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UNIVIEW

THE MAGAZINE OF THE UNIVERSITY OF WESTERN AUSTRALIA

FIT FOR LIFE



THE UNIVERSITY OF
**WESTERN
AUSTRALIA**

MESSAGE FROM THE EDITOR

A long and healthy life is something many of us aspire to, but what does healthy ageing really look like?

In this edition of *Uniview*, we explore the research helping people live healthier lives, from preventing disease and improving diagnosis through to supporting physical and mental wellbeing at every stage of life.

Read about the landmark Health in Men Study and the lessons it offers for ageing well, alongside research examining the opportunities and challenges of Australia’s ageing population. Discover how UWA researchers are investigating bone health, exploring links between hormones and cancer risk, and developing new approaches to reducing exposure to potentially harmful plastic-associated chemicals.

We also showcase innovative medical research that is improving lives, including world-leading work reducing preterm birth rates, new technologies to support breast cancer surgery, and advances in Alzheimer’s disease research through the appointment of Professor Ralph Martins AO as UWA’s Alzheimer’s Research Australia Endowed Chair.

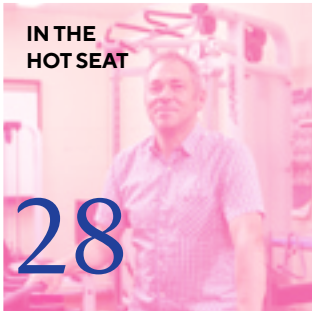
In this edition, we highlight UWA’s new *Make a Dent* campaign and celebrate the remarkable contributions of our alumni, researchers and staff who continue to shape healthier futures for our communities and beyond.

I hope you enjoy reading their stories.

Alison Batcheler
Editor
Associate Director, Corporate Communications

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The University of Western Australia acknowledges that its campuses are situated on Noongar land, and that Noongar people remain the spiritual and cultural custodians of their land, and continue to practise their values, languages, beliefs and knowledge.

SHAPING HEALTHIER FUTURES

A defining challenge of our time is not simply helping people live longer, but helping them live healthier, more fulfilling lives.

At The University of Western Australia, our researchers are working across disciplines to better understand disease, improve prevention and diagnosis, and develop innovative solutions that enhance wellbeing throughout life. Their work is helping address some of the most pressing health challenges facing our communities and shaping healthier futures for people in Western Australia and around the world.

This edition of *Uniview* highlights the breadth and impact of UWA’s health and medical research. From advancing our understanding of cancer risk, genetic screening and bone health to improving maternal health outcomes and exploring the effects of environmental factors on human wellbeing, our researchers are translating discovery into real-world benefit. You will also read about pioneering work in healthy ageing, helping us better understand how people can remain active, independent and connected throughout their lives.

The theme running through many of these stories is prevention – identifying risks earlier, intervening sooner and creating the knowledge needed to improve health outcomes before disease takes hold. This growing focus reflects UWA’s commitment to research that not only advances scientific understanding but also delivers tangible benefits for individuals, families and communities.

Our commitment to making a meaningful difference is also reflected in the University’s new *Make a Dent* campaign, featured in this edition. Grounded in our deep connection to WA, the campaign celebrates the impact of our students, graduates, researchers and staff, and the many ways they are contributing to positive change in our State and beyond. It reinforces UWA’s enduring purpose: to create knowledge, educate future leaders and make a lasting contribution to society.

I am also delighted to acknowledge the appointment of Professor Ralph Martins AO as the inaugural Alzheimer’s Research Australia Endowed Chair at UWA.

Internationally recognised for his pioneering contributions to Alzheimer’s disease research, Professor Martins has transformed our understanding of this devastating condition and helped drive the development of new diagnostic approaches. His appointment further strengthens UWA’s leadership in research that has the potential to improve lives and offer hope to individuals and families affected by dementia.

Together, these stories reflect UWA’s commitment to research and innovation highlighting that through discovery, collaboration and leadership, we are helping create healthier futures for everyone

Professor Amit Chakma,
Vice-Chancellor
The University of Western Australia





FUNDING BOOSTS TRIALS OF INNOVATIVE BREAST CANCER IMAGING TECHNOLOGY

Perth-based medtech innovator OncoRes Medical has secured \$27 million in private funding, which will help progress clinical trials in breast cancer surgery using its world-class precision imaging technology.

The UWA spinout announced its funding to progress clinical development and regulatory milestones for its Quantitative Micro-Elastography Imaging System, Elora.

OncoRes has opened an Australian clinical trial, which will include six different hospitals in Western Australia and Victoria and the recruitment of 110 breast cancer patients. This marks the first time the imaging system will be used as an intervention.

Among women, breast cancer remains the most common cancer. This device provides real-time tumour assessment to help surgeons more accurately identify and remove cancerous tissue – an approach that could improve outcomes in breast-conserving surgery and reduce repeat operations.

OncoRes Medical CEO Dr Katharine Giles, a UWA Medicine and MBA graduate, said the injection of capital was a strong endorsement of the company's technology and its potential to positively impact so many lives.

"The funding will be used to support our Australian clinical trial, together with product development, regulatory milestones and manufacturing for our US Pivotal Trial," Dr Giles said.

"We will also expand the team and progress proof-of-concept work for this technology in other cancer types, including prostate cancer.

"Expanding the reach and impact of this innovative, patient-centric technology at home and abroad represents a meaningful achievement for Australia's innovation sector at large."

As part of the company's targeted move towards regulatory approval and commercial presence in the US, OncoRes recently welcomed new Board member, Renee Ryan.

"I'm excited to join OncoRes Medical at such a pivotal stage in the company's growth," Ms Ryan said. "This team has developed a truly groundbreaking approach to improving breast-conserving surgery, giving surgeons real-time insight that can reduce the burden of repeat operations for patients.

"I've spent my career working with innovators who reshape what's possible in the operating room, and OncoRes stands out for both its technology and its unwavering focus on patient impact.

"I look forward to helping guide the company as it advances toward US clinical milestones and prepares for long-term commercial expansion."

OncoRes was spun out of UWA in 2016 on the back of groundbreaking research, the Western Australian Department of Health and the Harry Perkins Institute of Medical Research, led by world-renowned breast cancer surgeon and researcher Professor Christobel Saunders AO and biomedical engineer Professor Brendan Kennedy. ■

HUMAN SKIN MODEL TO HELP TREAT SKIN STIFFENED BY AGE AND DISEASE

Researchers from UWA will use biomaterials to create a lifelike 3D model of human skin to better understand and treat skin stiffness associated with age, scarring and disease.

If successful, in time the model could reduce the need for animal testing of skin products and enable personalised treatment plans for patients experiencing abnormal skin stiffness.

The three-year project, made possible thanks to a grant of almost \$500,000 from the Denmark-based LEO Foundation, aims to create biomechanically bespoke, full-thickness human skin tissue.

Project lead, Associate Professor Yu Suk Choi from the UWA School of Human Sciences, said the next-generation technology would allow researchers to explore the mechanics behind skin stiffness – a problem associated with age and diseases such as skin fibrosis, which is caused by the body making too much collagen.

"Our skin changes as we age and one of the main reasons is its layers gradually become stiffer – a process that is even more exaggerated in skin disease such as skin fibrosis," Associate Professor Choi said.

"Surprisingly, these mechanical properties have received little attention in skin research, but with new advances in mechanobiology we now know that skin cells sense and respond to these mechanical changes."

The project will use smart biomaterials that mimic the natural stiffness of each skin layer.

Researchers will then manipulate the stiffness of different layers to track how the skin behaves and to see whether it can be regenerated.

"The insights gained may identify new treatment targets and support the development of 'mechanotherapy' – therapies that work by gently adjusting the mechanical properties of the skin to improve healing and reduce disease," Associate Professor Choi said.

If successful, the technology would allow scientists to recreate individual patients' skin and then model different diseases and therapeutics to determine a personalised treatment plan.



"The main purpose of the model will be to treat skin stiffening associated with fibrotic disease, but potentially any abnormal stiffness can be targeted by this," Associate Professor Choi said.

"It has the potential to not just treat but prevent skin stiffening, and to help develop skin grafts for burns patients.

"Significantly, by developing a realistic, full-thickness human skin tissue model, it could potentially reduce animal use in research and product development."

The research team includes burns specialist Professor Fiona Wood from UWA's Medical School and the Burns Service of Western Australia, biomedical engineer Professor Brendan Kennedy, from UWA's School of Engineering and the Harry Perkins Institute of Medical Research, and bio-nanotechnology engineer Associate Professor Iyer Swaminatha Iyer from the UWA School of Molecular Sciences.

The project emerged from the Australian Research Council Training Centre for Next-Generation Technologies in Biomedical Analysis, directed by Associate Professor Iyer. ■



LOW TESTOSTERONE LINKED TO CANCER RISK IN MEN

By Tamara Hunter

New research shows men with very low testosterone levels are at higher risk of both fatal and non-fatal cancer later in life.

But while the research found men with low testosterone were 18 per cent more likely to die of cancer years down the track, the results did not hold for prostate cancer.

Rather, prostate cancer appears more closely linked with low levels of sex hormone-binding globulin (SHBG), which is the main carrier protein for testosterone in the blood, and luteinising hormone, which signals the testes to make testosterone.

The findings emerged from the Androgens In Men Study (AIMS) – an international collaboration led by Professor Bu Yeap from UWA’s Medical School – which is exploring links between sex hormones and health outcomes in men.

Professor Yeap initiated the AIMS collaboration to build on work he began as part of UWA’s long-running Health in Men Study (see page 18), inviting colleagues from across Australia and internationally to pool data from multiple longitudinal studies.

For the testosterone and cancer study the AIMS team analysed long-term data for more than 26,000 men involved in 11 cohort studies from Australia, the United States and Europe.

Analyses of sex hormones in blood samples taken earlier in life were matched to cancer outcomes for the same men in the decades following the tests.

Sex hormones analysed included testosterone, dihydrotestosterone (DHT) and estradiol – all measured accurately using mass spectrometry. SHBG and luteinising hormone were also analysed.

“We did find, however, that men with low levels of SHBG and luteinising hormone were at higher risk of prostate cancer.”



Professor Bu Yeap

The researchers wanted to know whether the concentration of these sex hormones in the blood was related to the risk of men being diagnosed with, or dying from, cancer into the future.

“What we saw was that if a man had low testosterone levels – in the lowest one-fifth compared to the highest one-fifth of the range – their subsequent risk of dying from cancer was higher, even after allowing for age and other health-related factors,” Professor Yeap says.

The normal range in young, healthy men is usually between 10 and 30 nanomoles per litre (nmol/L), with levels tending to be lower in older men. Levels can also be affected by modifiable factors including body mass index and physical activity, and by medical conditions such as diabetes.

“We saw that when baseline testosterone was below 8.6 nmol/L, subsequent cancer risk started increasing,” Professor Yeap says.

“This suggests low testosterone is an important biomarker, so it’s possible that looking at testosterone levels could help us identify men who might do poorly if they get cancer down the track.”

The study also sought to establish whether there was any link between natural testosterone levels and prostate cancer risk.

“Since reducing testosterone levels is a treatment for prostate cancer there’s always been a question of whether the amount of testosterone your own body makes relates to your risk of prostate cancer but based on our findings there’s no evidence they are related,” Professor Yeap says.



“We did find, however, that men with low levels of SHBG and luteinising hormone were at higher risk of prostate cancer.”

Professor Yeap cautions the findings are not a signal that men should start supplementing with testosterone to reduce their risk of cancer.

“While we’ve shown low levels are associated with increased risk, we haven’t got any evidence yet that actually giving men testosterone will reduce that risk,” he says.

“What we would say to men is if they are found for whatever reason to be low in testosterone, it’s important to go to the doctor for a full checkup. It may not show any sign of testicular disease, but it might show other health issues or risk factors they need to address.

“It could be a wake-up call and encouragement for men to engage in more healthy lifestyle behaviours, and to get regular, holistic checkups to stay on top of their health.” ■



AGEING INTO THE FUTURE

By Tamara Hunter

A century’s worth of advances in healthcare, education and living standards mean more Australians can expect to survive into older age than ever before.

By 2060 Australia will have more centenarians than at any time in its history, with a child born that year expected to live to 87 if a boy and 89 if a girl.

As our society shifts to having twice as many people aged over 65 than under five, governments are being forced to rethink how public policy can continue to meet the needs of all.

Economics Professor Anu Rammohan from the UWA Business School says longevity brings a complex mix of opportunities and pressures, particularly when quality of life is taken into account.

“Everybody in theory thinks, yes, I want to live a long life – but what does that look like?” Professor Rammohan says.

“If it’s not a long and healthy life, it has personal impacts as well as much broader ones.

“On the plus side, given we’ve had compulsory superannuation since 1992 the hope is people have built enough of a balance that they are not going to be a burden on the public purse.

“That has been a very good policy overall but not everyone benefits equally. For example, women tend to maintain lower superannuation balances than men.

“At some point if your super balance is too small you’ll probably come back onto the pension, so that places a greater burden on the shrinking pool of younger people of working age.



Professor **Anu Rammohan**

“This potentially leads to intergenerational tension. Similarly, if older people become a bigger proportion of the electorate and voting share there’s a risk families may feel more alienated by government policy.”

Other issues include whether superannuation, migration and tax policy need to be rejigged to compensate for the diminishing income tax base, whether the retirement age (currently 67) should be raised, and how to support equitable workforce participation for both older and younger people – particularly with AI reshaping employment.

“If you’re living longer, potentially being unhealthy, that can impact on your labour market participation,” Professor Rammohan says.

“It can also lead to increasing dependence on health, aged care and welfare systems so it will be crucial for us to fund those services that help people live well into old age – the challenge for government will be how we maintain that funding.”

Professor of Geriatric Medicine at UWA and Director of the WA Centre for Health and Ageing, Leon Flicker, agrees supporting healthier ageing is critical but argues our ageing population has been wrongly framed as a crisis.

“The fact we are living longer is a good news story. If you look back at life expectancy a century ago, we’ve gained more than 30 years,” Professor Flicker says.

“This is a manifestation of a successful society – people don’t die prematurely as much now.”

He says Australia’s population has been ageing gradually for decades.

“It’s not a sudden crisis – we’ve had a long time to prepare for this and while it does require changes to improve systems and address issues like disparity, inefficiency and excessive bureaucracy, it really only requires tweaks.”

Those tweaks include adapting the health system to care for more frail older patients alongside younger people, and rethinking how to provide meaningful work for all generations.

Professor Flicker challenges the idea that older people are driving rising healthcare costs, noting only 20 per cent is due to ageing itself, and 80 per cent to technological change.

“Healthcare costs rise because we have better treatments and more expensive drugs now – not because people are older,” he says.

He rejects assumptions that older Australians are a burden, saying many remain a functioning and productive part of society.

“People like to blame older people for our economic problems but it’s just wrong – we have to look at our tax system and the way we generate wealth in the country, at disparities between rich and poor,” Professor Flicker says.

“One of the problems we have is rampant ageism, both institutional and personal. None of the ‘isms’ make sense but ageism makes even less sense than the rest of them, because it’s us.

“What do we want our own older years to look like? That’s the question we should be asking.” ■



PLASTIC NOT SO FANTASTIC

Lifestyle changes can reduce the levels of plastic-associated chemicals in human bodies within days, which has prompted calls to modify the way we produce and package our food.

By Annelies Gartner

From farm to fork our food comes into contact with many forms of plastic; products we put on our skin expose us to plastic chemicals as does the air we breathe.

Researchers at The University of Western Australia, with funding provided by Minderoo Foundation, have examined how adults are exposed to plastic and the levels of plastic chemicals in their bodies and found a low-plastic diet can reduce levels of these chemicals in the human body within just seven days.

Principal investigator Clinical Professor Michaela Lucas, together with Professor Gerald Watts and senior investigators Dr Amelia Harray and Dr Andrew Lucas, are leading the Plastic Exposure Reduction Transforms Health (PERTH) Trial in collaboration with Minderoo to investigate

the impacts of two types of plastic chemicals, bisphenols and phthalates, on human health.

“Both of these chemicals can interfere with endocrine or hormonal functions in our body and have been linked to infertility and cardiometabolic disease,” Professor Lucas says.

A team of dietitians, doctors, nurses, statisticians and biologists analysed urine, blood and nasal samples, body composition, dietary intake, plastic-related behaviours and socio-demographic data from 211 healthy adults.

“The Queensland Environmental Alliance Centre has a clean laboratory – it’s a stainless-steel box where they unpack the urine samples and measure them using glass, while wearing cotton clothes – so there is reduced



Dr Andrew Lucas, Clinical Professor Michaela Lucas and Dr Amelia Harray

“Overall, the constant exposure to plastic-associated chemicals and micro-nanoplastic particles can trigger chronic inflammatory responses.”

environmental contamination,” Professor Lucas explains.

The results were contrary to previous studies where it was thought the body excreted plastic-associated chemicals within 24 hours.

“The ‘what you eat you excrete within 24 hours’ rule was really only correct if you’re looking at male participants who are very lean, however this was not quite the case for females or those with an increased fat mass index,” Professor Lucas says.

“It made us speculate that perhaps some of these chemicals are stored in your fat tissue or interact with the

fat tissue and don’t get excreted as readily as we thought.”

More than 16,000 chemicals are commonly used in the manufacture of plastic for food and beverage packaging, cookware, kitchen utensils, cling film, plastic food and drink containers and personal care products, among many other items.

“It’s quite clear that we are continuously exposed to these plastic chemicals through our food and personal care products,” Dr Lucas says.

“Overall, the constant exposure to plastic-associated chemicals and micro-nanoplastic particles

can trigger chronic inflammatory responses.

“These are the types of changes that make people more susceptible to disease, more susceptible to cancer – they’re all stressors on the body that we don’t need.”

All participants in the trial had high levels of plastic chemicals in their bodies, with each participant recording at least six different chemical types on any given day.

“There was a high prevalence of the chemical bisphenol S in healthy participants, which is an alternate chemical used to replace bisphenol A, and this should ring warning bells for food standards regulators,” Dr Lucas says.

“It’s very easy for the industry to swap to another formula and it is becoming clear these replacements are likely to cause similar harms.

“What we need is an international effort to try and create a Global Plastics Treaty that reduces plastic production and bans the use of these chemicals.”

From the original study, 60 individuals were selected to be part of a randomised controlled trial involving a low-plastic diet and lifestyle intervention.





10 TIPS FOR REDUCING PLASTIC EXPOSURE

- Wash canned foods before use, such as beans
- Don't microwave food in plastic containers or cook with plastic utensils
- Use wooden cutting boards
- Swap non-stick pans for stainless steel – and clean with steel wool
- Wrap food in paper towels or tin foil instead of plastic wrap
- Store food in glass jars
- Buy big packets of food instead of individually wrapped serving sizes
- Buy loose fruit and vegetables, not prepacked in plastic
- Buy drinks in glass bottles instead of plastic bottles or cans
- Buy tomato passata in glass rather than tinned tomatoes

The participants were divided into five groups to test the effectiveness of replacing all foods, beverages, kitchenware and personal care products with low-plastic alternatives.

“We identified that highly processed, packaged and canned foods and beverages were significant contributors to plastic chemical levels in the urine samples,” Dr Harray says.

“Ultra-processed foods are convenient, often individually packaged in plastic and made from a combination of many ingredients.

“Each ingredient can have multiple plastic touch points during farming and processing – from plastic conveyor belts and tubing to plastic grinders and storage in plastic bags or containers – and this all happens before the food is packaged for purchase.

“People often don’t think about cans or tinned foods as containing plastic chemicals but the tins or cans are internally coated with polymer resins containing hormone-disrupting chemicals.”

Plastic chemicals more readily leach into foods that are fatty, acidic or aqueous (resemble water).

“Food heated in a plastic container that is high in fat, such as a soup that has lots of cream and oil, can have more plastic chemicals,” Dr Harray explains.

“If you fry a fatty piece of meat in a non-stick pan and use a plastic spatula, more plastic chemicals will go into the meat – fat and heat both promote plastic chemicals to go into the food.”

The team went to incredible lengths to ensure plastic and other sources of plastic chemicals, such as silicones and

cans, were minimised along the food supply chain for the food intervention groups.

“Our dietitians worked with more than 100 farmers and food producers to educate and transform their food handling, processing and packaging to reduce plastic exposure from farm to fork,” Dr Harray says.

At the end of the seven-day intervention all low-plastic groups showed a decrease in urinary plastic chemical levels, compared to the control group.

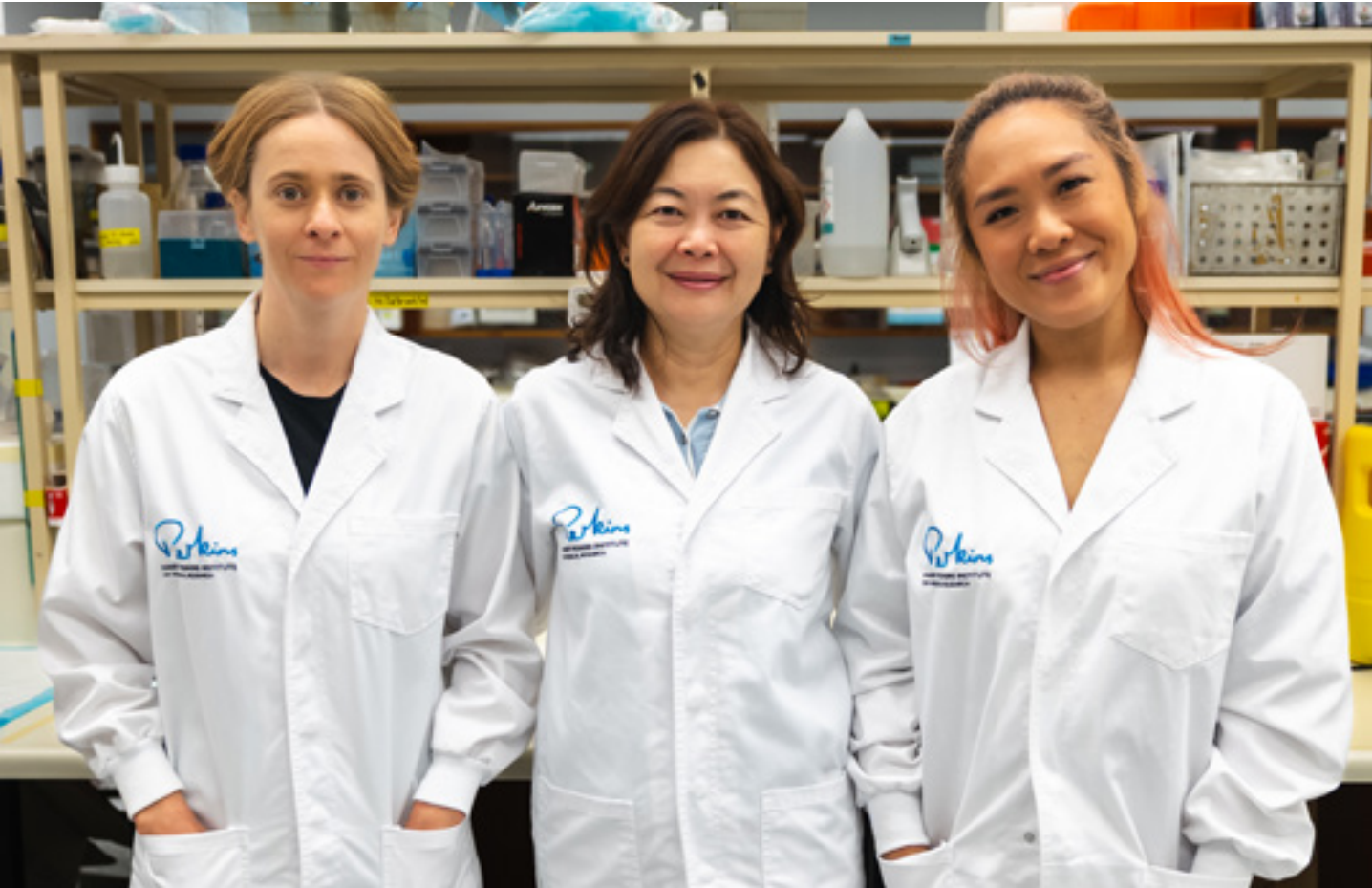
“By altering the participant’s lifestyle to include the consumption of low-plastic food, prepared with low-plastic kitchenware and the use of low-plastic personal care products, phthalates decreased by more than 44 per cent and bisphenols by more than 50 per cent,” Dr Lucas says.

The PERTH Trial team is calling for low-plastic, sustainable, cost-effective and healthy options to be more affordable and accessible for all people, which will require laws and regulations around plastic chemical use to be reformed globally.

“We do know that plastic chemicals are harmful to humans, and the health burden has and will increase over time unless we intervene,” Professor Lucas says.

“This trial has delivered a message of hope that we can actively reduce plastic chemical levels in our bodies but is linked to significant changes in the way we produce and package our food.”

Researchers are now looking at how plastic chemicals could impact heart disease as well as fertility. ■



Molecular geneticists **Purdey Campbell**, **Shelby Mullin** and Associate Professor **Kathy Zhu**

THE SKELETON CREW

Researchers are working to diagnose, prevent and treat bone disease so we can experience long and healthy lives.

By Annelies Gartner

The human skeleton is an amazing example of biological engineering but if one part is compromised it can impact the rest of the body's health and wellbeing.

Many factors are thought to affect bone health including diet, the gut microbiome, hormones, smoking, medications, physical activity, body composition, genetics and even sleep.

So how can we maintain good bone health and what research is being undertaken at The University of Western Australia to prevent, diagnose and treat bone disease?

Chief investigators Professor Scott Wilson, from UWA's School of Biomedical Sciences, and Associate Professor Kathy Zhu, from UWA's Medical School, along with molecular geneticists Shelby Mullin and Purdey Campbell are working to identify how inherited genetic differences influence osteoporosis risk.

"Bone mass accumulates during growth and at about the age of 20 to 30 years of age we achieve peak bone mass," Associate Professor Zhu says.

"Typically, men achieve a higher peak bone mass than women and bone mass begins to decrease after age 50, particularly around menopause in women."

The researchers are working to identify regulatory DNA variants that influence osteoclasts (cells that break down bone tissue) and osteoblasts (bone-forming cells), which together continuously renew the skeleton throughout life.

"It is estimated that around 60 to 80 per cent of variation in bone mineral density is influenced by genetics," Professor Wilson says.

"Genetic influences on osteoporosis risk begin early in life and can affect many aspects of bone biology, including osteoblast activity, which impacts skeletal growth and architecture."



Chief investigator Professor **Scott Wilson**

Large genetic studies have now identified many regions across the genome that are associated with osteoporosis risk.

"Through our research, and that of others, we have identified hundreds of regions in the genome that contribute to genetic risk for osteoporosis," Professor Wilson says.

"If your genetic make-up includes certain risk variants, you may develop a lower peak bone mass, which can increase the likelihood of fractures later in life."

Old and damaged bone, including micro-fractured bone, is removed by osteoclasts, and osteoblasts repair this by forming new bone.

"There seems to be an imbalance in some people, with excess resorption by osteoclasts, which can disrupt the repair cycle carried out by osteoblasts," Professor Wilson explains.

"Genetics also affects calcium handling and hormone pathways, including the oestrogen receptor.

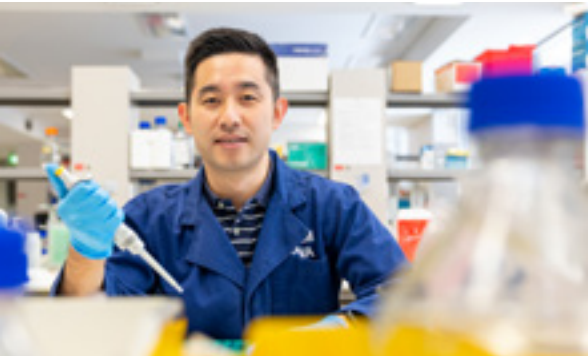
"Vitamin D metabolism plays a key role in calcium homeostasis and is also influenced by genetic variation."

A single gene variant can cause rare monogenic bone disorders. For example, DNA changes in the gene COL1A1 can cause osteogenesis imperfecta, leading to profound bone fragility.

Using advanced molecular genetics approaches, the researchers are pinpointing the specific DNA changes that alter gene regulation in bone cells.

Once this has been completed, the information can be used to help identify new therapeutic targets with an aim to develop therapies for osteoporosis that target osteoblasts and/or osteoclasts directly.

"Many genetic risk factors for osteoporosis have been discovered, but we still don't know how most of them actually affect bone cell function," Professor Wilson says.



Dr **Kai Chen**

"Our work aims to identify which genes are switched on or off by these risk variants, and how this alters the way bone cells function."

Dr Kai Chen, from UWA's School of Biomedical Sciences, is working to transform how bone diseases are understood and treated, with a focus on conditions such as osteoporosis, osteoarthritis and cancer that spreads to bone.

"Osteoporosis is the most common bone disorder in Australia and is estimated to cause one fracture nearly every three minutes a day," Dr Chen says.

"The current estimate is that osteoporotic fracture costs more than \$5 billion a year in Australia, with more than 20,000 osteoporotic hip fractures annually."

Dr Chen is also interested in cancer bone metastasis, when, for example, breast cancer or prostate cancer spreads to the bone and disrupts its normal structure and function.

"When people develop conditions such as osteoporosis, osteoarthritis or a bone cancer, the skeletal cells begin to behave very differently," Dr Chen says.

To better understand these changes, Dr Chen and his team have built an advanced imaging platform that can map metabolism within tissues at an unprecedented level of detail.

Using cutting-edge ion microscopy, the platform tracks how nutrients move through cells and tissues, helping researchers uncover what drives disease at the microscopic level.

"Using this innovative imaging technique, we hope to discover what kind of proteins, genes or enzymes are responsible for the changes in the skeletal cells," he says.

"This knowledge can then be used to design entirely new ways to diagnose and treat disease."



Nutritionist and dietitian **Amelia Harray**

“Vitamin D metabolism plays a key role in calcium homeostasis and is also influenced by genetic variation.”

A major focus of Dr Chen’s research is the development of nucleic acid therapeutics — medicines based on RNA.

“RNA is a molecule that carries genetic information and plays a crucial role in building proteins within our cells,” Dr Chen says.

“We aim to develop small RNA-based therapeutics that can bind to disease-related RNA in cells and switch off the genes that drive skeletal disease.”

The team has already discovered a novel marker highly associated with osteoporosis and is developing an RNA drug to test its effect in preclinical model.

The researchers also aim to develop novel markers which can diagnose osteoporosis and bone cancer at a very early stage – before it is detectable by a traditional scan.

But until these diagnostic tools and therapies are available what can be done to protect our bone health?

Nutritionist and dietitian Dr Amelia Harray, from UWA’s Medical School, says bone health is incredibly important at all stages of life.

“It is important pregnant females get enough calcium and also children as their bones grow really rapidly, so they consistently need to be eating calcium-rich foods,” Dr Harray says.

“Bone density peaks at about age 25 so getting lots of calcium into your children as they are growing into young adults is vital.

“When females hit menopause their calcium needs increase by about 30 per cent due to a decline in oestrogen. This hormonal change leads to increased bone breakdown and reduced calcium absorption in the gut.

“This continues to happen into older age when you’re most likely to have a fall and break a bone or get diagnosed with osteopenia or osteoporosis. So, it’s important to get more calcium from your diet to help maintain bone strength.”

Calcium also plays an important role in our nervous system and muscle contraction, and the body needs vitamin D to help calcium be easily deposited into bones.

“To keep up blood calcium levels the body will draw stores out of bones so when people get blood tests they think their levels are fine,” Dr Harray explains.

“But over decades their bone density is slowly decreasing as the stores are being drawn on and not replenished.”

A calcium-rich diet throughout life, from animal or plant foods, along with adequate vitamin D is essential for good bone health as well as weight-bearing exercises to strengthen bones.

“Try to make sure that any dairy alternatives are fortified with at least 120 milligrams of calcium per 100 millilitres,” Dr Harray says.

“People drink oat and almond milks thinking that they’re healthier. Even if they say unsweetened or organic, they may not be filling the gap of a dairy alternative in terms of nutrients.”

It’s also important to keep an eye on your bone health, especially for women once they reach around 50 years of age.

“A bone densitometry scan, a very low dose x-ray, can give early warning of osteoporosis risk,” Associate Professor Zhu says.

“If an older person falls and fractures their hip it can be a life-changing event and often leads to loss of independence, institutionalisation and an increased risk of death.

“A proactive approach, including a healthy diet, regular weight-bearing exercise, and timely bone density assessment, can help maintain bone health and reduce risk.” ■



Royal Perth Hospital volunteer **Max Machlin**

LESSONS IN LONGEVITY

In 2019-2020 there were 6,400 centenarians in Australia: by 2061 there are projected to be 40,900. As our population continues to age, it's becoming more and more important to understand what it means to 'age well'. A 30-year study of Western Australian men – and one of its most enduring participants – has a tip or two to share.

By Tamara Hunter

Every Monday morning, 95-year-old Max Machlin swings his legs out of bed, takes a moment to steady himself, then propels himself into a day of quiet giving.

By 9am he is in a ground floor office at Royal Perth Hospital, carefully loading out-of-date magazines and donated books onto the trolley he will spend the next few hours wheeling through wards populated, mainly, by cardiac and trauma patients.

As he approaches each patient, he assesses them to gauge their openness to a chat.

"You can feel if a patient wants to communicate with you or not," Max says. "I'll offer them a book or a magazine but if they're not interested or don't want to be bothered, I'll thank them, wish them well and move on."

For others, the sight of a friendly face and accompanying chat offers a cheering distraction – exactly the effect he is hoping for.

"On the trauma wards it's usually injuries from falls or some form of vehicle accident so I'll ask them 'What are you in for – motorbike, tree, ladder, e-scooter?'" Max says.

“You’ve got to have a reason to get up and out, otherwise it’s too easy to just vegetate at home.”

"It gives them something to laugh about and then we might spend five or 10 minutes having a conversation, discussing their problems.

"It makes things that little bit lighter, and the magazines can break the monotony of just laying in bed or watching television."

By the end of his shift as a Friends of Royal Perth Hospital volunteer Max and his trusty trolley – an essential aid to support a troublesome knee – will have put in close to 8,000 steps.

"It's good because it makes me walk," he says. "They're really long wards so I feel I'm doing something, but it gives me a lot of personal satisfaction, too. I'm helping someone who could use a bit of cheer."

It's that powerful sense of achievement, and the contribution it makes to his wellbeing, that continues to motivate Max after 38 years as an RPH volunteer – the first 33 driving patients to and from appointments and the past five as a patient service volunteer.

"It gives you something you have to get out of bed for," Max says. "You can't just retire and do nothing. Within a very short time you're asking yourself 'what have I got to get up for?'"

"You've got to have a reason to get up and out, otherwise it's too easy to just vegetate at home."

"I can't do that: this is not a rehearsal. I still want to live – I still enjoy so many things."

It's a mindset which, long-running UWA research shows, is key to ageing well.

On top of nearly four decades of volunteering, Max is one of thousands of Western Australian men who have taken part in the Health in Men Study (HIMS), led by UWA



Professor **Leon Flicker**

Professor of Geriatric Medicine and Director of the Western Australian Centre for Health and Ageing, Leon Flicker.

HIMS – the largest longitudinal study of men in Australia – has spent the past 30 years investigating the factors that help men remain healthy and live well as they grow older.

"The thing our HIMS participants always talk about as being really important to them is meaningful activity: having a reason to get out of bed every day. 'What are my jobs? What do I have to do?'" Professor Flicker says.

Starting in 1996 as a population-based trial to investigate the benefits of abdominal aortic aneurysm screening, HIMS soon evolved to cover a broad range of topics related to ageing.

More than 20,000 men aged 65 years or over were invited to participate, with more than 12,000 taking part in the first wave of data collection in the form of questionnaires and an ultrasound test. Some who participated in later waves also had physical assessments and blood tests.

With each wave, conducted on average every one-to-two years, numbers have steadily dropped off as the cohort has aged, moved into care, become too unwell to participate, withdrawn, or died.

As the study enters its 12th wave a hardy core of around 100 participants, including Max, remains. Those still involved are now aged between 94 and 103 years and continue to live independently – a core criterion for participation. The group includes six centenarians.

Aided by linked data including mental health, medical, mortality, hospital and emergency department records that have enabled the team to follow the men's progress, HIMS has yielded nearly 300 research papers reporting on topics including cardiovascular disease, cancer, dementia, mental health, frailty, health system costs associated with ageing, and the factors that shape successful ageing.



“It’s never too late to start. People always tell you about doing 150 minutes of physical activity and so on - but it’s actually the step from being sedentary to doing something every day that makes the biggest difference, then you keep getting benefits along the way.”

Key findings from both HIMS and the WA Centre for Health and Ageing’s broader work have included that many aspects of ageing are modifiable well into older age.

The bottom line, Professor Flicker says, is you’re never too old to improve your health.

“Staying physically active is so important,” he says. “Even 10 minutes of walking a day makes a major difference.

“It’s never too late to start. People always tell you about doing 150 minutes of physical activity and so on – but it’s actually the step from being sedentary to doing something every day that makes the biggest difference, then you keep getting benefits along the way.”

Other key factors for ageing well include managing balance and strength to reduce the risk of falls, staying on top of general health checks (such as blood pressure and diabetes), maintaining hearing and eyesight where possible – both linked to social withdrawal when lost – and maintaining meaningful social connections.

“You don’t necessarily need a lot of friends and family, but you need enough – whatever that is for the individual,” Professor Flicker says.

Study coordinator Jill George has been conducting the data collection, much of it in person during home visits, for the past 16 years.

Mrs George confirms ongoing physical activity and strong social networks are common features among the ‘healthy agers’ still involved in the study. Other common themes include family involvement; community engagement; stoic attitudes towards health setbacks; adapting to limitations; mixing with a range of ages; and a sense of humour.

“One question asked in the questionnaire is ‘Would you like to live to 100 and if so, why?’. Most reply ‘Yes, as long as I am well’,” she says.

“Some add things like ‘So I can see my great-grandchildren finish university, or my grandchildren marry’, so they still have a lovely investment in their life.

“They are really proud of their involvement in research that will benefit future generations, so that may provide them purpose, and they feel they add value in society.”

For Max – who in 2021 was awarded a Medal of the Order of Australia for his longstanding services to the community – the desire to contribute and keep moving shows no sign of waning.

“Some days it can be a bit grim having to get up early and beat the traffic to get down and see what magazines I have to fill my trolley with, but I know I have to do it and I’m glad I’m doing it,” he says.

“I’ll keep going as long as I am able, and if it becomes too much to do this, I’ll have a look for something else.” ■



*Grieve, O Kookaburras and Ducks
And all the lovelier fowl there are:
My own peacock is dead,
Alistair, my darling,
Whom I loved more than my eyes.
For blue and green he was and knew his
Care team well as a girl her mother,*

*Nor would he ever leave his balcony
But honking around, again and again
Kept singing to the arts building alone.
And now he's off on the dark journey
From which they say no bird returns.*

FROM THE WARDEN, EMERITA PROFESSOR JENNY GREGORY AM

Peacocks have been part of university life since 1975, when they were donated by Laurence Brodie-Hall and Jean Brodie-Hall, UWA’s landscape architect. Today, four peacocks and five peahens wander the Arts Building and surrounds and roost in the New Fortune Theatre. Most are named for Shakespearean characters.

An iconic and cherished feature of campus, they even have their own Facebook and Instagram pages. When the peacocks fan their magnificent tail feathers, people stop to watch and cameras snap.

Yet their presence is not without drawbacks. Their honking interrupts tutorials and plays, and their droppings are a nuisance. Beware if a window is left open in the Arts Building as occasionally they have been found wandering the corridors.

Debate about their place on campus is not new. In 1983, the now defunct Daily News reported ‘powerful pro and

anti-peacock forces preparing for battle’, with critics complaining that ‘the love call of the peahen sounds like a tone-deaf soprano being tortured’.

Thanks to UWA Collected online, we can now search past copies of Pelican. Peacocks have regularly featured, usually as the subject of warped undergraduate humour. ‘They sneak around under the guise of being elegant and sophisticated, and then circle you, their go-go-Gadget necks ready to spring out and snatch your meal’.

Inventive student ‘peacock facts’ warn of ‘being chased by a herd of brutal peacocks’, that ‘peacocks are carnivorous’, that ‘you’ll be expelled if you kick one’, and that ‘campus peacocks are reincarnations of successful graduates’.

The peacocks have become an enduring symbol of UWA. When one dies, staff who lovingly care for them mark their loss with classical verse. A poem for the recently deceased elder peacock Alistair, above, was inspired by Catullus. ■



Associate Professor **Paul J. Maginn**

POLICY IMPLICATIONS OF AN AGEING POPULATION

By Associate Professor Paul J. Maginn, Director, UWA Public Policy Institute

Age of the octogenarian

There has been a seismic shift in Australia’s population size and structure. Between 1911 and 2025 Australia’s population grew from 2.3 million to 27.2 million – an average increase of 9.4 per cent per annum.

According to the *UN (2024)* life expectancy in Australia is 84.1 years – males 82.3 and females 85.5. In terms of age structure, in Western Australia 21.6 per cent of the population is aged 60 and over.

Old-age dependency

The Australian Government’s (2023) *Intergenerational Report* notes that population ageing is one of the major forces shaping Australia’s future. This is reflected, for example, in the ‘old-age dependency ratio’. That is, the number of people aged 65 and over for every 100 people of traditional working age (15 to 64 years).

Gazing into the future, population projections show the old-age dependency ratio at the national level will increase to 48.9 by 2071.

In WA, it is projected to rise to 50.4 and even higher in South Australia (55.3) and Tasmania (59.0).

Geographies of ageing

Since the majority of Australians live in metropolitan regions the implications of ageing will be more visible there. This does not diminish the impacts of ageing in regional and remote Australia.

From a place-based policy perspective, mapping the geographies of ageing over time and at different scales is instrumental for informed policy-thinking, strategic planning and policy action in creating more age-friendly cities.

This is especially true for areas with rapidly growing cohorts in their 70s and 80s.

Ageing across WA

Australian Bureau of Statistics data on WA’s estimated resident population at the SA4 level shows the majority of West Australians in 2001 aged 60–69 years (73.1%), 70–79 years (70.7%) and 80+ years (71.4%) lived in the Perth metropolitan region.

More specifically, the north-west of Perth had the most people in the oldest cohorts. The south-east of Perth had the largest number of people aged 80-plus, closely followed by the north-east of Perth.

By 2024, the north-west of Perth had become the dominant hotspot for all three aged cohorts with increases of 94.4 per cent, 130.5 per cent and 141.3 per cent respectively.

Localised ageing hotspots

Drilling down to more localised hotspots of high old-age dependency ratios, the highest ratios tend to be in regional WA, with the top three locations identified as York-Beverley, Toodyay and Pemberton.

Within this demographic in metropolitan Perth, the highest old-age dependency ratios were all concentrated in the outer southern metropolitan region.

Old-age dependency ratios tend to be more pronounced in outer metropolitan Perth including along the eastern metropolitan fringes and the coastline from Cottesloe to Iluka-Burns Beach.

Relatively lower old-age dependent ratios are found in inner-Perth including Northbridge and Highgate and along the inner south-east and south corridors.

Old-Age Dependency Ratio Projections by State and Territory (2026–2071)

State/Territory	2026	2031	2036	2041	2046	2051	2056	2061	2066	2071
AUS	28.4	31.0	33.4	35.2	36.7	39.2	42.0	44.5	46.5	48.9
ACT	21.7	24.2	26.5	28.6	30.4	33.0	35.7	38.1	39.9	41.9
NSW	29.3	31.8	33.9	35.7	37.2	39.7	42.4	44.9	46.9	49.2
NT	14.9	16.9	18.4	19.3	20.0	21.5	23.0	24.4	25.3	26.4
QLD	28.2	31.0	33.6	35.6	37.0	39.4	42.0	44.4	46.4	48.8
SA	33.9	36.9	39.4	40.9	42.1	44.6	47.4	50.3	52.7	55.3
TAS	36.6	39.8	42.3	43.6	44.4	46.9	50.1	53.6	56.1	59.0
VIC	27.1	29.3	31.5	33.3	34.8	37.4	40.2	42.9	45.0	47.5
WA	27.3	30.6	33.6	36.0	38.1	41.2	44.2	46.5	48.2	50.4

Australian Bureau of Statistics Data Explorer

Projections based on (i) low fertility rate; (ii) high life expectancy; (iii) medium net overseas migration; and (iv) medium inter-state migration flows.

Key policy implications

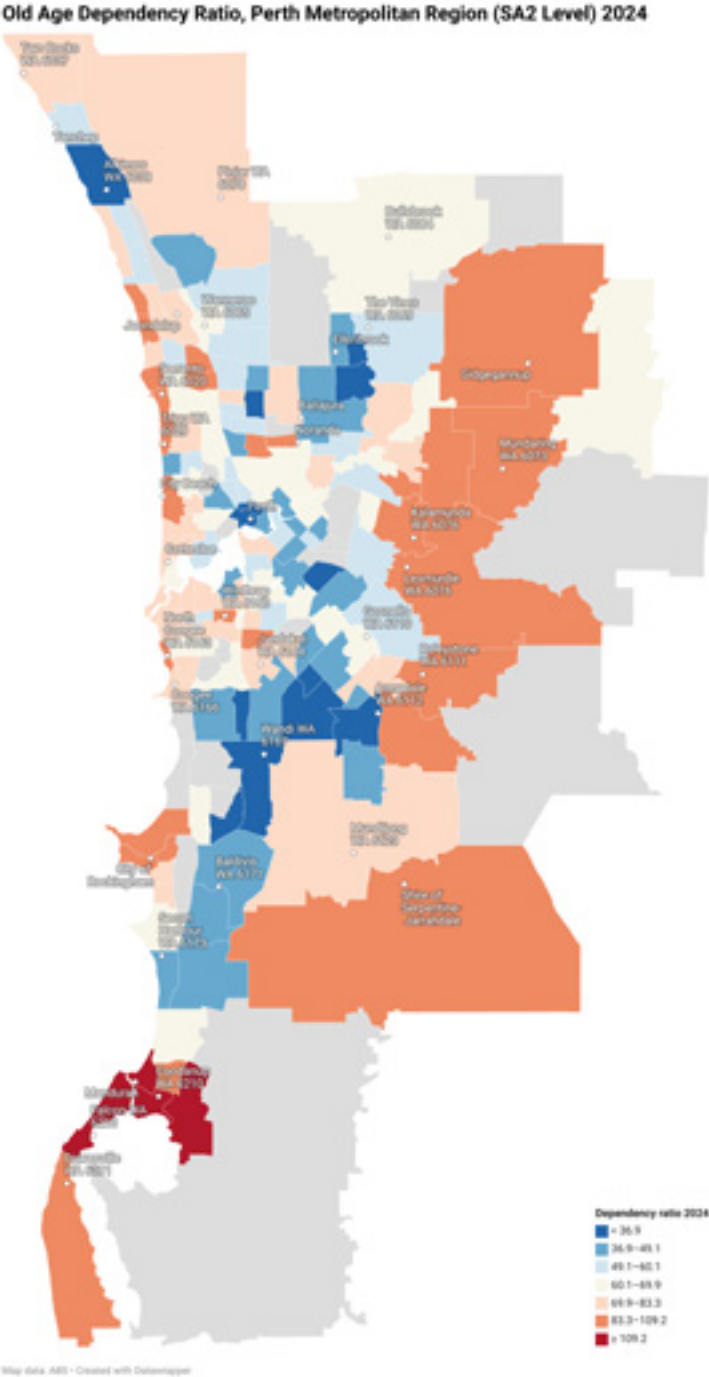
The overall ageing of the population, rapid growth of older age cohorts and high old-age dependency ratios pose a series of inter-related policy questions at the national, state, metropolitan, local government and suburban scales:

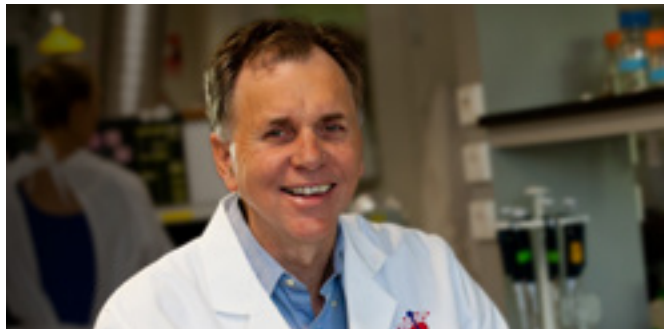
- **economic, taxation and fiscal policies** – how will governments generate sufficient revenue via taxation (eg income tax and GST) if the working age population shrinks relative to the growth of the aged population?
- **service delivery in health and social care** – where will the labour force come from to provide good quality medical, health and social care for a growing aged population?
- **familial structures and relationships** – are Australians ready for a significant growth in intergenerational households and at-home aged-care responsibilities?
- **physical design and liveability of cities/regions** – how will our cities and regions adapt to ensuring a good quality of liveability, accessibility, mobility and participation for older populations in terms of housing, transport, built environment and employment?
- **social and civic participation** – what measures are needed to ensure that older populations are not excluded from opportunities to participate in social, civic and economic life and maintain well-being?

Policy silver linings

Responding to these policy challenges is part of the State Government’s agenda and evident in the *Creating Age-friendly Communities in WA Toolkit* (2021) and *An Age Friendly WA: State Seniors Strategy 2023–2033*.

If current life expectancy levels and socio-economic standards are sustained, this offers a silver lining in that the growing number of people in their 70s and 80s in the future will be relatively more active, healthier and participatory cohorts. ■





Professor **Barry Marshall** AC



Dr **Asha de Vos**

The University of Western Australia has launched a major new brand campaign ‘Make a Dent’, confidently expressing its identity and purpose while reinforcing its leadership in innovation, research and real-world impact.

Through its deep and long-held connection to the State and commitment to education, discovery and leadership, the campaign reframes UWA as The University for Western Australia — an active, driving force for progress in a world that desperately needs it.

UWA Deputy Vice-Chancellor (Operations), Selina Torrance, says the initiative reflects the University’s responsibility to ensure its education and research remain relevant in a rapidly changing world.

“Like most organisations, we regularly review how we are perceived by the broader community,” Ms Torrance says. “This ensures our education and research remain aligned with the needs of our communities, future students and Western Australia’s evolving workforce.”

The campaign began with rigorous research into how UWA is perceived by students, employers, partners and the broader community. These insights were then tested and refined through extensive consultation with graduates, staff, students and partners, ensuring the final approach reflects not just what the data revealed, but what the UWA community genuinely feels and believes.

The review identified opportunities to better articulate UWA’s contemporary, industry-connected education, enriched student experience, and leadership in research areas including clean energy transition, health and biotechnology, and environmental sustainability.

At the heart of the campaign is the concept of making an impact or dent — the idea that a UWA education positions our graduates to make a difference to the world. While remaining proud of a significant legacy, the tangible measure of a university is the impact its graduates make through their respective contributions.

Drawing on this theme, the campaign showcases the achievements of UWA staff and alumni whose work has shaped Western Australia and the world - including trailblazing marine biologist Dr Asha de Vos and Nobel Laureate Professor Barry Marshall AC. The campaign underscores UWA’s role in producing graduates and discoveries that make a tangible difference, from advancing sustainability and health outcomes to driving innovation across industries and communities. It positions UWA as a place for people who move from learning to legacy, and who create change from Western Australia to the world.

Rolling out across television, radio, social media and other digital channels, UWA’s message is clear: impact demands visibility, conviction and action. This is a university that has always embraced change and continues to invite those who want to make their mark, make a dent, and pull the world forward, one discovery at a time. ■



STUDY SHOWS WORLD

FIRST AUSTRALIAN PRETERM BIRTH PREVENTION PROGRAM IS WORKING

Every year in Western Australia, 3000 babies are born too early. While many of these children may go on to live a normal life, for many others their early birth will prevent them achieving the health and wellbeing that should have been their birthright.

By Richie Hodgson

Early birth rates have been rising in recent decades across Australia and similar countries. But Western Australian researchers have led the way in showing that rates of preterm birth can be safely reduced.

This work has resulted in a world-first initiative to reduce preterm births in Australia, leading to a significant decrease in rates of potentially harmful early birth and improved pregnancy outcomes for women across the country.

The success of the initiative, published in *The Lancet Obstetrics, Gynaecology, & Women's Health*, presents

detailed outcomes from a six-year preterm birth prevention program first introduced in mid-2018.

Preterm birth – defined as birth before 37 completed weeks of pregnancy – remains a leading cause of death and long-term disability in children worldwide.

In response to rising rates of potentially harmful early birth across the country, the Australian Preterm Birth Prevention Alliance launched a comprehensive preterm birth prevention program in 2018.

“Australia is one of the safest places in the world to have a baby. This program has made it even safer.”



Professor **John Newnham** and Dr **Barb Vernon**

Professor of Obstetrics at The University of Western Australia, and Chair and Founder of the Australian Preterm Birth Prevention Alliance, Professor John Newnham says the ‘proof of concept’ phase for the program was modelled on a pioneering initiative delivered in Western Australia.

“From 2018-2021, broad implementation of preterm birth prevention strategies across the country through the Alliance were found to have lowered the rate of preterm birth by 10 per cent,” Professor Newnham says.

“In 2021, we then expanded the methodology through the Commonwealth-funded ‘Every Week Counts National Program’ – a collaboration of 59 major hospitals working together to lower the rate of birth in the early term ages (37-39 weeks).

“Overall, we have shown that using current knowledge we can lower the rate of harmful early birth by about 7-10 per cent.”

This equates to approximately 4,000 fewer cases of early birth each year across Australia since the program was launched.

“The study published in *The Lancet* contains the names of 300 Australian researchers and healthcare workers and describes nearly two million Australian births. This is a true Western Australian success story,” Professor Newnham says.

“Australia is one of the safest places in the world to have a baby. This program has made it even safer.”

Caring for preterm infants remains extremely expensive, and the socioeconomic impact is immense.

A 2020 cost analysis revealed the annual cost of untimely early birth to the Federal Government was \$1.4 billion each year, with more than \$350 million of this spend on those needing education assistance due to their early birth. A 10 per cent reduction in early birth equates to a saving of at least \$100 million each year.

“I hope everyone can be proud that this world-first national program was conceived in Western Australia, shown to work in Western Australia, and then rolled out across the rest of the country with great success,” Professor Newnham says.

In March 2025, the Federal Government announced new funding to expand Australia’s world-first national program to safely reduce rates of preterm and early term birth with a focus on improving pregnancy outcomes for First Nations mothers.

To support health services to adopt and spread evidence-based practice, the Alliance partnered with Women’s Healthcare Australasia and the Institute for Healthcare Improvement.

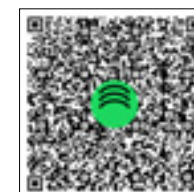
Dr Barb Vernon, CEO of Women’s Healthcare Australasia and Co-Chair of the Australian Preterm and Early Term Birth Prevention Program, is working with teams from more than 40 hospitals across Australia to strengthen their efforts and create even more impactful outcomes for women and babies.

Dr Vernon says implementing culturally safe continuity of care models for First Nations women and babies continues to be a key area of focus.

“Unfortunately, First Nations babies are twice as likely as non-Indigenous babies to be born too early,” she says.

Findings from the paper have also been featured as part of *The Lancet Obstetrics, Gynaecology, & Women’s Health* podcast which revisits the origins, evolution and successes of Australia’s pioneering program.

The podcast, featuring Professor Newnham, is available on Spotify. ■



Scan the code to access the podcast.



IN THE HOT SEAT

By Annelies Gartner

During this year’s Australian Open, scorching January temperatures in Melbourne triggered extreme heat protocols and outdoor play was suspended.

The Grand Slam tournament uses a heat stress scale based on radiant heat, humidity, air temperature and wind speed, with matches on outside courts stopped when it reaches level five.

According to Professor Olivier Girard from The University of Western Australia’s School of Human Sciences, players would have been training in a heat chamber for at least one hour a day for seven days before the Open.

“Once they’d arrived they would have spent time outside in the heat of the day to better cope with the stress of exercise – heat acclimation is the number one way to protect us against the heat,” Professor Girard says.

“Within about a week they can lower their heart rate by about 15 beats per minute, start to sweat earlier and delay the rise in core temperature.”

Professor Girard’s research has found exercising in the heat not only causes an increased cardiovascular load and core temperature but can also quickly affect cognitive function.

“When core temperature increases by just one degree, to around 38.5C, people become hyperthermic, which can impair decision-making,” Professor Girard explains.

Previously, it was assumed that alteration in cognitive function occurred only once core temperature had risen significantly.

Using UWA’s heat chamber at the Sport Science, Exercise and Health laboratory, Professor Girard was able to show heat stressors could impact cognitive ability even before the body became hyperthermic.

“If someone moves from a normal environment into a heat chamber, their cognitive function begins to deteriorate almost immediately,” he says.

“It is more difficult to solve problems, organise information logically and make decisions – it can be immediate.”

The findings are not only applicable to elite athletes but also to workers exposed to heat stress, such as FIFO and firefighters, where occupational heat stress can impact health and productivity.

“Environmental conditions, physical activity and heat retained by clothing or personal protective equipment can all affect the ability to work safely and efficiently,” Professor Girard says.

“Environmental conditions, physical activity and heat retained by clothing or personal protective equipment can all affect the ability to work safely and efficiently.”

UWA studies have found dehydration and poor sleep are among the main causes of occupational heat stress for FIFO workers in northern Western Australia.

“They’re there for two weeks, and if sleep quality is poor and they are dehydrated chronically, this adds to the fatigue that occurs through their shifts,” Professor Girard says.

“We need to improve education about hydration. Many outdoor workers drink a lot of coffee that contributes to dehydration, and people should not wait to be thirsty before you start drinking because by then it’s probably already too late.”

Professor Girard also works with firefighters from the Department of Fire and Emergency Services, whose protective equipment can prevent sweating.

“This can lead to a build-up of core temperature and, if appropriate work-to-rest ratios aren’t implemented, it can put the body at risk and cognitive function is altered – this increases the chance of injury,” he explains.

“They’re working in challenging environments and chronic dehydration is also a factor but everyone is very different depending on genetics, heat acclimation and previous exposure.”

So how can guidelines be developed when there are so many influencing factors?

“We’ve been doing research where we ask individuals to swallow a small ingestible pill that tracks gastrointestinal temperature to help us understand thermal strain,” Professor Girard says.

Currently this technology remains relatively expensive for industry to implement in the field on a regular basis.

“In the future it will become more affordable, and outdoor workers could be given ingestible core temperature pills that transmit warnings to wearable devices such as a watch,” he explains.

“It could let us know when it’s time for them to take a rest and when their core temperature has dropped. There’s still a lot of important work to be done in this space.” ■



Professor **Olivier Girard**



Associate Professor **Gilles Gignac**

WORRIED ABOUT TURNING 60? SCIENCE SAYS THAT’S WHEN MANY OF US ACTUALLY PEAK

This article by Associate Professor Gilles Gignac, from The University of Western Australia's School of Psychological Science, originally appeared in *The Conversation*.

As your youth fades further into the past, you may start to fear growing older. But research my colleague and I have recently published in the journal *Intelligence* shows there’s also very good reason to be excited: for many of us, overall psychological functioning actually peaks between ages 55 and 60.

And knowing this highlights why people in this age range may be at their best for complex problem-solving and leadership in the workforce.

Different types of peaks

There’s plenty of research showing humans reach their physical peak in their mid-twenties to early thirties.

A large body of research also shows that people’s raw intellectual abilities – that is, their capacity to reason, remember and process information quickly – typically starts to decline from the mid-twenties onwards.

This pattern is reflected in the real world. Athletes tend to reach their career peak before 30.

Mathematicians often make their most significant contributions by their mid-thirties. Chess champions are rarely at the top of their game after 40.

Yet when we look beyond raw processing power, a different picture emerges.

From reasoning to emotional stability

In our study, we focused on well-established psychological traits beyond reasoning ability that can be measured accurately, represent enduring characteristics rather than temporary states, have well-documented age trajectories, and are known to predict real-world performance.

Our search identified 16 psychological dimensions that met these criteria.

These included core cognitive abilities such as reasoning, memory span, processing speed, knowledge and emotional intelligence. They also included the so-called ‘big five’ personality traits – extraversion, emotional stability, conscientiousness, openness to experience, and agreeableness.

We compiled existing large-scale studies examining the 16 dimensions we identified. By standardising these studies to a common scale, we were able to make direct comparisons and map how each trait evolves across the lifespan.

Peaking later in life

Several of the traits we measured reach their peak much later in life. For example, conscientiousness peaked around age 65. Emotional stability peaked around age 75.

Less commonly discussed dimensions, such as moral reasoning, also appear to peak in older adulthood. And the capacity to resist cognitive biases – mental shortcuts that can lead us to make irrational or less accurate decisions – may continue improving well into the 70s and even 80s.

When we combined the age-related trajectories of all 16 dimensions into a theoretically and empirically informed weighted index, a striking pattern emerged.

Overall mental functioning peaked between ages 55 and 60, before beginning to decline from around 65. That decline became more pronounced after age 75, suggesting that later-life reductions in functioning can accelerate once they begin.

Getting rid of age-based assumptions

Our findings may help explain why many of the most demanding leadership roles in business, politics, and public life are often held by people in their fifties and early sixties. So while several abilities decline with age, they’re balanced by growth in other important traits. Combined, these strengths support better judgement and more measured decision-making – qualities that are crucial at the top.

Despite our findings, older workers face greater challenges re-entering the workforce after job losses. To some degree, structural factors may shape hiring decisions. For example, employers may see hiring someone in their mid-fifties as a short-term investment if retirement at 60 is likely.

In other cases, some roles have mandatory retirement ages. For example, International Civil Aviation Organisation sets a global retirement age of 65 for international airline pilots. Many countries also require air traffic controllers to retire between 56 and 60. Because these jobs demand high levels of memory and attention, such age limits are often considered justifiable.

However, people’s experiences vary.

Research has found that while some adults show declines in reasoning speed and memory, others also maintain these abilities well into later life.

Age alone, then, doesn’t determine overall cognitive functioning. So evaluations and assessments should focus on individuals’ actual abilities and traits rather than age-based assumptions.

A peak, not a countdown

Taken together, these findings highlight the need for more age-inclusive hiring and retention practices, recognising that many people bring valuable strengths to their work in midlife.

Charles Darwin published *On the Origin of Species* at 50. Ludwig van Beethoven, at 53 and profoundly deaf, premiered his Ninth Symphony. In more recent times, Lisa Su, now 55, led computer company Advanced Micro Devices through one of the most dramatic technical turnarounds in the industry.

History is full of people who reached their greatest breakthroughs well past what society often labels as ‘peak age’. Perhaps it’s time we stopped treating midlife as a countdown and started recognising it as a peak. ■



FROM UWA MEDICAL SCHOOL TO THE AFL BOUNDARY LINE

With the 2026 AFL season in full swing, UWA Medical School graduate and West Coast Eagles Head of Health, Dr Casey White (MBBS '12), is carving a unique path at the intersection of sport and science.

Throughout his journey from aspiring athlete to leading Australian Football League (AFL) club doctor, Dr White has developed a keen understanding of the physical toll of high performance sport and how to keep athletes thriving across the long and demanding modern AFL season.

“Sport and exercise medicine was on my radar before day one of med school,” Dr White says. “I dreamt of being a professional athlete, but it turns out I could have a bigger impact by helping to keep others on the park.”

After graduating in 2012, Dr White completed his rotations through various hospital posts, devoted his third year of residency to emergency medicine for its trauma exposure, and completed a Master

of Philosophy on burn-related neuroplasticity with Professor Fiona Wood – research he now extends to anterior cruciate ligament (ACL) injuries and brain stimulation therapies.

He also completed an International Olympic Committee (IOC) Diploma in Sports Medicine, before gaining admission to the Australasian College of Sport and Exercise Physicians (ACSEP) training program. This culminated in a Fellowship in 2021, where he was recognised as the College Medallist.

Early stints as a team doctor for WA Football League (WAFL) club Peel Thunder and the Fremantle Dockers’ AFLW team paved the way for his move to the West Coast Eagles, during a pivotal period for the club.

Now firmly established as Head of Health, Dr White leads the Eagles’ medical and wellbeing strategy, blending elite sport, clinical precision and medical innovation.

“Rapid, accurate musculoskeletal examination remains a core skill,” he says, when asked which clinical skills he relies on most. “On game day, you have your eyes, hands, and experience to decide if a player can return to the game.”

Dr White explains that match day is only a fraction of the role overall. The real grind happens during the week, with diagnostic sprints that include injury reviews, rehabilitation planning and selection meetings with coaches and high performance staff. These are followed by triaging knocks at training, running injury clinics and managing the constant flow of documentation required in professional sport. Still, match day provides many memorable moments.

“I once pulled a player minutes before the bounce for what turned out to be his first flare of ulcerative colitis – hardly your textbook footy injury,” he says. “Broken noses and bones, and even the odd haemopneumothorax, keep things lively but colleagues at other clubs can top me; a ruptured testicle might take the cake!”

Breaking into sports medicine can feel daunting for many medical graduates, largely because most students never see it on rotation. The field often appears insular, a ‘closed



Dr Casey White

world’, but there are accessible entry points for those who are curious and motivated.

Dr White suggests knocking on the doors of your local sport and exercise physician. He recommends asking to shadow them at training, or in the clinic, to get ‘a front-row seat’ or volunteering at sporting events such as the Busselton Ironman.

“A seasoned crew will guide you, and you’ll learn more in one weekend than a month on the wards,” he says. “Show up, be useful, and the invitations keep coming.”

Dr Casey White’s journey to sports medicine reflects a rare fusion of passion, precision and perseverance – proving that with curiosity and commitment, even the most specialised corners of medicine are within reach. ■



Dr Casey White provides comfort and care as a player is stretchered off during a tough match.



Dr Casey White (second row, fourth from left) joins players and medical staff on the field following an AFL match.



Dr Casey White in action on the AFL boundary line, providing rapid on field medical care under pressure.



Meet Professor Ralph Martins, AO CitWA:

UWA’S NEW ALZHEIMER’S RESEARCH AUSTRALIA ENDOWED CHAIR

Made possible through a new partnership built upon the generosity of Alzheimer’s Research Australia and Lions Alzheimer’s Foundation, UWA has welcomed globally recognised Alzheimer’s researcher Professor Ralph Martins AO CitWA as its inaugural Alzheimer’s Research Australia Endowed Chair.

Over the course of four decades, Professor Martins has pioneered groundbreaking Alzheimer’s research and made a profound impact in the international medical community – and now he is proud to be returning to the place where it all began. His UWA homecoming marks an exciting new chapter for the University and for the future of Alzheimer’s research in Australia and beyond.

How did you come to devote your life to Alzheimer’s research?
When I was completing my PhD at the UWA Department of Biochemistry, under the supervision of Dr Gilbert Stokes, I was offered a position with Professor Colin Masters AO to work on Alzheimer’s disease. The topic appealed to me as my father-in-law, George Lewis, was just diagnosed with Alzheimer’s at the young age of 60. The family was devastated, and, at that time, there was nothing known about the disease and its underlying cause, with diagnosis only confirmed when the brain was examined after death. I decided to work with Professor Masters before taking up an appointment in Dunedin, New Zealand. My aim was to inform the family about Alzheimer’s. Forty-one years later, I am still working on Alzheimer’s, with my passion



Professor **Anna Nowak**, Deputy Vice-Chancellor (Research), UWA, and Dr **Terry Bayliss**, Deputy Chair, Alzheimer’s Research Australia at the signing of the partnership

and commitment fuelled by three of my father-in-law’s daughters inheriting his dreadful disease, including the mother of our three children who is in a nursing home.

What is your vision for your work as the inaugural Chair?
I have pioneered the development of a blood test over the past 25 years. Despite being told that it was not possible, I nevertheless pursued this objective and, together with colleagues around the world, have demonstrated that certain blood proteins can be measured with great accuracy in reflecting the build-up of amyloid in the brain. My aim is to have a blood test in Australia within the next five years.

Can you tell us how philanthropic support enhances research innovation and discovery?
Philanthropic support is critical to the viability of my research programs. Besides allowing ideas to be tested early, donor funding has enabled the establishment of my team, along with the infrastructure and momentum for innovation breakthroughs, such as blood biomarkers for early diagnosis and prognosis of Alzheimer’s.

I am deeply grateful to The Honourable Dr Malcolm McCusker AC CVO KC and his family for over two decades of visionary support, which paved the way for many other generous donors: Alzheimer’s Research Australia, Lions Alzheimer’s Foundation, and more recently, Dr Tonya McCusker AM, who donated to seed our blood test diagnostic program. This generated pilot data, which led to a successful Industry Program Grant from the Federal Government.

What keeps you hopeful in the face of this devastating disease?
In the past decade, we finally have disease-modifying treatments that are now available in Australia. This outcome was made possible by the pioneering work of Professor Colin Masters identifying beta amyloid at UWA in 1986 and the subsequent decades of work undertaken globally. This outcome and the fact that we are so close to developing a blood test that will be accessible to everyday Australians – to enable them to access effective treatment early before brain damage occurs and for high-risk individuals to be identified for prevention – gives me great hope for the future. ■



Roslyn Barnes, 1st Vice District Governor, Lions WA, **Professor Vicky Vass**, Chief Executive Officer, Alzheimer’s Research Australia, **Leo McManus** OAM, **Professor Anna Nowak**, Deputy Vice-Chancellor (Research), **Dr Terry Bayliss**, Deputy Chair, Alzheimer’s Research Australia, **Professor Ralph Martins AO CitWA**, Alzheimer’s Research Australia Endowed Chair, **Associate Professor Helen Wilcox**, Dean and Head of School, UWA Medical School



HARNESSING GENOMICS TO PREVENT DISEASE

UWA researchers have cautiously backed calls for nationwide genomic testing after taking part in a Monash University-led pilot study which showed strong community appetite for genetic information that could help prevent disease.

By Tamara Hunter

The national study offered free genomic screening to 10,000 Australians aged 18-to-40 years, testing for 10 genes linked to hereditary breast and ovarian cancer, Lynch syndrome, and familial hypercholesterolemia (FH).

More than 30,000 people registered to take part in the study, which sought to assess the feasibility of population-wide genomic testing for selected high-risk, medically actionable conditions.

In findings published in *Nature Health* in January this year, the study found one in 50 participants (two per cent) was at high risk of developing one of the tested conditions.

Those identified were referred to genetic counselling and then to their local specialist centre for follow-up care and risk management. Eighty-nine per cent of the 202 people who screened positive took up the offered support, with some since diagnosed with cancer or cardiovascular disease.

Lead authors Professor Jane Tiller and Professor Paul Lacaze from Monash University said the study demonstrated that voluntary, population-based genomic screening was not only feasible but life-saving, providing Australians with critical health information that allowed them to prevent or identify disease early.



Winthrop Professor **Gerald Watts**



Dr **Kristen Nowak**

They are now advocating for the Federal Government to fund a 100,000-person translational phase to help determine the best way to implement the program nationally.

Winthrop Professor Gerald Watts, an FH specialist from UWA’s Medical School and study co-author, agrees proactive genomics testing could benefit thousands of Australians but only if accompanied by measures such as equitable access to tests, guaranteed access to counselling and support, careful integration with existing systems, and cascade testing of families.

“Such a program must be coupled with family screening to pick up first- and second-degree relatives,” Professor Watts says.

“Ideally it would also capture children because conditions like FH are already present in utero but are typically not picked up until much later.

“You also have to have a model for caring for these people after you’ve identified them – you shouldn’t go out detecting disease risk if you can’t promise people the best care possible once you find it.”

He says existing health services that are already under the pump would need to be strengthened.

“GPs and specialist services are not currently resourced or trained to absorb large numbers of newly identified patients so there would be a great need for additional training, infrastructure and support.”

Co-author Dr Kristen Nowak – an Adjunct Associate Professor with UWA’s School of Biomedical Sciences and Director of the Office of Population Health Genomics with the WA Department of Health – says genomic testing offers great opportunity, especially for preventative health, but comes with social, legal and ethical considerations.

“The phenomenal public response to this study shows people want to be proactive about their health and engage in genomics, but it is an area that can have a lot of sensitivities – especially because genomics don’t just tell us about our own potential risk or health condition but possibly our family’s as well,” Dr Nowak says.

“Generally we shouldn’t just test because we can – there needs to be a good reason, particularly when using health dollars.

“Fundamentally it should be a good use of public funding, and you want to cause more benefit than harm.

“We also want to make sure we’ve got that model of care available at the right scale, so while this has been a world-leading study with extremely promising outcomes, there’s a lot of work still to be done before possible implementation.”

- **Familial hypercholesterolemia (FH) is an inherited genetic disorder that affects how the body processes cholesterol and significantly increases the risk of heart disease and early heart attacks. It affects approximately one in 250 Australians.**
- **Lynch syndrome is an inherited genetic condition that significantly increases the risk of colorectal, endometrial and several other cancers. It is believed to be Australia’s most common inherited cancer risk, with one in 280 Australians believed to carry the mismatch repair gene fault associated with the condition.**
- **Of the 165 people found to be at high risk who went on to genetic counselling, nearly 75 per cent would have been ineligible for existing government-funded genetic testing.**

IN THE FRAME

Connected: our alumni, staff and students snapped at UWA events this year.

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Leading with Ethics in a Time of Change



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