

# ANMJ

AUSTRALIAN NURSING & MIDWIFERY JOURNAL  
VOLUME 24, NO.3 / SEPTEMBER 2016

## ALL HANDS ON TECH

HOW DIGITAL TECHNOLOGY IS  
REDEFINING HEALTHCARE

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## HOW DIGITAL TECHNOLOGY IS REDEFINING HEALTHCARE

Digital technology is on the cusp of transforming healthcare. The number of health apps at the fingertips of consumers has surpassed 165,000, giving people around the world more access to information than ever and the tools to take care of themselves. Similarly, the adoption of digital medical records across clinical settings is another catalyst shaping the new landscape. Robert Fedele explores the digital health movement amid its upward spiral.

PHOTO: ROHAN THOMSON



Leigh Dicker was in his early 40s when his first heart attack hit.

He describes the episode as a "complete shock" when considering he exercised regularly, wasn't overweight, and didn't smoke or drink. "When I went into hospital most of the guys around me were in their 70s plus. It certainly felt very strange," he recalls. "It happened at work. Just in the spur of the moment. I have a fairly stressful job. I just thought it was the usual stress coming on and in the end I realised things were fairly serious."

The heart attack triggered early onset diabetes and helped uncover unknown hereditary cholesterol problems. Feeling bulletproof, Leigh brushed off the heart attack as a minor glitch and had returned to work six weeks later as though nothing had changed. It would be his second heart attack, just two years later, that delivered the 'wake up call' he needed.

For Leigh, now 60, change meant fine-tuning his diet, reducing stress, and importantly, taking medications regularly.

Over the years he endured a massive regime of trial and error in a bid to juggle his copious amount of medications before stumbling across health app MedAdvisor two years ago. MedAdvisor aims to improve the lives of people taking multiple medications by reminding them how much to take and when.

It's linked to participating pharmacies across Australia and once a patient signs up, the app keeps track of all medications dispensed, reminds patients when they need to take them, how long their supply will last, and also when it's time to collect a refill or repeat script from their GP.

The app, which has more than 120,000 active users, also links with GPs and allows them to track whether a patient is sticking to their medication program.

Leigh, a busy architect who employs numerous people across multiple offices, uses the smartphone app to manage a cocktail of pills which he takes in different quantities and at different times of the day. "It's basically looking over my shoulder electronically and keeping it all in order," he says. "It made it consistently easier. It means I'm taking my medications more regularly, which means better health outcomes."

### Digital health research

In today's new age of patient empowerment a person can use their smartphone to help them manage a myriad of conditions. There are apps which tackle obesity by motivating people to undertake exercise, apps that manage mental health by tracking mood and pinpointing the danger signs of depression and anxiety, or apps that prepare a patient before and after surgery and offer step-by-step rehab procedures.

Health apps, in part, are viewed as an area which can help reduce the burden on the nation's health system by enhancing self-care and keeping people out of hospitals.

Adelaide's Flinders University has just launched its Digital Health Research Centre, with the research and innovation hub being led by Australian digital health experts Professor Anthony Maeder and Professor Trish Williams.

The centre will initially focus on developing smart and interactive technologies to monitor the health of the aged at home and target conditions like diabetes and cardiovascular disease.

"We're trying to set the centre up to see what contributions digital health can make to what you might call health smart living," Professor Maeder says, explaining the priority will be on home-based self-care.

Professor Maeder says technology exists to monitor health in various ways at home, such as being able to take one's blood pressure or heart rate, but interoperability

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issues across systems is what's affecting data integration." For example, taking data from a home monitoring system, routing it back to the My Health Record, this is pretty much impossible at the moment.

"The reason isn't because it's technically difficult. It's just that all the standards and formats that people use vary and no real thought has been given up front to try and make everything compatible."

Colleague Professor Trish Williams says. "We've got lots of things from the technology point of view, we can just monitor things, or we can collect it. But it's actually making that data useful and delivering it in a way that is useful to the clinicians and the patients that is the key."

Professor Maeder believes consumers are embracing new technologies available, such as health apps, because they've become

empowered from taking an active role in managing their own health. "Devices really range from smartphones that are just logging stuff on a little app through to dedicated Telecare stations. You can get Telecare devices with inbuilt spirometers that measure blood pressure and heart rate.

"So the sophistication range varies widely. I think wearable devices are becoming more popular. You see that at the consumer end of the market with Fitbits and the like. I think those single measurement or range of measurement wearable devices is probably where the market will expand more rapidly in the future."

In response to misgivings regarding the accuracy of such devices, Professor Maeder argues their reliability is no more or no less risky than the likelihood of human error.

He adds that the ripple effect of increased consumer engagement also provides untold benefits.

"I think there's an interesting social effect here which is the empowerment of patients. By giving them information, by giving them management duties or the gathering duties for that data, you're getting buy in and you're getting interest in their own health status and hopefully then some responsibility for managing their health status."

### Utilising consumers

Researchers from the University of Queensland (UQ) are among the swarm of app developers tackling health conditions through technology.

Last year, researchers from the university's Institute for Molecular Bioscience created PainPal, a smartphone app to help chronic pain sufferers.

PainPal works by recording the level of chronic pain a person experiences day-to-day and personalising the data to generate graphs that illustrate an individual's pain pattern.

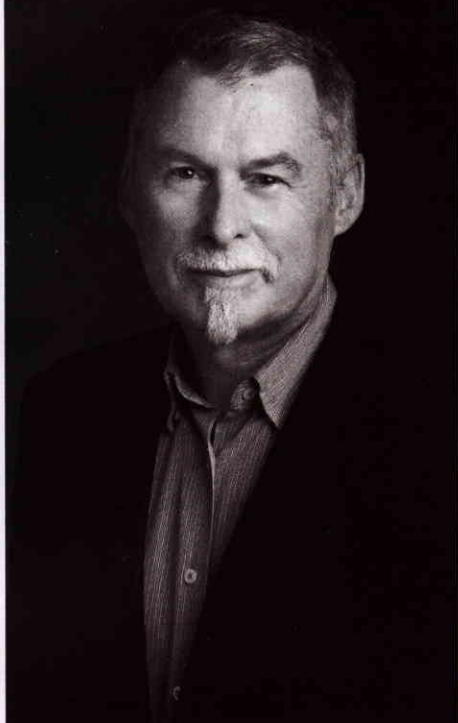
PainPal is still in development, with the team at UQ conducting an extensive survey of consumers in a bid to refine the app's design and features before hitting the market.

Researcher Prashanth Jutty Rajan says gauging the views of consumers should be an essential component of the developmental process. "Ultimately, they are the end users. They have to be able to decide what they would like because without the end users being in agreement with the kinds of ideas that we as app developers have it is almost futile going through this entire process."

Mr Jutty Rajan concedes the increasing use of health apps triggers valid concerns regarding the reliability of data, as well as newfound dangers in the shift to self-care, but he believes their use, once evidence and efficacy has been established, should be supported.

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Alison Patrick



"It's very important to remember that these are just tools to help patients communicate better with their doctors so it's absolutely important to remember that doctors do play a really important role in any sort of therapeutic regime that a patient may have."

Fellow researcher Kathleen Yin echoes the attitude. "I think that digital health has a great future ahead of it. I personally believe that healthcare apps should be complimentary rather than antagonistic to the doctors. If anything, these apps should encourage people to engage more with their doctors, rather than less."

### Impacting behaviour

Another innovative health app making a difference is AirRater, an app that helps Tasmanians breathe easier by pinpointing the dangers of pollen and smoke that can affect sufferers of hay fever, allergies, asthma, and other lung diseases.

Developed by Sense-T, a partnership between the University of Tasmania, CSIRO, and State government, AirRater was launched in October last year.

Asthma affects almost 12% of Tasmanians - higher than the national average.

The app is linked to a network of data sensors across Tasmania which capture information, including from the state's Environmental Protection Authority and Bureau of Meteorology, as well as pollen stations deployed by the project team.

The information is gathered in real-time and fed back to a central database which gives users vital information about current levels of pollution and potential triggers in their immediate area.

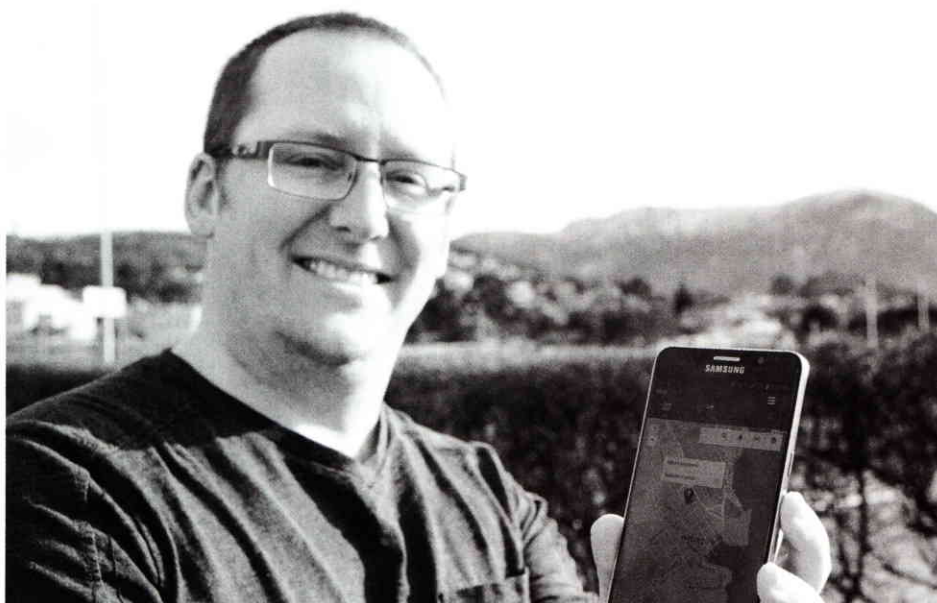
Over time, once users have entered their daily symptoms of asthma, allergies and hay fever into the AirRater smartphone app, they

will also be provided with an individualised report showing how environmental conditions impact their symptoms and even providing them with danger alerts.

Project Manager Sharon Campbell says the app is the first of its kind to pool such data together to create a case history and pinpoint a person's triggers. "If, for example, over winter, there's a lot of wood smoke in certain parts of Tasmania as conditions are really cool and people use wood heaters, if that's a trigger for people's asthma, then we're able to give them a little bit of warning that the wood smoke is quite high and then they can take their own steps towards managing that. That might be avoiding those areas, avoiding going outside, limiting the amount of physical activity they do or taking preventative medications."

Hobart resident Mike Cain is among the 1,000 Tasmanians who have already downloaded AirRater. The 33-year-old was





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born with heart valve problems that affect his circulation and cause dizziness and chest pains when an immediate burst of energy or oxygen is required.

AirRater has already made an impact, with Mr Cain cancelling a trip to Port Sorell earlier this year after a quick check of conditions revealed extra high smoke concentrations. On other occasions, during forestry burn-offs, he has monitored the situation before planning his day accordingly and limiting exposure and physical activity. "To be honest, it's not life-threatening. It's a comfort thing. I get dizzy and can't concentrate and sometimes get a little bit of chest pain. It's nothing serious but I'd prefer not to have those symptoms."

### Nurses adopting digital tools

As consumers become increasingly empowered by technology, nurses and other health professionals have arguably been slower to adapt, depending on the individual or the organisation.

Nurse Practitioner Chris Helms works in Canberra for National Health Co-op, a large group of general practices that operates across multiple sites.

Chris works as a generalist, specialising in cardiology, and provides care for complex clients who might have chronic heart or other long-term conditions. He believes health apps can be useful in empowering clients as well as clinicians.

As a nurse, he has embraced technology and regularly uses a variety of smartphone apps to streamline his delivery of care.

One of them, Orca, boasts a suite of apps that provide graphics and videos related to numerous acute and chronic health issues affecting areas like the spine, eyes, heart, and knee, in a bid to enhance patient understanding. The apps also provide a patient engagement

platform which delivers tailored information and advice for various conditions, as well as individualised care plans that can be emailed to the client.

For example, if a person suffers chronic lower back pain or osteoarthritis, the app can visually demonstrate the pathology of their condition and walk a patient through a basic physiotherapy exercise program based on their individual needs.

"It can be used as a very good tool to help them understand not only the disease process, but how they can actually manage their condition themselves," Chris suggests. "Some of these tools are excellent because they can actually help enhance motivation."

Chris feels comfortable using health apps in the workplace but admits there are some cohorts of nurses who might not due to pervading negative perceptions. "Looking at your smartphone during or after a consultation is very much looked down upon by employers. I think there's an assumption you're either playing on your phone or accessing text or email messages. But when you use them in front of a client and say this is what I'm doing, I'm using it to validate some of the risk factors you've identified, or I'm using it to create this care plan that can be emailed to you, I think consumers are actually quite happy to see you're accessing up-to-date information and that your practice is evidence-based."

Chris believes a culture shift is emerging in healthcare when it comes to using new technologies and is confident nurses can lead the way. While concerns about accuracy of information and data security exist, Chris believes coming years will see greater emphasis on enforcing standards concerning health apps that will help alleviate doubts. "I think there's a huge role to use health apps for patient education. It actually facilitates information exchange by

accommodating diverse learning styles, and creates more consistency in the message being delivered. I think there would be services reluctant to use apps, and those services might be ones that underestimate their role in advanced nursing practice."

### Digital medical records – a new frontier

The rise of increased consumer engagement in health is running parallel to the growing adoption of digital medical records across clinical settings.

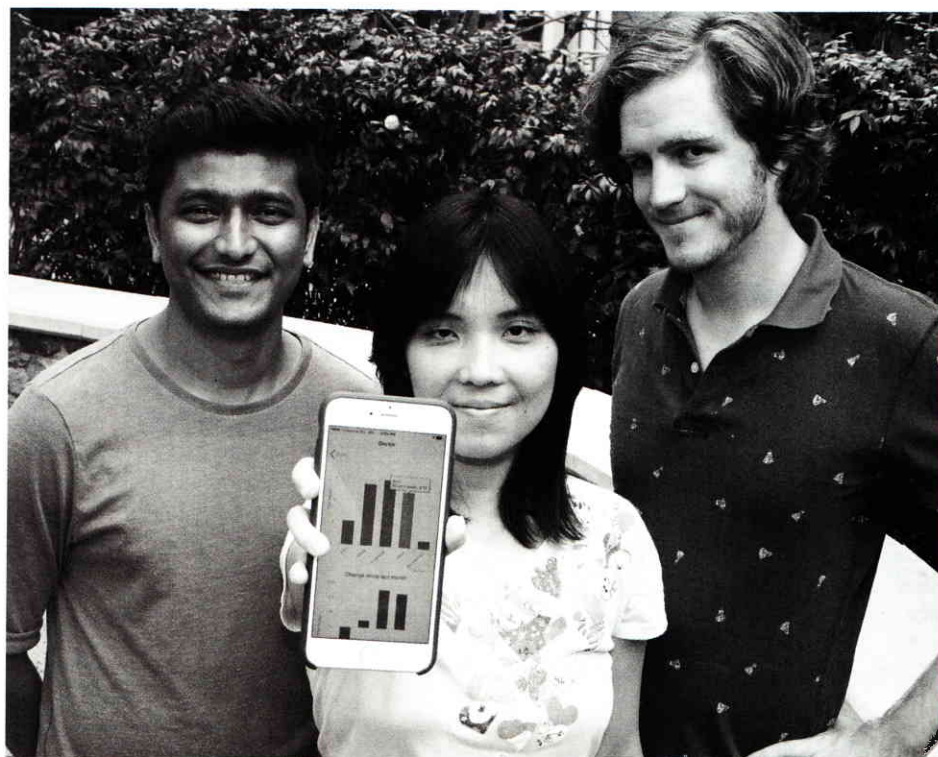
The government's problematic system My Health Record is finally gaining momentum, with more than 4 million people, or 17% of all Australians now registered.

My Health Record's vision is to give both a patient and their healthcare professional online access to their complete medical history.

The latest practice survey and whitepaper conducted by MedicalDirector revealed clinicians regard the use of technology in practice and patient management highly, with over 83% of practices stating they see the benefits of using technology to access or send patient records, and nearly half of survey respondents indicating they felt it would streamline their work and reduce administration time.

Hospitals are too embracing the digital revolution through the inevitable implementation of Electronic Medical Record (EMR) systems. While just 6% of Australian hospitals have successfully put EMRs into place, rapid growth is expected. The Royal Children's Hospital in Melbourne recently launched its EMR in April, becoming one of the first paediatric hospitals in Australia to replace paper-based medical records with an electronic system.

The EMR stores a child's clinical information



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Researcher Kathleen Yin

in one place where it is readily accessible to all clinicians involved in care and also available to families via a secure online hub where parts of a patient's medical record can be viewed via the internet.

The EMR also has the capacity to offer prompts and warnings to clinicians as they make decisions about medication, and has the ability to link with GPs to share information.

EMRs are becoming more common in Australia but resistance to change and drawbacks regarding usability issues are of genuine concern.

A 2014 US report which surveyed more than 13,000 nurses to gauge their satisfaction with their organisation's inpatient Electronic Health Record (EHR) system found 92% were dissatisfied with it, 94% did not believe communication between nurses and the rest of the care team had improved, and 85% said they struggled daily with flawed systems.

Tellingly, 88% of surveyed nurses blamed their hospitals' decision to choose low-performing systems based on price for the shortcomings, rather than quality of care delivery.

A Nursing Informatics Conference, held in conjunction with the Health Informatics Conference (HIC) in Melbourne last July, featured several Australian health services, including Monash Health, and Mercy Public Hospitals, in the process of implementing EMRs.

"The evidence suggests we need to advocate for user involvement at all stages of the development process," said Associate

Professor of Nursing Bernice Redley, who is working collaboratively on Monash Health's project, set to come to fruition in 2018. "If we ever think we're going to have an EMR that's going to sit on our system and that's going to be it, we're wrong, because we want those systems which continually evolve and develop as our profession continually evolves and develops."

Likewise, Alison Patrick, the Executive Director of Nursing and Midwifery at Mercy Public Hospitals, revealed her health service's ongoing plans to adopt an EMR and the critical considerations required.

After discovering the health service's paper based medical record systems were putting a strain on time, space, and money, Ms Patrick approached hierarchy with a new vision.

An EMR Advisory Group was established, which Ms Patrick has led for the past 18 months, and implementation is expected to begin next year.

Ms Patrick says it's difficult to find an EMR that suits all of Mercy Health's needs but stressed that defining what nurses are currently doing and involving them in discussions has been paramount to her inquiry. "Nurses are a significant part of the health workforce and yet our voice is not heard in many conversations about EMRs and about technology generally in health."

### The future

So where to for digital health? One of the keynote presentations at HIC 2016, the annual conference bringing together health's most forward thinking innovators, can perhaps offer a small window into the

shifting landscape.

The presentation, was delivered by Ron Gutman, CEO of virtual healthcare provider HealthTap, a US innovation that involves a mobile health platform that connects consumers with doctors in real time at any given time of the day.

HealthTap has accumulated a network of over 100,000 doctors and is already used by millions worldwide. It's free to download and works via a subscription model where users pay to ask a specific doctor questions through a consultation.

Gutman considers HealthTap a unique platform that delivers care from 'query to cure' and one focused on information, communication, and engagement by enabling people to take ownership in their health.

HealthTap can be downloaded on your smartphone and consultations take place via text, video, or voice on any mobile device, or personal computer, from home or remote areas.

Elsewhere, at HIC, a new Australian Digital Health Agency was launched. The advisory board is comprised of doctors, informatics specialists, digital experts, and customer service executives charged with ensuring the nation's digital health plans flourish.

Digital health is no longer a pipedream and it is clear technology is rapidly shaping the future of patient care and opening the door to consumers actively engaging in taking care of themselves. It's merely a matter of how long it will take to iron out the kinks and get everyone up to speed.