

# Wired for ultrasound

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Recent developments in technology present some revolutionary possibilities for the use of ultrasound in general practice.

Ultrasound has been in use in the healthcare field since the early 1940s and its lack of radiation offers significant benefits as a method of medical imaging.

'Whether it's [used for] checking a pregnancy for any conditions, up to when the baby's born, or it's looking at the brain or heart, right through to the end of someone's life, ultrasound can be used as a safe tool,' Lyndal Macpherson, Chief Executive Officer of the Australasian Society for Ultrasound in Medicine (ASUM), told *Good Practice*.



Lyndal Macpherson emphasises the need for adequate training in using point-of-care ultrasound.

For many years, however, the physical size of the technology largely confined its use to hospitals, significantly restricting patient access.

'The very first ultrasound machine in the middle of the 20th century was quite large; it took up a small room and provided only rudimentary pictures,' Adjunct Associate Professor David Canty, cardiothoracic anaesthetist and senior lecturer for the Ultrasound Education Group in the Department of Surgery, at the University of Melbourne, told *Good Practice*.

'[Traditionally], if the GP wanted their patient to have an ultrasound, they had to refer them to a radiologist or cardiologist and it could take up to a couple of weeks to get it done.

'The specialists do a very detailed job, but obviously there's a limit to ultrasound access because it's a limited, expensive resource. So a lot of patients have missed out on getting it done because it's inconvenient.'

But recent developments in the technology may enable point-of-care ultrasound – ultrasound brought to the patient and performed by the practitioner in real time – to become a reality for many healthcare providers, including GPs.

Macpherson compares these developments in ultrasound technology to those in a more familiar, everyday device.

'We used to have massive mobile phones we'd lug around, whereas now you're seeing people talking into their watches, like on *Get Smart*,' she said. 'Ultrasound is no different to that. We are seeing the miniaturisation of a number of the machines and the technologies to go with it.'

As a result, ultrasound is no longer confined to a room of its own, with some machines down to the size of a laptop or even a mobile phone. And these newer, smaller versions do not compromise on quality.

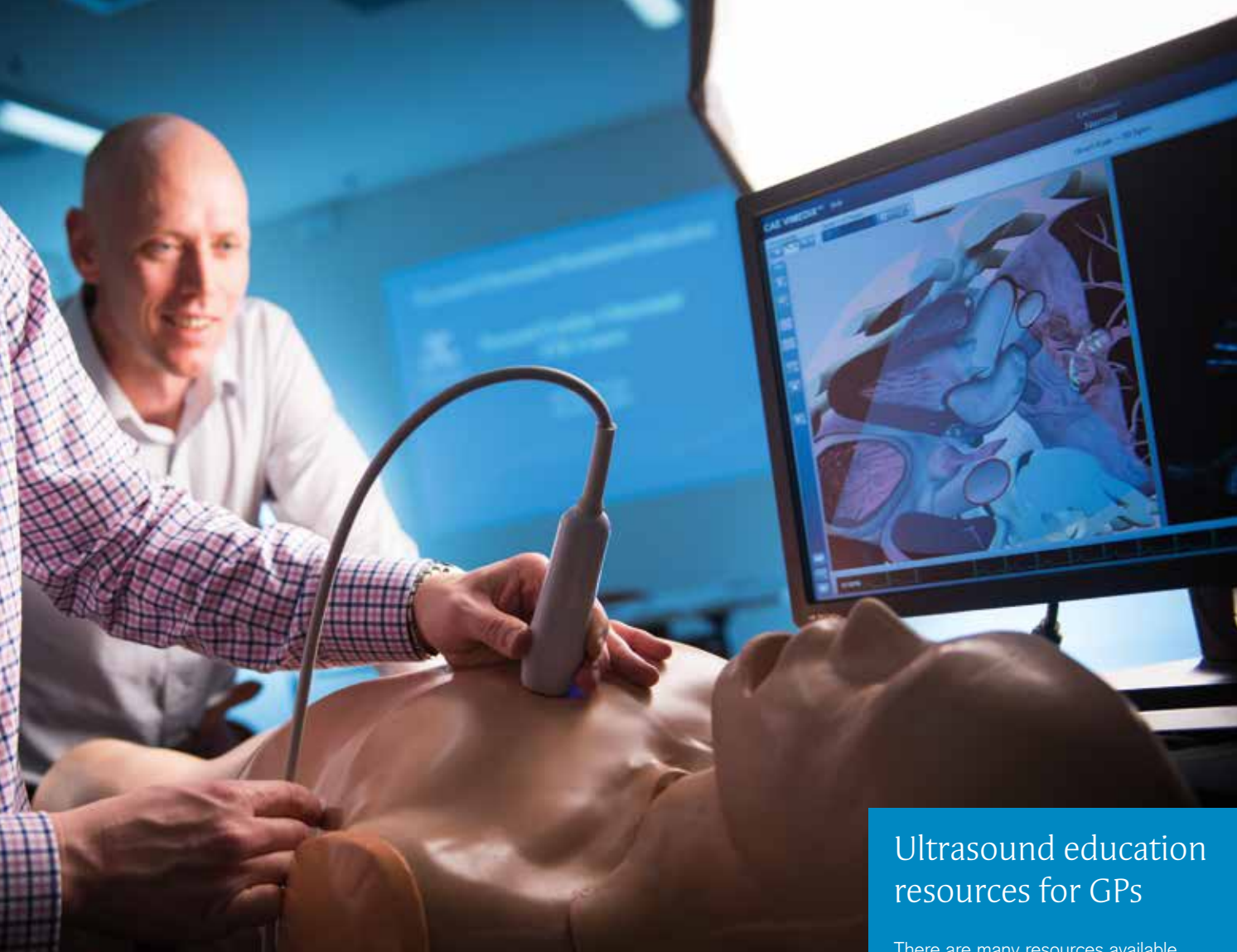


'The first few generations of the hand-held ultrasound devices were quite difficult to use and the image quality wasn't great. Whereas the new machines basically do exactly what the larger machines do – some of them are even wireless,' Dr Casey Parker, rural GP and author of the 'Broome Docs' blog, told *Good Practice*.

A further advantage of the miniaturisation of ultrasound is that the smaller machines are more affordable and thus more accessible to a wider range of practitioners, offering GPs the opportunity to take ultrasound into their own hands.

'Now you can learn to do it yourself and use ultrasound at the bedside without having to refer patients to a specialist,' Assoc Prof Canty said. 'This means a huge population of patients are able to get the benefit of ultrasound for their treatment and diagnosis.'

'The research [into ultrasound] has been flooding in over the last five years and has led to the realisation that it's a potential revolution in medicine.'



## Ultrasound education resources for GPs

There are many resources available for GPs interested in education and information about ultrasound:

- The RACGP's new active learning module (ALM), 'Introduction to point-of-care ultrasound for rural GPs' is scheduled for delivery at RACGP faculty offices throughout the country over the coming months. Visit [www.racgp.org.au/yourracgp/faculties/rural/advocacy/events](http://www.racgp.org.au/yourracgp/faculties/rural/advocacy/events) for more information and to register online.
- The Australasian Society for Ultrasound in Medicine (ASUM) is a multidisciplinary, membership-based society that provides information on the technology and related educational opportunities. Visit [www.asum.com.au](http://www.asum.com.au) for more information.
- The Ultrasound Education Group in the Department of Surgery at the University of Melbourne has a variety of education options in ultrasound. Visit [www.heartweb.com.au/courses](http://www.heartweb.com.au/courses) for more information.

### Rural ultrasound

GPs in Australia's rural and remote areas have traditionally been more likely to use ultrasound than their urban colleagues, as their patients are less able to access these services by



Dr Casey Parker believes greater use of ultrasound can save significant time for busy GPs.

other means. Dr Susan Downes, a GP obstetrician who works with the Royal Flying Doctor Service (RFDS) in Western Australia, is a salient example. She has used a portable 'backpack' ultrasound for several years and found it vital for a variety of reasons, compactness chief among them.

'You can do a scan in a creek bed if you want,' she told *Good Practice*.

Dr Downes has found that, in rural obstetrics, point-of-care ultrasound saves time, money and expense for patients, practitioners and the health system overall.

'It prevents the difficulty of getting [pregnant] patients to, for example, Port Hedland, which is eight hours away,' she said. 'The logistics of organising a visit for the nurse and patient, and the facilities they are going to require, are incredibly difficult. And if you send them too early they can't do the morphology scan, send them too late and you've got an inaccurate dating scan.'

'Being able to scan somebody yourself, immediately, gives you all that information.' >>

» Point-of-care ultrasound in remote obstetrics ensures expectant mothers can be transported to the hospital with more accurate timing.

'You can get [the expectant mother] out of camp at exactly the right time, so that they're not having to be flown out by the RFDS while in labour,' Dr Downes said.

Dr Downes utilises her portable ultrasound for many purposes beyond obstetrics.

'I use it all the time: in the right upper-quadrant plane looking for gall stones, and the flank plane, looking for renal stones,' she said.

'I use it for potential DVTs [deep vein thrombosis], which would be a fly-out. Sometimes I use it for fractures, sometimes for haematomas and abscesses, so I know where to incise. I also use it for foreign bodies and if I suspect there might be a pneumothorax.'

Dr Downes found her backpack ultrasound so useful, she made a business case to the RFDS to purchase more. The RFDS provided one each for its bases in Western Australia and one for the Rural Women's GP Program. Dr Downes believes these machines have already saved millions of dollars in unnecessary fly-outs, as well as a vast amount of people's time. She has also found them to be clinically invaluable.

'For the remote doctor, [the ultrasound is] crucial because it's what you're basing all your clinical acumen on,' she said.

### Urban ultrasound

With the benefits of ultrasound in rural and remote areas relatively easy to determine, the case for point-of-care ultrasound in urban general practice is also becoming clearer, fuelled by the shrinking size and cost of the machines, as well as their wide utility for clinical practice.

'Ultrasound can be used on the body and organs, and on the heart, lungs, abdomen, muscles and bones,' Assoc Prof Canty said. 'It can also be used to guide procedures, because you can see a needle and even a scalpel under the ultrasound.'

Increased diagnostic accuracy is another benefit of the technology.

'Ultrasound has a huge advantage in that there's less guessing and more accurate diagnosis and procedures,' Dr Parker said. 'We get better outcomes generally, and there are some safety aspects in which ultrasound is clearly better than the traditional practice.'

Assoc Prof Canty has found a perception within general practice that ultrasound



Rural GP Dr Susan Downes' ability to use her portable 'backpack' ultrasound means patients often don't have to travel for further diagnosis.

may be too time-consuming for busy GPs. However, research he has undertaken with the Ultrasound Education Group at the University of Melbourne has found the opposite: point-of-care ultrasound was shown to help GPs pick up heart conditions that may previously have been too difficult to diagnose. Conversely, it also helps to quickly identify patients without pathology.

'It's all about triaging the patient to go where they really need to go, as opposed to sending them to the wrong place,' Assoc Prof Canty said. 'And that can help save time and money.'

With the new machines, conducting the scan itself does not have to take much time.

'After proper training, you can do a scan in under five minutes,' Assoc Prof Canty said. 'You don't even need to take the patient's shirt off; you can just unbutton the buttons down the front, put the ultrasound probe on, and within two or three minutes – it sometimes takes a bit longer in some patients, maybe up to five minutes – you can perform an adequate ultrasound.'

'So it could probably take five to 10 minutes by the time you get the machine out and turned on, and have the result written down in the patient records.'

And while the time saved for the doctor and the health system are important, it can often be even more important for the patient.

'GPs may be able to treat the patient and save their life, when they may normally have not survived until the ambulance arrived,' Assoc Prof Canty said.

### Training

Whatever benefits the new ultrasound machines offer, it remains important to

understand that the technology is not simply 'plug in and go'.

'Ultrasound is extremely operator-dependent, so people do need to have some sort of educational background in the technology to provide quality care for patients,' Macpherson said.

It is currently uncommon for ultrasound training to be incorporated into the medical school curriculum in Australia.

'To get that training, GPs have to go out and pay to do courses, which is a big undertaking,' Dr Parker said.

Although he is confident the training will one day be integrated into undergraduate medical curricula, Dr Parker believes the efficiencies offered by ultrasound will prove any investment current practitioners make in education to be worthwhile.

'With more training and integration, GPs will understand [ultrasound] makes practice safer and more accurate,' Dr Parker said. 'I think it actually saves time in the long run.'

Meanwhile, the Ultrasound Education Group at the University of Melbourne has been working to adapt its existing training materials for a wider audience.

'We've been modifying our courses and university qualifications in ultrasound to try and make them scalable to teach tens of thousands of doctors and nurses, rather than a couple of thousand,' Assoc Prof Canty said.

This work has moved away from a focus on the traditional apprentice-style teaching model and towards more innovative methods.

'We deal with systems using the internet, simulators and automation, advanced computer software,' Assoc Prof Canty explained. 'This enables doctors to learn in their own time and they don't need to have as much supervision.'

Dr Parker has also been working on the training issue as clinical lead in the design of an RACGP active learning module (ALM) on ultrasound for rural GPs (refer to breakout on page 19 for more information).

'I think that's the first step, the basic introductory module,' he said.

'If five or 10 out of 50 people who turn up to a course decide to then take that next step and invest in a machine or do more training so they can perform more testing, then that's really great.'

If Dr Downes' experience with ultrasound is any indication, this may indeed turn out to be the case.

'I use ultrasound all the time. In fact, I'd rather have an ultrasound than a stethoscope or anything else out there,' she said. 📧