Golden anniversary of Busselton Health Study

50 years of research produces glittering results.

Even retired surfies get fat, it seems.

The latest tranche of findings from the internationally-respected Busselton Health Study (BHS) shows the older Busselton population, including ageing surfers, is not bucking the national trend towards overweight and obesity, with two in three over-tipping the scales.

Compared with data from the National Health Survey, results from the Busselton Health Ageing Study (BHAS) show more Busselton residents have a large waist and more men have high blood pressure while rates of risky alcohol intake and physical activity are similar to the national population.

The good news is that the Busselton bods eat much more fruit and veg, eat less saturated fat and are much less likely to smoke than other Australians.

Science on the Swan

The quality and breadth of research undertaken in WA was showcased at the recent Science on the Swan conference, with the Faculty’s Centre for Cell Therapy and Regenerative Medicine (CCTRM) well represented.

Deputy Director Emeritus Professor George Yeoh, co-convener for this year’s conference, said international and national delegates had been impressed with the wealth of expertise within WA in the area of regenerative medicine.

At the conference Associate Professor Rodney Dilley, CCTRM Program Leader, discussed the work his group is undertaking to discover stem cell therapies that could restore functional “hair” cells in the inner ear – those responsible for hearing and balance.

Fellow Program Leader Associate Professor Fred Chen outlined his work using transplanted neural stem cells taken from the patient’s own cornea to treat macular and retinal degeneration. And, findings from research to investigate the impact of burn injury and scarring were presented by CCTRM Clinical Director Professor Fiona Wood.

“The feedback has been fantastic,” Emeritus Professor Yeoh said.

“We have had emails coming in from participants that are saying it has been among the best conferences they have been to.”

Science on the Swan is an annual medical research conference that draws...
When he first decided to travel to Perth from China 29 years ago Ming-Hao Zheng, Associate Dean, International, admits he had little idea where on earth it actually was.

Many years on and he has now been converted into a true West Aussie and one of the Faculty’s and the State’s most passionate promoters. Professor Zheng is convinced that others will, like him, see the fantastic opportunities and high standard of learning and endeavour available at The University of Western Australia if given the opportunity to visit.

He said one of the great success stories for international engagement was the establishment of the Winter School program where for four weeks every August international students could come to the Faculty for course work and clinical observation or laboratory research experiences.

“When they come, a lot of these students realise what a great university this is and a good Medical School and as a result they come back for postgraduate study. Importantly, when these students return to their country they are our advocates for the university.”

International alliances were also being strengthened through relationships with local ethnic communities such as the Australian Chinese Medical Association and the Australian Indian Medical Association.

Increasing the diversity of the international student profile is also a key factor in success. While Asian countries continue to be a main target due to their near neighbour status and the fact they were in the same time-zone, opportunities were also being explored in South America and Northern European countries.

Overseas student enrolment in the Medical School remained below 10 per cent which compared to about 20 per cent elsewhere in the university, largely due to quotas. However, international PhD student enrolment within the Faculty had increased dramatically over the last four years.

Professor Zheng, whose work on regeneration of tendon and cartilage using a patient’s own stem cells has been recognised around the world, said there was great scope for research collaborations internationally, particularly in China, as well as opportunities for joint degrees to be offered.

A recently established joint clinical medicine program with Zhejiang University enables medical students from Zhejiang to study the foundations of medicine at the UWA Medical School for 18 months after which they return to their own university to continue their clinical studies. At the end of the five year course both universities award a degree: a Bachelor of Biomedical Science at UWA and a Bachelor of Clinical Medicine at Zhejiang.

In regards to pharmacy, Professor Zheng sees great opportunities for collaboration in Vietnam because the pharmacy system there is well established and there is a big demand for clinical pharmacists.

"It is inevitable that the international agenda for this Faculty is a key space for our future development. We really want to create and sustain an environment here that can support international activities and ensure that the learning experience includes an international dimension and opportunities,” Professor Zheng said.

- by Peta Rasdien

Quality research showcased at Science on the Swan

Continued from page 1

speakers from around the world and Emeritus Professor Yeoh said it was a priceless opportunity to foster engagement between young scientists and leading researchers and clinicians.

He said Perth’s isolation could make it difficult to spread the word about the excellent research happening in WA in a range of areas.

“By bringing the people here they realise that good things are going on and collaborations can be set up.”

Emeritus Professor Yeoh said he would love to see more students attend the conference next year.
The Dean’s Diary

Renewal taking effect

We are midway into 2017 and our new Vice-Chancellor is now more than 100 days into the position. A lot has happened this year. We are already seeing the outcome of the changes that resulted from the UWA Renewal process. Change is always unsettling and it has taken time for some aspects of our new structure to take effect. However, we are getting there. At an academic level the changes are strengthening collaborations in teaching and research.

An immediate benefit of the UWA Renewal has been the Be Inspired campaign. This campaign aims to attract and recruit highly talented academics to our university. Through this campaign our Faculty is seeking new academics to further enhance our excellence in teaching and research. These will be in areas in which we have been recognised internationally for our excellence, as well as new and strategic fields of endeavour which we wish to enhance in teaching or research.

Details of the campaign are on the UWA website at www.uwa.edu.au/beinspired. Although only launched in May there has already been significant interest. We look forward to appointing talented academics over the coming year who will assist us in achieving the goal of being a research-intensive university ranked in the top 50 universities worldwide by 2050.

Research funding

The remarkable donation from Andrew and Nicola Forrest recently announced will lead to expansion of the Forrest Research Foundation, a partnership with all five Western Australian Universities and based at UWA. This will support research scholars and fellows, some of whom, we hope, will be in the medical sciences.

The Forrest donation also includes support for early childhood education and to eliminate cancer through an international effort. Professors Donna Cross and Peter Leedman from our Faculty are key advisors to these programs.

In late May the National Health and Medical Research Council (NHMRC) announced changes to the structure of its grants program to be implemented in late 2018. The NHMRC intends to ensure continued support for Australia’s world-leading researchers through support of outstanding individuals, innovative research programs and synergistic collaborative groups. It is unclear at this stage what impact this restructured program is likely to have on the funding success for our Faculty. The NHMRC anticipates that the revisions will enhance research productivity and increase the potential for translation to improve health.

New major

Our new undergraduate major in medical sciences commenced in 2017 in both years 1 and 2. This exciting new educational offering has already been met with great enthusiasm by the students. Perhaps it is the names of the units that attracted the students, specifically Facts of Life – though the content may not be what the students had anticipated, parents may be relieved. The unit, in fact, teaches core subjects such as biochemistry, cell biology, genetics and human heredity and students have been attracted regardless. It is always a challenge putting together new programs and the many hours of hard work put in by our team of talented staff do not go unnoticed. The student feedback and performance to date show that this new program will be a success. Changes are continually being made to our teaching programs and curricula. This is to respond to feedback from students and staff and to ensure that our students are well-prepared for their future careers. Our postgraduate courses are a particularly important part of educational offerings: we wait to see the effect the 2017 Federal budget will have on the University, our students and the Faculty.

The UWA Medical School, first established on 1957 has, in its Diamond anniversary year, been re-created. In the 2017 restructuring we reduced the number of Schools in the Faculty from 9 to 5; we brought together all the Schools involved in the MD program into the Medical School. In the 60th anniversary year we say “thank you” to the people of WA: we trust that the donors of the 1950s are proud of what their generous gift delivered. If this were a wedding anniversary we would expect a letter from the Queen! I look forward to welcoming you to the Faculty and the many events that will be hosted during the second half of 2017. A special UWA 60th anniversary website has been created www.uwa.edu.au/med60 for the occasion.

By Professor Wendy Erber, Pro Vice-Chancellor and Executive Dean.
A decade of graduates

The Division of Pharmacy has cause for celebration this year – a 10th anniversary.

“The two-year Master of Pharmacy program started halfway through 2005 when we had our first intake and now we have had 10 years of graduates,” said Assistant Professor Liza Seubert, Head of the Division.

“At the beginning, it was a new program and the first time a Master of Pharmacy had been offered in Western Australia. Over the 10 years we have established a reputation for producing extremely high quality graduates, who are leaders in the profession and who are making a difference in both community and hospital pharmacy.”

In March, a special event was held with a dinner and prize-giving, attended by students, staff, alumni, preceptors and donors. Faculty Executive Dean Professor Wendy Erber spoke about pharmacy as a profession and Professor Alan Everett, who was the first Director of the Master of Pharmacy program, gave the special address, stressing the need to screen out the “noise” of politics and change, focusing first and foremost on the patient.

Mr Malcolm Roberts, who was a member of the initial team of pharmacy academics at the University of WA and retired last year, also attended the dinner. He received a Life Time Achievement Award at this year’s WA Excellence Awards of the Pharmaceutical Society of Australia, the peak national body for pharmacists. The award recognised his significant role in shaping the pharmacy profession as it is today.

Pharmacy graduate Ms Danae Perry was awarded a number of prizes recognising her outstanding academic achievements. She received the prestigious Gladys Heedes Medal for completing the degree with the highest weighted average mark across all units in the course. In addition, she received the Jen Bright Memorial Prize for Excellence in Pharmacy Practice which recognises not only academic achievement, but also excellence in the humanistic side of the pharmacy profession. “Being awarded the Jen Bright prize shows that Danae is well-rounded, exemplified by the fact that she has come back this year to be a mentor to our Year 1 students,” Assistant Professor Seubert said.

Once the formal proceedings had concluded, staff, students, alumni and guests caught up with news of each other, reminisced and danced the night away, she added.

- by Cathy Saunders

Mentoring Masters students

Two Master of Pharmacy students who graduated last year are returning each week to their alma mater to give fresher students some helpful tips.

Ms Danae Perry and Mr Jeremy Gill, now both interns, are part of the mentoring program in which recent graduates volunteer to come in as mentors to current first-year Masters students for an hour each week.

Assistant Professor Liza Seubert, Head of the Division of Pharmacy, said, “It is lovely that two of our ex-students are very connected.

“Mentoring was introduced in 2014 to help students in the early stages of the Pharmacy program adapt to the challenges of the intensive course. The mentors help them navigate the transition from undergraduate to postgraduate learning and with strategies to deal with the high workload.

“Developing leadership skills in our students is a key focus and these graduates are showing leadership in that they want to come back as mentors and give back to the profession.”

The mentors also help with teamwork. “Our students are put into groups from day one and if they work together to study, life becomes a lot easier for them and so this is to help create that cohesive team approach as well,” Assistant Professor Seubert said.

Ms Perry said the mentor sessions gave students the opportunity to ask questions, solidify knowledge and seek ongoing support, guidance and feedback. “Since the mentors are UWA pharmacy graduates, they are able to provide their lived experience of both the practical and theoretical components of the program,” she said. “The students respond to the sessions in a highly positive manner and their outward gratitude speaks volumes for the value they provide.”

Mr Gill said coming back into the pharmacy program as a recent graduate to mentor the current students had been really exciting. “Where other lecturers may offer years of clinical and academic experience, we can offer something more unique which is a recent understanding of what it is like to be on the other side of the table as a student,” he said.
Dispensing with the old for new dispensing

Pharmacy students will soon step into the virtual reality world to learn how to dispense medicines safely.

The students undertaking the two-year Master of Pharmacy degree will use a clever online tool called MyDispense that is a pharmacy simulation. It enables them to practise their dispensing skills and make mistakes without the serious consequences of practising in the real world.

Developed by a team from Monash University, the program provides various exercises in the form of tutorials which each student undertakes and receives feedback on. Marked assessment exercises are also available.

One of the online screens shows a virtual pharmacy, which enables the student to act as a community pharmacist facing a virtual patient who is waiting to have a prescription dispensed appropriately. The student has access via the screen to online reference books and other sources, dispensing software and even a virtual phone to call the prescriber for more information.

Another screen provides a virtual pharmacy back room where medicines and other products can be accessed by the virtual pharmacist (student) from the shelves, fridge and safe. The student can also print labels for the medicines and interact with the patient in a number of ways, including fact finding, answering questions and counselling the patient.

Head of the Faculty’s Division of Pharmacy, Assistant Professor Liza Seubert, said MyDispense would be really useful as students were able to access it from their own laptops or computers. “When they are on their own, students can go and practise anywhere with different scenarios.”

The new program would also free up clinical tutors to do more sessions on communicating with patients, she said.

To date, the tutors have undertaken up to six simulated clinical scenarios each semester with students, with the tutors acting as patients or doctors and the students as pharmacists. There was one tutor for every two students. The tutorials involved written scenarios with role-plays, ensuring that the students checked prescriptions and elicited all the necessary information from the “patient” or, if need be, checked with the “doctor”.

The students then used a room with 20 computers with dispensing software for labels and accessed medicine products from a secure room to complete the technical part of the dispensing process before returning to the tutor to speak to the simulated patient.

“That’s how we’ve done it in the past and it is a really good system,” Assistant Professor Seubert said. “But the software on the computers is not designed for teaching, it is designed to be used out in a stand-alone community pharmacy so we have lots of technical problems with it. This makes maintaining the software time-consuming.”

The introduction of MyDispense will enable the computer room and software maintenance to be done away with. “And it will eliminate our need to have a room full of medicines,” Assistant Professor Seubert said.

“The MyDispense program will be very good for the technical part of dispensing. But we still do need the clinical tutors for the cognitive part - talking to the patient and identifying any issues with the prescription. Communication and problem solving is what we really want to focus on.”

MyDispense will be trialled this year with second year students and is expected to be introduced into the teaching program next year.

- by Cathy Saunders

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This year’s Faculty restructure precipitated big changes within the UWA Medical School with better integration that is intended to create an enhanced experience for students.

Dr Brendan McQuillan, who has been appointed Head of the School of Medicine, said all the clinical disciplines involved in teaching the Doctor of Medicine program were now under one umbrella.

“We have reunited the clinical disciplines which were previously in their own separate Schools,” he said. “There is potential for better cohesion from a teaching point of view and it sends a clear message to students that all the people teaching into the course are working together as one unit. Other benefits may include greater scope for research collaborations across disciplines and some streamlining of administration.”

Dr McQuillan said the MD course at UWA was now in its fourth year and great efforts had been made to ensure it was running smoothly.

“The key thing with any new course is you are not going to get things absolutely right on the first go, so the course has already undergone quite a few changes as we have been rolling it out,” he said.

“Our fourth year students, who will be the first to complete the new MD course this year, have given valuable feedback that has resulted in a number of changes, especially to the early years of the degree.”

Some improvements relate to more even workloads and adjustments to the level of detail included in certain aspects of the course.

It was also essential that a balance was achieved in catering to a diverse blend of postgraduate students. “We have very high calibre students, some with strong biomedical science backgrounds while others come from fields completely unrelated to medicine such as law and town planning,” Dr McQuillan said. “That diversity is great for medicine but we have to be mindful so that we are still challenging the biomedical science graduates who already possess a lot of knowledge and skills in the area but at the same time not completely overwhelming those who don’t have that background.

“We really enjoy having those different types of students in the course as they bring a range of attributes and life experiences. While some might struggle early on, after the first couple of years it is pretty hard to pick where they have come from.”

Dr McQuillan, a cardiologist, was himself a graduate of the UWA School of Medicine in 1989 when it still offered an undergraduate MBBS course. This was a time when the School was trying to better integrate some of the pre-clinical sciences with clinical medicine.

“We did go to general practice in the first year of our course and started to get early exposure to clinical medicine, which the previous students didn’t get,” Dr McQuillan said.

“Also, it was a time when they were starting to bring in more about the psychological aspects of health and disease and introduce some training of research techniques in medicine.”

He went on to do a PhD in vascular biology at UWA and then a Post-Doctoral Fellowship at Harvard University. He completed sub-speciality training in echocardiography at Massachusetts General Hospital in Boston before returning to Perth.

- by Peta Rasdien

Dr McQuillan said it was good to reflect that in its 60th year the UWA Medical School produced graduates as good as anywhere in the world. While their training can lead to a diverse range of careers, most continue to work locally as doctors in Western Australia just as the public wanted way back when the School was first established.

“The public and our alumni have continued to support us over many years,” he said.

“The premise of the School has always been to benefit the health and prosperity of the people of WA and that is what the UWA Medical graduates have done.”
First female showed the way

With 60 years having passed since the opening of the UWA Medical School it is a good time to reflect on the many amazing achievements of its graduates.

The late Dr Judith Harper blazed the trail for all the women who followed her as the first female graduate of the school in 1957.

Having finished her secondary education at Perth College as Dux, Dr Harper was offered a university scholarship and chose to pursue medicine at UWA’s fledgling Medical School.

The following four years of her degree were completed at Adelaide University. And, although eight women had commenced the course back in 1952, Dr Harper was the only female to return to UWA for the final year in 1957, becoming the first female medical graduate to have studied at UWA.

Her degree was awarded from Adelaide University as four out of six years were spent there, but UWA awarded her a degree in 2007 on the school’s 50th anniversary.

Dr Harper was the first, but many more women have followed in her footsteps, with 2675 female graduates passing through the school’s doors since 1957.

To date the school has trained a total of 6231 graduates, including 3556 men.

Dr Harper’s daughter, Dr Heather Coventry, also a UWA Medical School graduate, now working as a GP in Dianella, said her mother praised the excellent teaching she had received in her final year and considered that all the teachers were trying their hardest to help the students pass.

“She found out she had passed the year because someone called out on the street, before she got the results, ‘the female passed’. She was so excited after passing she ran laps around the building.”

After having children, Dr Harper returned to UWA to attend medical lectures to refresh her knowledge before resuming medical practice – initially in registrar positions at Royal Perth Hospital and Hollywood Hospital and then as a general physician. In her later career she enjoyed teaching students, both medical and dental.

If you are a graduate, current or former staff member, or otherwise connected to the UWA Medical School, we would love to hear from you!

You can find more stories, share your memories of the School and register for 60th anniversary events at medpharm.uwa.edu.au/stories

Faculty staff, students and alumni are encouraged to attend this year’s offerings in the Dean’s Distinguished Lecture Series that ran so successfully last year.

The lectures are presented monthly from March to November by distinguished University of WA academics and are intended to take the audience on a journey from a medical problem through research to application to clinical care.

Already this year topics have ranged from rheumatic heart disease to stroke and childhood leukaemia.

Professor Barry Marshall will talk about “Are all Helicobacter pylori bad for you? Who and how to treat” in a lecture on 20 June and Professor John Eikelboom will speak on 25 July.

On 15 August, Professor David Mackey of the Centre for Ophthalmology and Visual Science, which is affiliated with the Lions Eye Institute, will talk about “Born with a bomb: going blind from Leber hereditary optic neuropathy”.

The lectures are held in the McCusker Lecture Theatre in the Harry Perkins Institute at the QEII Medical Centre and recordings will be available several weeks after each lecture.

Judith Harper, the first female to graduate from the UWA Medical School.

Does your grey matter need a kick start each day? Emeritus Professor Bernard Catchpole has posed a series of points to ponder that he suggests readers may like to contemplate as they clean their teeth in the morning.

People get enjoyment from a variety of activities and objects. What is the nature of pleasure?
Continued from page 1

Clinical Professor Alan James, Chair of the Busselton Population Medical Research Institute (BPMRI) which manages the BHS, said it was a shock to him to find that the Busselton population had the same obesity rate as the rest of the nation. “It shows how the obesity epidemic doesn’t respect regions, it is a population-wide problem,” he said.

The BHAS recruited participants from 2010 to 2015 and collected detailed data from more than 5100 adults born between 1946 and 1964.

Now a follow-up study from 2016 to 2020, dubbed the Busselton Baby Boomer Study (BBBS), is marking six years between visits of the same cohort and will furnish important data about the progression of disease and morbidity and its impact on cognitive and physical function, quality of life, work, and hospital admissions.

Already the BHAS has provided data on bone density, weight, and lung function and estimated prevalence of sleep apnoea, hearing disorders, heart problems, and multi-morbidity.

But these are only the latest in a swathe of studies that began 51 years ago in 1966. The findings have informed and changed medical practice, mapped common chronic conditions and their risk factors and helped investigate mechanisms of disease through more than 400 international scientific publications. The BHS has focused on common chronic conditions such as diabetes and endocrine disorders, respiratory disease, cancer, obesity, cardiovascular disease, sleep disorders, gastrointestinal disorders, kidney and liver diseases, mental illness, and genetic epidemiology.

“Initially the studies were intermittent and focused on prevalence of these common conditions and the health status of individuals,” Clinical Professor James said. “The motto has always been ‘no survey without service’. Individuals received, and still do, clinically relevant information regarding their health. There is now a huge repository of population data and biospecimens including serum, DNA and RNA for local, national and international scientists to use for pilot data, develop collaborations and attract research funding. In this way, the BHS can accelerate research.”

The BHS has detailed health and lifestyle data of 20,368 people. Between 1966 and 1987, seven health surveys of people aged over 18 years were carried out and for most there was a corresponding survey of school children. There have been many child and adult surveys since.

They have all produced important findings. For example, the Busselton Diabetes Study provided data on the growing prevalence of type II diabetes and complications including depression, disability and falls.

Collaboration has been strong, with more than 25 international genetics studies. Paramount is DNA collected from almost 6000 Busselton residents which has formed the basis for numerous genome-wide association studies (GWAS) that have identified genetic variants associated with many disorders including chronic obstructive lung disease. GWAS of haemochromatosis unearthed the relevant variants of the gene associated with the disorder and led to genetic screening.

Professor James said that GWAS, although frequently denigrated as “fishing expeditions”, have led to the discovery of the first gene linked to asthma and many other genes. Many conditions and traits, including height and weight, have been studied in this manner, leading to insights into disease mechanisms, possible treatment targets and understanding of normal human structure and function. The BHS is now moving to the “next generation” of genetic studies, including whole genome sequencing and the collaborative groups are working with the Centre for the Origins of Health and Disease (GOHaD), headed by Professor Eric Moses who is a BHS Board member.

From the start, the execution of the BHS has relied on the goodwill of volunteers, including health professionals, community members, companies and even, back in the day, milkmen who delivered glucose drinks for glucose tolerance tests free of charge to households as part of their routine deliveries.

“There has always been a volunteer core linked to the BHS and we still have a team of volunteers down there,” Clinical Professor James said. “There are about 5-10 who come to work for us for one or two days a week and they have done it for years and years.” In addition, paid research assistants collect the physical measurements.

The BHS was the brainchild of the late Dr Kevin Cullen who was a GP in Busselton. Thanks to his determination to instigate screening of the community for a broad range of health indicators, general practice has changed. Previously patients were usually only tested when they had symptoms whereas now screening for many health conditions is routine.

Dr Cullen also envisioned a rural based institute of research and teaching excellence and the BPMRI, with the support of the WA government, has come a long way to achieving his goals, according to Clinical Professor James. “The research undertaken in Busselton is of national and international standing and researchers, science students, medical students and nursing students develop skills at the centre and use the data for research. The Institute has no secure financial support and relies on small grants, partial government funding for core work and the generous support of benefactors and donors. This health data and investigative resource is for the use of all people and needs to be protected, especially for WA, where it has been shown to have a net positive economic effect.”

- by Cathy Saunders
Wealth of information

The BHS biological specimens are maintained by the Division of Pathology and Laboratory Medicine at UWA under the custodianship of Adjunct Professor John Beilby and Dr Jennie Hui. The School of Population and Global Health (SPGH) at UWA looks after the electronic database of information, overseen by Professor Matthew Knuiman. Application to use the data can be made via the BHS website, bpmri.org.au. Dr Michael Hunter, Adjunct Senior Research Fellow in the SPGH, is the Director of the Busselton Health Study Centre.

BHS facts

- 51 – Years of surveys.
- 48,572 – The total number of main survey attendances.
- 20,368 – The number of different people who have attended at least one of the main surveys since 1966.
- 5,107 – Baby-boomers attended the 2010-2015 survey out of 8,223 in the age group registered as living in the City of Busselton.
- More than 400 research publications produced using Busselton Health Study data.
- More than 25 international consortia studies of genetics.

Key achievements

- Discovery of first genetic association with asthma.
- Definition of the clinical relevance of genetic testing in haemochromatosis.
- Demonstration of the health effects of the survey (Kevin Cullen’s initial aim).
- New gene discovery and confirmation of known genetic associations with cardiovascular disease, respiratory disease, lung function, obesity, sleep apnoea, diabetes, iron metabolism and thyroid disease.
- Mapping trends of common diseases, especially asthma, diabetes and cardiovascular disease.
- Dissecting the role of smoking and asthma on longitudinal lung function.
- Providing reference data for the prevalence of disease and risk factors in a general Australian population (including cardiovascular disease, thyroid disease, diabetes and metabolic syndrome).
- Identifying sleep apnoea as a risk factor for death, cardiovascular disease and diabetes.
- Establishing the prevalence of obstructive lung disease in the community as part of the Burden of Obstructive Lung Disease in Australia survey.
- Relating male hormones to health outcomes and mortality.
- Examining the relationship between depression and diabetes.
- Identification of sub-clinical levels of thyroid dysfunction as a risk factor for heart disease.
- Showing the effect of obesity on bone density.

PHOTOS: Top to Bottom

Professor Matthew Knuiman.

Volunteers lined up to help out at the first Busselton Health Survey in 1966. There have been numerous surveys since for the now world-renowned Busselton Health Study, which celebrated its 50th anniversary last year.

Dr Michael Hunter (left) and Clinical Professor Alan James.

Research assistant Ms Aida Embling measures the lung function of study participant Mr Peter Coates.

Clinical Professor Alan James.
Preterm births fall with world-first program

Promising inroads are being made into reducing rates of preterm birth in WA.

In the first year of the groundbreaking Western Australian Preterm Birth Prevention Initiative launched in 2014, preterm births fell 8 per cent across WA.

This represents 196 fewer deaths than the previous year.

This is considered one of the biggest advances in the care of pregnant women and their babies and was recognised in The American Journal of Obstetrics and Gynecology (AJOG), where the findings were published in May, as a 'Report of Major Impact' – a classification introduced to recognise studies with the potential for important changes to clinical practice and immediate impact for the clinical and scientific community.

It is hoped the initiative, which is a collaboration between the Faculty and the Women and Newborn Health Service and the Women and Infants Health Research Foundation, may one day cut premature birth rates by a third.

Chair and Founder of the initiative, Professor John Newnham, said the success relied on the introduction of new clinical guidelines, an outreach program for health care practitioners, a public health program for women and their families, and a new clinic at King Edward Memorial Hospital for referral of cases at highest risk.

He said it was the first program in the world to have safely lowered the rate of preterm birth across the gestational age spectrum, including births as early as the 28-31 week category.

"Until recently, preventing preterm birth was an idea limited to the world of research. But the discovery and translation of effective new strategies, coupled with a multi-faceted commitment to educating health care professionals and families, has enabled change on such a scale," Professor Newnham said.

"These results have global implications for safely and effectively lowering the rate of preterm birth, saving countless lives and preventing lifelong disability.

"Our challenge now is to expand the effect and translate the program into other health care environments."

Preventing preterm birth

The new guidelines for the Western Australia Preterm Birth Prevention Initiative include:

- Ultrasound measurement of the length of the cervix be included as a standard component of the “anatomy” scan performed between 18 and 20 weeks gestation.
- Women with a shortened cervix measuring less than 25mm in mid-pregnancy are prescribed natural progesterone vaginally until 36 weeks gestation.
- Women with a history of spontaneous preterm birth between 20 and 34 weeks gestation be prescribed natural progesterone vaginally from 16 to 36 weeks gestation.
- Pregnancies to continue until at least 38 and a half completed weeks gestation unless there are medical or obstetric reasons justifying earlier intervention.
- Cases at high risk of preterm birth, or where there is uncertainty, may be referred to the Preterm Birth Prevention Clinic.
Research snippets

From the School of Allied Health, headed by Professor Rhonda Clifford

PHARMACY DIVISION

Investigating the implementation of asthma guidelines to community pharmacy

UWA Investigators: Ms Kim Watkins, Dr Kevin Murray, Dr Peter Kendall, Professor Rhonda Clifford

This research investigated the best way to effectively implement clinical guidelines to community pharmacy, where practices have expanded to include areas such as chronic disease management. Specifically, the research focused on asthma management and the guidelines for the provision of non-prescription, short-acting beta-agonist, asthma-reliever medications (SABA guidelines).

Following a review of the literature, focus groups were conducted to collect data on the issues related to asthma management and use of the SABA guidelines. Patients with asthma were recruited from community pharmacies and surveyed and baseline pharmacy practice measurements were collected using simulated patient methodology. This information was then used to devise an implementation-intervention tailored to overcome barriers to guideline-based care. The focus was on formalising the role of the pharmacy assistant in SABA requests.

A controlled trial of the implementation-intervention demonstrated improvements in the key outcome of appropriate medical referral, in line with the SABA guidelines. Post hoc analysis of the implementation-intervention involved the retrospective application of two published taxonomies to consider behaviour change elements and logistical issues.

This work has recently been compiled into a PhD thesis and has the potential to improve asthma management in community pharmacies. It also highlights the importance of considering implementation strategies to optimise guideline uptake.

Transforming bitter drugs into palatable solid oral medications for paediatric and geriatric patients

UWA Investigators: Professor Lee Yong Lim, Professor Britta Regli-von Ungern Sternberg, Dr Sam Salman, Dr Laurence Cheung, Ms Edith Tang, Ms Minh Nguyen

This project aims to apply a novel chocolate-based delivery system (CDS) developed in the laboratory to fabricate chewable and palatable tablets of effective drugs that are routinely rejected by paediatric patients because of their foul taste.

The first chewable CDS was developed in 2014 for midazolam, a bitter sedative. In vitro, in vivo and paediatric clinical studies were completed in late 2016, and the combined data showed the CDS to effectively mask the taste of midazolam, and to produce an onset to sedation time comparable with the control midazolam solution. Unlike the midazolam solution, the small scored CDS tablet offers flexible and accurate dosing, excellent storage stability at room temperature, comparable efficacy and is well-accepted by paediatric patients and their caregivers. A provisional patent was filed in Nov 2016.

Following the success of the midazolam CDS, the team was asked to develop a CDS tablet for tramadol, a bitter pain management agent. The tramadol CDS tablet is due to enter paediatric clinical trials in the second half of 2017.

Currently the team is in talks with sponsors to fund studies that will prove the transferability of the CDS technology to other strongly bitter drugs, particularly those required at much higher doses than midazolam. Some antibiotics are especially problematic with regards to achieving compliance in young patients. In addition, the team will be evaluating the possibility of extending the CDS technology to fabricate chewable medications for adults, specifically geriatric and other adult patients who cannot safely swallow conventional medicated tablets and capsules.

PODIATRIC MEDICINE AND SURGERY DIVISION

The effect of arch index on the peak pressure and pressure-time integral in the second and third metatarsal interspace in Morton’s neuroma patients

UWA Investigators: Ms Sruti Panda, Mr Christopher Si, Ms Chathuri Welgama, Associate Professor Reza Naraghi

This study is to determine if different foot arch profiles affect the magnitude of pressure and pressure-time integral in the second and third metatarsal interspaces in a population with Morton’s neuroma (MN), a compressive neuropathy of an interdigital nerve, typically located in the second and/or third metatarsal interspace of the foot.

It is expected that a higher arch and lower arch foot profile will result in increased pressure and pressure-time integral in the second or third metatarsal interspace, respectively. Moreover, it is expected that both arch types will cause an increase in the pressure and pressure-time integral in the interspaces in relation to the total forefoot pressure and pressure-time integral. Results obtained from this research will be influential in terms of the amount of arch correction needed, perhaps through the use of orthotic devices, to reduce pressure in the second and third metatarsal interspaces and alleviate the symptoms of MN.

Metatarsal height and forefoot peak pressures: Determining the relationship utilising a specialised foot stand with a novel axial radiographic technique and the EMED system

UWA Investigators: Miss Catherine Crabb, Miss Denise Lou, Mr Christopher McCluney, Associate Professor Reza Naraghi

This is an investigation into whether a relationship exists between metatarsal height using a novel axial radiographic technique and peak planter pressure at the level of the metatarsal heads using an EMED system, during the propulsion phase of the gait cycle in a healthy population.

Current literature describes the benefits and importance of peak planter pressure
Research snippets

Continued from page 11

measurements in improving treatment modalities of the forefoot, treatment of diabetic ulcers, as well as pre-operative and post-operative assessment for surgical interventions at the metatarsal heads. However, many plantar pressure measurement systems are costly and are not readily available, making them unsuitable in a standard clinical setting.

As such, it is hypothesised that a decrease in metatarsal head height as measured utilising a specialised foot stand and the novel radiographic technique, will correlate with increased peak plantar pressures at the level of corresponding metatarsal heads, as measured by the EMED system. We hypothesise that this radiographic technique will be reliable and may be used in conjunction with other metatarsal and pressure assessment modalities, while also providing a more cost-effective and convenient alternative to EMED plantar pressure measurements.

This study will address the rationale for using propulsion as the phase of gait, the reliability of EMED systems, the reliability of the specialised foot stand and novel radiographic analysis, and whether a correlation is evident.

It is hoped the findings may benefit a range of practical podiatric practices from diagnostic, therapeutic, prophylactic and surgical interventions of the metatarsal heads and corresponding peak plantar pressures.

HEALTH PROFESSIONS

EDUCATION DIVISION

Geographical reshuffling and its impact: understanding applicants’ medical school preferences, interstate relocation and homesickness

UWA Investigator: Professor Sandra Carr

It is known that medical students are at greater risk with respect to mental illness, stress and substance abuse than the general population. One stressor for commencing medical students may be interstate relocation to complete their studies.

Professor Carr along with academics from Flinders University are conducting an exploratory study to describe interstate relocation, identify the prevalence, intensity and predictors of homesickness, and understand the association between homesickness and psychosocial adjustment in medical students.

Our nationalised application system predicates geographical reshuffling of students and understanding the impact of this can hopefully guide the support students need once they move and commence in their respective universities.

Capturing the ‘Art’ of Emergency Medicine (EM): Does film foster reflection in medical students?

UWA Investigators: Dr Gabrielle Brand, Associate Professor Zarrin S Siddiqui, Professor Tony Celenza, Professor Daniel Fatovich

Integrating humanities-based pedagogy into curricula is of growing interest amongst medical educators, particularly in how it promotes reflection. The aim of this study was to describe whether a short local film: ‘The Art of the ED’ was an effective pedagogical tool to stimulate reflective learning processes in first year UWA medical students. This study drew on written reflections of 123 MD students to reveal three themes: the film provided students the opportunity to: preview emergency medicine; exposed the reality of ED; and fostered a growing awareness of the fragility of human life. These data support visual methodologies to foster reflective processes that assist students to integrate the ‘art’ of EM, and development and commitment of core doctoring values of empathy, service and respect for patients.

SOCIAL WORK AND
SOCIAL POLICY DIVISION

Disabilities and the National Disability Insurance Scheme (NDIS)

UWA Investigators: Associate Professor Judy Esmond, Dr Mark Sachmann, Dr Susan Young

With extensive social work field experience and academic knowledge in the area of disabilities, the Social Work team were commissioned to undertake initial research within the non-profit sector into the evaluation of disability services and the implications of the NDIS for these services.

From this preliminary research further research projects have rapidly developed and expanded to include: the experience of clients with disabilities and their caregivers in using the NDIS; evaluation of non-profit organisations and commercial agencies supplying services through the NDIS; increasing the impact of the NDIS to more effectively service the needs of people with disabilities; and understanding the extensive future career opportunities through the NDIS for social workers working with people with disabilities and their families.

100 Families WA

UWA Investigators: Dr Susan Young, Associate Professor Judy Esmond, Professor Colleen Fisher, Professor Paul Flatau; Dr Shawn Phillips, Associate Professor Maria Harries

This project examines entrenched disadvantage among 100 WA Families. It builds on the Family 100 project by the Auckland City Mission in New Zealand and, through listening to the lived experiences of families living in entrenched disadvantage, intends to contribute to improved practice and policy with these families.
the word is out – Faculty in the news

Quoted as Saying

The West Australian

Professor Vera Morgan, Head of The University of WA’s Neuropsychiatric Epidemiology Research Unit, is QAS if numerous people could be recruited into the world’s biggest study into the genetic causes of depression, it would help towards working out the best treatment for different people. More than 200,000 people worldwide including more than 20,000 in Australia will be asked to provide their DNA for the study that will try to pinpoint genes that contribute to clinical depression. The condition affects one in seven people in Australia and is the third leading cause of burden of disease in the nation. Professor Morgan said unlike other health conditions where one or two genes were implicated, depression was likely to involve many genes.

Dr Jason Tan, of the Medical School, is QAS 80 per cent of cases of cervical cancer occur in women who are not being tested. He was commenting on a new national screening test that will be introduced in December to replace Pap smears. Women aged 25 to 74 will be screened for human papillomavirus, or HPV, which causes most cervical cancer. They will need to be tested only every five years instead of two years with Pap smears. Unlike Pap smears which check cells for abnormalities, the newer test detects HPV infection before any cell changes. It can be used by all women, regardless of whether they have received the HPV vaccine. Dr Tan, a gynaecological oncologist, said the new test would be more sensitive and accurate and cheaper and he believed rates of cervical cancer would drop 15 per cent once the test was introduced. The test is expected to save more lives because persistent HPV infections usually take more than 10 years to cause the abnormal cell changes that can lead to cervical cancer.

Research Fellow Dr Karen Martin, from School of Population and Global Health, was QAS there were chemical differences related to the nervous and endocrine systems in people who are lonely for a long period of time. The stress hormone cortisol and feel good hormone oxytocin were affected.

She said research was starting to show that people who were lonely had reduced levels of oxytocin and increased cortisol. Elevated cortisol was associated with higher inflammatory factors which could lead to high blood pressure and cardiovascular disease, depression and dementia. At the same time it could lower immune response to viruses, so lonely people were more at risk of colds and flu. Sleep and weight issues were also related.

“What we are finding is that a lot of the chronic diseases are also associated with poor mental health and one of the contributors to poor mental health is the feeling of being lonely,” Dr Martin said. “Mental health far outweighs the obesity epidemic and is our biggest burden of disease in Australia.”

Professor Roger Hart, of the Medical School, was QAS more couples were travelling overseas for fertility treatment which research he co-authored had revealed put a large cost burden on the Australian health care system.

The study, published in the Australian and New Zealand Journal of Obstetrics and Gynaecology, reviewed 11 cases of multiple births conceived through overseas fertility clinics and found each one cost the WA system $1 million. Eight of the women were aged in their 40s, including one aged 49. Eight had twins and three women conceived triplets, although one of them lost two of the babies.

“There is an increasing number of women who appear to be travelling overseas for fertility treatment, perhaps due to the perceived lack of available egg donors in Australia,” Professor Hart said.

“They consequently return, often with a multiple pregnancy due to differing fertility practices overseas, with a resulting burden placed on the WA health care system in the management of these higher risk pregnancies.”

Dr Hart called for doctors to try to reduce the number of women going overseas for less regulated fertility treatment. One way this could be achieved was by allowing Medicare rebates for Australian egg donors.

WITS ABOUT YOU

Our medical quiz is kindly supplied by Emeritus Professor Bernard Catchpole, the second Professor of Surgery appointed to the Faculty.

1. Injured soldiers were at one time thought to need plenty of fresh air to aid recovery. Whose doctrine was this?
2. For what condition were quantities of mercury ointment rubbed into the skin?
3. What mechanisms might be responsible for any beneficial effects of rubbing anti-inflammatory agents into the skin over a damaged area?
4. Where can the preaxial lines be located on the limbs?
5. What is peculiar about the gut of the Giant Panda?

(Answers page 15)
Weaving changes with skilled hands

Dr David Chong graduated in medicine from UWA in 1992. He is a plastic surgeon at The Royal Children’s Hospital and in private practice in Melbourne, with a special interest in cleft lip and palate and craniofacial surgery. Several times a year he volunteers to perform reconstructive surgery and to teach in developing countries, mostly with Mercy Ships or Operation Smile.

1. What was your experience in Medical School?

My “tiger” Mum told me I was going to do medicine. I went to UWA at the “ripe young age” of 16 but was really quite unripened and played up a lot during Med School. I don’t mind talking about my failures because that’s what life is about to me, making sure I learn from my mistakes rather than regretting them or thinking I can avoid them. In my first year I got a sup and in second year a warning from the professor of anatomy. He said, “You didn’t fail anatomy but we notice you don’t come to labs.” But I didn’t learn and ended up repeating third year. (Later) I realised how close I must have been to being thrown back then to give me a second chance in Med School.

2. Where did you go after graduating from UWA?

From Medical School in fourth year I started harassing Louis Landau, the professor of paediatrics, every month telling him how much I wanted to do paediatrics. After my intern year, it was the first year they wanted junior doctors to do an year extra of adult medicine. It was fortuitous because if I had gone straight to Princess Margaret Hospital, I don’t think I would have done surgery.

I chose terms I thought would help me to be a better paediatrician. I particularly enjoyed Swan Districts emergency department with (Professor) Daniel Fatovich, who is definitely someone who influenced me a great deal. In my last term I was off to do haematology but Joyce O’Hara in medical administration at Royal Perth said, “Can you please do us a big favour and do a term of cardiothoracics?” I was fortunate that the surgeon was (Dr) Robert Labbalestier. He encouraged me to do surgery, together with (Dr) Mark Edwards. I did go to PMH and came across the last person from my younger days who had a big influence on me, (Professor) Gordon Baron-Hay (a paediatric surgeon). He was a very fun-loving, funny man and excellent at what he did. I thought, “Here’s where I can combine my love of kids with surgery.” I (sat and got) my first part surgical exam.

I went to Royal Perth (Hospital) and got Intern of the Year. I thanked the professors, two in particular – Konrad Jamrozik and Judy Stratton – who really fought for me back then to give me a second chance in Med School.

3. What has been your career trajectory since then?

I have never done things completely by the rules. I took a year off and went travelling around the world and ended up on the Mercy Ship. I remember thinking, “Goodness, this is where I am meant to be.” I met Dr Gary Parker, a maxillo-facial surgeon, and I could see the enormous impact he made on the people of Madagascar. I was going to stay on the ship but he said, “You should go home and specialise in plastic surgery and then come back and help.” I did a year of ENT and then swapped to plastic surgery. I was very influenced by (Doctors) Tony Baker, Harold McComb and David Gillett, who were the people who steered me towards doing clefts. My stepfather (Dr John Wheeler), also a plastic surgeon, had a practice and was retiring as I was starting so I walked into a practice in WA. But I knew clefts were what I wanted to do so I worked with a famous plastic surgeon in Texas for a year and with one of the current gurus of cleft lip surgery in Toronto. Then I got an offer from Royal Children’s Hospital in Melbourne in 2008. Last year I took a year off and, after 19 years, I went back and worked with Gary Parker on the Mercy Ship.

4. What are the highlights of your career?

A scholarship as a promising young surgeon in the States – an American Society of Maxillofacial Surgery Travelling Fellowship. But when I see one of the kids I have operated on I feel a sense of confidence and affection, I realise I am so blessed to experience gratification from what I do. I love that every time it happens and it makes me happy with my choice of career.

5. Is there anything you would still like to achieve in your working life?

I aim to devote three months a year to voluntary work.

6. What gaps remain in your field of medicine?

I think one day they will be able to cure things by finding genetic markers and be able to change, for instance, craniosynostosis.

7. What are your leisure time pursuits?

Swimming, tennis, bike-riding, trying to learn French, and travel.
Associate Professor Kevin Pfleger.

This year’s Business News 40under40 Awards were announced in March, celebrating WA’s 40 leading business entrepreneurs under the age of 40.

**Associate Professor Kevin Pfleger**, Head of Molecular Endocrinology and Pharmacology at the Harry Perkins Institute of Medical Research, was the winner of the Intrapreneur Category and also the City of Perth Strategic Alliance Award. An internationally-recognised medical researcher, he received the awards for his commitment to developing better medicines with fewer side-effects, and for his leadership emboldening medical researchers nationwide to progress their discoveries into new treatments. He works to develop better treatments for a wide range of diseases by innovatively researching molecules on cell membranes and how they interact with each other. “My research has enormous potential to change the lives of those suffering from conditions such as chronic kidney disease,” he said. “It has implications as broadly as cancer, cardiovascular disease and diabetes, the three major focuses of the Perkins.”

**Professor Andrew Whitehouse**, Head of the Development Disorders Research Group at Telethon Kids Institute, was also a 40under40 winner. An internationally renowned medical researcher, he has helped make important discoveries regarding the causes and treatment of autism in children.

A new benchtop imaging device which will enhance the removal of cancer tumours in breast surgery and hopefully help women avoid a second round of surgery has been developed by the Harry Perkins Institute of Medical Research. The sophisticated system enables surgeons to “see” the exact edge of a tumour so they ensure they remove all cancer cells in a single operation. Perkins Director **Professor Peter Leedman** said at present one in four women needed to return for a second operation to remove microscopic cancer cells left behind. While the patient was still on the operating table, surgeons could use the imaging device to examine, at a cellular level, the tumour they had just removed and determine if they had removed all the cancerous cells.

**Professor Anna Nowak**.

Unstinting efforts to further the field of mesothelioma research has earned an international award for **Professor Anna Nowak**, professor of medical oncology in the Faculty and a senior researcher at the National Centre for Asbestos Related Diseases (NCARD) based at The University of WA. She was honoured with the Pioneer Award from the International Mesothelioma Applied Research Foundation in the US for her exceptional contribution to the advancement of mesothelioma research, treatment, care, support, education, and advocacy. Professor Nowak was described as “a talented scientist whose contributions to the field of mesothelioma research and treatment bring hope to our patient community; she is also an incredibly caring and humble clinician whose first and foremost priority is always the patient.”

**Professor Stephan Schug**, Chair of Anaesthesiology at The University of WA, together with a group of researchers from University of Melbourne, Monash University and the Chinese University of Hong Kong, received the largest project grant – totalling $4.8 million – awarded in the recently announced 2017 National Health and Medical Research Council funding round. The international ROCKet Trial (Reduction of Chronic Post-surgical Pain with Ketamine), headed by Associate Professor Philip Peyton of the University of Melbourne, is a five-year, 4,884 patient, multi-centre, double-blind, placebo controlled, phase 3/4 randomised controlled trial of the effect of up to 72 hours of peri-operative ketamine on the risk of development of chronic post-surgical pain. Large studies have shown that at least one in eight patients who have major surgery – particularly abdominal, thoracic or orthopaedic surgery – develop long-term pain afterwards. Half the patients will receive ketamine as part of their anaesthetic and then as pain relief, via an intravenous drip, for up to three days after surgery. Patients in the control group will receive only saline in the drip. Both groups of patients will also receive other standard anaesthesia and postoperative pain relief. The trial, which will also look at whether ketamine can help prevent post-surgery delirium, will be managed via the University of Melbourne with trial sites in Australia, New Zealand and Hong Kong. For more information, go to http://medicine.unimelb.edu.au/research-groups/medicine-and-radiology-research/appmu/appmu/the-rocket-study

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**Answers to the quiz on page 13**

1. Florence Nightingale’s doctrine.
2. Syphilis.
3. (a) Placebo effect  
   (b) Counter-irritation  
   (c) Systemic effect from a contained pharmaceutical agent.
4. Where the hair streams anteriorly and posteriorly, the limb being in the anatomical position.
5. Its gut anatomy and bacterial content are said to be that of a carnivore and not of a herbivore. It is believed to have been a carnivore some 2 million years ago. #

#Guardian Weekly. 20-5-15, p35.
Powerful lessons far from home

Final year medical students found themselves far outside their comfort zones for their elective travel placements this year, in communities within Australia and overseas.

These valuable experiences, captured beautifully in words and pictures, were celebrated at a combined event for the WA Medical Students’ Society (WAMSS) Elective Photography Competition and the Alan Charters Elective Prize presentation in May.

Priya Sladden took her prize-winning photo titled Mums and Bubs while in the Akwidaa Village in Ghana, Eastern Africa.

People’s choice winner Katie Leiter’s image titled Wrecks and Sunsets was taken while watching the sunset behind one of the many wrecks in Espiritu Santo, Vanuatu after a day at Northern Provincial Hospital.

Dr Brendan McQuillan, Head of the Medical School, opened an exhibition of all the photos submitted by final year elective students held at the Lawrence Wilson Art Gallery May 16-19.

The Alan Charters Award, named after the much loved tutor and tropical medicine expert, was also presented on the opening night.

The winning presentation by Bonnie Tysoe, titled Never Forget Bungarun, was a moving story about a patient she never met after a childhood history of forced treatment for leprosy left them too scared to attend appointments.

Raymond Chester-Wallis, in his presentation titled Found in Trans*lation, detailed his experience at a New York mental health service supporting trans patients and their families through journeys of pain and loss and discovering his own limits in medicine.

Alexander Shivarev reflected on his once in a lifetime internship at the World Health Organisation, developing his public health skills and knowledge and interacting with and learning from global experts across multiple fields.

The Elective Travel Placement experiences are made possible through the support of travel scholarship donors, especially the late Dr PF Sobotka.

Award Winners

WAMSS Photo Competition (supported by Smith Coffey)

WAMSS Prize
- Priya Sladden, Mums and Bubs
- Katie Leiter, Wrecks and Sunsets

People’s Choice Prize
- Priya Sladden, Mums and Bubs
- Katie Leiter, Wrecks and Sunsets

Alan Charters Elective Travel Presentation Award

First place (supported by Western Diagnostic Pathology)
- Bonnie Tysoe, Never Forget Bungarun.

Runners-up places (supported by Dr Cathy O’Donovan and family)
- Raymond Chester-Wallis, Found in Trans*lation.

- by Peta Rasdien

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Contact us

Faculty of Health and Medical Sciences
The University of Western Australia
M500, 35 Stirling Highway
Crawley WA 6009 Australia
Tel: +61 8 6457 3928
Email: enquiries-fmdhs@uwa.edu.au

Executive Dean: Professor Wendy Erber
Head of Service Delivery: Dr Jan Dunphy
Editor/Writer: Cathy Saunders

We welcome contributions, photos, feedback and anecdotes. Please email the editor at: cathysaunders2@gmail.com or call 0403 813 830