Reflections on the unique Macquarie University Hospital
Q&A WITH PROFESSOR MICHAEL MORGAN AO
Once again, we are pleased to bring you a host of stories about our increasing range of new treatments, surgical innovations and clinical research activities at Macquarie University Hospital.

Our stories showcase the breadth and depth of the Hospital’s activities in the context of MQ Health – an academic health sciences centre that brings together the Hospital, Clinic and University in a unique and highly integrated initiative.

Many of the stories in this issue of Frontier demonstrate the international contribution and connection of the work we do. Our syringomyelia research group is making international contributions in the optimal use of shunts; our Motor Neurone Disease research collaborations continue to produce new understandings for the global community and our Day Oncology Unit participates in large international cancer trials.

While much of what we do is about pioneering new understandings on a global scale, we also share stories about bringing well-proven advanced procedures from overseas to Australia – many for the first time.

One of our interventional cardiology teams now performs minimally invasive ASD/PFO closures; our TAVI team has grown to be the busiest in New South Wales with patient outcomes equal to or better than in international registries; and mechanical stent thrombectomy for acute stroke patients was performed this year for the first time in New South Wales at the Hospital. All of these, and others, increase the range of treatments available to patients in Australia.

The hallmark of our surgical teams is their calibre – and their ability to treat patients with complex conditions. Many patients can receive treatment at Macquarie University Hospital for challenging conditions that may not be treatable elsewhere.

Our skull base team is one example. All with multiple international fellowships, the team is the most highly trained in New South Wales and are growing our endoscopic program for challenging skull base lesions – with exceptional results. We’ve also delighted to share a piece from our Hearing Hub colleagues doing fantastic long-term research into the relationship between hearing loss and dementia – research that is raising awareness for GPs and producing strategies to tackle this national health problem.

I’d like to take this opportunity to acknowledge Professor Michael Morgan AO, who retired this year. As you are no doubt aware, it was Professor Morgan who, after spending time at the Mayo Clinic in the US, returned to Australia with a vision for a similar university-based private hospital for Australia. He was instrumental in making that vision a reality and, 8 years after opening our doors, we celebrate Michael’s retirement and share his reflections on the Hospital in this edition.

We hope you enjoy another bumper edition of Frontier.

Carol Bryant
CEO, Macquarie University Hospital
MQ Health researchers have published the largest recent series of outcomes for patients receiving a shunt to treat syringomyelia, showing that shunts can work well in selected cases.

Characterised by cystic cavities in the spinal cord, syringomyelia typically causes pain and motor and sensory deficits, and is most commonly associated with Chiari malformation or spinal injury. Traditional treatment is to address the underlying condition. For patients with Chiari malformation, this involves creating more space at the base of the skull for fluid to flow between the head and the spine.

While this works well for Chiari malformation patients, for other groups of syringomyelia patients where the underlying cause is unclear or where treatment of the underlying patients where the underlying cause is unclear or where treatment of the underlying condition is too risky, there remain no consensus methods.

“Treatment of syringomyelia is generally aimed at addressing the underlying cause,” said Professor Marcus Stoodley, Head of the Neurosurgery Research Group at MQ Health. “However, underlying causes are not yet well understood. For this reason, we are focusing our research on understanding the pathophysiology of the disease.”

**Patient Case Series: Redefining the Role of the Shunt**

Given the rarity of syringomyelia, surgeons around the world perform surgical shunt treatment infrequently and, in general, these procedures have yielded a poor success rate, with infection and blockages often resulting, and revision surgery common.

“At Macquarie University Hospital, we see large numbers of syringomyelia patients," explained Professor Stoodley. "We have gained a lot of experience - both clinical and laboratory – as part of our long-term research program.

“Having gathered significant knowledge on syringomyelia, we now have a good idea of when a shunt is indicated.”

“Using pre-operative MRI and intra-operative ultrasound imaging to understand the variability of causes has meant we can identify the specific pathology and can then adapt surgical techniques and employ the team’s skills in advanced microsurgery.

“So we determine not only when a shunt is indicated, but what particular surgical combinations or adjustments should be made to increase its effectiveness for each individual patient.”

Professor Stoodley and colleagues have recently published the world’s most comprehensive and contemporary series, looking at outcomes in syrinx to subarachnoid shunt surgery in patients.

The retrospective analysis shows results from patients with syringomyelia treated between 2000 and 2016, and has now been published in World Neurosurgery. Included are cases where there is no known cause or when treatment of the underlying condition has been insufficient or a not feasible.

Results show that 90 per cent of cases experienced rapid and sustained reduction of the syrinx and 98 per cent of cases had stabilisation or improvement of neurological signs and symptoms. In contrast to the adverse outcomes reported in older case series, there was no incidence of infection, shunt malfunction, or spinal cord injury in the current cohort, and no decline in post-operative quality of life as reported by patients.

Up to 36 months post-operatively, just three of the 41 patients (7 per cent) required re-operation for recurrence or enlargement. This is superior to the rates of re-operation following syrinx to subarachnoid shunting previously reported, which ranged from 17 to 33 per cent.

“This case series demonstrates that in patients experiencing deteriorating neurological function, a syrinx to subarachnoid shunt is a safe and effective treatment for syringomyelia with no known cause or when treatment of the underlying condition has been insufficient or is not feasible,” said Professor Stoodley.

“The consistent efficacy of a syrinx to subarachnoid shunt, despite the diversity of pathologies in the current cohort, suggests shunting can be effective in many cases and the current findings should be broadly generalisable to other patients with syringomyelia.”

**Cervicothoracic Syringomyelia: Understanding Sub-types**

A second series of cases published looks at a sub-category of patients – those with scarring of the sub-arachnoid space at the juncture between head and spine, known as cranio cervical junction arachnoids (CCJA). This scarring can be caused by previous surgery, by trauma or by infection. CCJA is commonly known to be associated with syringomyelia. Treatment remains challenging with recurrence rates exceeding 50 per cent.

“Our research revealed these patients develop a specific kind of syrinx,” said Professor Stoodley. “So our treatment by posterior fossa decompression – opening up the space at the base of the brain – releases the fluid and is usually effective.

“The key, again, is the pathology of individual patient’s case. Patients showed a variety of pathological features, and surgical strategies should change slightly depending on the individual case.”

**Looking Ahead: Ongoing Research to Heal, Learn and Discover**

The Neurosurgery Research Group at MQ Health is also conducting ongoing investigation into assessing the dynamics of fluid flow in the spinal cord. Researchers have found that fluid here flows differently to the brain.

“We have always thought pressure changes and pulsations from heart and breathing influence fluid flow,” said Professor Stoodley. “So now we are closer to understanding how this might cause a syrinx to develop – how other physiological processes affect fluid flow.

“Our thinking is that if we can regulate fluid flow in the spinal cord, then perhaps we can decrease the development of syrinx progression.”

The team is in the early stages of investigation into altering water flow in the cord to determine whether syringomyelia can ultimately be treated by drug therapy. Preliminary evidence suggests that increasing flow through cell membrane water channels might decrease syrinx size, leading to the possibility of treating the condition medically rather than surgically.

Work undertaken by the Spinal Group is based on an integral link between clinical work with patients and laboratory-based research in understanding the disease.

Laboratory work helps to understand the best clinical path for a patient, with treatment data then helping to determine next steps in the lab.

“One can’t happen without the other,” said Professor Stoodley. “Macquarie University Hospital’s unique model of healthcare means that learning and healing go hand-in-hand. The discovery of new knowledge informs treatment and treatment informs directions for new discoveries.

“We’d like to see a range of treatments, enabling us to treat more effectively according to the individual cause.”

Macquarie Medical Imaging (MMI) also plays a vital role in understanding the pathology of syringomyelia. Amongst other activities, researchers from the Neurosurgery Group are working with MMI specialists to optimise MRI sequencing for patients with syringomyelia.

Macquarie’s syringomyelia research has been supported by grants from the NHMRC, and from a syringomyelia research foundation based in the United States, The Columns of Hope.

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**For more information:**

**Call:** 1300 622 782
A world-first trial based at four Melbourne and Sydney sites, known as the Lighthouse Project, has just been completed, with preliminary analysis emerging. The study focused on participants who had been diagnosed with the sporadic form of amyotrophic lateral sclerosis (ALS). Sporadic ALS has no direct cause and is classified differently to familial MND where the disease is directly inherited genetically from a patient’s parents.

The Lighthouse Project aimed to test whether sporadic motor neurone disease (MND) is caused or triggered by human endogenous retroviruses, and is the first research in the world to use modern combination anti-retroviral therapy in patients with MND.

Specifically, the study aimed to determine the safety and tolerability of an anti-retroviral therapy called ‘Triumeq’ and provide preliminary data on whether it is able to slow down the progression of MND. Triumeq is already used to treat HIV infection safely and effectively, and is produced by GSK.

“The trial is about re-purposing of a medicine from HIV to slow the progression of motor neurone disease,” said Professor Dominic Rowe, a leading MND researcher and neurologist at Macquarie University Hospital.

“Our last patient completed the trial in January this year, and we now doing analysis of the data. Initial indications suggest that, for a proportion of participants, the therapy slowed the progression of MND quite significantly. We are hoping that up to around 30 per cent of patients with sporadic MND could benefit from the therapy.

“In fact, preliminary results are so promising that the drug company who produces this therapy is looking to conduct a large international multi-centre trial.”

The Phase 2 study was conducted at Calvary Healthcare Bethlehem Hospital in Melbourne and three sites in Sydney: The Brain and Mind Centre at The University of Sydney, Macquarie University and Westmead Hospital.

Principal Investigators Professor Julian Gold and Professor Rowe and his team presented early data analysis from the Lighthouse Project at the International MND Conference in Boston in December 2017.

Globally, the MND research community is highly collaborative. Macquarie University Hospital’s MND Research Group has played a significant role in advancing genetic understanding of the disease and testing the early stages of possible therapies. MQ Health has 70 researchers, and clinical team of 12 based at Macquarie University Hospital. The MQ Health team is an internationally recognised team and one of the largest in the world.
Reflections on the unique Macquarie University Hospital

Instrumental in establishing the first private hospital on an Australian university campus, Professor Michael Morgan AO retires this year. Professor Morgan is an internationally recognised neurosurgeon for complex brain conditions, and has operated on more cerebrovascular cases than any other neurosurgeon in Australia – including more than 3,000 aneurysms and 800 arteriovenous malformations. He became the first Dean of Medicine at Macquarie University in 2006. We spoke to him about the Macquarie University Hospital journey and this one-of-its-kind healthcare model in Australia.

Q: Macquarie University Hospital introduced a new model for hospital care in Australia, and you did a lot of work in finding the right approach and establishing it. Can you tell us about the drivers behind the Hospital’s model?

Australian hospital care is world class – both public and private. And we should be proud of what we have achieved. Looking ahead, though, we face an enormous challenge in keeping up with the explosion of knowledge in medical procedures and technologies. We’re talking about double-digit per cent increases annually – much of this taking place in big medical research and clinical centres overseas.

Typically, the newly qualified specialist in surgery or medicine goes overseas to acquire skills and knowledge, returning to Australia to put into practice the latest medical and surgical developments.

I was one of those US graduates myself – having completed a Fellowship in neurosurgical training at Mayo Clinic – and I saw how learning and discovery at the highest level were an integral part of a clinician’s role.

What we were missing in Australia was the ability to be a player in that space, to contribute to global medical innovation in a significant way.

If you look at the great medical schools in the US – Harvard, Mayo Clinic, Johns Hopkins and UCSF, for example – they all have in common what we now have at Macquarie University Hospital. In each of these top medical schools, the hospital and university are highly inter-related in a way that merges exploratory work with clinical practice and education. These medical schools become a magnet for clinicians wishing to be innovators, teachers and leaders. These clinicians share a common goal: to heal, learn and discover. These are enmeshed not only in the expectations of the position and the relationship with their academic and clinical employers but in the organisational culture and structure.

So this was the driver behind the Hospital – and to achieve this by becoming the first Australian university to own and operate its own hospital. And I believe that, after eight years, that vision has been achieved – in large part because we built it from the ground up with full alignment between research, education and clinical work.

Q&A:

Reflections on the unique Macquarie University Hospital

Heal. Learn. Discover.
Q: Take us back to the early days. Who were the early players, people who perhaps are no longer here but who laid the foundations and had the vision for Macquarie University Hospital?

John Lincoln, who was one of the most important founders of Macquarie University, said to me that Macquarie would never be a real university without a medical school. The initial proposal for a hospital to be built on campus, however, emerged from a chance meeting between Carl Adams, then CEO of Dalcross Hospital, and Ian Briggs of Macquarie University. Prior to my appointment in 2006 as Dean of the Medical School, I met with Di Verberry, Vice-Chancellor at the time, and she was very keen – as was Jim Piper, then DVC Research – to progress the idea of a hospital as part of the ongoing conversation on expansion of the university and use of its land assets. When Stephen Schwartz became VC in 2006, the project was crystallised and brought into existence. There was broad support from the university for a Medical School to be associated with the hospital to be built. It was seen as a way to attract the prestigious NHMRC funding at a time when Australian Government funding for research was declining.

So it was through this that the project was born and a joint venture with a hospital was put on the table as an innovative model for medical research, education and clinical practice. In early 2009, almost certainly as a consequence of the 2008 recession, significant decisions had to be made about the continuation of the joint venture with Dalcross Hospital that threatened to scale back the project. The aim to achieve the most advanced hospital in Australia, a paperless records system, 20-bed intensive care, state-of-the-art operating rooms with the most advanced facilities such as intraoperative CT scans and angiography with an ability to record all performances, these things were all essential not just for excellent patient care but also for education and research purposes – core components of the model.

The patient accommodation is very comfortable and extremely advanced and contributes to the notion of excellence in all things patient related.

Q: What were your most anxious moments in establishing the Hospital?

There was a lot riding on the 2009 decisions being made in Council. As Dean, I was making the case for our preferred model of university ownership of the hospital and I knew that if I didn’t do a good job, the hospital component could have been sold to another hospital operator. Had this happened, we would not have achieved the advanced and integrated research, education and clinical model that I so desperately wanted.

Then, of course, doing the first operation in June 2010 was a momentous point. It all went very well and we moved forward from there.

Q: What are you most proud of?

The calibre of clinicians and medical staff, without a doubt, and our ability to recruit the best surgeons, physicians, anaesthetists, researchers and biomedical minds.

In the typical hospital in Australia, only a small percentage of the consultant staff is engaged in a commitment to innovation. What we’ve been able to do is form established teams across many disciplines to create a great depth and breadth of contributors with a commitment to creating new knowledge and facilitating learning within the umbrella of MQ Health.

Once you have a significantly sized team, you can make the case for NHMRC funding and really create new knowledge. This is not possible for clinicians to do in isolation. I think Neurosurgery is an example of achieving such a successful group, where income is being generated to support degree fellows, provide educational opportunities and establish a long-term research focus with tangible life-changing outcomes based on new medical discovery. Our AVM work, led by Marcus Stoodley, for example, is world class.

It’s a real matrix when you look at the multi-disciplinary involvement in many areas: surgeons in the Biomedical Laboratory; Motor Neurone Disease clinicians turning to zebra fish models; AVM researchers looking to proteomics; clinical epidemiologists collaborating with statisticians – the possibilities are huge. I am also absolutely delighted at the outstanding nursing staff, indeed all staff; who contribute to the quality of patient care that we are delivering. Under the leadership of CEO, Carol Bryant, and the Executive Dean of the Faculty of Medicine and Health Sciences, Prof. Michael Morgan, the culture of heal, learn and discover is now entrenched and makes this hospital unique, important and a leader.

Q: What would you like to see achieved in the five years after you leave?

I think that tangible and transparent metrics can drive an improved performance. We see this in sport, business, education and many fields. However, in medicine, the norm is that outcome data is not in the public domain. Claims of excellence are hollow unless measured against something. I would like to see each clinical unit define what a favourable outcome for their clinical practice is and for this to be on the Hospital website with how the unit is performing.

As an example, you can define a favourable outcome following intracranial aneurysm treatment as an effectively treated aneurysm without new neurological deficit. I would expect that 95 per cent of patients should be able to be included in this outcome. The hospital’s website could provide these results and this could be updated quarterly. This would allow clinicians, future patients and the public to judge our performance. We can then be benchmarked against the world’s best practice and we can identify where we need to improve.

An adverse performance would create some urgency in understanding and putting in place efforts to improve this performance. Of course, more complex work with higher complication rates may distort this picture, but if a standard complexity is defined then benchmarking is fair. Therefore, I think there is urgency for audits to be made available for patient and the public to judge the Hospital’s performance.

Q: Is the Macquarie University Hospital model one that can, or should, be adopted in other states around Australia?

I believe that the model of university-owned and run hospitals has a common purpose of team-based demonstrable excellence of care. All in the organisation striving for this purpose and measuring new projects against the model of a university hospital may achieve the goal of team-based demonstrable excellence of care with greater certainty.

Alternate hospital models usually find a clash in roles. Many private hospitals see the surgeon as the main customer – rather than demonstrable excellent patient outcomes as the goal – and many public hospitals have resource constraints that create tension between the role as tertiary referral centres and local community hospitals. Therefore, the model of a university hospital may achieve the goal of team-based demonstrable excellence of care with greater certainty.

It would be great to see more universities pick up the challenge and try to emulate what Macquarie has achieved. However, with university politics being what they are, this would be very difficult to achieve for a university with an existing medical school. Overcoming the various vested interests to make change would be a very difficult challenge. For universities without a medical school, to develop a medical school is equally difficult. We are very fortunate with the leadership of Patrick McNeill that a very exciting model of medical school has now been established at Macquarie University. The reality is that the Macquarie University model, whilst logical, was also very dependent on a unique combination of circumstances at the right time.

I would say that the most likely way that this university hospital system will grow is with Macquarie University itself. The current small hospital is small and could be expanded. The services could be increased. And it may be possible to establish Macquarie University Hospitals both in NSW and interstate.

Furthermore, Macquarie University Hospital – perhaps under the banner of MQ Health – should become a service for Southeast Asia. Mayo Clinic now cares for 1 million people per year employing nearly 4,000 doctors and scientists at various sites. It started in the 1880s, 100 miles by rail and buggy ride from the nearest last population center – the middle of the cornfields in southern Minnesota. It became world famous within 20 years of the foundation being established by the Mayo brothers. I believe that they had greater barriers to achieving their current size and excellence that we have at Macquarie University. I believe that we should be the Mayo of Australia and Southeast Asia.
Christine La Rose had initial surgery for what she thought might be a small benign lesion. Pathology results, however, found it to be a high-grade transitional cell carcinoma with the potential to penetrate the bladder wall.

“I was shocked,” recalled Christine who, at the age of 49, was in a low-risk category for bladder cancer. “I was fit, otherwise healthy and had no pain or other symptoms. It was blood in my urine that first prompted me to see my doctor.

“I knew that I would be looking at further treatment after receiving the pathology results. Dr Venu Chalasani referred me to Professor David Gillatt at Macquarie University Hospital to see if I was a candidate for the Hospital’s robotic program in urology.”

Professor Gillatt is a world-renowned prostate surgeon and Director of Medical Services at Macquarie University Hospital, which is now the busiest robotic prostate centre in New South Wales.

Urology surgeons at Macquarie University Hospital use the Da Vinci Surgical System to perform a range of procedures. In Christine’s case, Professor Gillatt proposed complete removal of the bladder and the fashioning of a neo-bladder. Christine underwent the procedure in June last year.

“Traditionally this was performed using open surgical methods, which can result in more tissue and nerve damage, more blood loss and a greater risk of post-operative infection,” said Professor Gillatt.

“Now, we can perform both stages of this procedure robotically. We first remove the bladder, along with the uterus and ovaries. We then create a sphere-shaped pouch using the patient’s own small intestinal tissue inside the body, and attach it to the kidney and to the urethra.

“This is a fantastic minimally invasive procedure, which also has greater precision. It’s an innovative stand-alone procedure that sees patients up and about within a day – much faster than after open surgery.”

Christine’s recovery has been remarkable.

“If you looked at me today, you would never know I had a major operation,” said Christine. “I feel 100 per cent. I have just a few tiny little scars left – and the occasional memory of what I went through. The new bladder functions just as my original one did.

“To think that if this minimally invasive approach hadn’t been available, I might have had a stoma with a bag for urine collection, or possibly long-term side-effects from open surgery.

“The whole experience was amazing. I’m delighted but so is my family – they have their mum happy and healthy.”

Neo-bladders are feasible life-long solutions for many patients.

“Most cases of neo-bladder are patients who have had their bladder removed due to cancer,” said Professor Gillatt. “And while bladder cancer generally affects older people, young people can also be at risk for the disease.”

“My advice for women who have blood in their urine or recurring urinary tract infections is: don’t ignore it.

“Bladder cancer is treatable, and there are many different options available, with a robotic cystectomy and neo-bladder being just one of them.”

ABOUT MACQUARIE UNIVERSITY HOSPITAL’S ROBOTIC PROGRAM

Macquarie University Hospital has two robotic surgical systems: the Da Vinci Si Surgical System and the newer Da Vinci Xi platform that features several advanced features.

The robotic-assisted surgery program is spread across many disciplines, including urology, gynaecology, cardiothoracic, colorectal and upper GI.

FOR MORE INFORMATION:
CALL 02 9812 3838

Professor David Gillatt
Just last year, Professor Ian Chubb – retired Vice-Chancellor of the Australian National University and Australia’s Chief Scientist from 2011 to 2016 – attended the 25-year anniversary of former colleague Peter Doherty’s winning of the Nobel Prize in Medicine.

Doherty researched the effect a virus has on a cell, discovering how our immune system responds to a virus. That discovery, decades on, has informed the latest generation of cancer treatments: targeted immunotherapies. So when Professor Chubb himself began undergoing targeted immunotherapy for metastatic kidney cancer, he found himself the unexpected beneficiary of some great science.

“The treatment I’m having has its origins in basic science research 30 to 40 years ago,” said Professor Chubb, who is receiving the drug through a clinical trial at Macquarie University Hospital.

“That early research looking at how our immune system recognises a virus as foreign and tries to kill it. It was not an anti-cancer project in those early days; it was about learning more. To me, that indicates the fundamental importance of basic science and the long-term commitment needed simply to understand well how things work.

“It’s not just Peter Doherty, important as he was, but a great many scientists have made contributions over the decades to the treatment I’m getting. Even I myself had used more primitive monoclonal antibodies in my own lab as a young researcher in the neurosciences.

“Many of these discoveries are still with us today. When it comes to cancers, we are beginning to learn what we can do to improve outcomes for patients. It’s not just the presence of the cancer cells, it’s how they try to escape our immune system that is the real challenge.

“The amount of work required to get to the point where we can inject antibodies into a human being to treat a cancer is simply enormous!”

Professor Chubb was diagnosed with clear cell renal cancer in 2016. He had his kidney removed at the time, but a few months later, unexpectedly, metastatic lesions were found in his lungs.

His oncologist in Canberra referred him to Professor Howard Gurney, Director of Clinical Trials in the Faculty of Medicine and Health Sciences at Macquarie University, to see if he was a suitable candidate for an immunotherapy trial.

Macquarie University is a growing leader in making available to patients the latest and most promising medical treatments. Immunotherapy trials for treating cancer have become one of the Hospital’s biggest and most important.

“What immunotherapies aim to do is switch the immune system back on at the microscopic level where cancer cells and immune cells interact,” said Professor Gurney.

“The big change is that this approach doesn’t target the cancer. Instead, it targets the immune cells and tries to activate them to block the cancer. So far it is showing great promise. In some patients, we are seeing cancers disappear.

“Such is the case for Professor Chubb, whose last CT scan and blood test showed him to be cancer-free. The experimental drug has wiped away any trace of Chubb’s cancer. Chubb’s experience, while still not representative of the majority of patients, is an increasingly common story from the world of cancer immunotherapy, which is revolutionising the field of oncology.

“My alternative to this treatment would have been chemotherapy, which would have had a very different effect on my quality of life and possibly, as it turns out, a very different prognosis,” he said.

“With the immunotherapy treatment, I have not been in hospital for five days in almost one and a half years of treatment, I’ve only had four days of downtime, and to see CT scans of my lungs with no visible lesions is stunning.

“I never expected to be a subject in a research project, but I am happy that the dedication of all the scientists and clinicians over many years has led to my treatment.”
Combined orbital and ENT surgery successfully removed a large, rare orbital tumour located deep within the eye socket, while preserving vision for nine-year-old Stefan.

By the middle of last year, Jennifer Geoghegan noticed that her nine-year-old son Stefan had an increasingly protruding eye. “It was eventually bulging prominently,” said Jennifer. “However, his vision wasn’t being affected, and there was no pain. So we eventually sought some medical advice.”

A biopsy revealed a solitary fibrous tumour – benign, in Stefan’s case, and slow-growing tumour most commonly found in the lungs and very rare in paediatric populations. These lesions don’t respond well to chemotherapy or radiotherapy, which meant that surgical resection was Stefan’s next best option.

“So we had to look at an endoscopic approach to give Stefan the best possible chance of removing the tumour while preserving his site,” said Dr Krishna Tumuluri, an ophthalmologist and oculoplastic surgeon who specialises in orbital disorders and was Stefan’s treating specialist.

Dr Tumuluri talked to long-term colleague Macquarie University’s Professor Richard Harvey, who has trained with the world’s best rhinologists and skull base surgeons, and is unique in his ability to treat more serious and challenging orbital and sinus pathologies.

In October last year, they planned and performed a combined ENT–oculoplastic approach using the most advanced minimally invasive techniques for orbital and skull base tumours.

“Because it extended back into the eye socket, where the orbit connects to the brain and houses the optic and a host of other nerves, a traditional approach entering via the eye socket would probably have put his vision at risk. It was also a large tumour, giving us very little space in which to manoeuvre,” said Dr Tumuluri.

Through a three per cent endoscopic approach, the two surgeons used endonasal and transorbital approaches to reach the tumour and, in an 8-hour surgery, were able to remove the tumour. A small area of less than one per cent on the lateral aspect of the optic nerve remains for observation.

“Stefan’s recovery from the surgery was rapid,” said Jennifer. “The bulging, of course, was gone, with bruising and swelling much less than I would have expected. He was so well looked after by the Hospital’s brilliant nursing staff.

“Before the operation, Krishna had talked to Stefan about the operation and what might happen afterwards, and we’d prepared him ourselves for possible partial or full loss of vision in his left eye – one of the biggest concerns.

“So there was that tense moment when the eye patch was removed after the procedure when Stefan woke up in Recovery. Was he going to have full vision or not?”

“And then an elated: ‘He can see!’ from everyone. It was just phenomenal.”

Stefan returned home and is leading a normal life. He will undergo ongoing monitoring for the next five years.

“This is an excellent result for Stefan,” said Dr Tumuluri. “I didn’t imagine it would be such a great outcome. To have removed the tumour to such an extent without loss to vision is really a demonstration of the excellent patient outcomes that Macquarie University Hospital and others are increasingly able to bring to patients through such advanced surgical approaches using highly advanced imaging and other services.”
Macquarie University Hospital’s sterilisation department has an outstanding practice that embraces advanced technology, robust systems for patient safety and, most importantly, a focus on staff engagement.

They sterilise close to 5000 items every day, using a range of high-end equipment and mapping each item in a complex process designed to ensure quality control of the highest level. “We are a support department and deal with anything related to medical devices,” explained Roel Castillo, CSSD Manager who joined the Department three years ago after working as a sterilisation technician at POWH and as a sterilisation supervisor/theatre CSSD Coordinator at RFAS. Roel also set up Chris O’Brien Lifehouse CSSD.

“We are an ISO hospital so infection control needs to be to these standards, which can be pretty complex and which change all the time. Working in a hospital where advanced technology and innovative practice is embraced, we go above and beyond basic requirements.”

Last year, the Department added to its suite of equipment and became one of the first hospitals - if not the first - in Australia to use, operationally, a high-end electronic monitoring system that can cater to monitoring requirements in all areas of CSSD. This includes medical devices, surface cleanliness, environmental surfaces, reprocessing equipment and hand hygiene – all accomplished with ease and outstanding precision. The electronic system works by assessing the level of microbial contamination using an adenosine triphosphate (ATP) Bioluminescence Assay.

3M Clean-Trace™ is a small handheld device. The operator swabs a surface with something akin to a cotton bud. Samples are inserted into a small vessel that fits into the handheld ‘reader’. The machine produces a reading of contamination in Relative Light Units (RLU) and can be downloaded to its software application for reporting, data and analysis if required. This can be reviewed if trends or issues need to be corrected from a safety reprocessing perspective.

“This is a quantitative reading, measured in RLU and corresponding to the level of microbial or organic contamination present on the sampled surface,” said Roel. “Any capture above the acceptable limit of 50RLU on a medical device surface is considered as an infection risk, so a decision to act is clear. “It also gives you an affirmation of what CSSD does well – expectations of a correctly cleaned and reprocessed (sterilised or high-level disinfected) medical device worthy of patient reuse.”

Roel says that the real key to success of Macquarie University Hospital’s sterilisation services lies in the people who work there. As Manager, he places significant emphasis on all staff being fully engaged and creating what he calls a ‘culture of ownership’.

“If you look at employee engagement around the world, it’s generally very low,” said Roel, “only around 25 per cent of the global workforce is highly engaged in their work, according to a Gallup Global poll taken in 2016. Around 40 per cent are actively disengaged or passively engaged. “In our work, that kind of statistic would be really problematic. We need 100 per cent staff commitment in a context where excellence in patient care is your mandate. Technology alone doesn’t do that job. We have to have a team who is well-trained, committed to their work and personally accountable. “We have put systems in place for staff success. Our technicians can confidently know they are well-trained in sterilisation but they also access a detailed system that tracks every piece of a Reusable Medical Device (RMD) and its place in the process. New technology such as 3M Clean-Trace™ is one of the important ‘enablers’ of the staff engagement we achieve. “We have moved from medical device only to whole CSSD monitoring using the ATP Bioluminescence Assay, with Macquarie University Hospital’s CSSD at the forefront of its utilisation in the global reprocessing context.” CSSD is actively involved in research, including on-site investigations of how best to meet ISO standards and improve practice. One recent on-site investigation on the credibility of ISO 17665-3 looked at RMDs and the need to establish unique penetration times based on product families. The work showed that reprocessing RMDs correctly – by ensuring sufficient ‘lethality’ of sterilisation according to their family groupings – is critical in ensuring integrity of sterility. Roel presented findings from this study at the 21st World Federation of Hospital Sterilisation Sciences earlier this year. The group has presented at several international conferences held in Australia, Germany, Switzerland, New Zealand, Czech Republic and Thailand.

Macquarie University Hospital’s Central Sterile Services Department (CSSD) is part of the peri-operative team working across the Hospital’s 12 operating theatres. It provides services for a number of surgical disciplines, including orthopaedic, neurosurgical, urology, plastic, ENT, ophthalmic, general, cardiovascular and robotic surgery. It also supports endoscopy, angiography, ICU/CCU, wards and clinics. CSSD is a smart team of 21 technicians working with the most advanced sterilisation equipment available, improving their processes constantly and taking their innovations to international conferences.

Keeping it clean and safe
Macquarie University Hospital surgeons are integrating an innovative neuro-machine interface into existing bionic limb replacement, ushering in the next generation of neuro-prosthetics.

Advances in prosthesis development over recent decades have focused on optimising the interface between the artificial limb and a patient’s body – not only attaching the new limb but also enhancing information transfer. Macquarie University Hospital orthopaedic surgeons have now combined several surgical procedures that together form a pioneering new approach to information transfer to bionic limbs for upper-limb amputees.

“At Macquarie University Hospital, we are taking existing targeted muscle integration and osseointegration techniques and adding implantable electrodes,” explained Associate Professor Munjed Al Muderis, one of Australia’s leading hip and knee surgeons and an osseointegration specialist. “It is the combination of the three procedures that makes the interface more intuitive than ever before. The key to this advance has been implantable electrodes that can now capture complex brain signals to enable more natural upper limb mobility.

“So, in practice, when the patient thinks about moving his or her finger, the finger moves; when thinking of moving the wrist, the wrist moves.”

Targeted muscle reinnervation (TMR) was developed in the US several years ago. It allows surgeons to transfer residual nerves to alternative muscle sites. After surgery, the target muscles produce electromyogram (EMG) signals that serve as amplifiers of motor commands from the transferred arm nerves for control of the elbow, wrist and hand. Osseointegration provides a bone-anchored method for TMR. Now, implantable myoelectrodes transmit and receive computer-generated electrical signals to and from the brain. Because multiple signals can now be captured, a more natural response is possible.

“Electrodes have long been used for other medical devices: pacemakers, most commonly,” said Associate Professor Al Muderis. “What we have done is to modify these for our purposes. It is the sophisticated information feedback enabled by the implantable myoelectrode that enables intuitive control. This stands to transform neuroprosthetics – and the lives of upper-limb amputees.

“What sounds like science fiction is a reality – controlling a limb with the mind. With the Osseointegration Clinic at Macquarie University Hospital now well established, we are looking ahead to making this new development part of a permanent clinical program. “It’s still so new we are developing it as we go – optimizing the surgical approach and capturing patient outcomes. The long-term goal is to make it clinically available to large patient populations, with the real benefit for the next generation of people who have lost upper limbs from injury or cancer.”
In January this year, patient Van Nguyen, while waiting to have an elective coronary angiogram at Macquarie University Hospital, found himself unexpectedly undergoing a different procedure after suffering an acute stroke in the waiting area of the Hospital’s Angiography suite.

Mr Nguyen’s sudden inability to talk and loss of movement with severe weakness on one side of his body alerted staff, and a code blue was called.

Imaging, which was immediately arranged through Macquarie Medical Imaging, demonstrated occlusion of the middle cerebral artery. Mr Nguyen deteriorated further and was returned to the Angiography lab for an emergency acute mechanical stent thrombectomy, performed by Dr Brendan Steinfort, Interventional Neuroradiologist at Macquarie University Hospital.

“There are 50,000 acute strokes in Australia each year,” explained Dr Steinfort, a pioneer in acute stroke treatment with advanced expertise in carotid stenting, cerebral aneurysm treatment and intracranial hypertension.

“Standard treatment includes intravenous thrombolysis using recombinant tissue plasminogen activator to break down blood clots.

“However, approximately 10 per cent of acute stroke patients would potentially benefit from mechanical thrombectomy – a new treatment that uses ‘stent-retriever’ devices to remove the thrombosis.

“Although fully approved for use in Australia, in New South Wales, only about 10 per cent of patients who may benefit from this procedure receive it. This is due to factors such as delayed presentation, lack of clinician awareness and difficulty accessing resources in a timely fashion.”

The team treating Mr Nguyen was rapidly assembled.

Admitting physician and cardiologist Dr Ru-Dee Ting, neurologist Professor Dom Rowe, anaesthetics, cath lab staff and the ICU all worked alongside Dr Steinfort to provide the best possible outcome. The complex procedure required multiple thrombectomy runs and Reopro bolus infusion.

The patient was transferred to ICU following the procedure. He improved overnight and was discharged three days later with no neurological deficit from the stroke.

Dr Steinfort was the first person in Australia and probably the second in the world to perform a mechanical stent thrombectomy for acute stroke. Working collaboratively with Dr Kenneth Faulder and Dr Timothy Harrington – also at Macquarie University Hospital – Dr Steinfort has participated in extensive research, including one of the first case series of mechanical stent thrombectomy. This INR team was the only Australian unit in the Solitaire Thrombectomy for Acute Revascularisation (STAR) trial and the only Sydney unit to participate in the seminal EXTEND-IA, trial.
Led by Professor John Magnussen, the MRI program at Macquarie Medical Imaging (MMI) has embarked on a groundbreaking new study in neuroimaging of crucial importance for patients with brain tumours and other neurological diseases.

MMI, located within Macquarie University Hospital, is the first site in the Southern Hemisphere to conduct a novel study using Magnetic Resonance Spectroscopy (MRS), technology that measures brain chemistry rather than anatomy.

In the new era of genomic analysis, MRS reads the chemical composition of a region of tissue, which could be used as biomarkers – now considered superior diagnostic, prognostic and therapeutic indicators in the analysis of brain tumours.

"MRS provides information on the metabolic profile of different pathologies, rather than the shape of the brain," explained Dr Antonio Di Ieva, Associate Professor of Neuroanatomy and Neurosurgery at Macquarie University Hospital, who worked closely with Professor Magnussen and Professor Changho Choi (from the University of Texas Southwestern Medical Centre, Dallas) to bring advanced MRS to Australia.

"Specific MRS biomarkers, their quantity and patterns of distribution of the metabolites can help in the differential diagnosis of types and sub-types of brain tumours versus tumour mimics – often seen in infective or inflammatory diseases."

The current MMI study is investigating the ability of MRS to quantify the oncometabolite 2-hydroxyglutarate (2HG) – a product of a genetic mutation (IDH) – to improve diagnostic and prognostic outcomes for brain tumour patients.

"With this technique, we are now able to identify a relevant genetic mutation in brain cancer even before the operation," said Associate Professor Di Ieva, who introduced the term ‘spectrobiopsy’ – along with other ground-breaking innovations in neurosurgery and neuroimaging.

The study is also applying advanced computational analysis to radiological images to address the growing challenge of interpreting the exponential sums of data produced by MRS and other parametric diagnostic tools that are now the norm in neuroradiology and neuropathology.

"This large and complex data is difficult to interpret – even for experienced subspecialists – let alone be easily translated into general use," explains Associate Professor Di Ieva.

"Computational modelling, artificial intelligence-based and machine learning tools for big data analysis will become the diagnostic routine of brain tumours and other pathologies over the next few decades. At Macquarie University we are at the frontline of such advancements, for the benefit of patients."

REFERRALS AND APPOINTMENTS
GP can refer patients suspected of having neurological disease or patients with brain tumour to MMI for advanced imaging and to the MUH neurosurgeons for advanced multidisciplinary management.

All MMI neuro-radiologists have subspecialist fellowship training and significant experience delivering high-calibre expertise in their area.

Patients can be assessed for suitability for the 2HG study, or treated through other pathways.

REQUEST AND APPOINTMENT:
mqneurosurgery.com.au/contact-us/
request-an-appointment
CALL 02 9812 3900

Macquarie Medical Imaging and Macquarie University Hospital have expanded the use of magnetic resonance spectroscopy in Australia – and set the future of neuroimaging.
The internationally recognised Macquarie Medical Imaging is involved in close on 100 research projects, all aimed at improving patient care through improved imaging.

Macquarie Medical Imaging (MMI) is becoming well known for its imaging services. Located within Macquarie University Hospital, it plays a crucial role in the Hospital’s streamlined services for patients. MMI has built its excellent service by recruiting highly specialised radiologists, nuclear medicine and magnetic resonance imaging specialists, and by investing in some of the most advanced medical imaging technologies available in the world.

Behind MMI’s patient service sits a significant program of research. Most radiologists at MMI have post-qualification fellowships and are active researchers working in partnership with Macquarie University Hospital and a host of national and international institutions.

The number of research projects in which MMI is involved is rapidly expanding. Despite a range of interests, all share one goal: to enhance the diagnostic function of medical imaging that plays a key role in patient care.

In partnership with Macquarie University Hospital

“We are unique in having a very extensive ‘in-house’ research program, which accounts for almost half of all our total research time,” said Dr Marg Pardey, Chief Research Facilitator with MMI and Post Doctoral Research Fellow with Macquarie University. “For the remainder, we are engaged in clinical trials as well as funded research in partnership with other research institutions.”

“Our key areas of focus are oncology, cardiology, neurology, multiple sclerosis and musculo-skeletal medicine. In partnership with the Hospital, we have a large focus on MRI, where there are important gains to be made in optimising the techniques used.”

MMI’s MRI research is led by Professor John Magnussen and focuses largely on neurology, in particular neuro-oncology and neurodegenerative diseases – including Alzheimer’s disease and dementia.

One study is investigating the ability to accurately measure with non-invasive techniques a genetic metabolite, 2HG, to improve diagnostic and prognostic outcomes for brain tumour patients.

“In Europe and America, they use magnetic resonance spectroscopy to quantify 2HG,” explained Professor Magnussen. “Macquarie University Hospital neurosurgeon Dr Antonio Di Ieva is working with our team to establish this in Australia. Indeed, within the last few months we have become the first site in the Southern Hemisphere to conduct such a study. Such a technique lets us use advanced MRI instead of a brain biopsy.”

Musculoskeletal imaging research is also growing at MMI under Dr John Read’s leadership. Here, MMI’s goal is to maximise anatomical detail and also to provide new information of greater clinical relevance about joint function and dysfunction.

Anatomical resolution is key to the detection and characterisation of many musculoskeletal injuries, particularly those that involve macroscopic tissue disruptions. However, functional information...
is also required to understand other common musculoskeletal disorders such as pain syndromes that reflect mechanical dysfunctions rather than disruptions.

Key cardiac imaging research projects aim to reduce the duration of scans, while maintaining high imaging standards. Traditionally, the availability of cardiac MRIs has been limited, as extended scan duration and the need for specialist attendance make them overly expensive. Driven by Professor Stuart Grieve, research in this area aims to generate a robust MRI examination that can be conducted routinely and quickly, making it viable for cardiac MRIs to enter into standard clinical practice.

“In a new and exciting oncology program, MMI researchers are looking to develop MRI biomarkers to replace biopsy for diagnosis,” said Dr Pardey. “The implications of this are significant, enabling not only earlier and more accurate diagnosis but the potential to tailor treatment through individual medicine.”

“MMI has a close working relationship with Macquarie University Hospital to support its clinical work. For example, MMI conducts the essential scans for patients prior to Gamma Knife treatment. Further, MMI assists the Cochlear Institute with their research developing implants that are safe to enter an MRI environment, and that remain functional afterwards.”

### MMI’s national and international reach

MMI is the selected site for many large multi-site clinical trials that utilise CT, MRI, PET and bone scans. A large proportion of these are oncology based with neurodegenerative diseases, predominantly Alzheimer’s disease and the dementias, making up the remainder.

**MMI SELECTED TO INTERNATIONAL PARKINSON’S INITIATIVE**

In 2012, MMI was selected as the only site in Australia to participate in the prestigious, international Parkinson’s Progression Markers Initiative (PPMI). MMI was selected because of its advanced research programs in MRI and PET, its research and technical expertise, and its convenient location to Macquarie University Hospital. PPMI, established by American actor Michael J. Fox, is a landmark observational clinical study to comprehensively evaluate cohorts using advanced imaging, biologic sampling and clinical and behavioral assessments to identify biomarkers of Parkinson’s disease progression.

Funded research sees a broad range of collaborative work, including through the ARC and NHMRC, with other universities such as Western Sydney, New South Wales and Sydney University. Researchers at MMI also actively engage in supervising PhD students and Master of Research students across various faculties of Macquarie University.
The expertise at Macquarie University Hospital's rhinology and anterior skull base surgery unit is second to none. Located within the Department of Otolaryngology–Head and Neck Surgery at Macquarie University and engaged in clinical practice through the Hospital, the team is made up of five skull base surgeons, all of whom have completed multiple advanced international fellowships. This level of combined skill and capability not only makes the unit a national leader, but brings patients treatment options that are on par with the best available globally.

Trained at the best academic hospitals in America, UK and Australasia with world-leaders in advanced rhinology and endoscopic skull base surgery, the Macquarie team can perform highly specialised procedures by advanced endoscopic skull base and orbital surgery techniques.

Done 100 per cent internally, an endoscopic approach uses the nasal cavity, paranasal sinuses or ocular walls to remove brain or eye tumours, including very large lesions on the anterior skull base. Using an endoscopic approach means radiosurgery and external craniotomy are avoided, less damage is caused to surrounding tissues and structures, and patients recover much faster.

“Besides the extensive training that the team has, what also makes us able to offer innovative approaches or take on high-risk cases is the multidisciplinary nature of the team that we can assemble,”

Professor Ray Sacks
said Professor Ray Sacks who is Head of Otolaryngology–Head and Neck Surgery at Macquarie University and a world-renowned rhinological surgeon himself.

“Our rhinologists can team up with oculoplastic, plastic and neurosurgeons in treating either particularly big tumours or complex cases.

“Macquarie University Hospital also has one of the most advanced neurosurgical programs in the country so by collaborating with them, we are able to offer patients what really is the best available by world standards.”

The team has access to Theatre 12, the Hospital’s dedicated neurosurgery and skull base surgery space. It is equipped with the latest endoscopes, multi-image guidance systems and an intraoperative CT scanner. Post-operatively, patients can be cared for in the ICU by specially trained nurses.

“Patients who otherwise would have had pretty invasive open surgery are able to be treated by our team through endoscopic means,” said Professor Sacks.

“As one example, we treated a woman in her sixties who had a very large adenocarcinoma on her skull base. Because endoscopic surgery allowed us to enter from below – as opposed to an external approach from the top of the head – we were able to resect successfully such a large tumour located so deeply at the base of the brain.

“Her recovery was remarkable, and she has no residual nerve or tissue damage that may have been caused by navigating through the brain to get to the tumour.

“In another case, we treated a medical student who had been viciously assaulted and suffered severe orbital fractures that led to persistent double vision and awkward cosmesis. She was referred to undergo a third fellowship under Professor Aldo Cassal Stamm at Sao Paulo in Brazil, widely regarded as the founder of modern-day endoscopic skull base surgery.

Professor Harvey is also one of only two specialist rhinologists to have completed a PhD in NSW and has published in excess of 150 peer-reviewed papers. He has co-edited the textbook Endoscopic Sinus Surgery Optimizing Outcomes and Avoiding Failures with Rodney Scholosser.

Associate Professor Dr Yureesh Naidoo, ENT Surgeon

Associate Professor Naidoo is the second rhinologist in NSW to have earned a PhD and was extremely fortunate to have been granted a 12-month advanced fellowship in endoscopic skull base surgery and rhinology under one of the pioneers of endoscopic sinus surgery, Professor Peter John Wormald. Associate Professor Naidoo is also the Supervisor of Surgical Training in the Department of Otolaryngology at Concord Hospital and is a member of the regional training committee for ENT training in NSW.

Dr Arjuna Ananda, ENT Surgeon

Dr Ananda was the very first ENT Surgeon to have been given the opportunity to undergo a fellowship and advanced training in endoscopic sinus and skull base surgery under the tutelage of Professor Peter John Wormald who, at that time, was leading the world in his revolutionary approach to endoscopic surgery of the nose and paranasal sinuses. Dr Ananda is also the Head of the Department of Otolaryngology–Head and Neck Surgery at Royal Prince Alfred Hospital in Sydney and is actively involved in the training of ENT JET trainees.

Dr Raewyn Campbell, ENT Surgeon

Dr Campbell completed three back-to-back fellowships. Having trained under Professor Sacks at Hornsby and Concord Hospitals as a registrar, she then completed an advanced rhinology fellowship at Auckland City Hospital with Professor Richard Douglas, followed by a fellowship in rhinology and skull base surgery at the world-renowned unit at the University of Pennsylvania with Professor James Palmer. Finally, she completed her training with a further 12 months at Ohio State University Hospital/The James Comprehensive Cancer Centre with Professor Ricardo Carras, who is regarded as the ‘father’ of anterior skull base reconstructive surgery.
Gamma Knife surgery has revolutionised the management of many complex or inoperable brain conditions – including arteriovenous malformation (AVM).

While smaller AVMs are removed surgically, larger ones and those buried deeper in the brain are now best treated by stereotactic gamma knife radiotherapy. Gamma knife damages the endothelial cells, which, in turn, increases smooth-muscle cells and extracellular collagen.

The neurosurgery team at Macquarie University Hospital has now treated 20 AVMs since commencing its gamma knife service ten years ago. Eighteen of those have been treated from within the past two years, so follow-up is still short. However, results are promising and in line with international studies.

To date, one AVM has been completely obliterated on digital subtraction angiography (DSA). Four have been obliterated on MR angiogram, with doctors waiting a longer period before DSA is performed.

Eleven have decreased in size with reduced flow through them and four have not had follow-up imaging yet.

“This is encouraging that the lesions we have treated are responding as predicted in comparison with worldwide treatment data,” said Dr Fuller, Macquarie University Hospital’s leading gamma knife neurosurgeon.

Follow-up is at 2, 3, 5 and 10 years with international data showing about an 80 per cent obliteration rate by year 10. For remaining patients, risk of haemorrhage is reduced for the duration of their life.
Over eight years, the Day Oncology Unit at Macquarie University Hospital has gone from being a brand new unit to treating more than 300 patients per month and participating in international clinical trials.

Medical oncologist Dr Pirooz Poursoltan joined Macquarie University Hospital’s staff in 2010 when the hospital first opened its doors and not one patient had yet been seen.

Eight years later, Dr Poursoltan is the busiest medical oncologist in a unit that treats more than 300 patients per month and adheres carefully to best practice guidelines at all levels.

“We think our Day Oncology Unit is one of the best facilities in the area,” he said. “It’s extremely comfortable and friendly. Patients have easy access to consultants, specialty trained nurses and experienced medical oncology and clinical trials fellows.”

A skilled and caring team

Over the years, Macquarie University Hospital has focused on recruiting outstanding oncologists, haematologists and oncology nurses.

An additional on-site haematologist at Macquarie University Hospital, Robin Giorowski, has recently joined Jonathan Blackwell and Ray McKinley to providing a full breadth of services for patients with haematological cancers. And oncology nurses Tabitha Kellock, Abby Eyle and nurse practitioner Jenny Ghirri lead a highly experienced nursing team, both in the oncology unit and Ward 3.

Patients at Macquarie University Hospital also have access to state-of-the-art radiation oncology, including the only Gamma Knife in New South Wales.

One of the most important initiatives to be set up has been the multidisciplinary Team (MDT) structure for a number of oncology areas.

“It’s impossible to practice high-standard medical oncology in the absence of MDTs,” explained Dr Poursoltan. “These teams provide the structure for discussion and communication between all specialists involved in the care of a patient. Together, we get the best outcome for that person.”

Dr Poursoltan, along with radiologist Dr Kevin Ho-Shon, was instrumental in establishing the lung and gastrointestinal MDTs. Professors John Boyages and Dr Andrew Davidson have established those in breast cancer and neurological cancers.

“It took about twelve months to get the first MDT properly established,” said Dr Poursoltan. “Now Macquarie University Hospital has an outstanding MDT record.”

Training and education

On the academic and education front, another milestone was setting up the MD Program. The Oncology Day Unit plays an important role in helping to train local interns and fellows, as well as international fellows in oncology.

“Macquarie established the MD program from scratch,” Dr Poursoltan said. “It was highly rewarding to be able to create a new medical program incorporating the latest teaching skills.”

Clinical trials for new therapies

Another reason for the success of Macquarie University Hospital’s oncology unit is its involvement in clinical trials. Under the guidance of Clinical Trials Director Professor Howard Gurney, the unit participates in more than 30 trials involving a range of cancer types. The Hospital is involved in Phase I, II and III trials in lung, GI, breast and gynaecological malignancies.

Macquarie University Hospital is the only New South Wales site participating in the liver-targeted therapy for treatment of cholangiocarcinoma. The treatment involves tiny radioactive beads – smaller than the width of a human hair – administered directly to the liver to attack tumours.

A small catheter is passed through the groin’s main artery to the liver, where millions of the microspheres that have a radioactive isotope attached to them are released into the tumour’s blood supply.

“This is a unique study,” said Dr Poursoltan. “It is the first time a large randomised trial has been conducted to assess the effectiveness of trans-arterial radioembolisation in treating what is typically a very aggressive form of liver cancer.

“The approach aims to maximise the benefit of the therapy while reducing the side effects because of its targeted approach.”
Australian cook, author, restauranteur and gourmet food producer Maggie Beer has teamed up with leading Alzheimer’s researcher, Macquarie University’s Professor Ralph Martins, to write a cook book with recipes that boost brain health.

Inspired by the latest scientific discoveries of Professor Martins and his neurobiology team in the Department of Biomedical Sciences, Maggie came up with Recipes For Life which contains more than 200 recipes that help provide the nutrients we need for optimum brain health.

More than one million Australians and their families are affected by Alzheimer’s, but research has shown healthy eating, regular aerobic exercise and plenty of mental stimulation can help reduce the risk of developing the disease.

Professor Martins said ‘lifestyle’ diseases such as type 2 diabetes, high blood pressure or heart disease increases our chances of developing brain damage in the future. But he said a diet rich in fresh fruit and vegetables, fish, dairy foods, healthy fats and whole grains can help fight cognitive decline.

“You have the power to give yourself the very best chance of a healthy future,” Professor Martins said.

“The good news is that we have begun to identify the factors that can reduce a person’s risk of developing Alzheimer’s and some other forms of dementia, and slow its progression.”

The proceeds from Recipes For Life will be shared between the Maggie Beer Foundation and the Lions Alzheimer’s Research Foundation.

Maggie, whose Pheasant Farm shop in South Australia’s Barossa Valley is a popular tourist destination, said meals in the new book could have immediate health benefits.

“To have a healthy old age you must act now, whether you are 30 or 50,” she said.

“I have been delighted to work with Professor Ralph Martins and I have learned that if we are to avoid Alzheimer’s and other lifestyle diseases, it is what we eat today that matters.”

by Angie Kelly
Professor Martin Ng and Professor Michael Wilson perform this game-changing procedure together, and they have completed more procedures than any other in NSW.

“Our data shows that we achieve better patient outcomes than in other international registries,” explained cardiologist Professor Martin Ng. “More than 93 per cent of our patients are alive and living independently after 12 months.

“One of the reasons for our success is thorough our patient screening. Patients spend almost a full day being assessed prior to being deemed a suitable candidate for TAVI.

“And, when we take on a patient for TAVI, we take on the whole patient. Many have co-morbidities and complex conditions. We manage all of these as part of their TAVI treatment with a large multidisciplinary team that includes – in addition to Professor Wilson and myself – geriatricians, specially trained TAVI nurses, allied health professionals and psychologists.

“We also choose from four different valves, with each patient assessed for the best option, and we use alternative access routes if femoral approach is not suitable. In addition, a cardiologist and a cardiothoracic surgeon are both present throughout every TAVI operation.”

PATIENT STORY

Kay Norman will turn 80 this year and, after having TAVI at Macquarie University Hospital late last year, she’s back home living life to the full.

Prior to the procedure, Kay had developed several leaking heart valves – including her aortic valve. Her condition was worsening and, eventually, she was short of breath just walking across a room.

Her cardiologist, Dr Peter Iles, suggested she might be a good candidate for TAVI and referred her to interventional cardiologist Professor Martin Ng at Macquarie University Hospital.

After being rigorously assessed for the procedure, Kay underwent a successful TAVI procedure by Professor Ng in early December. After her follow-up appointment, she was given the all-clear.

“I had only local anaesthetic, administered by such an excellent and caring anaesthetist, and there was no pain or discomfort at any stage during or after the operation.

“The nurses, doctors and even the receptionist staff – from the moment we walked in to Macquarie University Hospital – were so attentive and made it all so easy.

“Then I went home and had no pain to manage and no wound to look after. There was just a small hole in the groin area. The whole recovery was so fast.

“It’s like nothing happened and yet they gave me a new aortic valve. It really was like magic.”

High-volume matters

The medical literature now demonstrates a clear volume-outcome relationship for TAVI. Outcomes of the TAVI procedure are directly correlated to the experience and the capacity of the clinic. Our TAVI team works across Macquarie University and Royal Prince Alfred Hospitals and is the most experienced in New South Wales. Due to this extensive experience, we are seeing fantastic results.
Can a healthy long-term relationship or marriage stave off dementia later in life? Researchers at the Macquarie University-based Australian Hearing Hub are exploring the role of hearing and memory collaboration in cognitive and brain health.

Dementia is proving to be one of the greatest global health and social challenges of our time. With no disease-modifying treatment currently available, interventions targeting the modifiable risk factors of dementia currently are our ‘best medicine’.

Recent research has shown that of all the modifiable risk factors for dementia, mid-life hearing loss is one of the most significant.

“We know that untreated hearing loss is associated with an increased risk of developing dementia,” said Professor Amanda Barnier from the Department of Cognitive Science at Macquarie University, and part of an interdisciplinary group of hearing, memory and ageing practitioners and researchers at the Australian Hearing Hub.

“Hearing loss can lead to social disengagement, isolation and depression – themselves all risk factors for developing dementia. So together with collaborators from Cochlear Limited, Australian Hearing and its research arm National Acoustics Laboratory, and Macquarie University’s Centre for the Implementation of Hearing Research and Centre for Emotional Health, we are studying the relationship between hearing loss, successful communication, emotional health and cognitive decline.”

In one recently completed ARC-funded study, Professor Barnier, Dr Celia Harris (also from Cognitive Science) and Professor Greg Savage (from the Department of Psychology) worked with couples who have been married for, on average, 50 years.

The researchers investigated whether shared remembering in intimate groups like this can compensate for, and possibly protect, older adults from the effects of cognitive decline and very early dementia.

This research was conducted in partnership with the Australian Imaging, Biomarkers and Lifestyle (AIBL) Study of Ageing, established in 2006 to discover the factors that predict subsequent development of Alzheimer’s disease. Professor Savage and Professor Ralph Martins (from Macquarie University’s Department of Biomedical Sciences) are two of the leaders of this study, the largest of its kind in Australia.

Working with AIBL, Professor Barnier, Dr Harris and Professor Savage interviewed long-married couples about their memories of daily life – such as the names of friends, holidays they had taken and events of their wedding day – first alone, then together.

“We ask them to engage in memory collaboration – to remember different kinds of information together,” explained Dr Harris. “We compare their joint remembering with how they remember alone, and map the ways in which they support one another’s cognition. We hope to identify the communication or conversational strategies that couples use to successfully remember together.”

The researchers are testing ‘distributed cognition’ – an idea from philosophy that says we use and rely on people and things outside our head to support and scaffold everyday mental processes.

“As children, our parents teach us what is worth remembering and help us when we forget,” said Dr Harris. “As adults, we jog our memories with objects in our environment such as markers in the landscape, photo albums, travel souvenirs and iPhones. We also form ‘transactive memory systems’ with partners, family and friends to share the load of encoding, storing and retrieving important memories and information.”
An important finding is that couples remember much more on average when interviewed together than when interviewed alone, especially for more personally relevant memory tasks.

Additionally, the researchers are working to identify communication strategies that predict successful memory collaboration.

“Couples who agree on a strategy for remembering together, who offer memory cues to one another and who acknowledge and repeat their partner’s contributions typically remember better together,” explained Dr Harris. “Also, couples who are sensitive to one another’s memory abilities are more likely to use memory strategies that increase their collaborative success.”

The possibility that older adults may benefit cognitively from collaborating with their partner might help to explain fascinating new findings from an analysis of over 812,000 people involved in 15 studies of dementia from around the world: married people were found to have a 42 per cent lower risk of developing dementia than lifelong singletons and a 20 per cent lower risk than bereaved people.

In studying long-married AIBL couples, the researchers are also finding that not all couples collaborate successfully. Couples who disagree on a memory strategy or who correct or discount the contributions of their partners appear less successful when remembering together. Also, couples where one partner dominates the conversation show less evidence of the collaborative strategies that predict memory success.

The researchers noticed another important pattern — although they weren’t looking for it to begin with.

“Couples who report hearing difficulties in everyday life and who seem to have trouble hearing one another during our interviews appear to gain much less benefit from remembering together,” said Professor Barnier.

“Difficulty hearing your family and friends is not just socially isolating but is cognitively isolating as well. If you are cognitively isolated, you may miss out on the benefits of distributed cognition.”

The research team is about to embark on a large, cross-sectional, observational program to test possible links between hearing loss and cognitive impairment. This research will evaluate whether hearing treatment can improve communication and collaboration, can combat social isolation and depression, and have flow-on benefits for cognitive performance and health.

THE COST OF DEMENTIA TO AUSTRALIA

Around 400,000 Australians and 47 million people worldwide are living with dementia, with about 365,000 family members, friends and others are involved in their care. By 2056, an estimated 1.3 million Australians (2.4 million worldwide) will be living with dementia at a cost of nearly $37 billion to our nation.

ABOUT THE AUSTRALIAN HEARING HUB

Macquarie University and the Australian Hearing Hub are hosts to leading hearing health providers, researchers and innovators from Australian Hearing, Cochlear Limited and the National Acoustic Laboratories. It is home to the ARC Centre of Excellence in Cognition and its Disorders, the Macquarie University Centre for Implementation of Hearing Research, the Macquarie University Centre of Emotional Health, and the Departments of Cognitive Science, Linguistics and Psychology.