and the role of nutraceuticals like red yeast rice in the management of hypercholesterolemia.

In other news, our Sydney Cardiology CBD clinic location has moved a few doors down. We are still providing the same cardiac expertise, conveniently located near Wynyard station. The room can still be contacted by the current CBD clinic number and is operational now.

I hope you enjoy this edition of GP Connect. We remain available as always to provide continued care to you and your patients in any way possible.

Thank you for your continued support,

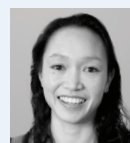
Dr Gunjan Aggarwal

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Access past issues

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What you missed!

Women are less likely to receive bystander CPR than men due to fears of 'inappropriate touching'

- Dr Fiona Foo interviewed by ABC News

[Click here to access the video.](#)

Technology Update: Pulse Field Ablation



Dr Bill Petrellis

Specialising in general adult cardiology and electrophysiology, including atrial fibrillation and device implantation.

Introduction

It is well established that catheter ablation is an effective intervention for arrhythmia management. Pulse field ablation is a novel non-thermal ablation modality that is unlike any other ablation source in that it can preferentially ablate myocardial tissue. This technology has the potential to provide shorter procedure times, increase effectiveness and enhance safety compared to existing ablation modalities.

Traditional thermal modalities, such as radiofrequency ablation (RFA) and cryoablation (CA), are limited by their potential for collateral tissue damage. During left atrial catheter ablation for atrial fibrillation, adjacent 'at risk' structures include the oesophagus (atrioesophageal fistula) and the phrenic nerves (diaphragmatic paralysis).

Traditional thermal modalities also require long single lesion application times, up to 60 seconds for RFA and 4 minutes for CA.

How do these modalities compare?

Radiofrequency ablation uses high-frequency alternating current which generates heat and creates controlled thermal injury to the target tissue. When the electrode tip is activated, it heats the adjacent tissue causing cellular damage, eventually leading to tissue necrosis which prevents the electrical signals causing the arrhythmia from traveling through the target tissue.

Cryoablation uses extreme cold temperatures to freeze and destroy tissue. Pressurised liquid nitrous oxide (N₂O) is delivered via an ultra-fine tube to the cryoablation catheter tip. The liquid refrigerant then vaporizes and absorbs heat from the surrounding tissue. The extreme cold temperature (-40°C or lower) causes cellular damage by forming ice crystals within the cells, disrupting their structure and function. Cryoablation is generally associated with a lower risk of collateral thermal damage.

Pulsed field ablation (PFA) is an emerging technology that delivers a series of punctuated electrical pulses (nano- to microsecond duration) to modulate the cellular and interstitial environment. The catheter has a series of electrodes that emit short, high voltage pulses. The induced electrical field alters the cellular transmembrane potential and induces 'electroporation' of the target cells, without producing heat or thermal damage.

Electroporation is the creation of temporary pores in the membrane of myocardial cells. When pulses are delivered in a specific sequence and timing, it causes the cell membranes to become permeable, allowing the influx of ions and other molecules which causes altered homeostasis, irreversible loss of cellular integrity and ultimately cell death.

Tissue-related response to PFA

There is evidence that cell specific characteristics affect their response to PFA. It is suggested that myocardial cells are more susceptible to PFA than vascular smooth muscle or nerves, reducing the risk of collateral tissue damage. Consequently, it has the potential to be safer than radiofrequency ablation.

Another key feature of PFA is the ability to cause cell apoptosis without disrupting the surrounding tissue architecture and extracellular matrix.

This maintains the function of the interstitium and allows potential repopulation by new cells (e.g. vascular repopulation or fibroblast infiltration for scar generation).

The PULSED AF Pivotal Trial

This clinical trial evaluated the safety and effectiveness of pulsed field ablation (PFA) for the treatment of atrial fibrillation (AF). The trial enrolled 300 patients with paroxysmal or persistent AF who were refractory to antiarrhythmic drugs and patients were randomly assigned to receive either PFA or RFA.

Acute pulmonary vein isolation was achieved in all cases. The trial showed that PFA was non-inferior to RFA in terms of the primary endpoint of freedom from arrhythmia recurrence at 1 year (66.2% PFA vs 67.6% RFA for paroxysmal AF).

The rate of major complications was low in both groups. There were no cases of pulmonary vein stenosis, atrio-oesophageal fistula, coronary artery spasm, myocardial infarction, pulmonary vein stenosis or permanent phrenic nerve injury related to the pulsed field ablation. ►

Technology Update: Pulse Field Ablation

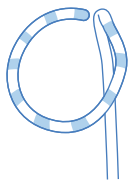

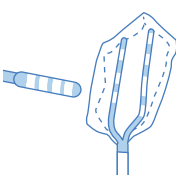
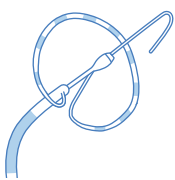
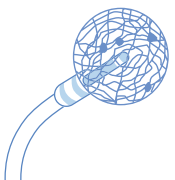
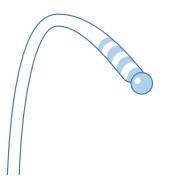
Manufacturer	University of Utrecht	Farapulse	AtriAN	Medtronic PFA	Affera	Galaxy
Primary Catheter Style	Circular: 10 electrodes	Basket/Flower: 5 splines with 4 electrodes each	Focal catheter & glove	Circular: 9 electrodes	Large focal basket	Focal
Catheter Image						
Electrode Configuration	Monopolar	Bipolar	Monopolar	Bipolar	Monopolar	Monopolar
Waveform Style	long Monophasic (Exponential Decay)	Biphasic	Monophasic	Biphasic	Biphasic	Biphasic
Target Applications	Endocardial atrial ablation	Endocardial atrial ablation	Neuronal ganglionated plexus	Endocardial atrial ablation	Endocardial atrial ablation	Endocardial atrial ablation
Guidance	Fluoroscopy	Fluoroscopy	Epicardial Access	Fluoroscopy	Proprietary 3D electroanatomical mapping	Existing 3D electroanatomical mapping systems

Figure 1. Summary of clinical pulsed electrical field systems currently under evaluation or approved for human cardiac ablation. From *Circ Arrhythm Electrophysiol.* 2021;14:e010086. DOI: 10.1161/CIRCEP.121.010086

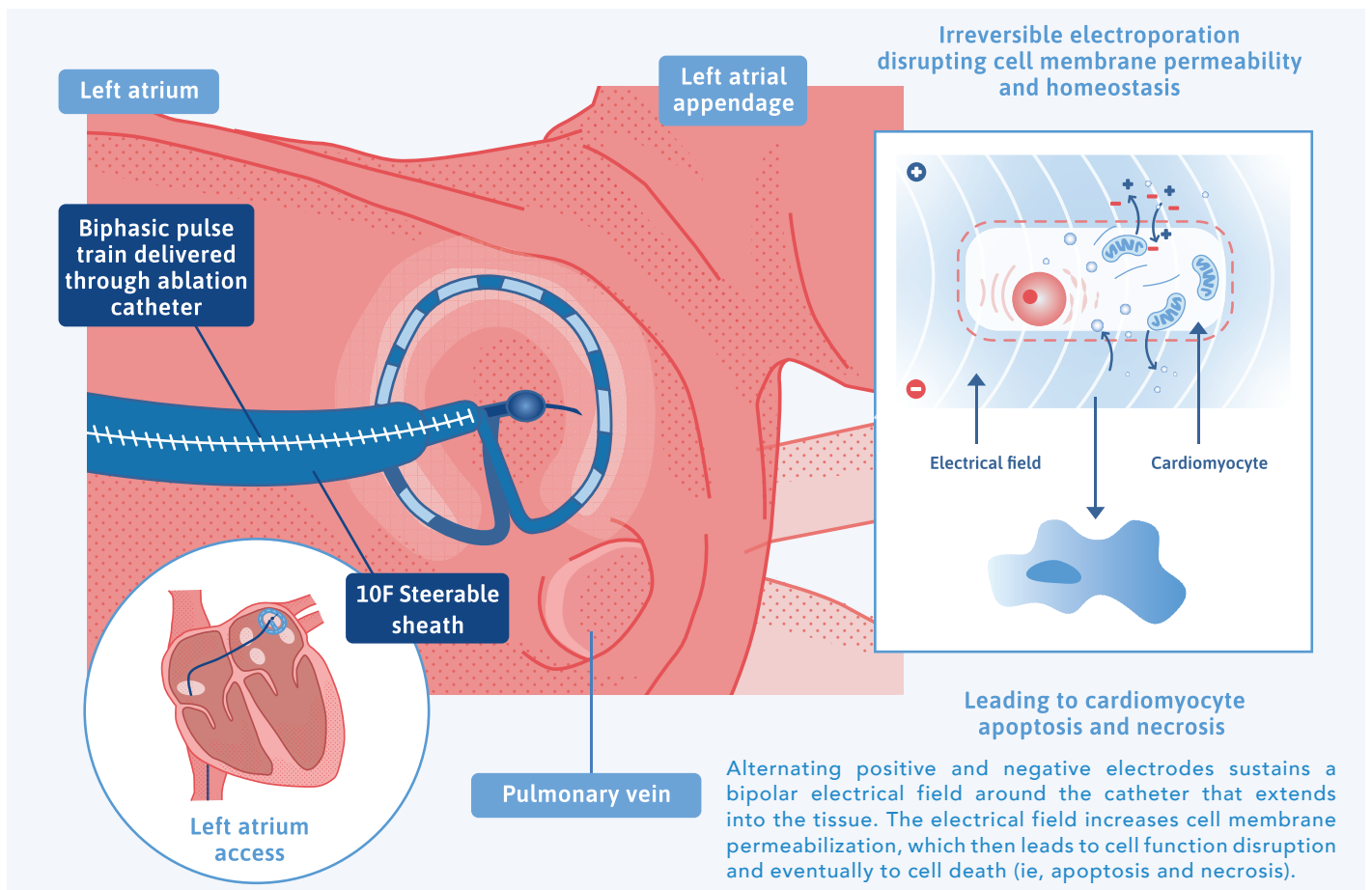


Figure 2. Catheter ablation method with pulsed field ablation system. From *Circulation.* 2023;147:1422–1432. DOI: 10.1161/CIRCULATIONAHA.123.063988

Technology Update: Pulse Field Ablation

Pulsed field energy is delivered within milliseconds and substantially improves procedural efficiency. In this study, the total energy application time was 30 seconds and the time from first to last application (left atrial dwell time) was one hour, which included the protocol-mandated 20-minute waiting period.

This means the procedure was actually performed within 30 to 40 minutes and is much faster than 1.5 to 2 hours that is typical with thermal ablation.

These findings suggest that PFA is a safe and effective treatment for AF and is a viable alternative to RFA.

References: 1. Primer on Pulsed Electrical Field Ablation *Circ Arrhythm Electrophysiol.* 2021;14:e010086. DOI:10.1161/CIRCEP.121.010086
2. Pulsed Field Ablation for the Treatment of Atrial Fibrillation: PULSED AF Pivotal Trial *Circulation.* 2023;147:1422–1432. DOI: 10.1161/CIRCULATIONAHA.123.063988

Conclusion

Pulse field ablation is a relatively new technology that is currently under research to determine its safety, effectiveness and optimal parameters for the treatment of various arrhythmias.

With further development of this ablation platform, it seems very likely that pulse field ablation will dominate the ablation market over the next 5 to 10 years. However, more research is needed to confirm these findings and to determine its long term safety and effectiveness compared to established ablation methods.

Dietary interventions and cardiovascular disease



Dr Gunjan Aggarwal

Specialising in general adult cardiology and non-invasive cardiac imaging, particularly echocardiography and cardiac CT.

Red yeast rice - nutraceutical of promise for statin intolerant patients?

Hypercholesterolemia is an important modifiable risk factor for the development of atherosclerotic plaque. Despite there being a number of effective pharmacologic treatments, a number of patients are either intolerant of therapy such as statins or are not eligible for PCSK 9 inhibitors based on current PBS criteria.

There is also an increasing recognition of the importance of inflammation in the development of coronary artery disease and therapies that reduce inflammation have shown some benefit as a therapy for addressing atherosclerosis.

As such there is growing interest in nutritional non drug approaches to both address hyperlipidemia and also combat systemic inflammation. Red yeast rice (RYR) is such a product that has historically been used in traditional Chinese medicine (xuezhikang). It is created by fermenting yeast (*Monascus purpureus*) in red rice which then gives rise to a complex of substances called monacolins. One of these monacolins is monacolin K which is an inhibitor of HMG-CoA reductase inhibitor – the rate limiting enzyme of cholesterol synthesis. It is structurally very similar to lovastatin.

RYR has demonstrated efficacy when given at a dose of 1200 mg/day and lowers LDL by an average of 1mmol/L after 8 weeks of therapy. It is equivalent in potency to pravastatin 40 mg daily or lovastatin 20 mg daily. There is some evidence from a Chinese study that it is associated with a reduction in coronary events and mortality post MI in a secondary prevention setting ¹.

RYR also has beneficial effects on endothelial function and leads to a reduction in markers of inflammation such as hsCRP by upto 28% ². It reduces TNF α by down-regulating the NF- κ B activity and reducing the intracellular production of reactive oxygen species in smooth muscle cells by promoting and stabilizing the expression of endothelial nitric oxide synthase ³.

Out of all the healthfoods currently marketed in Australia as having beneficial effects on cardiovascular health, RYR is perhaps the one best supported by evidence. It remains a promising option for truly statin intolerant patients who are not candidates for other more expensive therapies such as PCSK 9 inhibitors and for whom limited other therapeutic options exist.

References: 1. Lu Z, Kou W, Du B, et al. Effect of Xuezhikang, an extract from red yeast Chinese rice, on coronary events in a Chinese population with previous myocardial infarction. *Am J Cardiol* 2008;101(12):1689-1693. 2. Li JJ, Hu SS, Fang CH, et al. Effects of xuezhikang, an extract of cholestin, on lipid profile and C-reactive protein: a short-term time course study in patients with stable angina. *Clin Chim Acta* 2005;352(1–2):217-224. 3. Ruscica et al. Impact of nutraceuticals on markers of systemic inflammation: Potential relevance to cardiovascular diseases – A position paper from the International Lipid Expert Panel (ILEP). *Progress in Cardiovascular Diseases* 67 (2021) 40–52.

Our team

We have experienced cardiologists in all major sub-specialties to provide the highest quality of patient care. We also have specialists in related fields including endocrinology and respiratory medicine. Our Sydney Cardiology team includes:

Cardiology



Dr James Wong

Specialising in general cardiology, prevention of coronary artery disease and hypertension.



Dr Abhinav Luhach

Specialising in general adult cardiology, cardiac CT, and preventive cardiology.



Dr Gunjan Aggarwal

Specialising in general adult cardiology and non-invasive cardiac imaging, particularly echocardiography and cardiac CT.



Dr Andrew Terluk

Specialising in general cardiology with an interest in cardiomyopathy in the setting of cancer.



Dr Ru-Dee Ting

Specialising in general and interventional cardiology, including cardiac haemodynamic studies and complex coronary intervention.



Dr Fiona Foo

Specialising in general and interventional cardiology with an interest in heart disease affecting women and sports cardiology.



Dr Bill Petrellis

Specialising in general adult cardiology and electrophysiology, including atrial fibrillation and device implantation.



A/Prof Martin Brown

Specialising in advanced heart failure, pulmonary hypertension, and transplant cardiology.

Endocrinology



Dr Suja Padmanabhan

Specialising in diabetes and general endocrinology with a special interest in diabetes in pregnancy and women's health.

Respiratory Medicine



Dr Tracy Smith

Respiratory and sleep physician specialising in respiratory disease with a special interest in respiratory failure due to lung or heart disease.

Holiday Hours 2023/2024

Over the Christmas period, Sydney Cardiology rooms are open at the following locations. Please call our rooms to make an appointment.

For the on call cardiologist, please call our pager service on **9966 7700**.

From Week 15 Jan onwards all clinics are back to normal operation.

Bella Vista 02 9422 6000 Blacktown 02 9422 6050 Chatswood 02 9422 6040 Parramatta 02 9422 6060 Sydney City 02 9422 6080

MON	TUE	WED	THUR	FRI
18 Dec All Locations	19 Dec All Locations	20 Dec All Locations	21 Dec All Locations	22 Dec Bella Vista Blacktown Chatswood Parramatta
25 Dec PUBLIC HOLIDAY Closed	26 Dec PUBLIC HOLIDAY Closed	27 Dec Bella Vista	28 Dec Bella Vista	29 Dec Bella Vista
1 Jan PUBLIC HOLIDAY Closed	2 Jan Bella Vista Blacktown Chatswood	3 Jan Bella Vista Blacktown Chatswood	4 Jan Bella Vista Blacktown Chatswood	5 Jan Bella Vista Blacktown Chatswood
8 Jan Bella Vista Blacktown Chatswood Parramatta	9 Jan Bella Vista Blacktown Chatswood Parramatta	10 Jan Bella Vista Blacktown Chatswood Parramatta	11 Jan Bella Vista Blacktown Chatswood Parramatta	12 Jan Bella Vista Blacktown Chatswood Parramatta

Testosterone replacement and cardiovascular safety



Dr Abhinav Luhach

Specialising in general adult cardiology, cardiac CT, and preventive cardiology

Introduction

Testosterone replacement therapy is indicated in men who have confirmed low testosterone levels as well as signs and symptoms of androgen deficiency (e.g. reduced libido, low bone mineral density). It is used in both hypothalamic-pituitary and primary testicular disease. There has been a significant rise in the use of testosterone replacement therapy in recent years.

A number of potential adverse effects and precautions with the use of testosterone replacement therapy have been described. These include prostate cancer, raised haematocrit and the risk of venous thromboembolism. There have also been concerns about the potential for these therapies to increase cardiovascular risk in elderly men. To date, evidence in relation to cardiovascular risk has been inconclusive.

The recently published TRAVERSE trial was designed to specifically answer persisting doubts about cardiovascular safety.¹ The study involved over 5000 men, aged between 45 and 80 years who had symptomatic hypogonadism and low testosterone levels. Patients were required to have either preexisting or be high risk for cardiovascular disease. The study was a randomised and double blinded with a placebo control and designed as a non-inferiority trial. Patients were assigned to either testosterone gel or a placebo gel.

The primary cardiovascular endpoint of the study was the first occurrence of any event from a composite of cardiovascular death, non-fatal myocardial infarction or non-fatal stroke. The mean duration of treatment was 22 months. The results showed that the primary cardiovascular outcome occurred in 7% of the treatment arm and 7.3% of the placebo arm. A higher incidence of atrial fibrillation, pulmonary embolism, and acute renal impairment were noted in the testosterone treatment group. However, the incidence of prostate cancer was found to be similar in both groups.



Conclusion

The trial's overall statistical analysis showed testosterone replacement was non-inferior to placebo in relation to the incidence of major adverse cardiovascular events. The study had a pharmaceutical sponsor. Some of the commentary published along with the trial results discussed the relatively short duration of therapy in this particular study when considering that atherosclerotic disease typically develops slowly.² Also, the actual increase in testosterone levels achieved in the treatment group of the study was only modest. Nonetheless, the study provides important safety information in relation to use of the testosterone replacement over a 2 year period.

References: 1. Cardiovascular safety of testosterone replacement therapy. Lincoff AM et al. *N Engl J Med* 2023; 389:107-117 2. Safety of testosterone replacement therapy in older men. Orwoll E. *N Engl J Med* 2023; 389:177-178.

Our services

Sydney Cardiology is a world class comprehensive cardiology service, delivered with expertise and experience. Using state of the art diagnostic equipment in all five clinic locations, Sydney Cardiology strives to provide exemplary outcomes for long term patient care.

Urgent access

We provide same-day urgent appointments and 24/7 on-call support for GPs with a dedicated phone number, **02 9966 7700**.

Non-invasive testing

Including stress-echocardiography, echocardiography, holter monitor studies, ambulatory blood pressure studies, coronary calcium score, dobutamine stress echo, electrocardiogram and event monitor recording.

Echo, ABP, and holter monitor-only referral services

We provide echo-only, ABP-only, and holter monitor-only referral services, with a summary report on any adverse findings.

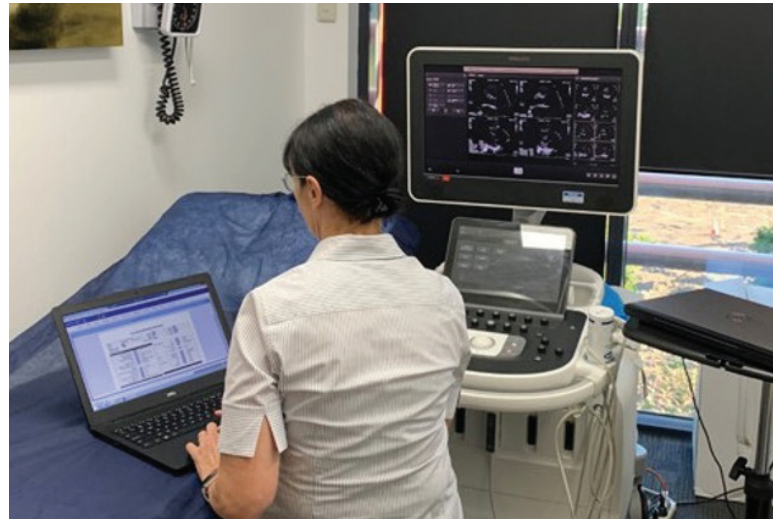
Electrophysiology

Including diagnostic electrophysiology studies, ablation of cardiac arrhythmias, cardiac device implantation, pacemakers and defibrillators, and follow up of implanted cardiac devices.

Cardiac procedures

Including coronary angiography, cardiac biopsies, right heart catheterisation, transesophageal echocardiogram and coronary angioplasty.

Including renal and lower limb angioplasty, ankle brachial index and SphygmoCorR central blood pressure testing.



ECG fax service

For urgent advice, 12-lead ECGs can be faxed to our locations.

Bella Vista - Fax: 02 9672 6214

Blacktown - Fax: 02 9676 8900

Chatswood - Fax: 02 9411 1904

Parramatta - Fax: 02 9635 1247

Sydney City - Fax: 02 9422 6081

Peripheral vascular services

Including renal and lower limb angioplasty, ankle brachial index and SphygmoCorR central blood pressure testing.

In-hospital care

All patients with appropriate private health coverage undergoing hospital procedures, do not incur any out-of-pocket costs. Sydney Cardiology has access to leading private hospitals, including:

Sydney Adventist Hospital

Wahroonga

Norwest Private Hospital

Bella Vista

Macquarie University Hospital

North Ryde

Northern Beach Hospital

Frenchs Forest

Patient fees

Sydney Cardiology is a private clinic however there are no out of pocket costs for Department of Veterans Affairs patients.

Referrals

To request a referral pad, click [here](#)



Clinic locations

All clinics have emergency appointment timeslots available for same-day referrals. Contact any of our clinics directly for more assistance.

Bella Vista

Suite 213, Q Central,
10 Norbrik Drive,
Bella Vista NSW 2153

Tel: 02 9422 6000 | Fax: 02 9672 6214

Blacktown

Suite 4,
15-17 Kildare Road,
Blacktown NSW 2148

Tel: 02 9422 6050 | Fax: 02 9676 8900

Chatswood

Suite 901, Level 9, Tower B,
799 Pacific Highway,
Chatswood NSW 2067

Tel: 02 9422 6040 | Fax: 02 9411 1904

Parramatta

Level 5 Suite 501, B1 Tower,
118 Church Street,
Parramatta NSW 2150

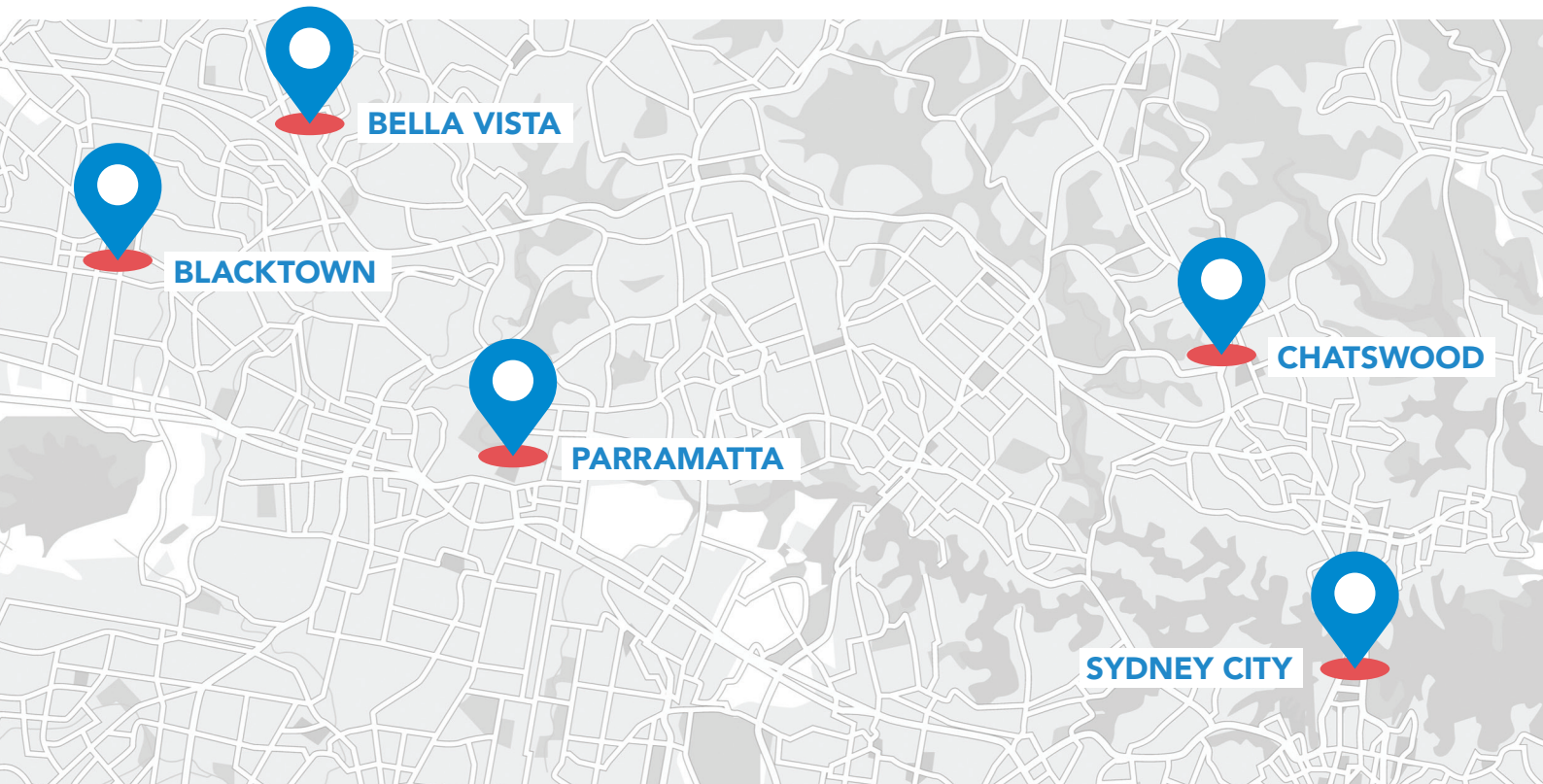
Tel: 02 9422 6060 | Fax: 02 9635 1247

Sydney City

Suite 1303, Level 13
68 Pitt Street
Sydney NSW 2000

Tel: 02 9422 6080 | Fax: 02 9422 6081

Sydney Cardiology offers a free
after-hours consult service for GPs
Call (02) 9966 7700 for
specialist advice



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