

health

AGENDA

Inspiring you to make healthier choices

**DYNAMIC
THERAPIES**
FOR PARKINSON'S
DISEASE

+

**ROBOTS TO
THE RESCUE**
INNOVATIVE
HELPERS FOR
KIDS WITH AUTISM

**Reap
what
you
SOW**

THE
PROVEN
BENEFITS OF
GARDENING

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SMART CITIES
HOW WE'LL LIVE
IN THE FUTURE

From
the
ground
up

THE
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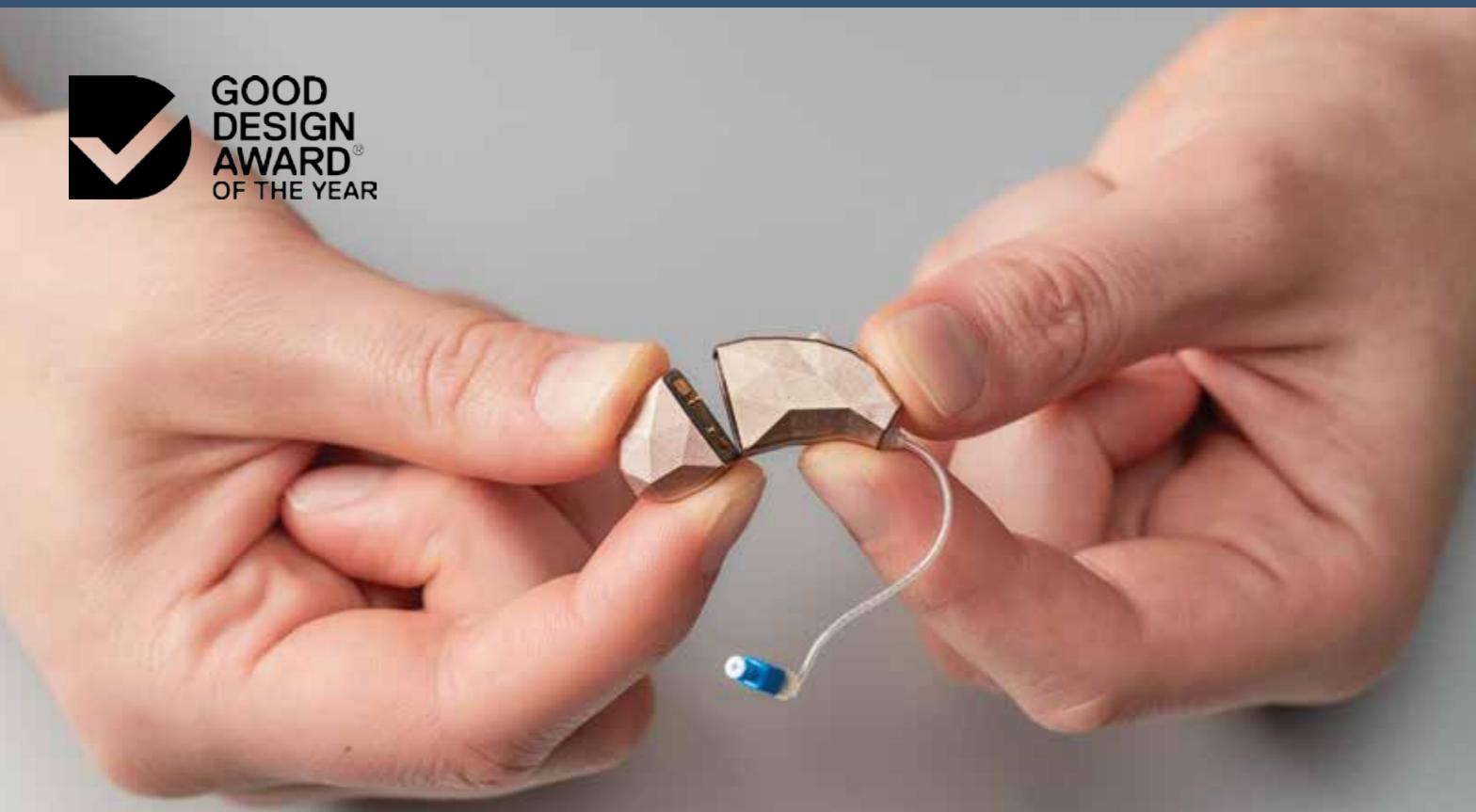




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Welcome

Dear readers,

While I don't have green thumbs myself, I'm tempted to give gardening another go given the inspiring story of Jo Morgan on page 58. She modified her garden tools so she can work from her wheelchair, and she credits the garden with helping her post-traumatic stress disorder. There are physical and mental benefits to this popular hobby that could help us all, from lowering stress to boosting heart health. Best of all, spring is the perfect time to start.

Throughout this issue we're seeing some incredible developments in treatments and therapies. Dance for Parkinson's is a fun way to keep fit despite illness, a range of robots are helping kids with autism with everything from social cues to maths. In our news pages you'll learn about a new test to detect glaucoma developed by Australian researchers. We also look to the future, speaking to city planners who are easing the strain of population growth and pollution on our health.

I urge you to read 'Matters of Life and Death' on page 62. While it's easy to forget about or ignore, getting on top of your paperwork can make a huge difference to your loved ones. If you've got an Advanced Care Directive for example, your family will know how you want to be treated if you're too ill to tell them.

Thanks to everyone who took part in our recent readers' survey. We're hard at work going through your feedback and will take your comments on board.

If you missed out on the survey, do get in touch at editor@hcf.com.au or Brand Communications Manager, 403 George Street, Sydney, NSW 2000. We always love hearing from our members.

Monique Barns
Managing editor, *Health Agenda*

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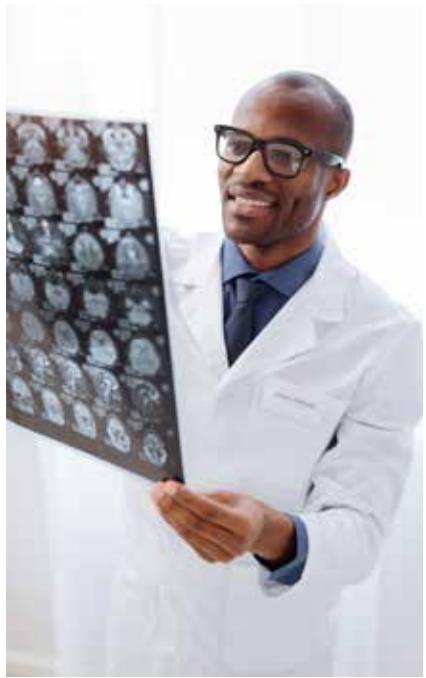
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Prostate potential

A new, non-invasive test to diagnose prostate cancer has been unveiled in Scotland. It targets the prostate with a particular type of ultrasound to differentiate between normal and cancerous tissue. In trials, it detected 89% of prostate cancers.

While there are no immediate plans to launch this method in Australia, there's good news here, too, with a Medicare benefit now available for prostate MRI scans.

"We have a lot of confidence in the ability of this to detect and monitor prostate cancer in," says Associate Professor Declan Murphy, from the Peter MacCallum Cancer Centre in Melbourne.

"Whether this new technique from Scotland performs as well as MRI remains to be seen, but in the meantime, Australian men can be reassured that urologists here already use advanced scanning technologies to help evaluate their risk of prostate cancer."

Getting an accurate blood pressure check

THE TRADITIONAL WAY of checking your blood pressure is sitting by your doctor's desk while they take your measurement, but this might not be the best approach. A study from University College London has found that an ambulatory blood pressure reading – where people wear a cuff for 24 hours – gives a more accurate blood pressure picture. It is 50% more accurate at diagnosing those at most risk of death from heart disease. This is because it shows the variation in your blood pressure from day to night and during different activities. It's also measured away from the medical environment, which can alter how people respond.

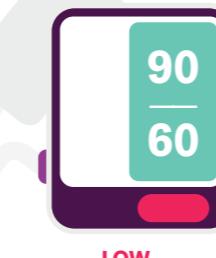
Blood pressure tests measure systolic pressure (the top number), the pressure in your arteries when your heart pumps blood around your body; and diastolic pressure (the bottom number), which is the pressure in your arteries when your heart relaxes between beats.

You can be in the normal range for only one of these numbers "but if either measure is higher than it should be [considered] the person has hypertension", explains the Heart Foundation's chief medical advisor, Professor Garry Jennings.

Low blood pressure can sometimes lead to symptoms like dizziness. High blood pressure puts strain on the heart and is a risk factor in many diseases, including heart attack and stroke.

Right now, ambulatory readings may be given if your blood pressure reading by your GP is more than 140/90. Medicare does not cover this type of monitoring. Costs vary from around \$80-\$200.

HCF members aged 18 and over with extras cover can get a free blood pressure check at selected HCF branches thanks to the Victor Chang Cardiac Research Institute. Visit hcf.com.au/victor-chang for more.



LOW
Under 90/60 is low blood pressure – or hypotension. This can sometimes lead to symptoms like dizziness.



NORMAL
90/60 to 120/80 is normal blood pressure.



HIGH END OF NORMAL
Between 120/80 and 139/89 is the high end of normal.



HIGH
Over 140/90 is high blood pressure – or hypertension.



Which is better – fresh or frozen?

IF YOU'RE TRYING to eat healthily, should you buy fresh or frozen vegetables? We asked Felicity Curtain, accredited practising dietitian and spokesperson for the Dietitians Association of Australia.

"The best type of vegetable is the one you'll eat the most of – so if it suits your lifestyle or budget better to buy frozen, then buy frozen; if you prefer fresh vegies, then choose fresh. Or even better, combine the two to add variety to your diet."

"In terms of their nutrient content, frozen vegetables might be better. They are snap frozen at the time of harvest – this means they contain all the nutrients in the plant at the time of harvesting. Some fresh vegetables may have been harvested weeks before and so contain slightly fewer nutrients than their frozen counterparts. Eating fresh vegetables in season will help ensure they contain their maximum nutrient levels."

How you cook your veg can also make a difference to nutrition – if you boil them for too long the nutrients can leach away, reports Queensland Health.

THEN & NOW Home blood glucose monitors

These essential aids measure blood sugar levels of people with diabetes.



Then: First developed in the 1970s, these home tests used drops of blood placed on strips of paper, rather like today's method – but testers had to add chemicals to get a result and required electricity.



Now: Tests have become more compact, they run on batteries and the test strip is often built into the device itself. They also take seconds, not minutes, to show results and a much smaller fingerprick sample is all that's required.

What next? Researchers are working on various non-invasive monitors; MIT and Harvard Medical School are testing tattoos that change colour in response to blood glucose concentration.

WHAT'S THE DIFFERENCE?

You may see both of them during your pregnancy, but how do they differ in the care they provide?



	MIDWIFE	OBSTETRICIAN
WHEN WOULD YOU SEE THEM?	"Midwives work with women and their families throughout pregnancy, birth and the early parenting period," explains Allison Cummins, spokesperson for the Australian College of Midwives. "The types of things we do include ordering screening tests like ultrasounds, the detection of complications and to conduct the birth. We work in close collaboration with obstetricians and GPs. Midwives are the right care providers for women when they do not have any complications in their pregnancy, birth or afterwards."	Obstetricians can also work through all stages of pregnancy, conducting antenatal checks, managing complications and delivering the baby – including Caesarean births. They can consult on low-risk pregnancies, but they are recommended "when a pregnancy is classed as high-risk or has complications. This might be if you are having twins, if there are problems with the foetus or if the mother has existing medical conditions," explains Dr Philippa Costley from the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). Obstetricians can help birth babies vaginally or by caesarean.
WHAT QUALIFICATIONS DO THEY HAVE?	"To be qualified as a midwife in Australia, you need to complete a three-year Bachelor of Midwifery," says Cummins. "Registered nurses who wish to become midwives... need to complete a 12 to 18-month degree after their nursing degree." Midwives are registered with the Australian Health Practitioner Regulation Agency (AHPRA). They must continue professional education and demonstrate competent practice to stay registered.	"An obstetrician is a doctor with a specialist qualification in obstetrics and gynaecology," says Dr Costley. "They need a medical degree and then follow the RANZCOG six-year training program. It therefore takes a minimum of 13 to 15 years to become a fully qualified obstetrician. Obstetricians are also required to complete a continuing professional development program to maintain their qualification." With training in both, these doctors can work as both obstetricians and gynaecologists.
DO YOU NEED A REFERRAL?	Women can request midwifery-led care when they book into a public hospital. Or you can self-refer to a privately practising midwife.	Yes. You need a referral from a GP if you want to claim on Medicare. In the public system, you might only see an obstetrician if you have a high-risk pregnancy or have complications in birth.
ARE THEY COVERED BY MEDICARE?	Yes. In the public system your care is free. For registered private midwives, your Medicare benefit may be up to 85% of the fee.	As a public patient, the care is free but you won't be able to choose your doctor. As a private patient, you'll be able to choose your obstetrician and will pay the difference between what the doctor charges and the Medicare benefit.
ARE THEY COVERED BY HCF HOSPITAL INSURANCE?	Depending on your level of cover.	Depending on your level of cover. HCF's My Family, My Family Plus and Premium Hospital policies include some pregnancy and birth-related services. Visit hcf.com.au/preparing-for-hospital/childbirth for more.

HCF's pregnancy and birth related services are subject to a 12 month waiting period.

A blood test for autism?

SCIENTISTS IN THE UK have discovered that children with autism spectrum disorder (ASD) have higher levels of certain markers in their blood. This could lead to blood or urine tests to confirm a diagnosis of suspected autism faster than the current process, and may also help researchers find what causes the disorder.

Currently, it's thought that ASD could be caused by neurological, genetic or environmental factors (such as birth complications) – or a combination of these factors.

The next step for the UK research team is to repeat the study with further groups of children to confirm the initial findings. Anything that speeds up diagnosis of autism will be welcomed by parents and the medical profession, as early intervention can help improve the outcomes of behavioural and developmental intervention. ASD can be detected as early as age two but in Australia the average age of diagnosis is six – and according to Autism Awareness Australia, 34% of families wait more than a year for a diagnosis.



Put some pep in your step

ALL WALKING IS GOOD for your health – but the faster you move, the better. A study of 50,225 regular walkers in the UK found that those who said they walked at a brisk pace lived longer than those walked at a slower pace.

The research, a collaboration between the University of Sydney and universities in England and Ireland, found that the key factor was increasing your heart rate – in other words, walking at a pace that makes you slightly out of breath or sweaty. But some people increase pace in a way that risks injury, so how should you increase pace safely?

"Take shorter, quicker strides, and bend your arms at the elbows and power forward using your fists," suggests personal trainer Jeff Laurence. "You're aiming for a pace that feels higher than five out of 10 for effort – but that you can keep up for 30 to 40 minutes."



DOCTOR ON CALL

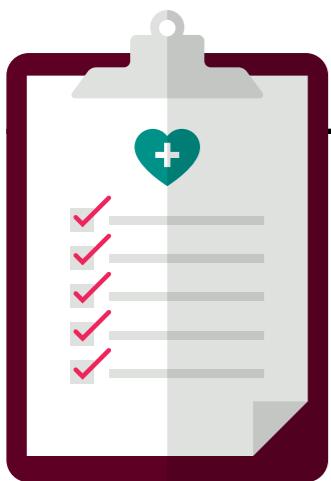
This issue, Dr Aifric Boylan, GP, answers the question: should I have a medical check-up every year?

"Generally, if you're in your 20s and 30s and in good health, there's no real need for an annual medical check-up; just the recommended cervical screening for women. It's recommended that women aged 25 to 74 get a human papillomavirus (HPV) test every five years.

"Once you reach 40, more health conditions start to show themselves. At this point, I think you should have a baseline check-up and a chat with your doctor to determine your current risk factors for disease and how often you need any future check-ups.

"Everyone should take advantage of screening tests offered to 50 to 74-year-olds – mammography for women and bowel cancer checks for both sexes." Women 40-49 are eligible for free breast checks.

"Some groups may need annual check-ups at any age. These include people with long-term health conditions like diabetes and asthma, smokers and those carrying excess weight or with a family history of certain conditions. Your doctor can advise."



What are the private health insurance reforms?

In 2017, the Australian Government announced a range of private health insurance reforms, with the aim to make private health insurance simpler and more affordable for Australians. These are the most significant changes to the industry in more than a decade. The reforms include:

- All health insurers must categorise health insurance products as Gold, Silver, Bronze or Basic.
- Members will be able to quickly upgrade cover to include mental health treatment if needed.
- Health insurers will be able to offer travel and accommodation for benefits for members in regional and rural areas.
- The government is working to lower the price of implanted medical devices (like pacemakers and replacement hip joints), with the aim of lowering premiums.
- Introducing the option to choose a higher excess on your insurance to lower your premiums.

We've been working closely with the government and our industry peers to share knowledge and give advice on how best to implement some of these changes. We're committed to passing on any savings to our members. Many of the reforms will not come into effect until 2019. Visit hcf.com.au/campaigns/private-reforms for more information.

Varicose vein treatment

Varicose veins can be painful and unsightly – and contrary to popular belief, it's not only women who have to contend with them. According to The Vein Institute in Sydney, research shows that between 20–30% of both men and women will also have varicose veins during their lifetime.

Most common in the legs and feet, varicose veins occur when tiny valves in the vein stop working, causing blood to pool. This creates a swollen, twisted vein that can be painful and, if left untreated, may lead to complications like blood clots and leg ulcers.

The good news for anyone with this condition is that there are now a number of different treatments available. "There are a few different ways to tackle varicose veins, including laser and radiotherapy... but only surgery treats the larger, more problematic veins," says Dr Bernie

Bourke, president of the Australian and New Zealand Society for Vascular Surgery.

Dr Bourke explains that in varicose vein surgery, the affected veins are removed through a small incision.

"The operation requires only a local anaesthetic and people normally go home the same day," he says.

Can activities like running lead to varicose veins? "Running won't cause varicose veins – it's caused by a hereditary weakness in the valves that keeps the veins closed," says Dr Bourke. "But running might exacerbate this."

Standing also makes this worse, which is why the biggest group of people I treat are hairdressers."

If you're an eligible HCF member with Hospital cover, varicose vein surgery may be covered if it's for medical reasons, but not if it's for cosmetic reasons.



FIVE OF THE BEST

Sunhats

Enjoy the summer sun safely with a quality hat. The right hat can reduce your risk of skin cancer and cut the amount of UV light reaching your eyes. Here are options for the whole family.



- 1** The wide brim of a boater hat can provide good shade from the sun. **General Pants, \$40, generalpants.com.au**



- 2** The adjustable chin strap will help to keep this unisex hat on your little one's head. **Bedhead Baby Bucket Hat, \$31, bedheadhats.com.au**



- 3** This kids' hat is easily folded and stored in your backpack or handbag for unexpected sunshine activities. **Acorn Kids, \$38.95, acornkids.com.au**



- 4** Like outdoor adventures? Pack this waterproof hat when you set off. **MacPac, \$60, macpac.com.au**



- 5** Chic checks for stylish sun protection. **Avenue, \$90, avenuethelabel.com**



I KEEP HEALTHY BY...

Adam Long, 31, is an HCF member from Sydney who runs two small companies. He tells us how he combines a healthy lifestyle with being an entrepreneur.

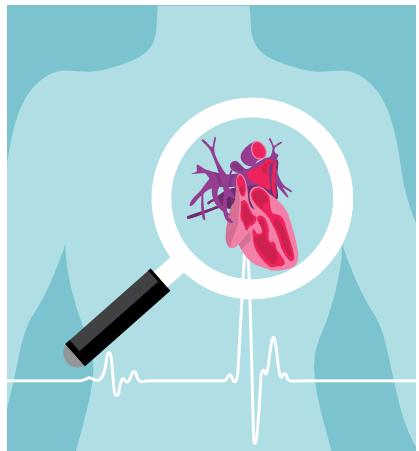
What's your routine like?

All my time and energy goes into these two businesses. I used to work 14-hour days and have very little time for myself. I'd get home exhausted and collapse on the couch with a beer, instead of going for a run or to the gym like I knew I should. One day I realised that I shouldn't be waiting until the end of the day to look after myself; I should do it at the start. So I changed my work start time to 10am every day, got up at 6am and chose to use the first hours of the day to exercise, meditate, read and cook healthily. I now finish work earlier too.

How do you fit exercise in?

I run and I hike at weekends. My perfect day is to go down to the Royal National Park in Sydney for a 35km walk. I also choose not to own a car, and as a result walk more than 10km each day to the office and various meetings around the city.

For tips on work/life balance, visit hcf.com.au/health-agenda/body-mind/mental-health



Heart in a box

Until recently, only three or four of every 10 hearts donated for transplantation could actually be used to save a life. One of the factors in this is transporting them on ice – the longer an organ is kept cold, the more damage it sustains.

A new technology has increased the number of viable hearts for transplantation to eight out of 10. A simple system, known as the ‘heart in a box’, places tubes through the heart that keep it supplied with blood. It can also deliver nutrients or medications that can improve organ function.

“This new technology avoids damage and effectively keeps that organ acting just as it did when it was alive,” explains Ash Attia from medical technology company TransMedics.

This living state not only keeps hearts healthy, but it also extends the timeframe for surgery. Normally, an organ isn’t used if it takes longer than three hours to reach the transplant recipient. Using the new technology, a recipient in Perth is living with a transplanted heart that was kept viable for more than 10 hours.

Four transplant centres in Australia use the ‘heart in a box’ technology, but it’s hoped more will follow.

Eyes on new glaucoma test

THE UNIVERSITY OF SYDNEY has developed a new way to detect glaucoma. Glaucoma is a condition where pressure builds up in the eye, causing damage to the optic nerve. It severely restricts sight and can lead to blindness.

Glaucoma affects 2% of Australians. In the early stages, it shows no symptoms – in fact, it’s estimated that up to 50% of those with the condition have not yet been diagnosed. Caught early, the progression of glaucoma can be slowed or stopped.

Diagnosing glaucoma involves a few different tests that measure eye pressure, look at the optic nerve and examine field of vision. The University of Sydney’s new test, Enlight.AI, uses photographs of the back of the eye run through an algorithm to assess extremely subtle changes on the optic nerve caused by glaucoma. These photographs can be taken by any ophthalmologist on a specially adapted smartphone, reducing the need for patients to travel to specialist centres for screening.

Some clinics have started using the new technology but it’s not yet available as part of the standard eye test. Regular eye checks are important; find a HCF participating provider at hcf.com.au/locations/find-a-participating-provider



Operation immunity

HAVING YOUR TONSILS OUT is one of the most common surgeries for children worldwide. But it can mean an increased risk of upper respiratory diseases, including asthma, the flu, pneumonia and bronchitis.

This is the finding of researchers from the University of Melbourne, the University of Copenhagen and Yale University, who analysed data of more than a million people and found that removing tonsils and adenoids in the first nine years of life can impact the development of the immune system.

In the past when antibiotics were not as advanced, it was more common to have tonsils and adenoids removed to curb the problem of recurring throat and nose infections.

Dr Sean Byars from the University of Melbourne says “our results support delaying tonsil and adenoid removal if possible, which could aid normal immune system development in childhood and reduce the possible later-life disease risks we observed in our study”.

Healthy Living

Tennis can boost your physical health, from your brain to your bones.

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Experts help you overcome common sleep struggles.

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Why your bathroom scales are not the only way to test your fat levels.

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DANCE TO A NEW TUNE

Developments in the diagnosis and treatment of Parkinson's disease.



EXERCISE TO TRY TENNIS

MORE THAN A MILLION PEOPLE IN AUSTRALIA REGULARLY PLAY TENNIS. HERE ARE THE BENEFITS YOU CAN GET IF YOU'RE ALREADY ONE OF THEM OR ARE PLANNING ON JOINING THEM.

Words Helen Foster

You're standing on the tennis court as the ball comes toward you; within seconds your whole body goes into action. "Your eyes start to track the ball and your spatial awareness system kicks in, telling you where you need to be in order to hit it. Now, your brain triggers your body to move. Your leg muscles engage and your core contracts to give you a stable base. You turn and then, finally, you hit the ball," explains Jason Oei, exercise physiologist and tennis coach at Sydney's Precision Athletica.

A few seconds later, you do it all again. This whole body experience triggers health benefits and makes tennis one of the most physically and mentally stimulating sports you can play.

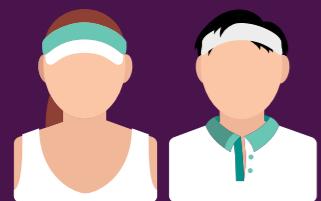
Let's start with the stop-start nature of tennis moves. A fast game of tennis sees you alternating 4-10 seconds of high-power activity as you run and hit the ball, then 10-20 seconds of recovery while your opponent rallies.

This is similar to "the pattern of movement you use in the high intensity interval training (HIIT) that's so popular right now," explains Oei. "And HIIT is excellent for improving fitness and particularly good at triggering the loss of fat that collects around the middle."

fast fact

Tennis is one of the top 10 ways men and women stay active in Australia.

Source: Australian Sports Commission



As a social sport, tennis could help lower your stress levels – workouts may be more calming when done with others.



Tennis burns the same amount of kilojoules as aerobics, racquetball, soccer and using a gym rowing machine.



Experienced tennis players run an average of 3m per shot and up to 12m in the course of a point.

SOURCES: AUSTRALIAN SPORTS COMMISSION; TENNIS AUSTRALIA; TENNIS INDUSTRY ASSOCIATION; MENTAL ILLNESS, STRESS AND TENNIS; INTERNATIONAL JOURNAL OF STRESS MANAGEMENT; BRITISH JOURNAL OF SPORTS MEDICINE

YOUR BODY AS YOU PLAY TENNIS

MOOD
One small study found levels of depression and anxiety decreased just 13 weeks after people started tennis lessons.



BRAIN

Tennis gives the brain a workout as you judge pace and angle in order to return the shot. "This type of mental activity helps strengthen the brain," explains Oei.

HEART

The average heart rate of a tennis player during a singles game is 141–182 beats per minute – 70–90% of maximum heart rate. That makes it excellent for improving fitness.

LEGS

Tensing your legs into a squat as you wait for the ball to be returned, springing up to catch a high shot and running to reach a long shot works a variety of muscles in the legs.

BONES

The impact of landing after jumping for the ball triggers development in the bones of the leg and the spine. Hitting the ball also strengthens the playing arm, which studies show has about 10% thicker bones and muscle strength than the other arm.

FAT

People who play tennis regularly may have below-average levels of body fat. One study reported recreational players who play twice a week are, on average, 3% leaner than non-players.

Search for a tennis coach online at tennis.com.au/play/coaching

TRIPLE ZERO HEROES

THESE MEN AND WOMEN ARE THERE FOR US FOR SOME OF OUR SCARIEST MOMENTS. ONE PARAMEDIC TAKES US THROUGH THE SKILL AND DRAMA OF HIS LIVE-SAVING ROLE.

Words Carmel Sparke



From broken bones on a rugby field to heart attacks and car crashes, paramedics witness accident and injury every day. Each shift is different, but there's one common theme to virtually every callout.

"Everyone's happy to see a paramedic. We're always popular and it's a good feeling to have," says NSW Ambulance paramedic Evan Steinle-Davies, 28.

"It's great just to be able to put a smile on your patient's face and to relieve their pain or to provide a bit of reassurance. It's so fulfilling."

He's one of the country's estimated 17,000 paramedics. After four years with the NSW Ambulance, Steinle-Davies can't imagine doing anything else, having experienced the highs, the lows and the unpredictability of the job.

SLEEPLESS NIGHTS

Working at a large Sydney ambulance station, Steinle-Davies covers the city and northern suburbs in 12-hour shifts with two half hour 'crib' breaks, which are a chance to get some food or sleep. Night shifts are part of the job.

"People always think the night shift is cruisy, but on average we attend anywhere from six to 12 jobs overnight," he says.

"And you can never tell when it's going to be busy – it might be a Monday or a Tuesday night, you'll be up for 12 hours, and wonder, 'what happened to my crib?'"

When they're called to a job, paramedics just receive brief information on a screen in the ambulance and the full picture is only revealed when they arrive.

One paramedic is the designated driver, and the other takes responsibility for treating patients; they swap the roles on the next shift. Drivers take the lead role in getting to the patient quickly, operating the radio and coordinating other services, while the paramedic on treating duty is mainly focused on patients.

They both look after the patient once on the scene, but divide up these primary responsibilities each shift as the most efficient way of providing care.

Once the patient has been assessed and treated, if they need to go to hospital, one paramedic rides with the patient, and the other drives. At the hospital, paramedics wait for the patient to be triaged (prioritised for care), then it's back to the station, ready for the next callout.

These range from life threatening situations to the calls that could have been fixed with a trip to the GP.

"Every hour is different, and I love that. You can go to a kid with croup, then an hour later, you're dealing with a rugby accident, and the next minute you're at a cardiac arrest," he says.

In one case, Steinle-Davies recalls attending a 23-year-old man at home, who was nursing his foot,

reporting he'd "hit his big toe against the wall accidentally".

"When we do get to take a look, it's just a bit bruised," he says. "It kind of gets on our nerves because if we're attending someone with a stubbed toe, then someone else who is out there having a heart attack or has been hit by a car in a proper emergency, we're an ambulance down. But we stay professional throughout and treat all injuries with the utmost respect."

HEARTBREAKING TIMES

While they nearly always appear calm on the outside, on the inside, it can be a different story, as challenging, stressful scenarios unfold.

"Once on the scene, your brain is constantly thinking, 'what am I going to do next?' especially if it's a big job," says Steinle-Davies.

"If you have a critically injured person, or you have someone having a heart attack in front of you, you'd be thinking, 'what drug am I going to give, have I spoken to the hospital, what am I going to do next?'

"But you have to stay calm, because if people look at us and we're not calm, it would be a bit frightening for them."

He's felt occasionally threatened and in danger, but paramedics call police if the situation feels unsafe and won't go into a building if they believe a patient may be violent.

He finds domestic violence cases challenging, but the most distressing callouts are those involving young children, especially if they're seriously ill.

"No one wants to see a loved one pass away and unfortunately with the job we have to deal with unexpected deaths, including kids."

"I've been on a job where a three-year-old has had a cardiac arrest and that's heartbreaking."

Paramedics are trained in dealing with trauma and Steinle-Davies says talking to colleagues helps a lot, with lessons learned from difficult callouts, and professional support and counselling is available if needed.

"It's part of the job, not everything can be glorious and clean. We do see a side of the world that a lot of people are sheltered from."

"However every few weeks we have a breakfast BBQ at the station, which is great for a catch up and staff morale."

"It can be stressful, and our shifts are long, but we get our days off and in the end it's a very rewarding job." ☺

fast fact

NSW ambulances made **3,074** responses a day in 2016–17, on average. That's one response every 28 seconds.

Source: NSW Ambulance



Did you know ambulance callouts aren't covered by Medicare? Find out more at hcf.com.au/ambulancecost



dancing TO A NEW

TUNE

 The word "TUNE" is written in a large, bold, sans-serif font. Each letter is stylized to look like a musical note on a five-line staff, with black stems and heads.

NEW DEVELOPMENTS IN THE DIAGNOSIS AND TREATMENT OF PARKINSON'S DISEASE HERALD A PROMISING NEW ERA IN THE BATTLE AGAINST A CONDITION FIRST IDENTIFIED MORE THAN 200 YEARS AGO.

Words Denby Weller Photography Chris Elkes

Fourteen years ago, Christine Clark sat in her parked car outside the neurologist's office, tears streaming down her face. "I just remember sitting there, stunned, not knowing what to do, and crying." She had fled the doctor's office minutes ago after he gave her the news that she had Parkinson's disease. "I can see your mouth moving, but I can't take it in," she told him. "I'll have to come back."

"I didn't know anything about Parkinson's, because I'd never known anybody with it," Clark recalls. Her mind raced through the endless questions: how will I tell my kids? What's the outcome? How does it progress? She sat in the car, 55 years old, with virtually no knowledge of the condition, except that it was going to completely alter her plans for the future. "I kept thinking, 'Old people get Parkinson's. Fifty-five year olds don't get Parkinson's.'"

PARKINSON'S AND AUSTRALIANS
The median age for diagnosis in Australia is 65, however, 5-10% of people who are diagnosed with it will develop it earlier than 65. It affects approximately 85,000 Australians, and with an ageing population, that number is expected to balloon to 120,000 by 2024. Though a cure is still a far-off goal for Parkinson's researchers, recent studies have reported promising results in the areas of diagnosis and treatment. There is an air of optimism in the field that the next few years will herald breakthroughs in slowing the disease and relieving symptoms.

Parkinson's disease is a degenerative neurological disorder with no known cause. It has a wide range of symptoms, including tremors, muscle rigidity, slow movement, a stooped posture and memory difficulties.

It was first identified by British physician James ▶

Parkinson in 1817, but despite 200 years of study, no single cause has been found. Professor Simon Lewis of the University of Sydney's Brain and Mind Centre has been studying Parkinson's for 18 years. "I think the truth is that there won't be a cause, there will be several," he says.

Parkinson's disease damages brain cells responsible for producing the neurotransmitter dopamine. One of dopamine's functions is to regulate communication in the part of the brain that controls motor function. Less dopamine leads to the movement symptoms of Parkinson's.

AN ELUSIVE DIAGNOSIS

Patients who are yet to develop noticeable motor symptoms are the focus of one study at Melbourne's RMIT University, co-authored by Professor Dinesh Kumar.

"Parkinson's disease can be managed to a reasonable extent, if the medication and treatment is started in time," says Prof Kumar. "Though people normally present themselves to the clinic for evaluation only when they have symptoms such as a tremor."

"By that time, it could be as late as 10 years after the actual onset of the disease, and something like 80% of the brain is already affected... which means there is not as much hope of managing the disease as there could have been otherwise."



People have very clear visions of what Parkinson's might mean and it's very difficult to be able to reassure them that those things aren't necessarily going to happen."

PREVIOUS PAGE

Christine Clark says Dance for Parkinson's classes have helped her stay active and positive.

RIGHT Dance for Parkinson's Australia program director Erica Rose Jeffrey.

Some early symptoms you may not associate with Parkinson's can delay diagnosis. These include fatigue, mild depression, muscle pain and even changes in your handwriting.

Prof Kumar and his team developed a test that involves asking a patient to trace a spiral on a piece of paper that is laid over a large digital drawing tablet. The test measures writing speed and pen pressure, as the disease can cause shaking and muscle rigidity.

In trials, it was 93% accurate in identifying Parkinson's patients in the early stages of the disease. With no specialised equipment needed, it has the potential to revolutionise diagnosis, and close that troubling 10-year gap.

There are other advances in the works too. Professor Miratul Muqit of the University of Dundee, Scotland, is



BRITANNICA: PARKINSON'S AUSTRALIA; PARKINSONISM & RELATED DISORDERS

researching the cellular pathways that are damaged in Parkinson's, with a focus on gene mutations in an enzyme called PINK1.

But the most exciting treatments on the horizon, he says, involves another gene therapy developed in the US, LRRK2 inhibitors. "I would anticipate that within five years we will know if this can be an effective treatment to slow down Parkinson's. There are also exciting trials underway to reduce the protein clumps that build up in the brains of Parkinson's patients."

REIMAGINING THE FUTURE

Two weeks after she was first told she had Parkinson's, Clark and her new partner John returned to the neurologist's office and began their journey with the disease. "In Parkinson's... there's just so much loss," Clark says. "You lose the ability for your body to do what it wants to do. I had to give up work before I was ready."

But with the support of her partner and family, Clark began reshaping her vision for the future. Experts, patients and carers agree that this is one of the biggest challenges of dealing with the diagnosis.

"At the moment, we don't have anything that offers the potential for a cure, so it's often seen as bleak," acknowledges Prof Lewis. "People have very clear visions of what Parkinson's might mean – nursing home, wheelchair,

dementia – and it's very difficult, especially at the time of diagnosis, in some patients, to be able to reassure them that those things aren't necessarily going to happen."

There are medications that can improve the symptoms of Parkinson's. For Clark, therapy and a tendency toward optimism helped in those early years. "Fortunately, I've got a very loving, supportive family."

THE IMPORTANCE OF COMMUNITY

Support is critical for people living with Parkinson's, according to Steve Sant, CEO of Parkinson's Australia. One of the reasons is the high incidence of depression and anxiety among people with Parkinson's.

"Dopamine is one of the things that is really important in mood," Sant explains. "It's a sort of 'feel-good' neurotransmitter, and if you have less of it, it's going to have a big impact."

One of the ways Clark has remained positive is through exercise. As well as her weekly group physio sessions, she attends dance classes at Dance for Parkinson's Australia (danceforparkinsonsaustralia.org), an organisation that runs classes for Parkinson's patients and their families.

"We have a focus on community in our classes," says program director Erica Rose Jeffrey, "so caregivers, partners and family members are all welcome in the class." ▶



SIMON LEWIS
Professor of Cognitive Neuroscience, University of Sydney

Professor Kumar's test could help detect Parkinson's earlier.



The program began in 2001, when someone from the Parkinson's community approached the Mark Morris Dance Group in New York and requested a dance class for people with the disease. There are now more than 100 Dance for Parkinson's classes around the world.

The core of the classes, says Jeffrey, is that they're founded on an artistic practice, even drawing from professional dance companies' work for inspiration. "We view the experience as a community dance class. People may have therapeutic benefits, which we support, but we really approach it from an artistic and creative dance focus."

"You get the goodies on both grounds," says Clark. "You get to move your body in a different way, and sometimes even forget that you've got Parkinson's, because you get involved in the music and it's such a lovely experience."

There is growing evidence of the benefits of exercise for people with Parkinson's. A small study from Charlotte in the US suggests that exercise is linked to neuroplasticity in people with Parkinson's, helping the brain to change its connections. And research published in *Frontiers in*



DINESH KUMAR
Professor of Biomedical Engineering, RMIT

Aging Neuroscience says that not only can exercise potentially reduce the risk of developing Parkinson's but it may also benefit people with Parkinson's by protecting dopamine neurons.

Prof Lewis is more cautious. "We have some good – but not overwhelmingly convincing – data that intense exercise can improve symptoms. Whether that really equates to a slow-down in cell death, which is what we're talking about, I don't know. But the bottom line is, there is no doubt that it is good for all of us."

Sant agrees. "I've been to Dance for Parkinson's classes, and the thing that I saw, more than the documented evidence, was that everyone came out with a smile on their face. If that's the worst thing that happens to you, then that's a good thing." ☀

To get involved in Dance for Parkinson's, go to danceforparkinsonsaustralia.org. For support for people with Parkinson's and their carers, go to Parkinson's Australia at parkinsons.org.au



CLIMB EVERY MOUNTAIN

Life is one long adventure for 58-year-old Di Westaway. Almost 20 years ago, she took on a wilderness challenge that changed the course of her life. Feeling restless and dissatisfied, she knew she needed to experience something outside work and family, so when her personal trainer invited her to climb Mt Aconcagua in South America, she took a leap of faith.

"When I was approaching my 40th birthday I went through a phase where I felt miserable," she says. "I was sacrificing a lot, prioritising my husband's work and being there for my young kids, who were seven and five at the time. I felt like I had no time to myself."

Standing around 6,960 metres tall, Mt Aconcagua is the highest mountain in the western and southern hemispheres

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Words Nicola Conville

and not a challenge for the faint-hearted. Westaway prepared herself by training to get as fit as she possibly could. Although the trip was extremely tough and she didn't reach the summit, it was a revelatory experience and the start of many more adventures around the world.

"It was a very difficult trip but we came back feeling elated despite everything," she says. "I had a real epiphany and realised I wanted to keep going and see if there were other women out there who wanted to do the same thing."

The trip inspired Westaway to launch Wild Women On Top (WWOT), an organisation that trains women for trekking challenges, and Coastrek, an annual walk that takes place in Sydney, Melbourne, Adelaide and the Sunshine Coast. To date, Coastrek has raised more than \$25 million for eye health charity The Fred Hollows Foundation. ▶

PHOTO: ROB MULALLY





THE EVOLUTION OF THE WILD WOMAN

When Westaway started trek training she had a group of friends who were also passionate about being outdoors and having adventures. They did hikes near and far, from the Blue Mountains to Mount Kilimanjaro.

"I put a notice in the school newsletter to see if any other mums wanted to get together for evening walks after they put their kids to bed. The response was overwhelming. Next, I left my day job in radio and it just took off from there. I had been a gymnast my whole life so I knew a lot about fitness already."

Westaway had discovered a new passion: helping women achieve adventure goals and find time-efficient ways to exercise, by training with their friends in nature. "It's amazing to see women experience the great happiness that comes with being healthy," she says.

Hiking is the perfect outdoor activity for many, Westaway says, because it is accessible and it doesn't discriminate on age, size, shape or fitness level. Hiking can also be cheaper than joining a gym or going to exercise classes. "Hiking helps our heart, buffs our butts, tones wobbly bits, increases suppleness, builds balance, reduces brooding and maximises memory. And it's bloody great fun," she adds. "Adventure taught me mental toughness and helped rejuvenate me. It also gave me the power and strength to go on."

FACING CHALLENGES ALONG THE WAY

Despite her fearless, intrepid nature, Westaway has faced plenty of challenges and been thrown a fair few curve balls along the way. She took a huge risk with her savings

“Hiking helps our heart, tones wobbly bits, increases suppleness, builds balance and maximises memory. And it’s great fun.”

in order to build WWOT, and had to do a lot of upskilling along the way to build her business properly, because, as she says, "a good idea is just the beginning of the journey". Not only that, she did it all while also dealing with the dissolution of her marriage.

"I was in a bad, dysfunctional marriage and ended up going through a break-up while trying to raise three children and protect them from that," she says. "But I survived my divorce while building a small business and raising my family."

Difficult treks come with challenges and risks that can't be ignored. In 2010, Westaway tried to summit Mount Everest – and almost died as a result. "I attempted to climb up Mount Everest's North Col, which is 7,020 metres above ground," she says. She went straight from another expedition to North Col "so by the time I joined the group I was a little behind in acclimatisation and unfortunately that meant I went up too quickly."

Westaway ended up suffering from high-altitude pulmonary edema (HAPE), a condition where fluid builds

in the lungs. She was literally gasping for air and too terrified to sleep as the roaring wind gusts sent shards of ice tumbling onto her sleeping bag.

"The thoughts of my kids kept me focused," she explains. "The team doctor said I had altitude sickness and insisted a Sherpa guide take me down to Base Camp immediately. That experience scared me into removing Everest from my bucket list."

MAKING A COMMITMENT TO FITNESS

Living a healthy, vital life is essential for energetic Westaway, who squeezes as much physical activity into her week as she can. "I love sunrise jogging along Manly Beach and along the bush tracks of North Head, stopping at sunrise to stretch on the spectacular rocky cliffs that look out over the Pacific Ocean," she says. "My favourite song to work out to is 'These Boots are Made for Walking' by Nancy Sinatra, it's a great trekking track."

Westaway also goes rock climbing two or three times a week and says it's her favourite way to relax. While she loves outdoor rock climbing, she says indoor climbing is more time-efficient and helps her train her upper body and core and improve flexibility.

Having big goals to work towards also helps keep her accountable. Committing to extreme adventure goals means she trains even when she's feeling tired or the weather is bad. "I also run trek training with clients which forces me to do interval and endurance training with a heavy pack in all weather."

She believes walking in nature is "key to a long and happy life."

"I like to get active with my family, too, by going skiing and adventuring in the bush. We do night walks in national parks, and visit secret lookouts for sunrise and sunset moments."

TICKING OFF THE BUCKET LIST

Westaway's job means she gets to travel around the world with members of WWOT, ticking items off her



bucket list as she goes. She has just returned from an adventure to Iceland, where she led a group of women through its southern highlands.

The group hiked for 15-25 km each day through diverse landscapes featuring lava fields, pumice gravel, rivers, waterfalls and mountains. They also climbed the active volcano of Mt Hekla and swam in natural hot springs along the way.

While no trip is without its challenges, Westaway remains upbeat about her experiences. "Apart from river crossings in freezing waters fuelled by the glacial melt, snorkelling in the deep underwater canyons between the tectonic plates and hiking through lava sand in gale-force winds, the most challenging part of this adventure was sleeping through snoring in mountain hut bunks and deciding which pair of dirty socks to recycle when the clean ones ran out," she says.

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As she nears 60, Westaway has no intention of slowing down. "We often hear that women feel invisible after 50, but I refuse to accept that my worth has a 'use-by' date. I know I've got many more years ahead to serve, to laugh, to love, to climb, to bike, to hike, to travel and to explore this magnificent earth."

LEFT AND BELOW

Walking event Coastrek has raised more than \$25 million for charity.

For more information, visit Wild Women on Top at wildwomenontop.com and Coastrek at coastrek.com.au

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THEN

In the 1960s the
average dinner plate was

24cm



NOW

The average
dinner plate is

30cm



PORTION DISTORTION

THE AMOUNT WE'RE EATING HAS GREATLY INCREASED OVER RECENT YEARS, LEADING TO WEIGHT AND HEALTH PROBLEMS. HERE'S HOW TO CUT OUR SERVINGS DOWN TO SIZE.

Words Charmaine Yabsley

SOURCES: APPETITE; HEALTHY FOOD GUIDE; EATFORHEALTH.GOV/AU

With approximately 63% of Australian adults overweight, it's thought that the amount we're eating, and serving up for our meals, may be a major contributor.

"There's a name for it: portion creep," says dietitian Catherine Saxelby, in her book *Catherine Saxelby's Complete Food and Nutrition Companion*. "The portion on your plate may be as many as eight times a standard serve (see below). The problem is that the bigger the portion in front of you, the more you tend to eat."

MORE TREATS, FEWER GREENS

The 2011–12 Australian National Nutrition and Physical Activity Survey revealed that our typical portion sizes of breads, cereals, meat and starchy vegetables were a whopping 30% to 160% larger than standard serves. This research included median portion sizes regardless of whether we were eating out or at home.

But with some nutritious foods, servings were actually shrinking. The study found that our portions of dairy products, some fruits and non-starchy vegetables like

fast fact

66%

Rise in the average portion sizes of both pizza and cake from 1995 to 2011–2012.

Source: *The George Institute for Global Health*

broccoli and leafy greens were up to 90% smaller than they should be.

Even more worryingly, our lavish servings of 'treat' foods, such as cakes, ice cream, hamburgers, pizza and alcoholic drinks, were exceeding recommended sizes by up to 400%.

WHY PORTIONS COUNT

Accredited practising dietitian Tim McMaster agrees that we seriously need to address our portion sizes if we want to get our weight problems under control.

"People blame their weight gain or excess weight on too many carbs, fat or sugar. But the biggest culprit is portion sizes, and many people simply don't have any idea how much they should be eating."

Even healthy eaters are not immune from the problem. "If the portion size is large, they're still overeating," says McMaster.

Sometimes seemingly healthy food can have hidden traps. For example, McMaster points to salads that have dressings containing high amounts of sugar and saturated fat, "so the kilojoule count is bumped up without you being able to see it".



“People blame excess weight on too many carbs, fat or sugar. But many people simply don't have any idea how much they should be eating.”

Our eyes can be bigger than our stomach, leading us to serving up more than we need. "We tend to look at a plate of food, and if it's not overloaded, then we don't think it will fill us up," he says.

There are some simple things we can do to help us. Pay more attention to what we're eating, and how much: chewing our food thoroughly, sitting at a table to eat and turning off the television and other devices.

"We're so time-poor we literally don't take the time to eat, taste food properly or chew it correctly," says McMaster. "You'll be more aware of whether you've eaten enough." ☀

LEAN MEAT, POULTRY, FISH, EGGS, NUTS & SEEDS, LEGUMES	CARBOHYDRATES & GRAINS	VEGETABLES & LEGUMES/BEANS	FRUIT	MILK, YOGHURT & CHEESE
<p>Protein including:</p> <ul style="list-style-type: none"> • Steak • Chicken • Lamb the size of palm of your hand • Fish the size of your entire hand • Nuts or seeds a small handful • Legumes 1 cup • 2 eggs <p>SERVES A DAY FOR MEN</p> <p>3 serves</p>	<p>The size of your closed fist once cooked.</p> <p>SERVES A DAY FOR WOMEN</p> <p>2½ serves</p>	<ul style="list-style-type: none"> • Non-starchy veggies such as leafy greens the size of 2 cupped hands. • Starchy vegetables such as potato and sweet potato • Corn the size of 1 cupped hand • ½ cup legumes. <p>6 serves</p>	<p>The size of 1 cupped hand.</p> <p>SERVES A DAY FOR WOMEN</p> <p>2 serves</p>	<ul style="list-style-type: none"> • About 1 cup of milk • 2 slices of cheese • ¾ cup of yoghurt <p>2½ serves</p>
		<p>6 serves</p>	<p>5 serves</p>	<p>2½ serves</p>



SLEEP SOLUTIONS

IF YOU HAVE TROUBLE FALLING – OR STAYING – ASLEEP, THEN HEAD TO BED WITH THESE TOP TIPS FROM SLEEP CLINICS AROUND THE WORLD.

Words Helen Foster

It's 3am and it feels like you've been tossing and turning for hours. You're tired but you just can't seem to fall asleep. If this sounds familiar, you could be one of 45% of Australians who experience problems either falling asleep or staying asleep, according to the Sleep Health Foundation. And 20% of Australians suffer significant insomnia; ongoing sleep problems with symptoms including fatigue, difficulty concentrating and irritability.

Chronic lack of sleep can risk your long-term health too; The Sleep Health Foundation reports that sleeping less than six or seven hours on average per night may increase

the risk for obesity, type 2 diabetes and heart disease.

The good news is that the world of sleep research is ever evolving and there's a lot of support out there to help you develop better sleeping habits.

THE FEAR OF NOT GETTING FORTY WINKS

How well did you sleep last night? The truth may surprise you if you have insomnia. Part of your brain remains active while you are sleeping. Most of us don't register that activity, but research from Brigham Young University in the US has discovered that some people with insomnia do – and it makes them think they are awake when they're

SOURCES: EUROPEAN SOCIETY OF CARDIOLOGY; BBC; JOHN HOPKINS MEDICINE

not. This is very significant, "because fear about not sleeping causes anxiety that actually keeps you awake," says psychologist and Emeritus Professor Leon Lack from Flinders University. "Most insomniacs sleep 60-90 minutes more a night than they think they do."

While the only way to know if you're definitely asleep is to measure brainwaves, Prof Lack says you can test yourself with a simple question.

"If you're awake and your mind is whirring you'll remember everything you thought about, but you won't remember thoughts during sleep. So, ask yourself – what were you thinking about for all those hours you think you were awake? If you can't think of more than one thing, chances are you were asleep."

GETTING SLEEP FIT

Poor sleep costs Australian companies \$17.9 billion a year in lost productivity, reports the Sleep Health Foundation. There's also an impact on employee health and happiness, which is why HCF supported SleepFit through its tech accelerator program HCF Catalyst. The SleepFit process starts with a sleep assessment that incorporates the advice of experts to determine what type of approach to improving your sleep will work best for you. Depending on your results, you might be offered a 28-day behaviour change program that teaches you good sleep habits; a six-week online cognitive behavioural therapy program; or, if a medical sleep problem like sleep apnoea is suspected,

Your body and sleep

Experts still don't know exactly what happens in the body during sleep but here are a few things we do know.

You clean your brain: When sleeping, the space between our brain cells may increase, meaning the brain can get rid of toxins. The National Institute of Neurological Disorders and Stroke in the US says this had implications for several neurological disorders including Alzheimer's disease.

You learn and create memories: During sleep the brain creates connections between neurons (nerve cells) that cement the facts you learned that day.

You repair your body: Your body releases a growth hormone that repairs tissues and muscles.

you'll be referred to your GP. Businesses like Optus and Lendlease are now offering SleepFit to their employees, and the platform was recently included in the CB Insights report *The Rise of the Wellness Economy*.

SPACE FOR NAPS

In New York City, busy people desperate for more sleep now have a way to fit a revitalising snooze into their day ▶



– the city recently launched its first nap club. At Nap York members can book a space – similar to capsule hotels – to sleep in for 30 minutes.

Nap York might be one of the first clubs solely dedicated to rest, but it's not the only nap-related innovation. Christopher Lindholst runs US company MetroNaps, which offers specially designed sleep pods that can be installed in any office (pictured left). "We've been working on quashing the stigma of napping for over a decade now. Napping directly benefits wellbeing, with a quick midday nap boosting mood, health, productivity, happiness and energy," he says.

In Australia, Virgin Active has installed sleep pods in Sydney and Melbourne clubs – though if you do get the chance to snooze, don't forget the ideal power nap is 15-30 minutes.

If you have ongoing sleep problems that are affecting your quality of life, speak to your GP. ☺

Top tips from sleep experts

We asked sleep experts from around the world how they would solve three of the most common issues.

YOU CAN'T GET TO SLEEP...



The expert:
Professor Leon Lack, Flinders University, Australia

The solution: Taking a long time to fall asleep can happen because you haven't let yourself wind down before bed, says Prof Lack. And one common cause of this is exposure to blue light from smartphones and screens in the hours before your head hits the pillow. This light suppresses melatonin levels in the body, the hormone which triggers those sleepy feelings at night-time.

"Swap your phone to night mode or install the app f.lux (justgetflux.com), which blocks blue light from your screen," says Prof Lack. It will also help to create a bedtime regime that tells your body it's time for bed. Or instead of charging your phone near your bed overnight, leave it in another room or out of reach."

YOU FEEL THE MINUTES TICKING BY



The expert:
Sleep physiologist Dr Guy Meadows, The Sleep School, London, UK author of *The Sleep Book: How to Sleep Well Every Night*

The solution: We sleep in cycles and it's normal to wake up a few times a night. Sometimes you might drift back to sleep, and sometimes you feel wide awake and your mind is racing.

"Never look at the clock, as that can create anxiety over how much [sleep] time you have left," says Dr Meadows.

"Instead, gently bring your mind into the now by focusing your attention on what you feel; the weight of the sheets on your body or the movement of your breath. This gentle process of noticing and letting go helps you accept your worrying thoughts and feelings, and the fact that you're awake, and moves you closer to sleep."

YOU WAKE UP TOO EARLY



The expert: Dr Chris W Winter, from Virginia, US; author of *The Sleep Solution: Why Your Sleep is Broken and How To Fix it*

The solution: Start your day. "Perhaps your brain is just done sleeping," suggests Dr Winter. "If you go to bed at 10pm, set your alarm for 6am, but continually wake up at 5am, it may be that you only require seven hours of sleep and aren't capable of sleeping for eight."

If your body does need more sleep, it may adjust the next night.

PHOTO: METRONAPS

COULD you HAVE *hidden* **FAT?**



SOURCES: SCIENCE DIRECT; HEALTH DIRECT; NATURE CELL BIOLOGY; HEART FOUNDATION; PLOS

EVEN NATURALLY SLENDER PEOPLE NEED TO WATCH THEIR DIET AND EXERCISE. WE FIND OUT WHY THERE'S MORE TO YOUR HEALTH THAN THE NUMBER ON A SCALE.

Words Nicola Conville

If you have a slim build, it can be easy to think that you're healthy. After all, you're not overweight. But according to new research, just because you look fit and healthy on the outside, doesn't mean you're healthy on the inside.

This state is known as metabolically obese, normal weight (MONW). MONW is where you may have serious health problems going on beneath the surface, often due to poor diet and lack of exercise. Other risk factors include ageing, having an inactive lifestyle and not eating enough protein.

For some people, their slim frame may hide serious health problems. These health problems occur when you carry fat around the heart and abdominal organs such as the kidneys and intestines. Called visceral fat, a 2014 study published in *Nature Cell Biology* reported it could contribute to elevated cholesterol, blood sugar levels and blood pressure.

"With MONW, the weight according to their body mass index (BMI) is within normal range: people look thin, but their fat percentage is high and they have a low muscle mass," explains Dr Michelle Groves, a GP specialising in diabetes and heart disease. "They are metabolically the same as a patient who is obese."

HOW TO CHECK YOUR FAT LEVELS

If you're worried about your level of fat, regular check ups with your GP are important. Blood pressure, cholesterol and blood sugar tests can give an indication of your metabolic health.

BMI is a common self assessment. It's calculated by your weight in kilograms divided by your height in metres squared, with a BMI of 18.5–24.9 considered within the healthy weight range. But BMI and weight alone can't tell you if you have hidden fat, nor are they an accurate measure of overall health. The World Health Organization says that your BMI should only be used as a rough guide, as everyone has different fat percentages.

Waist measurement can be a helpful check. For men,

they should be below 94cm and for women, below 80cm. For more information go to heartfoundation.org.au and search for 'waist measurement'.

There are other diverse ways to check your fat levels, from bone density scans to high-tech scales, but they vary in reliability and cost.

LIFESTYLE CHANGES TO MAKE

Even if your weight or BMI is in the normal range, it doesn't mean you can indulge in takeaway food and binge watch TV every day.

"Just because someone is within a healthy weight range, they don't have the liberty to eat extremely unhealthily," says exercise physiologist Jennifer Smallridge. "You can't necessarily 'feel' high cholesterol or high blood pressure, but it does all add up and can start to significantly impact health."

Regardless of your weight, keep an eye on your cholesterol intake, as high cholesterol levels can increase your risk of heart disease. We can have high cholesterol due to our genes, or poor diet.

Saturated and trans fats in the diet tend to increase 'bad' cholesterol in the blood. Common sources of saturated fats include animal products like butter, meat fat, beef, lamb, chicken skin and full-cream dairy foods. Trans fats are found in some processed foods like pastries and biscuits and deep-fried foods.

"A healthy diet needs to include lean protein, fibre, fruit and vegetables, while limiting sugar, fat, alcohol and salt," says Dr Groves. "Through all the fad diets that come and go, the Mediterranean-style diet has proven to be the most beneficial to our overall health, and is recommended by many health professionals for diabetics, obese and heart disease patients."

The Mediterranean diet includes lots of fresh vegetables, fruits, nuts, seeds, legumes, whole grains, olive oil and fish. It limits sugar, red meat and processed foods like sausages or white bread.

Regular exercise is also important. According to one US study, exercising four times a week has been proven to be effective in reducing fat around the organs. The study recommends that two of the exercise sessions are high intensity, such as interval training or fast cycling, and two of the sessions are of moderate intensity (30 minutes of brisk walking, cross-training or swimming).

"The value of exercise also appears to be in preventing the onset of visceral fat in the first place; and interestingly, those in the study who did no exercise for six months significantly increased their visceral fat levels," Smallridge says.



DR MICHELLE GROVES
GP, Paradise Point Surgery, Queensland

5 WAYS YOUR FACE CAN REVEAL YOUR HEALTH

THE UNCOMMON SYMPTOMS THAT MAY HINT AT A HEALTH CONDITION.

Words Emily Joyce

Certain areas of your face could be giving clues to underlying health problems. The next time you look in the mirror, take the time to check for changes and see your doctor if you have any concerns.

① DO THE EYES HAVE IT?

We can often get dark circles under our eyes when we're tired and some may experience itchy eyes due to allergy or dry eyes due to long hours at a computer. But if a doctor spots yellow patches around your eyes, it may suggest something more serious.

A 2011 Danish study found that these yellow patches—cholesterol deposits known as xanthelasmata—could predict heart attack and heart disease risk. People with these patches were 48% more likely to have a heart attack and 39% more likely to develop heart disease.

Melbourne GP Dr Aifric Boylan says that this sign would give "a valid reason to rigorously assess a person's overall cardiovascular risk".

While it may be a trigger to open a conversation about heart concerns, she adds the focus will remain on major risk factors such as smoking, blood pressure and family history.

To keep your heart healthy:

- Keep blood pressure and cholesterol levels down
- Maintain a healthy diet
- Keep active
- Don't smoke.

② MORE THAN SKIN DEEP

Many of us have had a skin issue at some stage, from acne to eczema. Skin rashes can suggest lots of different health issues, but a butterfly-shaped rash on your face could be a symptom of lupus.



SOURCES: BMJ; BETTER HEALTH CHANNEL; HEALTH DIRECT; SCIENCE DAILY; JEAN HAILES FOR WOMEN'S HEALTH; DENTAL HEALTH SERVICES VICTORIA. IMAGE FOR ILLUSTRATIVE PURPOSES ONLY.

Lupus is an autoimmune condition where the immune system attacks healthy tissue throughout the body, causing inflammation and pain. The exact cause is unknown but is thought to be a combination of genes and triggers such as sunlight, infections and certain medications.

Research shows up to 80% of people with lupus experience skin rashes, including the butterfly-shaped rash across the cheeks and nose.

"Most people with lupus will [have] other symptoms... joint pains, loss of hair or fatigue," says Dr Boylan. "It can go undiagnosed for a while because it can have so many random symptoms that are seemingly unconnected."

Medications and maintaining a healthy lifestyle can help to manage the disease.

③ READING BETWEEN THE LINES

As we get older, our skin produces less elastin and collagen, meaning it becomes thinner and is more prone to sagging and lines. But deep face wrinkles in women could also be a sign of deteriorating bone density, reports the Yale School of Medicine. After menopause, about half of all women over the age of 60 will have at least one fracture due to osteoporosis. In the small Yale study of early menopausal women, researchers found a relationship between worsening skin wrinkles and lessening bone density. Dr Talat Uppal, clinical director at Northern Beaches Health Service, points out that this is only a link with bone density loss, not a cause.

④ EXCESSIVE FACIAL HAIR

How much hair we have is usually determined by our genes. But some women have particularly coarse hair in less common areas, such as the face, chest and back. Called hirsutism, this can be due to too much of the hormone testosterone or polycystic ovary syndrome (PCOS).

"For most women with hirsutism... if they have an underlying medical disorder, the most common one is going to be PCOS," says Dr Uppal.

PCOS is a complex hormonal condition and other symptoms can include irregular or no menstrual cycles, weight gain and acne. Depending on the symptoms, PCOS can be managed by a healthy diet, excess weight loss, physical activity and medication.

⑤ SWOLLEN LIPS

While we know what passes our lips stimulates our digestive system, it's not too common for it to happen the other way around. But swollen lips can be one of the symptoms of Crohn's disease, according to the *World Journal of Gastroenterology*.

Crohn's disease is a chronic inflammatory disease of the intestine. Professor Finlay Macrae, head of colorectal medicine and genetics at The Royal Melbourne Hospital, says, "One cause of quite marked swollen lips is a condition called orofacial granulomatosis (OFG)... it affects the face, mainly the lips and inside the mouth."

He says an OFG diagnosis needs to be confirmed with a biopsy and, "if granulomas are found in multiple sites in the gastrointestinal tract, which may include the mouth, a diagnosis of Crohn's disease has to come into high suspicion".

Future Focus

Robot teachers may help children with autism to recognise emotions in others.
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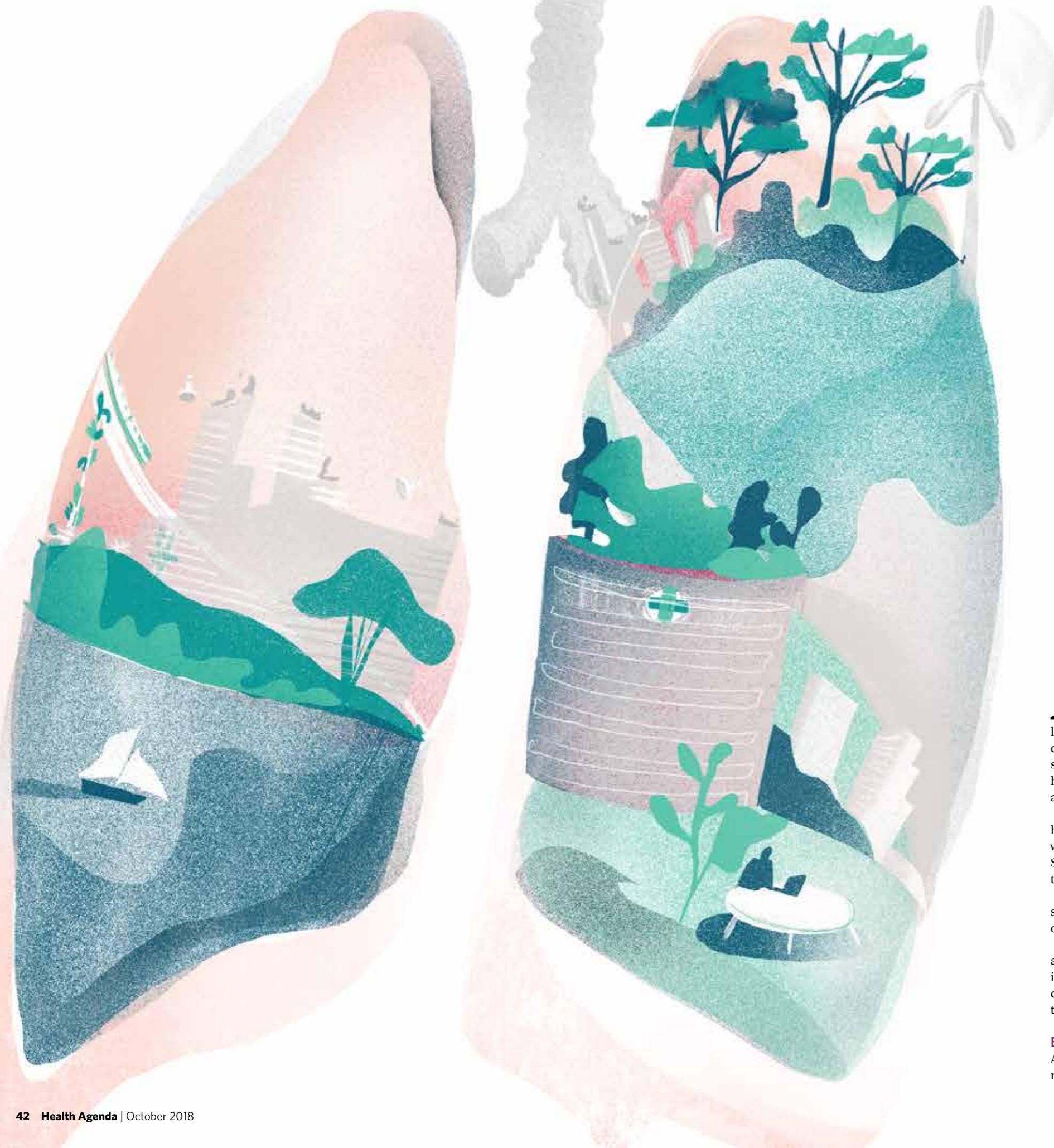
Two Australian scientists are developing affordable medications in plants.
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**PLAN SMART,
BREATHE EASY**
City planners are making our cities more health conscious than ever.

PHOTO: SPRINGFIELD



PLAN SMART, *breathe easy*

THE WAY AUSTRALIANS LIVE IS BEING REDESIGNED TO ENABLE US TO LIVE HEALTHIER, LONGER AND HAPPIER LIVES IN SPECIFICALLY DESIGNED HOMES AND CITIES.

Words Nate Cochrane Illustration Annelien Smet

As Australia's population grows and human longevity increases, the way in which people live, and where they live, could change for the better. But there are challenges and health risk linked to urban growth too. Developers are currently designing cities, suburbs, villages and communities that serve residents by enabling them to work from their homes or in shared spaces, with designated wellness areas, community gardens and solar-powered buildings.

Sydney is growing fast, with 100,000 extra people having moved to the city in 2016–17 alone. Currently with 5 million people, it's expected that by 2036 Sydney's population will exceed 6.4 million. It's likely to reach nearly 8 million by 2053.

This increase is creating overcrowding and a shortage of affordable housing and is placing a strain on the city's environment, resources and air quality.

Seeking to reduce air pollution is nothing new, although with our cities expanding it's more important now than ever that contemporary developments create healthy cities using 'smart' technologies to improve our health and wellbeing.

BUILDING BREATHABLE CITIES

Air particles including pollution are said to be responsible for decreased lung function, increased

respiratory symptoms and increased heart and lung disease, according to the *Australia State of the Environment 2016* report. It may also worsen conditions like asthma and chronic obstructive pulmonary disease. The World Health Organization estimates that in Australia alone air pollution contributes to 4,316 deaths a year.

City of Sydney Deputy Lord Mayor Jess Miller led the Breathable City Hackathon in August, which challenged locals to workshop ideas about clean air. Products were road-tested from Plume Labs in France; wearable air quality trackers and a pollution forecasting app.

Sydney's air-pollution monitoring only looks at ambient air quality and there are no monitors in the CBD, Miller says.

"The locations [currently monitored] are where air quality would be good, such as Lane Cove National Park. So we started to think about how to do it better."

Miller says one of the local government's priorities is to remove superfine, carcinogenic 'PM2.5' air particles that may cause asthma and threaten lung function. Sources include pollution from cars, wood burning and coal power plants. She says the use of sensors could improve the lives of the vulnerable, the young and seniors by providing warnings when air quality is ➤

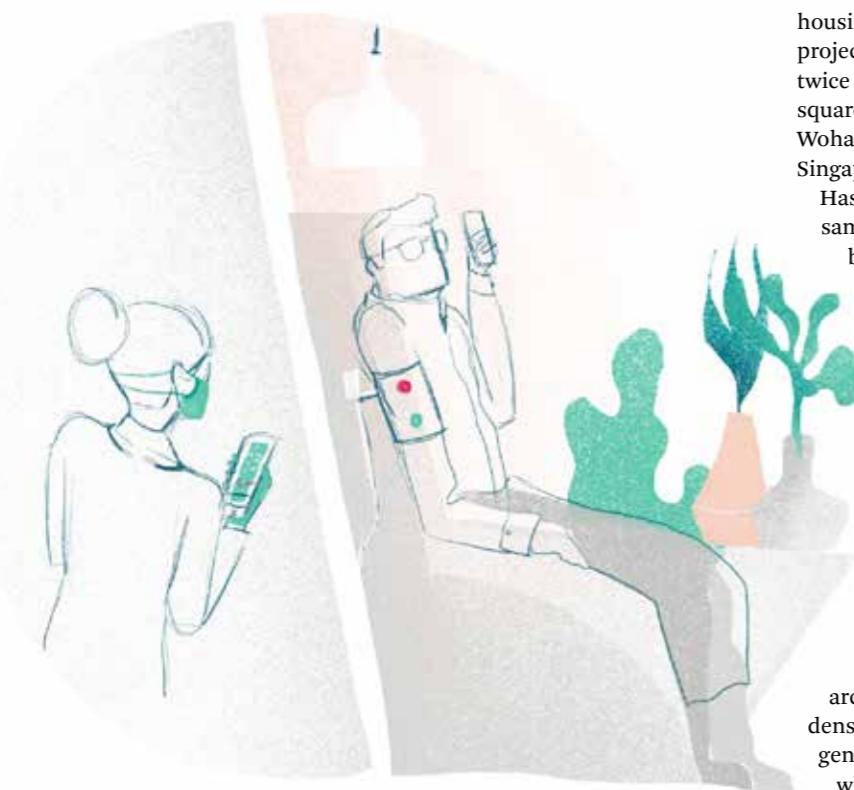
likely to be hazardous. They can then avoid particularly polluted areas or being outside at peak times, or take medications if needed. There's also a strong economic case for this approach if it can reduce hospital costs related to respiratory illnesses. "It's preventative health from a city-planning perspective," Miller says.

BUILDING 'GREEN' HOUSES FOR HEALTH

The United Nations forecasts the global population will jump from 7.6 billion today to 10 billion by 2056. By this time two-thirds of the world's people will live in cities, so many town planners seek to curb urban sprawl and cut air pollution.

As co-founders of the design firm Woha, Singapore-based architect Richard Hassell and his business partner Wong Mun Summ are tackling both concerns. Woha's starting point is to "create even more nature than [existed] before the city was there", says Hassell. More greenery combats air pollution by filtering out particles, absorbing carbon dioxide and producing oxygen. The 'sky gardens' created by Woha also limit the urban 'heat island' effect that makes city centres hotter than surrounding areas, and at the same time suppress noise. And they dramatically cut or even eliminate air-conditioning costs, Hassell says.

The pair sees a sustainable, affordable solution to



housing stress in the sky. Woha's breakthrough 2013 project, Parkroyal on Pickering in Singapore, had twice as much green space as site area, with 15,000 square metres of elevated terraced sky gardens. Woha topped that three years later with Oasia hotel, Singapore, with a green-to-site ratio of 10:1.

Hassell says citizens of developing nations want the same garden lifestyle more common in the West but wrestle with the obstacle of high population densities.

"The problem is the number of people in megacities of 10 million [people] and up to 90 million in China – you can't have 90 million quarter-acre blocks."

"Can you still deliver this very high quality of life at much higher densities?"

The Woha team learned it could build parks and recreation and gathering areas at great heights. Woha even has a concept of 'garden sheds' in which people explore hobbies to improve wellness and incubate start-ups to spur economic development. Hassell envisions buildings that are their own architectural ecologies, or "arcologies". These dense, self-sustaining vertical communities will generate their own power, water and even fresh food while recycling waste and limiting pollution.



"The technology is all there and not very difficult," says Hassell. "[The challenge is] how you get everyone on board and have a large enough project where you can see the effect."

IS THERE A DOCTOR IN THE HOUSE?

On a more intimate scale, technology could help individuals to manage health conditions, says MOQdigital technologist Nick Browne.

The Brisbane consultancy is exploring how to use \$2,000 Arrow ECS sensors that capture carbon monoxide, carbon dioxide, oxygen, air pressure, temperature and humidity readings. The data is displayed on a real-time map as 'traffic lights' so people with respiratory conditions know which areas to avoid or when to stay inside. This is relevant to aged-care, nursing and childcare providers whose clients can be vulnerable to poor air quality.

SMART DEVICES EQUAL A SMART HOME

Focusing on individuals' welfare but operating on a much broader scale, Catherine Caruana-McManus has co-founded a start-up, Meshed, that provides smart solutions for cities on everything from smart lighting to waste management. It also assesses walkability against criteria such as safety, usefulness, comfort and interest.

Caruana-McManus points to Tulip (Technology for Urban Liveability), an open-source project that gathers data to improve city dwellers' lives. It is deployed in Lake Macquarie in New South Wales to monitor air quality degraded by Hunter Valley coal dust.

As a cheap and accessible technology, Tulip is available to anyone with an interest in assisting with the project. "People buy their own [environmental] sensors or work with a university to attach one to a building, bike or pole, and we bring that [information] together using the internet and smart apps," Caruana-McManus says.

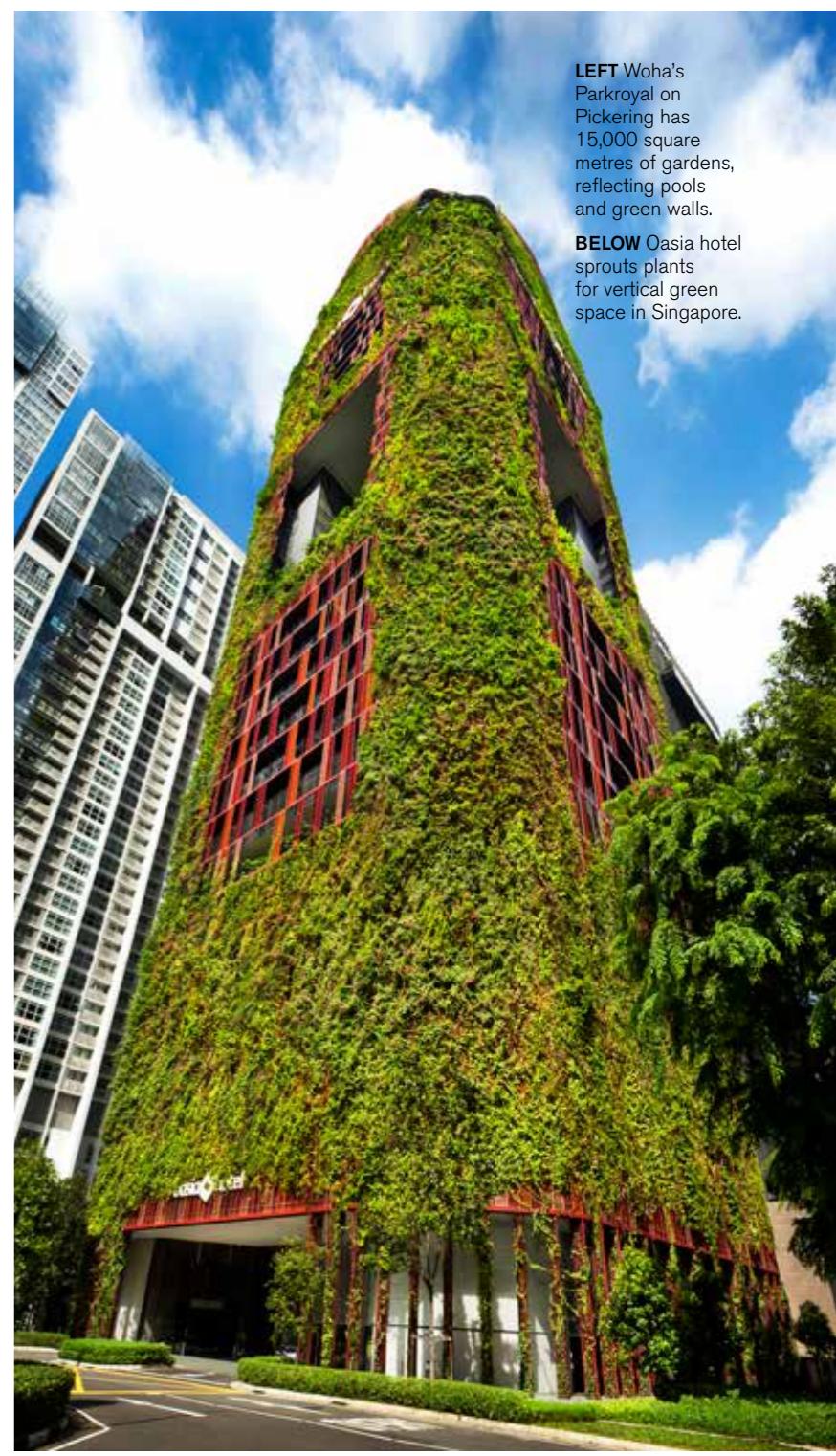
Although industry and the government must drive the smart city agenda, she says it's important for everyone to get involved.

"Smart cities [are] only effective if everyone has buy-in. It's exciting, [this] ability for the average person to get engaged around the health and liveability of their cities."

THE FUTURE OF CITIES IS HERE

Taking exit 33 on the Centenary Highway 33 kilometres south-west of Brisbane and driving over the Paul Pisasale Bridge leads to the heart of Springfield. This Springfield is not the home of Homer and Marge Simpson and their cartoon-character kids; it's Australia's only privately developed city. At 2,860 hectares it's also the country's biggest master-planned development. ▶

“It's preventative health from a city-planning perspective.”



LEFT Woha's Parkroyal on Pickering has 15,000 square metres of gardens, reflecting pools and green walls.

BELOW Oasia hotel sprouts plants for vertical green space in Singapore.



With a population of nearly 40,000 and plans for that to surge to 100,000 by 2030, Springfield expresses the notion 'If you build it, people will come'. It turns the traditional housing development on its head by building infrastructure for jobs in anticipation of growth.

A third of Springfield's area is reserved for parks, and rail, schools, hospitals, shopping centres and public amenities are built before houses. Springfield attracts the likes of aged-care provider Aveo and Mater Hospital,

How does Australia's air quality rank?

Air pollution is measured by air particles of less than 2.5 microns (PM2.5). The World Health Organization recommended level is 10 micrograms per cubic metre ($10\mu\text{g}/\text{m}^3$). All Australian cities have an annual mean under this level. At the other end of the spectrum, Zabol in Iran has $217\mu\text{g}/\text{m}^3$.

Despite our relatively good air, pollution can still affect some people with allergies and asthma. Air filters in your home and car may help though. The National Asthma Council Australia says that quality of filters varies; visit sensitivechoice.com for more.

as well as private schools and tertiary institutions.

Springfield Land Corporation education and health enterprises CEO Terry Kearney says the organisation has a vision for 50,000 jobs to employ a third of residents.

"It's about creating an economy, not a dormitory suburb," says Kearney.

Housing choices range from affordable apartments, townhouses and detached houses to multi-million-dollar mansions ringed by a Greg Norman-designed golf course. It adds up to a community that promotes healthy and active lifestyles for people wanting to "work, live, play and learn", says Kearney.

Another unusual initiative of the development is the biannual Shifting Health by Design symposium at which experts discuss how to include the community in designing better public health outcomes.

Springfield's other health initiatives include a testing centre for health technology, and sports medicine facilities at the proposed \$70 million Brisbane Lions' AFL stadium. This year Springfield will also unveil \$45 million worth of parks complementing existing open areas such as Robelle Domain to create a walkable end-to-end community by linking shops, public transport and offices in the CBD with homes.

The average age in Springfield is just 28. But as the city's population ages more people will move their

SOURCES: DEPARTMENT OF ENVIRONMENT AND ENERGY; DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES; AUSTRALIAN BUREAU OF STATISTICS; NSW PLANNING & ENVIRONMENT; THE GUARDIAN



“It adds up to a community that **promotes healthy and active lifestyles.**”

A third of the Springfield development in Queensland is devoted to parks.

extended families to Springfield and over time seek to retire there after living and working in the area, says Kearney. With a view to helping them to move around, Springfield recently conducted a trial of autonomous mini buses down John Nugent Way, the spine that links The University of Southern Queensland with the Orion shops.

BUT WHERE'S THE DATA?

While mayors across the nation struggle to find the data they need to gain funding for healthy initiatives, the answers may already be on the smartphones and devices of everyday Australians. Increasingly, councils are turning to public and open-source data when planning their developments. For instance, ride-sharing company Uber has begun providing anonymised open data on traffic behaviour in Sydney, Melbourne, Brisbane and Perth through its Uber Movement information-sharing initiative.

Brisbane consultancy Place Design Group works with Livingstone City Council on its Active Livingstone strategy that encourages citizens to get out and exercise within Central Queensland Shire. The collaborators use data gathered from Strava, a running and cycling app, to plot potential bike routes and walkways, says Stephen Smith.

"They're a small, local authority that struggles to get the [basic] information about where people are going," says Smith, principal at Place

Design Group in Brisbane. "That's where you need to turn to sources like Strava to see how people are going on-road and off-road."

And the Strava data is tracking closely to feedback gleaned in resident interviews, he says. "It's not definitive, but in the absence of anything else Strava data helps you build a picture of road and off-road networks."

The data will also be included in a pitch to state government to fund future bike path improvements. "We want to get people off their bums and let them enjoy the fantastic lifestyle that Livingstone delivers."

FUTURE CITIES



10b

PEOPLE IN THE WORLD BY 2056. TODAY WE HAVE AROUND 7.6B.



>36.8m

PEOPLE IN AUSTRALIA BY 2061. TODAY WE HAVE AROUND 25M.



66%

OF PEOPLE TO LIVE IN CITIES BY 2050, UP FROM 54% TODAY.

Sources: World Population Clock; Australian Bureau of Statistics (ABS) Population Clock; ABS population projections; World Urbanisation Prospects 2014 Revision

Growing A NEW TYPE OF painkiller

A REMARKABLE COLLABORATION BETWEEN TWO AUSTRALIAN SCIENTISTS COULD LEAD TO CROPS FULL OF AFFORDABLE MEDICINES WITH PAINKILLING AND ANTI-CANCER PROPERTIES.

Words Fiona McMillan

In August 1961, a Norwegian doctor named Lorentz Gran arrived in the Congo region of central Africa. The Red Cross had sent him to a small hospital in an area where fighting had broken out and casualties were high. As the weeks passed, the conflict gradually eased, but Gran stayed on and turned his attention to the maternity ward. It was here that something piqued his curiosity: during labour, women often drank a hot tea made from the leaves of the local 'Kalata-Kalata' plant (*Oldenlandia affinis*) to promote uterine contractions and accelerate childbirth.

Intrigued, Gran went on to discover that the active ingredient was a peptide, a type of molecule. At the time, he didn't know how it retained its properties after being boiled and eaten.

The mystery of this little peptide, named Kalata B1, remained unsolved for decades. Then, in the early 1990s, David Craik, an Australian molecular chemist at the University of Oxford, figured it out.

A peptide is a short chain of amino acids, which are the building blocks of proteins. Most peptides have a beginning and an end, like a piece of string, but Craik discovered that Kalata B1 is a tightly knotted circle. This is a highly unusual structure for a peptide.

"No-one really believed me at the time," says Professor Craik. But for him, it was an *Aha!* moment. "It immediately explained why the peptide was so stable," even as tea.

Because it was a knotted circle, it was strong – resistant to both heat and acid. He called it a cyclic peptide, or cyclotide. The discovery raised the exciting possibility of growing plants that could be used as medication in remote or developing parts of the world in an affordable way.

THE MASTER KEY OF MEDICINES?

Large molecule medications can be more powerful and targeted. But they usually need to be injected or taken intravenously and are complex to create, making them expensive. For example, insulin injections for diabetes include large complex molecules. Aspirin is a small molecule drug that is relatively cheap and easy to make, now that chemists know how.

Cyclotides are large molecule drugs that, being resilient, can be taken by mouth. They can also be designed to physically fit into the large natural grooves on a protein, like a key designed to fit a specific lock. This means peptide drugs have less chance of hitting the wrong target in the body, reducing the risk of side effects.

Current peptide medications can easily unravel and are susceptible to being broken down by the body. If they can't remain intact and hold their shape, they can't be effective.

Prof Craik wondered if it might be possible to use Kalata B1 together with peptide drugs, like

SOURCES: BRITANNICA; INSTITUTE FOR MOLECULAR BIOSCIENCES; AT THE UNIVERSITY OF QUEENSLAND; MEDICAL UNIVERSITY OF VIENNA; THE JOURNAL OF ANTIBIOTICS; DEPARTMENT OF AGRICULTURE AND RESOURCES

UNSW 3D
Visualisation
Aesthetics Lab.

a durable blank key that could be modified to fit different locks.

It was an ambitious idea, and one that required learning a lot more about these cyclotides, including how the plant makes them. In 1995 he returned to Australia to set up his own laboratory at the University of Queensland. He partnered with plant biochemist Marilyn Anderson, who was in the process of setting up her own research group at La Trobe University in Victoria.

She had a particular interest in how plants defend themselves against insects, and had been running some feeding trials to see how insects respond to a variety of plant molecules. Out of curiosity, she and Prof Craik added some Kalata B1 to the trial. The effect was striking.

"They are really very effective deterrents to insects," says Professor Anderson. "The insects have a little taste of the leaf and then they just go away, because it irritates their guts." This could make them easier and cheaper to grow. ▶

UNCOVERING NATURE'S SECRETS

The next step was to figure out how the Kalata-Kalata plant makes the cyclotides. Prof Craik soon discovered that a number of other plants carried similar genes, especially those in the violet family. But these were designed for fending off insects and not suited for large scale production.

He set to work modifying the cyclotides, to see if he could get them to act as powerful, targeted drugs with the aim that they could be produced cheaply, even in remote areas in the future.

"He's an absolutely excellent chemist," says Prof Anderson. "He's been busy adapting this little circular peptide and making [medications] that can be used for the treatment of cancer, obesity or pain."

It's important that any new medicine can be produced in sufficient quantities to meet demand. Cyclotides are time consuming and expensive to make artificially in the lab, on a large scale. But Prof Craik already had something else in mind.

"Why not get plants to produce the cyclotides?" says Craik. If they could accomplish this, he reasoned, then

“He set to work, to see if he could get them to act as powerful, targeted drugs.”

it might be possible for people in the developing world to grow their own pharmaceuticals. But when they put the cyclotide gene into another plant, it didn't produce very much. The gene alone was not enough. They realised that something else must be needed to make cyclotides, and had a strong hunch it was probably an enzyme that makes the peptide circular. So while Prof Craik's group continued exploring the medical possibilities of cyclotides, Prof Anderson's group set out to find the mystery enzyme. It was like a needle in a haystack, but in 2015 they found it.

TAKING THE RESEARCH FURTHER

It was now theoretically possible to make cyclotides in plants, they just had to show it could be done.

When Craik was awarded the prestigious Ramaciotti Biomedical Research Award for this work in 2015 they used the funding to establish the Clive and Vera Ramaciotti Facility (CVRF) for Producing Pharmaceuticals in Plants.

This was a wonderful boon for a collaboration and friendship spanning decades, and one that was well deserved. There had been constant discussions, overcoming problems and floating new ideas, fortnightly lab meetings via phone, sharing the supervision of research students, as well as setbacks and victories along the way. But neither of them would have it any other way.

"We like working with each other and it's been really complementary," says Prof Craik.

With the facility up and running they reached the crucial moment: would incorporating both the cyclotide gene and the helper-enzyme gene into an ordinary crop plant really work? In a word, yes.

"We get perfect production," says Prof Anderson. "We're pretty excited about it!"

In January, they published their results,

demonstrating that cyclotides could be made in a number of different plants, including lettuce, canola and green beans.

Prof Craik is now exploring production in rice, potatoes and tomatoes, and he will settle on which cyclotides have the most potential in the clinic.

From here, Prof Anderson says, there are two ways forward for producing cyclotides for medical use.

In the first, she says, "You could grow them on a large scale and then extract the active molecules that you want." Once the crops are harvested and processed, the therapeutic molecules could be extracted, purified and concentrated into specific doses, then put into a pill or liquid.

The other way forward is a bit more direct, like chewing on a specially designed leaf. She cautions that, with the second option, it would have to be a therapy that does not require a precise dose, because you would not be able to measure the levels consumed. More research is needed for this avenue, but both Professors Craik and Anderson are keen to see it come to fruition.

As for which particular conditions could be treated with cyclotides, the potential range is vast because it's such a versatile key.

"We think there are lots of exciting possibilities," says Prof Craik.

He points out that a number of other research groups are now using cyclotides in medicine design as well. Many are in the early stages, but some are advancing towards being tested. A colleague in Austria has recently developed a small cyclotide for the treatment of multiple sclerosis, and it could soon be in clinical trials. As with the original cyclotides in Kalata-Kalata tea, it is active even when taken orally, so it could be developed into a pill. ☀



SOURCES: BRITANNICA; ABC; WILEY TRAFFIC PHOTOS: JOHN MCGHEE AND QUENTIN JONES

Molecular farming in Australia and worldwide

Agricultural biotechnologist TJ Higgins, an honorary research fellow at CSIRO, believes there is a lot of potential for growing therapeutic molecules in crops, which is known as 'molecular farming'.

"Plants are already used widely as factories for pharmaceuticals," he says.

"There's been a lot of work on the production of vaccines in plants, and various other pharmaceutical compounds have also been produced in plants."

Higgins can envisage medicinal crops being grown on a commercial scale, at around 50,000 to 100,000 hectares. It would also be feasible to grow

them in plots as small as one or two acres.

"Farmers can greatly benefit from molecular farming," he says, adding that it would be particularly valuable in regions with poor access to medication. Of course, farmers in Australia and overseas would need to take their products through a regulatory system, he adds. In many places these rules are still being developed and can vary dramatically.

There is still a lot of work to do when it comes to making this kind of technology universally accepted, says Higgins, but there could be a promising future ahead for both food production and molecular farming.

ROBOTS *to the* RESCUE

PROCESSING EMOTIONS AND SOCIAL CUES CAN BE A STRUGGLE FOR CHILDREN WITH AUTISM. ROBOT TEACHERS MAY HELP CHILDREN WITH AUTISM, PLUS THEIR FAMILIES AND THERAPISTS.

Words Natalie Parletta



LEFT: Robot Kaspar has proven effective in engaging kids with autism.

RIGHT: Nao robots are being used to support teachers with everything from maths to dance.



For people with autism, a chat in a café could be a confusing and overwhelming experience. You might be distracted by the multiple conversations taking place and the loud sounds of the coffee machine. You might not understand the non-verbal cues of the waitress or the expression on her face. You may have difficulty making yourself understood.

Although there are many different symptoms and varying levels of autism spectrum disorder (ASD), having difficulty with social interaction is a common experience. Researchers have found human-like robots with simple facial expressions and non-threatening, predictable behaviour have the potential to engage children with autism and aid learning in social, communication and life skills.

THE ROBOT-AUTISM ENIGMA

Several studies are currently underway to deliver the next generation of robot-enhanced therapy and diagnosis. Liz Pellicano, educational psychologist and professor at Macquarie University in Sydney, recently returned to Australia after eight years at University College London. She is involved in DE-ENIGMA, a large project running from 2016 to 2019 across six European countries. Its focus is on creating a human-robot interaction that will enhance the social skills of children with ASD and help them better understand emotions and expressions.

The project's star is Zeno, a small, endearing, boyish-looking robot with wide, dreamy-looking eyes. He was chosen because he can make facial expressions realistic enough but "when he makes his sad face, it's exactly the same every time", Pellicano explains. The consistency helps the children learn the expression and emotion.

DE-ENIGMA is currently working with 128 autistic children aged 5–12, who are mostly non-verbal and difficult to reach. In the project's next stage, researchers plan to use the collected data to make Zeno smarter. The goal is to develop an autonomous robot that will >

respond dynamically to an individual autistic child's behaviour, rather than just act on pre-programmed responses. For instance, a child might feel overwhelmed by noises and put his hands over his ears.

"Zeno might 'think' that the child is feeling something [negative], so might turn his volume down," says Pellicano. "If we can pull that off, I think that will be an amazing feat."

Zeno was originally the brainchild of American roboticist Dr David Hanson. Dr Carolyn Garver, clinical director of the Autism Research Centre in Dallas, Texas, says: "About five years ago, I got a call from this incredible man named David Hanson who in Singapore was developing one of the most realistic robots in the world."

Dr Garver, who has worked with autism in children and adults for 45 years, teamed up with Dr Hanson – he taught her about robotics and she taught him about autism.

Dr Garver now works with a robot named Milo, an identical version of Zeno. She remembers a 17-year-old patient who struggled with aggression, and his mother said he didn't understand emotions at all. One day, Dr Garver was working with the boy on understanding 'sad'. She asked him, "Is Milo sad?" and he said, "Milo is sad." Dr Garver looked at the boy and saw a huge tear running down his face. "I just lost it," she says. "I was blown away that he actually expressed empathy. That was huge."



LIZ PELLICANO
Professor,
Department
of Educational
Studies,
Macquarie
University

CREATING EMPATHY AND MOVEMENT

Dr Christine Roberts-Yates, manager of Murray Bridge High School's disability unit in South Australia, has also observed that robots "unwittingly create empathy". Using her fellowship funds, she purchased two Nao robots and is researching them in collaboration with the CSIRO. Less human-like than Zeno and Milo, they look more like troopers from Star Wars, but with round eyes and a small mouth that gives them an innocent expression.

Dr Roberts-Yates says the children – with varying degrees of intellectual disability, half with autism – worry when the robots fall over. She recalls finding a boy with Down syndrome outside the classroom one day. When she asked him why he was there, he said, "The robot fell over and he's hurt his leg."

The children know the robots are not human beings, says Dr Roberts-Yates, but they're very patient with them, and the robots have a calming influence. Her unit uses the robots as mentors to support the school curriculum, teaching skills that range from spelling, maths, reading and chemistry experiments to holding a knife safely, shopping etiquette and manners. They even engage them in tai chi and yoga. "They really want to model the robot, and some will put their own dance steps in," she says.

KASPAR THE FRIENDLY ROBOT

Robot Kaspar wears a sporty cap, jeans, shirt and socks. He was designed by the University of Hertfordshire's Adaptive Systems Research Group, founded in 1998 and coordinated by Professor Kerstin Dautenhahn. Dr Ben Robins joined in 2002 and was amazed at how well the children responded to Kaspar. Like Zeno, Kaspar's simple, consistent facial expressions are thought to be easier to interpret for children with autism.

Dr David Silvera-Tawil, research scientist at the CSIRO, spent a few months with Dr Robins about three years ago and brought Kaspar back to Sydney for research on social learning. The researchers use stories and Kaspar acts as a role player or peer mediator. For example, says Dr Silvera-Tawil, if a goal was to learn to say 'hello', then the story would be about "how saying hello is nice, and other people like it when you say hello, and this is how you say hello". Then Kaspar joins in to motivate and engage the child to practise what they've learned.

Professor Rajiv Khosla, CEO of Human Centred Innovations in Greensborough, Victoria, has been working with Matilda. More like the robot from *Lost in Space*, Matilda has two large eyes, lights for ears perched on a round torso and two little feet poking out. Launched in March 2017, the robot has been developed over 20 years.

"The good thing about the Matilda face is that it is accepted universally across all age groups, cultures and languages," says Prof Khosla. She is also multilingual. Originally used for dementia patients in aged care,



Matilda is now also used in children with autism in Australia and China, in collaboration with the University of Hong Kong.

COULD IT BE DIGITAL OVERLOAD?

Just as some research suggests that screen devices like smartphones can disconnect people and impact child development, are there similar downsides to using robots? Prof Khosla explains that screen devices draw children in passively. He says that humans don't learn naturally through screen devices, and it may be causing issues with children's language and their social and emotional development. These robots, on the other hand, encourage interaction and engagement. In this way, they can stimulate active learning. Importantly, they're not meant to replace human interactions, but to help children with autism learn to relate to others. The hope is that they'll be able to have more, and better, interactions with family and friends.

“The goal is to develop an autonomous robot that will respond dynamically, rather than just act on pre-programmed responses.”

LEFT Nao
robots mentor
students in
South Australia.

ABOVE Robot
Zeno can help
to learn facial
expressions.

Dr Garver observed that children can generalise from the robot to the real world – once they learn simple emotions from the robot, they are better able to identify people's emotions. Dr Roberts-Yates says that the families she works with report their children are "more confident, communicative, more helpful at home". But she highlights that robots are just computers and are only as good as the people working with them.

They are a tool, and "we need as many tools as we can to work with these kids; we need to be innovative," says Dr Garver. And the opportunities for health applications of robots are boundless. As Dr Silvera-Tawil suggests, "we're just starting to see the tip of the iceberg".

To find out more about autism research and education, visit AutismCRC at autismcrc.com.au

Balance

Ease stress for your loved ones by having your affairs in order. Here's how.

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Get back to nature: the growing list of reasons to start your own garden.

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DRIVING
COMMUNITY
CONNECTIONS
A Brisbane-based
charity that aims to
ease the isolation of
homeless people.



SOWING *the seeds for* HEALTH

HOW YOUR GREEN THUMB MAY GROW
LONG-TERM BENEFITS FOR YOUR MENTAL
AND PHYSICAL HEALTH.

Words Sophia Auld Photography Glenn Hunt

Jo Morgan credits gardening with saving her life. The 59-year-old, from Ipswich in Queensland, suffered debilitating physical and psychological trauma during her time in Australia's defence forces. As her health deteriorated, she was no longer able to work or manage the 80-acre property where she'd been living, and in 2000 she moved into a housing commission disability unit.

"I was totally lost and very depressed because I was sitting in this house by myself with nothing to do," she says. "I don't think I would be here today if I hadn't found gardening. I was very close to not going on at one stage."

On moving into the unit, Morgan, who has been in a wheelchair for 20 years, immediately got stuck into establishing a garden. "I thought, oh well, it's a brand-new place [with] no garden, so I started from scratch and went from there."

Morgan has modified her gardening tools so she can use them from her wheelchair and she uses a handy gadget called a Power Planter to help with digging. She has a small trailer to carry what she needs. Her garden is blooming with a rose garden, cacti and succulents, fruit trees, and five raised beds for growing vegetables.

An increasing body of research is bearing out what Morgan has experienced. A report called 'Gardening is beneficial for health: A meta-analysis', published in the journal *Preventive Medicine Reports*, explored the results from 22 studies into the health effects of gardening. The researchers found that it has wide-ranging physical and mental health benefits.

The researchers observed that certain conditions – like obesity, diabetes, heart disease and stroke – are "becoming a major public health issue". They also said that, as populations become more urbanised, people are more ➤



“ You might start off with a little bit of pain, but it’s well worth putting up with that and being able to do far more than you thought you ever would.”

ABOVE Jo Morgan credits gardening with improving her mental health.

RIGHT Founder of Urban Growers Byron Smith.

likely to have unhealthy lifestyles, with high-fat diets, lack of physical activity, exposure to environmental pollutants, and increased levels of social and psychological stress.

On the flip side is the mounting evidence showing that time spent in nature offers health benefits, with the potential to offset some of the adverse effects of urban living. The research suggests that daily contact with nature has a deep and lasting impact on health, including on depression and anxiety, obesity, heart disease and longevity.

GARDENING GAINS

So what are some of the physical health benefits of getting out into the fresh air and sunshine to dig, plant, weed and water? Morgan, who has lost one arm as well as the use of her legs, says her upper body is a lot stronger since she started gardening. “The top part of my body is far more stable,” she says. “I can lift a lot more [and] I’m not falling to the right as much as I was.”

Gardening has also helped ease her arthritis symptoms. “You might start off with a little bit of pain, but it’s well worth putting up with that [then] ending up in no pain at all; and being able to do far more than you thought you ever would.”

The research backs this up, finding that healthy older adults who gardened to a moderate physical level, for 30 minutes at least five days a week, had better overall fitness, less pain, and better hand function than those

who were also active but did less gardening.

The researchers believe that repeated short-term exercise in gardens has a cumulative positive effect on health. And because gardening encourages exercise, it contributes to improving psychological as well as physical wellbeing.

“Gardening is a very credible form of exercise, using a mixture of strength, cardio and flexibility activities,” agrees exercise physiologist Amelia Burton.

“You’ll build up your strength from lugging bags of fertiliser or pulling out stubborn weeds, and you’ll improve your cardio levels from activities like sweeping or raking, and flexibility from squatting and bending to [get to] those hard-to-reach places. In fact, sweeping can burn as many calories as a fast power walk.”

Gardening can even help with balance. “The act of getting down to the ground and back up again is quite a challenge for the body, shunting blood from one end to the other. This improves cardiovascular health as well as strength and coordination. It can help to improve balance. But if you’re prone to dizziness do be careful [at first].”

Gardener and author of *Slow Down and Grow Something* Byron Smith says children can also benefit from helping out in the garden. “City dwellers [can sometimes] feel disconnected from nature... this connection is especially important for children growing up in the city who may miss regular opportunities to explore the great outdoors.”

When children grow some of the ingredients for their

meals, they’re also more likely to eat healthily. A small study from Cornell University in the US found that when vegetables grown by children were included in a salad, they were four times more likely to eat them.

CLEARING THE AIR

While the physical benefits of gardening are great, for Morgan, who suffers post-traumatic stress disorder (PTSD), the psychological benefits are even more important. She says many of her fellow veterans don’t understand her positivity, given what’s she’s been through.

“I just tell them it’s because I keep busy,” she says. And being busy indoors doesn’t cut it for her. “You need to get out and get physical – the more physical you can become with this PTSD... the better off you are.”

Even a few hours in your garden can reduce depression and anxiety symptoms. Two Norwegian studies published in 2011 looked at whether gardening activities affected depression, with measures taken before and after a 12-week gardening program, and at a three-month follow-up. In both studies, the symptoms of depression decreased during the therapy, and remained low at the follow-up. Participants described the gardening as meaningful and influential on their view of life.

For Morgan, just thinking about her garden has a positive impact on her mood. When she’s had to spend time in hospital, she plans what she’ll do when she gets home, which gives her something to look forward to.

SOCIAL BUTTERFLIES

You don’t even need to have your own garden to get the health benefits. In fact, joining others in gardening activities

**fast
fact**

50%

The reduced Alzheimer’s disease risk for those who participated in a variety of physical activities, including gardening.

Source: Journal of Alzheimer’s Disease

– in community or allotment gardens – can have social benefits, too. As studies continue to prove how vital social connections are to health and longevity, allotments and community gardens provide opportunities for people to connect with others in their local communities. Visit communitygarden.org.au to find one near you.

Morgan, whose garden has won three awards, has people stop by to admire what she has done, giving her a sense of pride. She believes this also encourages others.

“People can say, ‘Look at what she’s achieved.’ I think it’s inspirational for other people that they can see me – a person in a wheelchair, with one arm, doing what I’m doing – to know that it has not stopped me.”

For Morgan, the health benefits have been nothing short of life changing. To anyone considering gardening for its health-boosting effects, she has this advice: “Do it – it has just helped me so much.”

HOW TO GROW YOUR OWN GREEN SPACE

Like Morgan, Smith says his garden is his refuge. “In the garden, your mind can unwind, reflect and pause to appreciate the simple beauty of nature... [it’s] a quiet escape from the stress of the modern world.”

He points out that it’s not the size of your garden that counts, and that even city dwellers can get back in touch with nature with window boxes, herb gardens and small fruit trees.

Smith speaks of studies that report green spaces can improve productivity at work and reduce anxiety and stress. He believes there are physical benefits too.

“It can be quite physical depending on what you’re doing. It could be 15 minutes or a few hours on the weekend. You find a nice balance that suits you. And it’s something you can do into your old age and it keeps you fit.”

His top tips for getting your garden started are to grow in the sunniest location you can and go with premium soil and potting mix.

If you’ve got a small balcony space, go for a “selection of nice pots with hardy Mediterranean herbs like oregano, rosemary and thyme. In another big pot have salad greens like bok choy, rainbow chard and kale. In the third big pot you could have a dwarf citrus tree with an underplanting of edible flowers.” These plants don’t take up too much room and you can get the satisfaction of eating the herbs and salad greens on a regular basis.

If you have a garden, you could start with a “raised timber garden bed at about 40cm high” where you could experiment with other herbs and fruit trees.

For people with no outside space, if you’ve got a sunny spot in your home certain plants will still thrive. “Edible plants don’t do so well indoors. A good indoor plant is the fruit salad plant, philodendron species. [Indoor plants] clean the air and are good visually. Deep down I think that relaxes us and we know it’s a tranquil place to be.” ☀

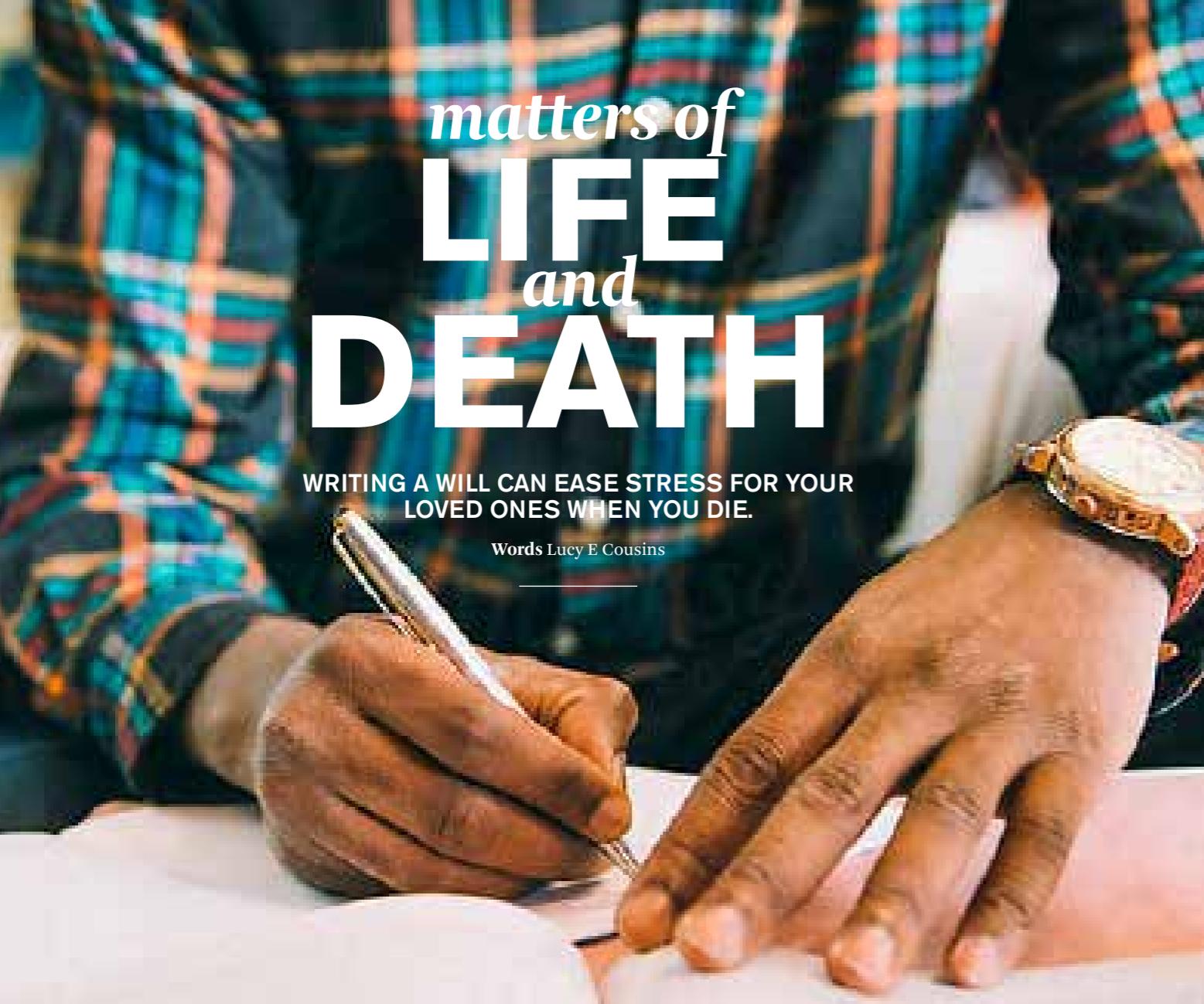


 If you are feeling depressed or anxious, contact Beyondblue on **1300 22 4636** or visit beyondblue.org.au for support.

matters of LIFE and DEATH

WRITING A WILL CAN EASE STRESS FOR YOUR LOVED ONES WHEN YOU DIE.

Words Lucy E Cousins



Talking about death can be challenging, especially if you're talking about your own death. Understandably, it's a topic we tend to avoid. Psychologist Breanna Jayne Sada says the thought of not being around for our family and friends is confronting.

"Every individual might have their own reasons for avoiding doing their will," says Sada, "but essentially it comes down to accepting that death is a reality of life."

Sada recommends trying to make it easier for ourselves, and our families, by changing our perspective when it comes to getting our affairs in order.

"Creating a will doesn't mean you're going to die soon," she advises. "It just means that when you die your loved ones are going to be provided for. And knowing there is some consideration for them can be comforting to them and to you."

It's a sentiment that Jeff Roberts, 61, understands well.

"It comes down to the fact that, at various stages of your life, you think more about your mortality," he says. "And

I wanted to make it easy and straightforward for the people I am leaving everything to. That's really important to me."

For Roberts, making sure his will was in place and easy to understand was key to his peace of mind.

"I don't want it to be a great burden [when I die]; I want it to be as organised as possible. I've never done one of those do-it-yourself wills," says Roberts. "I've always gone to a lawyer because I wanted to make sure it was done correctly."

While do-it-yourself will kits can be found easily on websites, in post offices and from some insurance companies, lawyer Andrew Simpson, National Head of Wills and Estate Planning at Maurice Blackburn Lawyers, doesn't advise using them.

"It's a legal document; it needs legal advice to go with it," explains Simpson.

According to Simpson, some of the errors people make when they do their own will include not signing it correctly, not getting it witnessed correctly, and trying to bequeath assets they think they own, but don't.

"We see all kinds of unusual requests or provisions in homemade wills that just won't work," advises Simpson. "What that creates is a massive conflict after the event. It takes longer to resolve, it costs more, and creates heartache."

STEP 1: WRITE YOUR WILL

Only 59% of Australians have a will, according to a study from The University of Queensland.

"For a relatively small outlay," Simpson says, "you can get a will that you know will be valid and you know will deal with your scenario at that time."

Though fees can vary, Simpson says that you can organise a relatively simple will with a lawyer for \$500-\$800.

But doing a will once isn't good enough. Simpson advises updating your will every five years, or when new life events happen, such as buying a house, marriage or having children.

STEP 2: ACCOUNT FOR ALL SCENARIOS

Try and think through some possible scenarios. For example, you may leave your assets to your partner, and then explain that if your partner dies your assets go to your children. But if you all die together, such as in a car accident, what happens then?

In this eventuality you may want to name someone outside of your immediate family or even a charity.

STEP 3: CHOOSE AN EXECUTOR

The next step is to appoint an executor, who is the person you name in your will to administer your estate – your money and assets.

The executor will take charge after your death and get a grant of probate. This is permission to access your legal documents, collect your assets, make sure your bills and debts are paid, and then distribute the estate according to the instructions in your will.

"Make sure that you choose the right executor," advises Simpson. Choose someone you trust and you know will be able to administer your estate according to your wishes.

Don't forget to tell your executor that you have chosen them in your will, so they can be prepared. Simpson also recommends speaking to your executor about any instructions for your funeral, as well as any unusual aspects of your will, such as leaving out someone that may have expected to be in it.

STEP 4: ORGANISE YOUR POWER OF ATTORNEY

Next you need to prepare for a scenario where you're unable to make decisions due to being injured or sick. "I've always taken the view that estate planning is [made up of] two parts. One is the, 'What happens when I die?,' meaning the will," explains Simpson. "The other part is, 'What happens if I'm incapacitated or just unable to make decisions?'"

A way to prepare for this is to organise a Power of Attorney, so that someone can act on your behalf to make financial and legal decisions. You can appoint more than one power of attorney.

What happens if I don't have a will?

It's important for every adult to have a basic will in place.

"If you're an 18-year-old who's working, you'll be a member of a superannuation fund. They'll be making super contributions and that fund will have a life insurance component attached to it in most cases," explains lawyer Andrew Simpson.

If you pass away without a will, or with an out-of-date will, each state has different laws on how your estate would be distributed.

"Typically [the government] looks for next of kin to try to find the nearest, closest relative," says Simpson. "The estate will go to that person or that group of people. That can be a very tricky exercise, particularly if you've got people all over the world."

STEP 5: WRITE A CARE PLAN

A care plan can help to direct your health care if you're seriously ill or injured.

You may want to include instructions around life support, resuscitation on life support, pain relief and organ donation. Put your preferences in writing by completing an Advance Care Directive and nominating someone to make medical decisions if you can't. Talk your wishes through with the person you nominate, and give both them and your GP a copy of your care plan.

You can find more information and Advance Care Directive forms at advancercareplanning.org.au

STEP 6: STORE YOUR DOCUMENTS SAFELY

Lastly, Simpson advises leaving a document with all your passwords and accounts such as:

- Any automatic payments like media subscriptions
- Bank details
- Debts including loans
- Insurance
- Investments
- Superannuation.

"It's a good idea to put that kind of information in an envelope and store it with your will, saying, 'Open in the event of my death,'" or similar, he says.

This preparation can ease a lot of frustration and stress for your loved ones when you die. Passwords are particularly important as without them, your friends or family may not be able to access your phone, computer, social media accounts or emails.

If you are concerned about security, you may wish to store these documents in a secure place such as a safety deposit box or with your attorney. ☀



For more information, visit advancercareplanning.org.au, and australia.gov.au and search for 'wills'.



DRIVING COMMUNITY CONNECTIONS

Q & A

A FAST GROWING NOT-FOR-PROFIT ORGANISATION IS HELPING HOMELESS PEOPLE CLEAN THEIR CLOTHES AND HAVE A MUCH-NEEDED CHAT.

Interview Beth Anderson

Lucas Patchett and Nicholas Marchesi, both 24, started washing clothes for free from the back of their old van in 2014. They now head up Orange Sky Laundry, a registered charity that exists through fundraising and generous donations. Nearly four years and many laundry loads later, they tell us why clean clothes are just the beginning of their ever-expanding service for homeless people.

What inspired you to start Orange Sky Laundry?
Our eyes were opened to homelessness when we volunteered for community projects at school. We were both curious about why so many people in our community were doing it tough. Leaving high school, we wanted to find a way to help people. It started out as a very simple mission: to wash and dry clothes for homeless people. When your belongings are constantly damp or dirty and maybe not smelling great, having clean clothes can restore your respect and make you feel worthwhile. So we had this crazy idea of putting washing machines and dryers in the back of a van and driving around, washing clothes for free. A lot of people told us it wouldn't work – and they were almost right! We broke a lot of washing machines before finally figuring it out.

Has the project turned out as you'd expected?
We realised very quickly that the real benefits came not so much from the laundry, but more from sitting down and having a chat. Many homeless people feel disconnected from their community; unfortunately, loneliness and isolation are things we see every day. While people are waiting for their clothes to be washed and dried, they can have a chat with someone, which

makes them feel better and connects them back to their community. Orange Sky not only aims to improve hygiene standards for people who are doing it tough, we're also trying to facilitate those connections.

You began as a mobile laundry and now offer mobile showers as well. How else has the service changed?

We started out with one van in Brisbane; we've now got 26 vans operating across Australia. Each week, 1,200 volunteers wash and dry 7.4 tonnes of laundry; deliver 150 hot showers; and go to 185 locations. We're hoping to spread to more locations, so that we can continue to help more people. We're also looking at how we can use our vans for commercial purposes, such as washing and drying clothes for cafés or drop-in centres and employing the people that would usually use our service. And we're always looking at ways we can add layers of value to the time people spend with us. It [could be an] awesome opportunity for someone to get healthcare information or have a health check-up.

fast fact

For every
10,000
Australians,
50
are homeless.

Source: Australian Bureau

What kind of feedback do you get?

The feedback we get is really positive. We see people who haven't spoken to anyone else all day and then they speak with one of our volunteers and build rapport, maybe even friendship. Our volunteers also benefit: they come from all walks of life and one of the best parts of their week is helping in their community. The same applies to the people running fundraisers or giving donations. We're all different and can have a big impact on someone else's life.

How has Orange Sky changed your own lives?

We never dreamed that Orange Sky would touch so many lives across the country. It reminds us that we can all have dreams and ambitions and that, when we come together, they can come to fruition. Our lives have changed forever, not because we have done anything special, but because we have shared many powerful and moving moments with thousands of amazing people – volunteers, donors and friends on the street.❶



To donate or get involved in Orange Sky Laundry, visit orangesky.org.au. For information about homelessness, go to homelessnessaustralia.org.au