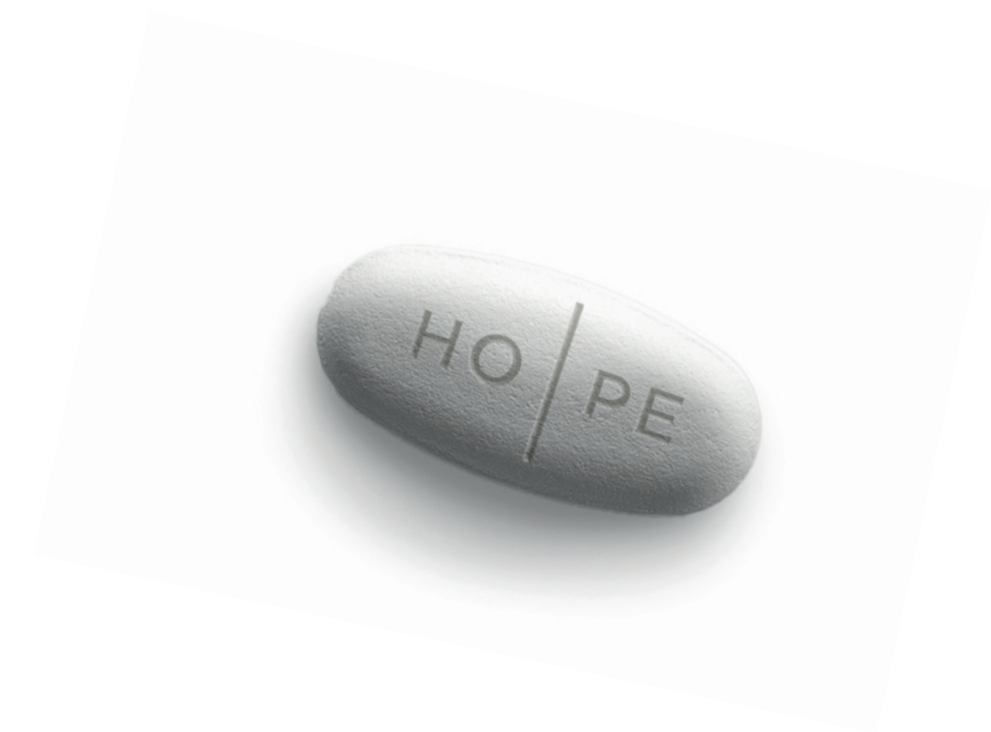
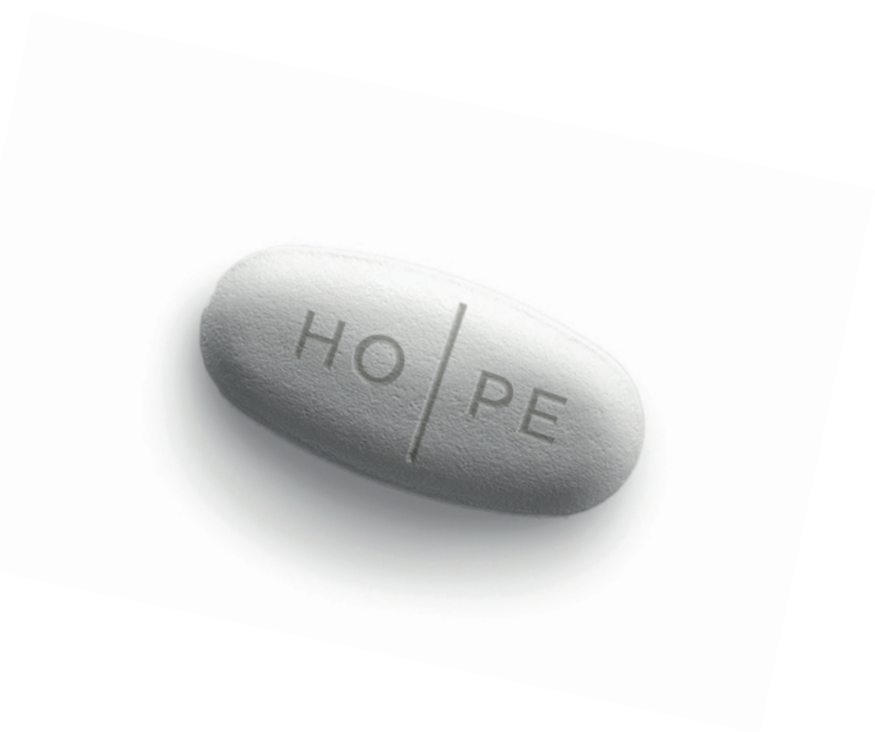


2020-2021 | **SVI**
YEAR



Experience informs expertise:
Medical research solving
real-world problems

WELCOME

FOR more than 60 years, SVI has driven breakthrough medical research, improving health outcomes for those in need.

We have a singular mission, but not a singular disease focus. We investigate diseases that affect millions of Australians every day.

Cancer, diabetes, heart disease, Alzheimer's, osteoporosis, mental illness.

Our work spans the spectrum of research endeavour – from uncovering the body's most complex biological pathways, through rigorous pursuit of evidence, to patient trials for new treatments.

SVI is where hope begins.



SVI acknowledges the Aboriginal lands on which we live and work, and pays respect to Traditional Owners, ancestors and elders.

SVI IN 2020

192
RESEARCHERS AND STAFF

56
STUDENTS

21
LAB GROUPS

7
RESEARCH THEMES

INSIDE

Welcome from Chairs and Director	4 - 5
Research in focus	6 - 17
Type 1 diabetes	
Cancer	
COVID-19	
Type 2 diabetes	
Mental health	
Bone health	
Financial snapshot	18 - 19
Your support	20 - 21
Thank you	22 - 23



THE EXPERIENCE with COVID-19 has pulled into sharp focus for all of us the fundamental connectivity between medical research, healthcare and health.

In 2020, while our NRL division enthusiastically joined the collective effort to combat COVID-19, SVI's other research efforts continued unabated. Working with restrictions imposed by the virus, we were still able to launch a clinical trial, embark on new and exciting research projects and raise crucial funds for our emerging research stars.

Staying closer to home also had some advantages: it gave us the opportunity to examine and develop our Strategy, improve internal work practices, and pursue new development activities for our staff.

Throughout the year, our researchers turned up every day to their labs and their home offices – home-schooling their children by day and joining international zoom conferences by night, painstakingly composing their research articles, and sweating over grant applications – all in aid of the same mission: to create and

harness knowledge of disease in order to improve health outcomes for those in need.

In late 2020, SVI launched the world-first BANDIT clinical trial to test the effectiveness of the drug baricitinib at slowing the progress of type 1 diabetes in newly diagnosed young adults. Supported by JDRF Australia and JDRF International, the trial involves many of the nation's top type 1 diabetes clinical researchers. It is expected to report results during 2023.

During the year, a Medical Research Future Fund grant was awarded to a collaborative team led by Dr Helen Frazer, Clinical Director at St Vincent's BreastScreen, and Dr Davis McCarthy, Head of SVI's Bioinformatics and Cellular Genomics Lab. The project – also including researchers from St Vincent's Hospital Melbourne, the University of Melbourne, the University of Adelaide and BreastScreen Victoria – is investigating the use of deep

learning algorithms to improve breast cancer screening for Australian women.

Philanthropy also continues to make a real difference at SVI. Thanks to generous supporters attending the 2020 *For the Love of Science* Dinner, we were able to provide four of SVI's most talented early-career researchers with Rising Star Awards in 2020. The remarkable success of the *For the Love of Science* event in early 2021 will fund a further seven awards.

SVI's Discovery Fund is making its first allocation of funding in 2021, allowing us to add to SVI's star research line-up by recruiting ovarian cancer researcher Dr Elaine Sanij as a new Lab Head.

In progressing SVI's research, we use the abundant resources and technologies available in Melbourne – one of the world's leading life science clusters. However, the pace of discovery can be slowed without direct and immediate

access to vital technology. During the past year, we had enthusiastic support through our philanthropic partners – particularly SVI's Catalyst Circle – to enable the purchase of new equipment to accelerate research discoveries.

The past year has also seen a number of honours bestowed on SVI's talented team.

Deputy Director, Professor Natalie Sims, was awarded the prestigious Paula Stern Award by the American Society for Bone and Mineral Research, and Carl Walkley was appointed an honorary Professor by the University of Melbourne.

Professor Tom Kay received the 2020 Australian Diabetes Society Kellion Award, recognising his impact over many decades on type 1 diabetes research and on the development of new treatment options.

We are delighted that three members of the SVI family were recognised in the 2021 Australia Day Honours: Brenda Shanahan AO, Christine Tarascio AM and Claire O'Callaghan OAM.

Collaboration is the key to research advances that can make a difference to those in need. We acknowledge our

research partners, particularly St Vincent's Hospital Melbourne and the University of Melbourne, as well as other universities, medical research institutes and industry partners, both locally and further afield.

We are grateful for the contribution of our Board members, all of whom are volunteers, for their diligence and professionalism in advancing the work of SVI. Particular thanks to three Board members who departed in the past year – Professor Shitij Kapur, Angela Nolan and Professor Dick Fox – and welcome to new Board member Dr Megan Robertson. We also thank departing Foundation Board members Brenda Shanahan AO, Jim Hatzimoisis and Maria Palazzolo for their efforts, and welcome Phil Huzzard and Simon Marton as new members.

We are grateful to our key government and organisational funders for their ongoing support: the State Government of Victoria (through the Operational Infrastructure Support Program), the Australian Government (through the National Health and Medical Research Council,

the Medical Research Future Fund and the Australian Research Council), the Board of Melbourne, as well as other universities, medical research institutes and industry partners, both locally and further afield.

Our heartfelt thanks to all SVI's generous donors, who believe in the importance of medical research. And to SVI's staff, for their perseverance through COVID-enforced restrictions during 2020.

May you find hope and inspiration in SVI's work.

Tony Reeves, Chair, SVI Board

Karen Inge, Chair, SVI Foundation

Tom Kay, Director

SVI MAKING A DIFFERENCE



Delivering impact through research excellence and its translation

Supporting and attracting outstanding people

Enabling research innovation through cutting-edge facilities and services

Growing research capacity and capability

“WILL I still be able to surf big waves?”

That was Anders' first thought when he was diagnosed with type 1 diabetes at the age of 29.

“I'd lost about 10 kilos in six weeks. My gut feeling was there was bound to be a simple explanation and I wasn't that concerned, but my girlfriend encouraged me to go see a doctor.”

“I had other symptoms, in hindsight. My mouth was very dry, and I was drinking lots of water, but it didn't occur to me to mention this to the doctor.”

Anders was the second person to be enrolled in SVI's BANDIT clinical trial. The drug baricitinib is approved globally for rheumatoid arthritis patients, but SVI researchers have discovered that it may also stop the immune system from attacking insulin-producing cells in the pancreas (the cause of type 1 diabetes).

Friends and family had told Anders about the trial after hearing about it in the media. Anders said he immediately considered enrolling, for a few reasons.

“The more altruistic reason was that I could play a role in research that could potentially help people diagnosed with type 1 diabetes in future. Having just been diagnosed, I understood how very tough it could be.”

“Secondly, I really hope this works and makes the rest of my life easier to manage. I realise there's a chance that I may be one of those participants getting the placebo, but at the end of the day, I'm getting great care, and contributing to what I think is an important research project.”

Like his type 1 diabetes diagnosis, taking part in a clinical trial raised many questions.



‘I'm getting great care, and contributing to what I think is an important research project.’

“The endocrinologist who is leading the trial at the hospital was very reassuring. He walked me through the questions I had about the information and put it into more familiar terms for me.”

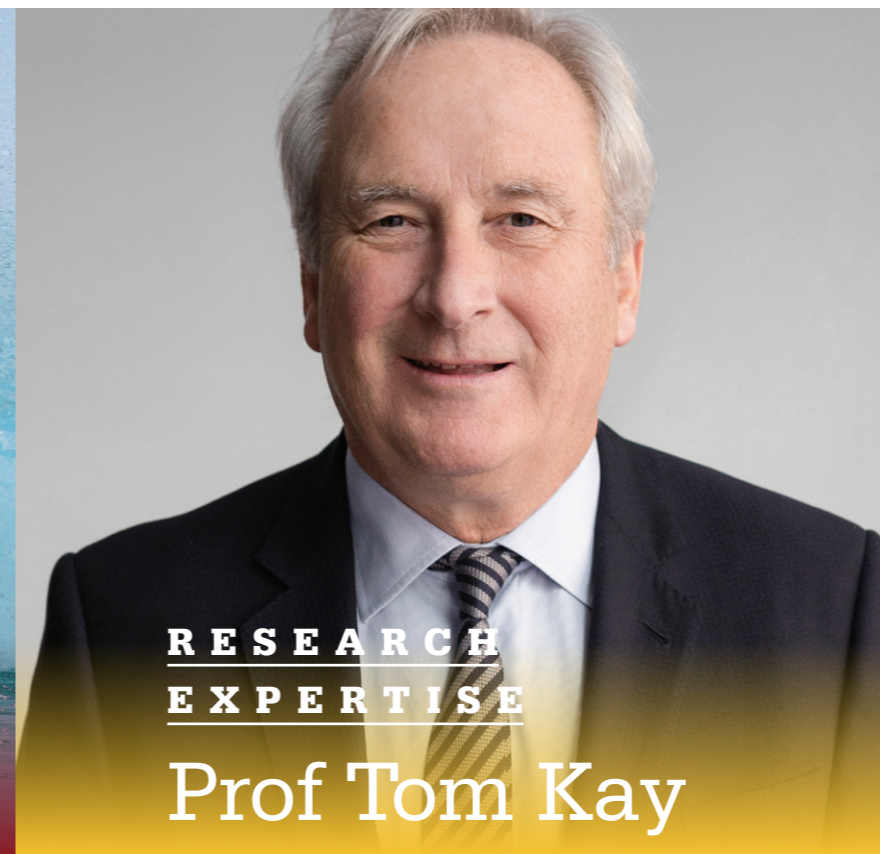
While Anders is hoping his participation in the trial may see his glucose levels stabilise, he is happy to report that he has indeed managed to find a way to keep enjoying surfing big waves. “That's been a really positive

revelation,” he notes.

Anders is now learning to ride the wave of his type 1 diabetes diagnosis, and he still holds hope that new treatments for people with the disease will be found.

“You just never know when a trial like BANDIT is going to lead to a huge breakthrough in science, so I would encourage everyone to take part in a clinical trial if they are given the chance.”

To view a video about the BANDIT trial, scan QR code with your mobile device



JANUARY 2022 marks a century since insulin was first used to treat Leonard Thompson, a 14-year-old dying of type 1 diabetes. The then experimental treatment saved Leonard's life.

Leonard needed insulin because his body's immune system had targeted and destroyed the insulin-producing cells in his pancreas, meaning his blood sugar levels were not able to be controlled.

“To stay alive, people with type 1 diabetes are dependent on insulin replacement – given by multiple daily injections or an insulin pump – along with frequent blood glucose measurements,” explains Professor Tom Kay, SVI Director and internationally-leading diabetes researcher.

But while life-saving, insulin treatment has limitations.

“The long-term complications of type 1 diabetes include heart attack, stroke, vision impairment, kidney disease and nerve damage – it is a significant condition,” says Tom. “Our century-old

‘If this trial proves successful, people with type 1 diabetes could be significantly less dependent on insulin...’

approach to managing this disease does not address its underlying cause: the processes which lead the body's immune cells to destroy insulin-producing beta cells.”

A clinical trial being led by SVI aims to change that.

Dubbed “BANDIT” (Baricitinib in new onset type 1 diabetes), the trial is investigating whether baricitinib – a drug used to treat rheumatoid arthritis – can protect insulin-producing beta cells from

immune attack.

“Our aim is to retain those beta cells still present when type 1 diabetes is first diagnosed, and prolong the body's own production of insulin,” says Professor Helen Thomas, BANDIT co-investigator and Head of SVI's Immunology & Diabetes Lab.

“If this trial proves successful, people with type 1 diabetes could be significantly less dependent on insulin treatment. That would herald a massive change in type 1 diabetes care.”

Some of the nation's top type 1 diabetes clinical researchers – from The Royal Melbourne Hospital, The Royal Children's Hospital (Melbourne), St Vincent's Hospital Melbourne and The Women's and Children's Hospital, Adelaide – are collaborating on the BANDIT trial.

“We're optimistic that with the support of our generous trial participants and the expertise of these outstanding clinicians, we will see positive results,” says Helen. “We are very hopeful of being able to change the lives of people diagnosed with type 1 diabetes in future.”

“That would be a dream come true for us, and for those patients.”

The BANDIT trial is supported by JDRF Australia and JDRF International.

People aged 12 to 30 years who have recently been diagnosed with type 1 diabetes may be eligible to take part in the BANDIT trial. www.svi.edu.au/bandit

TYPE 1 DIABETES IMPACT



15 HUNDRED INSULIN SHOTS

are typically required each year for a person with type 1 diabetes

150 THOUSAND AUSTRALIANS

have type 1 diabetes – one of the highest rates worldwide

570 MILLION DOLLARS

Estimated annual healthcare cost in Australia for treating people with type 1 diabetes (latest available data, 2012)

CANCER survivor Gay knows all too well how devastating chemotherapy can be.

“I had terrible ulcers in my nose and sores in my mouth. I lost my hair – some of which has never grown back. I regularly felt nauseous and I lost my appetite,” she recalls. “At the time, all I could do was wish that it would stop.”

“I had five cycles of chemotherapy, followed by six weeks of radiotherapy. The chemotherapy was given intravenously every three weeks. I’d just start to feel OK and then it would be time for the next treatment.”

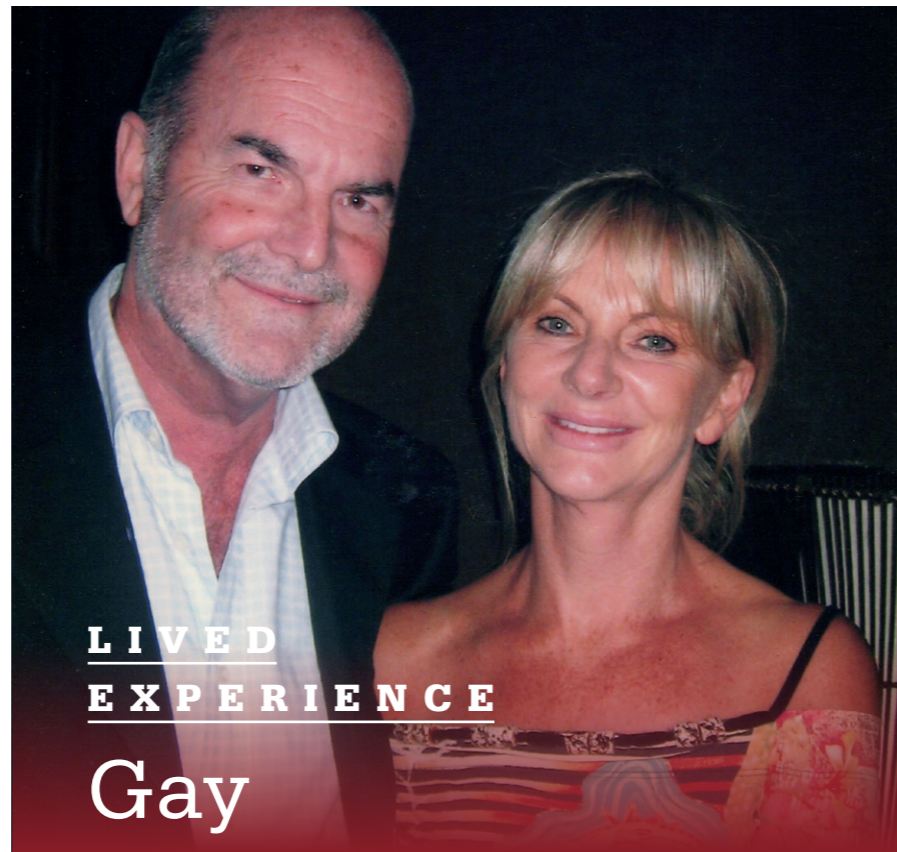
But little did Gay know that her journey with cancer would be longer and more winding than she had ever expected.

While undergoing treatment for her breast cancer in 1999, Gay’s husband Kerry was diagnosed with an incurable brain cancer. He passed away just eight months later.

“When you have chemotherapy, it’s like your body goes into shock,” she says. “The biggest impact most people experience is the overwhelming fatigue. Just getting dressed in the morning can sap all your energy.”

With her own cancer finally in remission, Gay married again. After a few years, her second husband, Robert, was diagnosed with bowel cancer and Gay again became a cancer carer. Robert, too, passed away after an eight-month battle with his cancer.

“When my first husband, Kerry, was diagnosed with a brain tumour, I learnt that my oncologist had lost her husband to the same cancer. She was very open about it, and the story of her lived experience was invaluable to me. It was like being forewarned. And it helped me talk



LIVED
EXPERIENCE

Gay

with my 12-year-old son about how his dad’s illness would progress.”

This memory – and all she had weathered as a survivor and carer – led Gay to become a volunteer for Cancer Council Victoria’s Cancer Connect services, providing peer-to-peer advice and support.

“I wanted to do something,” she says. “With all I’ve been through, I can help others in their cancer journey – either as a person diagnosed or as their carer.”

“When I was having my chemotherapy, I remember being told that I was lucky to be a fit healthy person. ‘You’ll be able to take it’, they said. They were right. I am still here, and very grateful.”

‘When you have chemotherapy, it’s like your body goes into shock.’



RESEARCH
EXPERTISE

A/Prof Andrew
Deans

“THE PROBLEM of chemotherapy – experienced by most cancer patients – is that while it kills cancer cells, it also kills useful cells in many parts of the body. Hence the terrible side-effects, like hair loss,” explains Associate Professor Andrew Deans, Head of SVI’s Genome Stability Lab.

Cancer arises through cell replication gone mad.

“Our cells are continually dividing and reproducing themselves – that is how children grow taller and adults continue to grow hair, nails and skin,” Andrew says. “But cancer hijacks this process, to replicate cells that no longer respond to the usual, healthy processes of cellular growth and death.”

Understanding what drives this crazed cell behaviour and how we can ultimately control or contain it is a key focus of Andrew’s research.

First identified in 1938, telomeres are tiny caps on the ends of each of our chromosomes. They function as a molecular clock, wearing

‘Research on ALT cells has a good chance of yielding drug treatments within the next decade.’

down each time the cell divides and reproduces itself. But cancer cells have developed clever ways to avoid the telomere’s usual limiting of cell life. One of these death-defying processes is called “alternative lengthening of telomeres”, or ALT, which borrows long telomeres from other parts of our DNA and copy/pastes them onto the cancer cell’s shortening ones.

“It’s an ingenious adaptation that keeps the cancer cells going, when they

should naturally die,” says Andrew.

This ALT pathway is considered a strong potential target for new cancer therapies.

“The beauty of developing treatments based on the ALT pathway is that there would be considerably fewer side effects, because normal cells would be unaffected,” says Andrew. “This is a cancer-specific mechanism that we can harness to kill off cancer cells. That makes it a very attractive prospect for research aimed at developing new-generation cancer treatments.”

ALT cells exist in every cancer type but in some cancers, they can make up a third or even a half of the cancer.

“For instance, sarcoma, a tumour cancer that forms in soft tissues like blood vessels, muscles or nerves. These cancers are typically 30 to 50 per cent ALT cells,” Andrew notes.

“If we can work out how to attack the cancer’s ALT pathway, it will be a double victory, because these cells’ ability to endlessly replicate makes them much more resistant to treatment. Sadly, patients with sarcoma and other high-load ALT cancers have much poorer outcomes.”

“Research on ALT cells has a good chance of yielding drug treatments within the next decade,” Andrew concludes. “That’s what keeps me and my team going, every day.”

CANCER IMPACT



48
THOUSAND

Estimated number of cancer deaths in Australia in 2020, with 145,000 new cases diagnosed

69%
SURVIVAL

The relative 5-year survival rates for all cancers combined (2012-2016)

1 IN 2
AUSTRALIANS

By age 85, 50% of Australians will be diagnosed with cancer

HELENA Dix knows the perils of COVID-19. Just days after thinking she'd recovered from the "really horrible" virus early last year in London, the operatic soprano found herself suddenly and completely devoid of breath.

"I couldn't breathe, let alone speak or call for help," she recalls. Her body was collapsing as a massive blood clot hit her lungs. Helena was only saved by her finely tuned ability to carve out every last molecule from a single inhalation – before the ambulance's oxygen arrived.

Helena's doctors agree that in those crucial moments, her opera training saved her life.

She spent nearly two weeks recovering in hospital, and many months afterwards rebuilding her voice – literally one note at a time. "Every week it would take all my energy just to sustain one more bar of music – it was painstakingly, frustratingly slow," Helena comments.

"But to be told that I might never be able to sing again was devastating. My voice is not only my livelihood, it's my life. That drove my determination to use all my energy and intricate knowledge of my lungs to help myself recover."

Although finally back making her first stage performances – in Australia, her homeland – Helena is still dealing with the impact of the coronavirus episode.

"There is long-term damage to my leg, where doctors now think the large clot originated. I have lymphoedema and ongoing pain. I continue to wear compression stockings and take blood-thinning medication."

"It took months for the medical team to properly connect the problems with my leg to COVID. This virus is so new to us, and it's creating so many unexpected health



**LIVED
EXPERIENCE**

Helena

outcomes, that doctors are really struggling to keep up."

"The best news is that my heart is not affected – much to my relief and my doctors' surprise."

And Helena found that her knowledge of breathing could help others.

She is one of a number of opera singers in the UK who have used their deep understanding of breath control to advise doctors on COVID recovery exercises to help sufferers regain their normal breathing capacity.

"It's the least I can do," she says. "Musicians have this in-built discipline, that comes from hours and hours of daily practice. I applied that to my own recovery. But I also realised I could use my experience to help people who aren't singers."

"My post-COVID life has taught me to appreciate success in small, slow increments – and that everything will be OK."

'Every week it would take all my energy just to sustain one more bar of music – it was painstakingly, frustratingly slow.'



**RESEARCH
EXPERTISE**

Dr Pip Hetzel

COVID-19 changed the path of humanity in 2020, but for SVI's NRL division it meant doing a whole lot more of what they do best.

A designated World Health Organization (WHO) Collaborating Centre, NRL is a world leader in evaluating test kits and improving the quality of laboratory testing for infectious diseases.

"Accurate testing has been central to the fight against COVID-19," says NRL Director, Dr Pip Hetzel.

"The focus last year was squarely on diagnostic testing – the now-familiar nose and throat swab. But with vaccination forging ahead internationally, antibody testing of blood samples is becoming increasingly important."

"Investigating whether a person has developed protective antibodies – either in response to exposure to the virus or vaccination – will be key to understanding long-term immunity."

'NRL is the lead agency in WHO's worldwide assessment of new antibody test kits'

Exactly how long a vaccine will give the body immunity against COVID-19 is still to be established, as is their effectiveness against emerging variants of the virus.

"Antibody testing is routinely used in public health research to measure levels of community exposure and response to infections," Pip explains. "Point-of-care test kits are also emerging for potential use in workplaces, aiming to give quick turn-around results on a pin-prick drop of blood. However, the

accuracy of many of these new tests is yet to be fully assessed."

This is where NRL comes in. The team's unique expertise in quality assurance for antibody testing (also known as serology testing) is now being sought nationally and internationally. NRL is the lead agency in WHO's worldwide assessment of new antibody test kits and has been contracted locally to provide the same services in Australia.

The comprehensive scientific evaluation of antibody test kits requires a large number of what Pip describes as "pedigreed" serology samples: a sizeable repository of blood samples collected sequentially from individual COVID-19 patients over the course of their infection and recovery. This allows NRL to assess all test kits on the same samples, giving a comparison of performance.

"This gives us a single source of truth to assess and compare, rigorously, each new test kit," Pip comments.

"WHO will use our evaluation results to determine which test kits are safe and effective for use. That makes our work really powerful and highly satisfying."

INFECTIOUS DISEASE IMPACT



1 IN 4 DEATHS

Pre-COVID, infectious disease accounted for almost 25% of all deaths globally (2019)

160 MILLION PLUS CASES

Worldwide, COVID has claimed more than 3 million lives and infected more than 160 million people (at May 2021)

17 MILLION

Tests for COVID-19 in Australia since the start of the global pandemic (at May 2021)

A TRIP to Italy didn't end quite the way Kevin and his wife Jenny had hoped.

Kevin is a pragmatic man who has lived with type 2 diabetes for a number of years. Knowing the risk of ulcers, he had been taking precautions to look after his feet while travelling.

"We were in a small tourist town and decided to go to the beach," he says. "When we went into the water, we noticed it was quite dirty – it turns out some untreated water from the town ran into it. My sandals had also been rubbing against my feet, which can cause skin trauma. And then, unknowingly, I put my feet into a very unhygienic environment."

Kevin ended up with a foot ulcer and went to the local pharmacist. "The treatments they prescribed didn't help much. I probably needed antibiotics."

Soon the wound became infected, so Kevin and Jenny had to end their holiday and return to Australia. Kevin's GP sent him to hospital, where testing revealed the infection had entered the bone of his left big toe. A vascular surgeon discovered that Kevin had very poor blood flow.

"Because of the depth of infection and the low blood flow, I didn't have the option of having skin flap surgery – amputation was the only resort," Kevin explains. "After they removed my toe, I needed another surgery to clean up the site. That didn't heal properly, so I then had to undergo hyperbaric therapy for about an hour a day for two months."

A common treatment for decompression sickness, serious infections and wounds unable to heal – like Kevin's – hyperbaric oxygen therapy places the patient in a



LIVED
EXPERIENCE
Kevin

'My surgeon told me I dodged a bullet as I could've lost my whole foot.'

chamber where air pressure is increased two to three times more than normal. The lungs can then gather much more oxygen, which helps the body more effectively fight bacteria.

Thankfully, this treatment worked for Kevin and his wound healed.

"I don't think about it much anymore," he says. "But I am thankful. My surgeon told me I dodged a bullet as I could've lost my whole foot."

"Hopefully, I won't have any more complications, but it's reassuring to know

medical researchers are thinking about the many health impacts of diabetes. If they are able to help people who develop foot ulcers with new therapies – before they progress to the point mine did – that would make a big difference to many people."

RESEARCH
EXPERTISE

A/Prof Geraldine Mitchell

STEM cells derived from a patient's own skin or blood cells, together with 3D printing technology, could hold the key to solving one of the most serious problems faced by people with type 2 diabetes: diabetic foot ulcers.

"These ulcers, or sores, are caused by poor circulation as a result of the damage diabetes causes to nerves and blood vessels. The poorer blood flow then makes it harder for the sores to heal," says Associate Professor Geraldine Mitchell, Head of the Vascular Biology Group in SVI's O'Brien Institute Department.

"When other treatment approaches such as antibiotics aren't enough to heal the ulcer, a common treatment is skin flap surgery. Skin is taken from somewhere else on the body that still has a blood supply, to cover the ulcer"

But while skin flap surgeries may resolve the immediate issue of the ulcer, they can create further problems – as a second

'We are essentially growing 'donor' tissue from the patient's own cells...'

wound site is created. Patients often face a long, painful rehabilitation and recovery.

Geraldine looked outside the box – and outside the body – to come up with a new approach to resolve these multiple challenges.

"I put together a collaborative team to see how we could meet this challenge," she comments. "We came up with an exciting project which looks at integrating 3D-printed medium-sized blood vessels into skin flaps grown in the lab from the

patient's own stem cells."

The team includes post-doctoral researcher Dr Anne Kong and SVI colleagues Dr Max Lim and Dr Jarmon Lees from the Cardiac Regeneration Lab – who have already created small blood vessel capillaries in the lab. Dr Cathal O'Connell, a biomedical engineer from RMIT University, provides expertise to develop the 3D printing of the larger vessels. Professor Wayne Morrison, a reconstructive surgeon, advises on the clinical design and Dr Kiryu Yap (trainee surgeon and PhD student) will complete the experimental surgery.

"We are essentially growing 'donor' tissue from the patient's own cells, so there is no need to create a second wound site," Geraldine explains.

"The aim is to use these bioengineered skin flaps to repair the ulcer wound. This will offer better overall wound healing, and ultimately, a much better outcome for the patient."

By putting patients' own cells at the heart of the solution, this new technique could improve the lives of thousands of Australians.

TYPE 2 DIABETES IMPACT



4.4 THOUSAND AMPUTATIONS EACH YEAR

Diabetic foot ulcers result in 10,000 hospital admissions annually, about half of which result in amputation

UP TO 34%

Estimated risk of a patient with diabetes developing a foot ulcer across their lifetime

ALMOST 1 MILLION

The number of Australian adults with type 2 diabetes (2017-18)

WHEN Jann first saw a psychologist “at around the age of 20”, she had no idea she would still be trying to manage mental health issues 50 years later.

“I was depressed and feeling insecure and had this real sense of aimlessness for much of my 20s. Despite finishing art school, I didn’t know how to look after myself. I just didn’t feel like I fitted in.”

“During my mid to late 20s, I experienced highs and lows – both in my behaviour and in my decision-making. I got married, but that didn’t work out.”

“I built a house at the age of 30, remarried, had two children back-to-back and taught full-time. That kept my mind occupied, so I had minimal highs and lows,” Jann says.

“After my second marriage dissolved and the children were in their mid-teens, I fervently enjoyed gardening; beautifying my outdoor environment inspired me to paint my home interior. That led to the rash decision (one of many) of selling, as I had decided I needed to downsize. I still regret it.”

Jann had been referred to another psychologist during her second marriage.

“I remember telling him that I felt dumb and ignorant; I didn’t think I was intelligent. I knew there was still something else going on besides depression, so I literally begged my psychologist to do more. He arranged for me to have for some cognitive tests, and they all came back normal.”

Despite these results, Jann went to “about five other doctors” and – almost 20 years after first seeking help – was diagnosed with bipolar disorder and prescribed medication.



**LIVED
EXPERIENCE**

Jann

‘I knew there was something else going on besides depression... I literally begged my psychologist to do more.’

“Nothing felt right though. Nobody checked to see how anti-depressants work with bipolar medication – you’re not supposed to combine those two classes of drugs. It took a couple of years to find the drug combination that worked for me. I tried lithium once, but I didn’t continue with it because it really messed with my head.”

“Even with medication, 30 years after my bipolar diagnosis I still feel frequent lack of focus, and I find it really hard to synthesise information. I continue to feel as though I do not fit in socially most of the time. My brain won’t stop.”

“If I had the chance to speak with medical researchers, I would say: ‘How can you help me, how can you help people? I’m 70 years old and still going through this.’”



**RESEARCH
EXPERTISE**

Dr John Scott

THE WORLD’S first treatment for bipolar disorder was discovered in the 1940s by a psychiatrist-researcher working in an abandoned pantry in the Bundoora Repatriation Mental Hospital in Melbourne’s north. Now, 70 years later, a fellow Melburnian is forging a path to potential new bipolar treatments.

“Dr John Cade’s use of lithium – a potentially toxic substance – to treat patients with bipolar was an early medical research breakthrough,” says Dr John Scott, Head of SVI’s Neurometabolism Laboratory. “Cade was so dedicated to helping his patients that he experimented with lithium on himself to establish a safe dose. But he was never able to pinpoint exactly how, or why lithium worked.”

That mystery still remains today, and lithium is still the sole front-line treatment for people living with bipolar disorder.

Cue John Scott, who is laying new groundwork in

‘Fundamental research of this kind is critical.’

understanding how and why bipolar disorder develops – essential knowledge in the search for new treatment options for a disease affecting 1 in 50 Australian adults each year.

“It is now becoming clear that the manic and depressive phases of bipolar disorder are triggered by imbalances in brain energy metabolism,” John explains. “My work focuses on an enzyme called Ca²⁺-calmodulin dependent protein kinase kinase-2, or more simply, CaMKK2, which regulates energy balance.”

Studies undertaken by John and his team have shown that mutations in humans which stop the normal function of CaMKK2 are associated with

bipolar disorder. He’s also gone some way to establishing that the effectiveness of lithium is likely a happy accident related to it acting on the same energy pathway – lending additional evidence that CaMKK2 might prove a good target for developing new, less toxic treatments.

“Fundamental research of this kind is critical,” says Deakin University’s Professor Michael Berk, a clinical psychiatrist and researcher, one of John’s collaborators.

“Unless we can understand the molecular basis of the ‘toggle switch’ between mania and depression in bipolar disorder, we will continue to be unable to design targeted therapies. Instead, we rely on serendipity to treat this devastating disease.”

By investigating mice as a model for how brain energy regulators work in humans, John and his team are uncovering bipolar disorder’s molecular map. They have also generated small molecules – potential drugs – that affect CaMKK2 function.

“It’s been a long time coming, but I’m optimistic that we are getting closer to creating more effective treatments for bipolar and other mental health disorders,” says John.

Future treatments flowing from this leading-edge research will be due to the collective effort of scientists and clinicians – dating back to trailblazers like John Cade – in unravelling the complex biological mechanisms deep inside our brains.

**BIPOLAR
DISORDER
IMPACT**



1 IN 50

Australians will develop bipolar disorder during their lifetime

**ESTIMATED
22%
OF SUICIDES**

Suicide rates for people with untreated bipolar are 10 to 20 times greater than for the general population

**\$7.39
BILLION
PER YEAR**

The cost of bipolar is 2.56% of all government health and welfare expenditure in Australia

WE TEND to take our bones for granted – until they break.

“Bone health is not always top-of-mind when thinking about older adults,” says Dr Christine Mandrawa, Geriatrician at St Vincent’s Hospital Melbourne. “As friends and family, we often don’t realise the slow, silent impact of losing bone strength, while the person’s general health may appear otherwise well.”

In “pretty good health” at age 94, John was living independently until the day he took a wrong turn heading to the optometrist on his mobility scooter.

“I always cross the road at the same place, but one day I tried a different spot,” John recalls. “There was a rock in the way, and my scooter bumped into it. I hit the ground on my shoulder.” The accident landed John in hospital.

“For every 24 hours an adult spends in a hospital bed recuperating, we lose three per cent of our muscle mass. As the body ages, the impact of immobility becomes greater. For someone like John, who was living well independently, a fracture can significantly deplete their overall strength and physical capacity,” says Christine.

“John is making really good progress in his recovery, but because of the fracture now needs help with day-to-day tasks like dressing and cooking that he didn’t before.”

“In some ways, John is quite fortunate to have fractured his arm, as studies show that after a hip fracture, one in five older adults – including people younger than John – end up in aged care.”

Christine is part of the multidisciplinary Geriatric Evaluation and Management team – doctors, nurses,



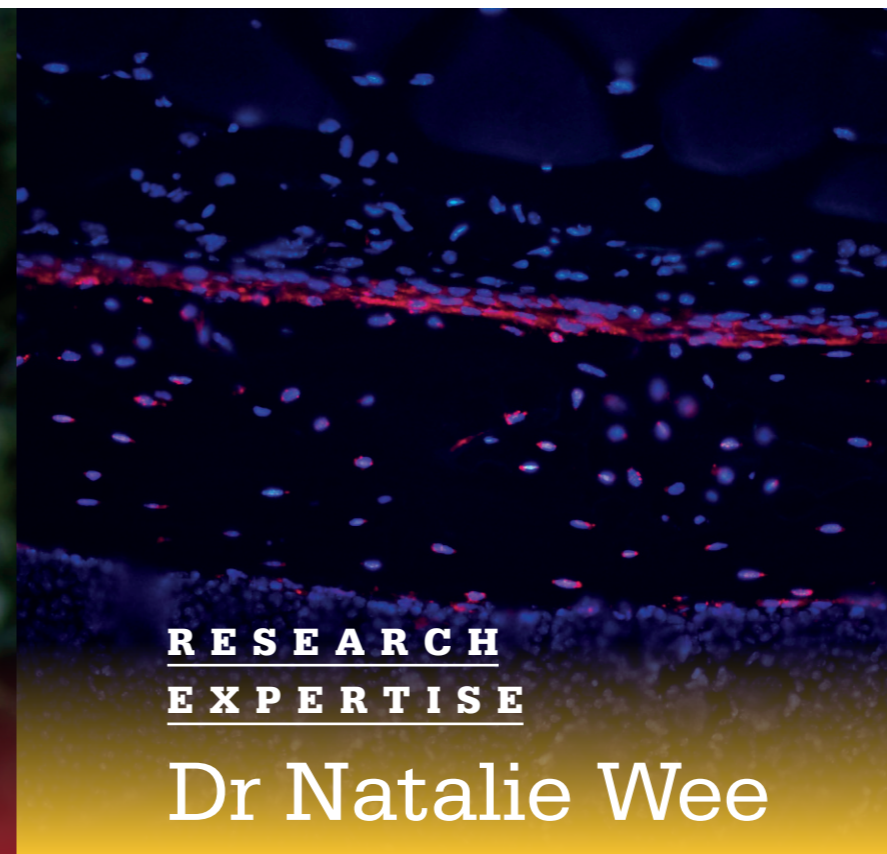
‘... we often don’t realise the slow, silent impact of losing bone strength, while the person may appear otherwise well’

physiotherapists, occupational therapists, pharmacists and other professionals – which supports older adults suffering a significant fracture. “It’s a program of enablement,” she explains. “We want to ensure that people like John are supported to get back home safely, to their full and independent lives.”

Becoming more proactive about bone health – regardless of our age – is Christine’s advice. “Reducing smoking and alcohol consumption, getting three serves of calcium-rich foods each day, getting a regular vitamin D test and doing weight-bearing exercise are all things we can do to support better bone health – especially as we age.”

“I call myself Lucky Jock,” says John. “I am very lucky to be healthy and to live in a good neighbourhood where I know lots of people. Hopefully, I’ll soon go back to my old daily routine.”

“But I say to others: Don’t break a bone. Stick to the same path. Play it safe!”



RESEARCHER

Natalie Wee can literally see bone growing.

“It’s an amazingly complex process, that we are still unravelling,” she comments. “What I see under the microscope is happening in all of us, every day – but science is yet to fully understand it.”

Natalie’s research at SVI is focused on cells in the periosteum, a dense layer on the outside of each of our bones. (“Peri-osteum” literally means “around the bone”).

“Periosteal cells are activated to repair bone when fracture occurs,” Natalie explains. “What we are less sure about, though, is the day-to-day work of these cells.

‘A key goal is finding new pathways to strengthen the skeleton, so we can prevent fractures...’

If we can fully understand their function, then periosteal cells could provide new targets for drug treatment to address bone strength issues.”

Originally from Sydney, Natalie completed postdoctoral research at the Center for Regenerative Medicine and Skeletal Development, University of Connecticut Health Center (USA). It was there that she first encountered periosteal cells.

“I was fascinated by these cells that work to make the bone thicker and stronger.

I wondered how we might harness their unique role in bone growth and repair.”

Fractures can have a devastating effect, with one study of adults aged 50 or more showing that up to a third will die within 12 months of suffering a hip fracture.

“A key goal of this work is finding new pathways to strengthen the skeleton, so we can prevent fractures in the first place,” says Natalie.

By tagging periosteal cells with a fluorescent-coloured marker, Natalie is able to see changes under the microscope as she exposes them to different conditions. This allows her to monitor cells as they transition towards building new bone.

“Making the cells fluorescent allows us to clearly see where and how they are changing. It’s a window through which I aim to fully define their function.”

“If we can understand bone at the cellular level then we open the way to new, more fine-grained targets for testing and screening bone strength,” Natalie explains. “Addressing specific changes in bone mass, shape or mineralisation, for instance, could make it easier to solve a patient’s underlying skeletal weaknesses.”

In 2020, Natalie was awarded the EH Flack Fellowship, supporting her salary for three years, as well as an SVI Rising Star Award. Although starting her new appointment at the height of Melbourne’s COVID lockdown in July 2020 was hardly ideal, Natalie’s outlook is bright.

“I’m really grateful for the opportunity to be back in Australia,” she says. “With the skills and knowledge I gained from my time in the US, I’m really looking forward to making a strong contribution here.”

BONE FRACTURE IMPACT



EVERY
3.4
MINUTES

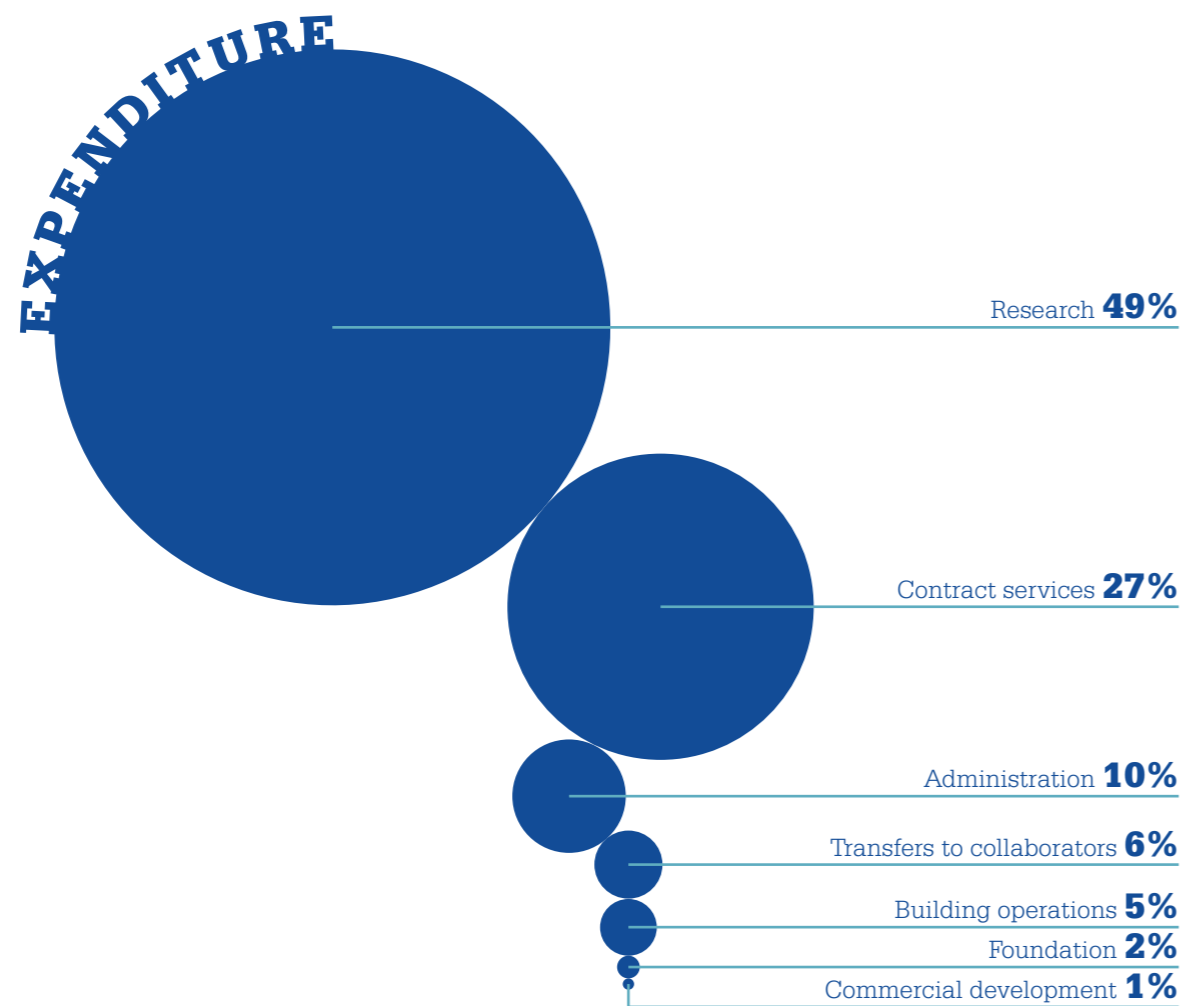
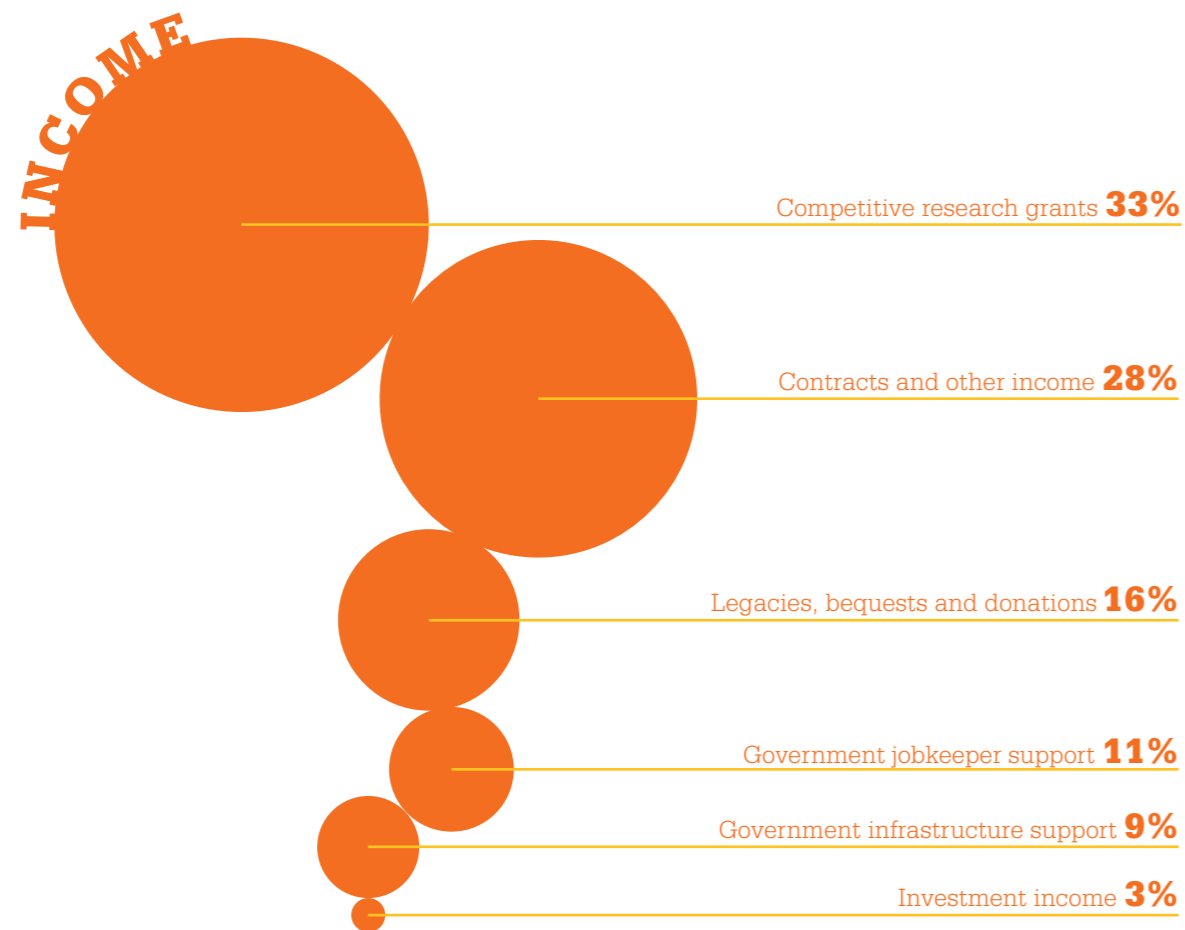
An Australian breaks, snaps or cracks a bone due to poor bone health

ALMOST
1 IN **3**

One in three adults aged 50+ dies within 12 months of suffering a hip fracture

1 IN **2**
WOMEN

And 1 in 3 men aged 60+ will have a fracture related to osteoporosis



STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER

	2020 (\$)	2019 (\$)
ASSETS		
Current assets	13,743,417	7,612,709
Non-current assets	27,587,080	30,409,645
TOTAL ASSETS	41,330,497	38,022,354
LIABILITIES		
Current liabilities	10,686,793	9,224,961
Non-current liabilities	1,228,736	215,320
TOTAL LIABILITIES	11,915,529	9,440,281
NET ASSETS	29,414,968	28,582,073
EQUITY		
– Retained surplus	28,921,718	26,600,704
– Reserves	493,250	1,981,369
TOTAL EQUITY	29,414,968	28,582,073

STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER

	2020 (\$)	2019 (\$)
Revenue	13,442,390	15,099,994
Other income	18,752,846	16,101,541
TOTAL REVENUE	32,195,236	31,201,535
Consumables and general research expenses	(7,208,102)	(7,656,814)
Employee benefits expense	(17,887,142)	(17,380,094)
Depreciation and amortisation	(912,473)	(1,019,444)
Administration expenses	(2,053,192)	(3,254,333)
Transfers to collaborators	(1,813,313)	(1,998,061)
TOTAL EXPENSES	(29,874,222)	(31,308,746)
Surplus/(Deficit) for the year	2,321,014	(107,211)
Other comprehensive income (loss):		
Net gain (loss) on revaluation of financial assets	(1,488,119)	1,426,329
Total comprehensive income for the year	832,895	1,319,118
Total comprehensive income attributable to members of the entity	832,895	1,319,118

NOTE 1: GOVERNMENT GRANTS

National Health and Medical Research Council:

– Independent Research Institutes Infrastructure Support Scheme	1,355,804	1,202,58
– Research grants	7,470,288	7,789,414
Australian Research Council	124,562	293,944
Victorian State Government – Operational Infrastructure Support Program	1,393,712	1,766,773
Job Keeper Government Support	3,653,205	

The summary financial information shown above does not include all the information and notes included in the entity's statutory set of financial statements. The full set of Statutory Financial Statements can be obtained upon request to the Chief Financial Officer. The Statutory Financial Statements comply with the Australian Accounting Standards and an unqualified audit opinion was issued by the auditors, William Buck Audit (Vic) Pty Ltd.

Thank you to our donors and supporters

“On behalf of everyone at SVI, I would like to thank you, our donors and supporters, for your continuing commitment to making a difference. Your support makes our research possible. It’s as simple as that.”

Professor Tom Kay, SVI Director

SVI’s mission is to create and harness knowledge of disease to improve health outcomes for those in need.

Our researchers seek to improve outcomes for medical conditions that affect millions of Australians every day: cancer, diabetes, heart disease, Alzheimer’s, osteoporosis, mental illness.

Support for medical research is an investment in the future health of our nation.

Empowering research

“I am honoured to be able to establish a new ovarian cancer research lab at SVI, thanks to support from SVI’s Discovery Fund. I aim to find new effective treatments for ovarian cancer. I want to give women with ovarian cancer the best possible chance for treatment, to have better quality of life after cancer and to grow old with the people they love.”

Dr Elaine Sanij, Lab Head

The SVI Discovery Fund was established in 2006 by long-time supporter Christine Tarascio AM. Her vision of a perpetual endowment for the long-term benefit of SVI’s research has drawn enthusiastic support from numerous donors over the past 15 years. Having achieved its initial capital goal of \$5 million, the Discovery Fund has recently made its first distribution, supporting the recruitment of cancer biologist Dr Elaine Sanij.



Cutting-edge facilities

“Support from generous donors allowed us to purchase an instrument that we are using to analyse the immune cells from people taking part in our BANDIT clinical trial. With your help, we are working to change the lives of people diagnosed with type 1 diabetes in the future.”

Professor Helen Thomas, Lab Head

Cutting-edge research requires cutting-edge equipment. This gives our researchers the advantage they need to push the boundaries of medical research and redefine what is possible. The Catalyst Circle of donors raises funds to support equipment purchases that underpin the day-to-day pursuit of medical discovery.

Building the next generation

“The funding landscape can be quite dire for early career researchers like me. Receiving support through the Rising Star Program has given me an opportunity that I am grabbing with both hands. This will allow me to support the development of a promising new cancer treatment for the hardest-to-treat breast and ovarian cancers.”

Dr Michael Sharp, Rising Star Fellow

SVI is committed to growing the next generation of researchers, supported by our committed donors through our Rising Star Program.

- *Rising Star Awards support the research projects of our brightest postdoctoral researchers.*
- *Rising Star Fellowships offer salary support for early career researchers for three to five years.*
- *PhD Top-Up Scholarships attract the best young scientists in training.*



STEMming the gap

“I love what I do and see it as a privilege. I have three beautiful young daughters, and I’m really proud that they get to see their mum doing a job which she is passionate about and that makes a difference. I am so grateful to the people who have invested in me and my research.”

Dr Jacki Heraud-Farlow, Christine Martin Fellow

A skilled workforce is essential to realising Australia’s potential. SVI is committed to creating an environment that allows us to capitalise on all of the nation’s available talent. Philanthropy is helping us to support women to fully participate in science innovation and to remove barriers to participation at every point in the pipeline.

THANK YOU

LIKE many Australians, SVI supporter Christine Tarascio AM feels indebted to scientists at the forefront of medical research – whether in decades past or the current era of COVID-19.

“When I was growing up, I remember the impact of the Triple Antigen vaccine (preventing diphtheria, tetanus, and whooping cough). We are now seeing these same research benefits in the pandemic,” says Christine, who was awarded a Member of the Order of Australia (AM) in the 2021 Australia Day Honours.

Christine’s admiration for scientific endeavour – and the ground-breaking possibilities of medical research – has motivated her to generously leave a gift in her will to St Vincent’s Institute.

“It’s a gift to the next generation – our children and grandchildren,” she says. “I want to leave a legacy where it will make a real difference.”

One of Christine’s sons, David, has also made a bequest to SVI, and she says other family members are likely to follow.

“The fact is, we live and we die. I am lucky to be in a position to be able to give to the next generation’s health and longevity. It’s an honour to do it.”

Christine’s journey with SVI began 15 years ago, when she was invited to join the Foundation Board.

“One of my sons, Sam, has psoriatic arthritis. When I went on an initial tour of the institute, the SVI team told me about research they were doing in this field. I would do anything for my children, so I was hooked.”

Christine has an abiding respect for SVI’s scientists, in their tireless work to understand common diseases and improve health outcomes.



‘I want to leave a legacy where it will make a real difference.’

“Now that I have been involved for so many years, I’ve watched young scientists grow from their first public talks to leading their own lab teams,” she says.

Christine is especially buoyed by the strong performance of the SVI Discovery Fund she established. In March 2020, just before the COVID-19 national lockdown, this endowment fund well exceeded its initial aim of raising \$5 million in capital.

“There has been a lot of work, and a lot of loyalty from fabulous SVI Foundation Board members and Discovery Fund members – many of whom are very close

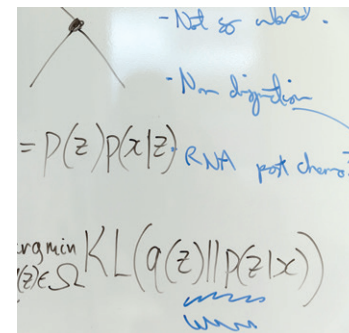
friends of mine – to achieve that initial aim of \$5 million,” she says.

“We have just made our first distribution from the Fund, supporting ovarian cancer research. From here, we intend to grow the Fund; the potential is infinite.”

But the greatest gift for Christine is watching her son, Sam, harness modern medical breakthroughs to expertly manage his psoriatic arthritis while pursuing an impressive corporate career.

“It may not have been possible for him to achieve what he has today without previous scientific advances,” Christine comments. “There are so many people who have similar stories – people living full and healthy and wonderful lives, because of medical research.”

SVI: Where hope begins



Donating to SVI

I would like to support SVI and allocate my gift to:

- SVI’s Rising Star Program
- SVI’s Highest Priorities

Please make my monthly* recurring gift:

- \$42
- \$63
- \$85
- Other \$ _____

*gift is ongoing unless you notify us otherwise

Please accept my one-off gift of:

- \$500
- \$750
- \$1,000
- Other \$ _____

Please make my receipt out to:

Title _____ First Name _____
 Surname _____
 Address _____
 Suburb _____
 P/Code _____ State _____
 Preferred email _____
 Preferred phone _____

To make my gift:

- Cheque (please make payable to St Vincent’s Institute)
- Credit card (please tick one of the following cards and complete details)

Card type (please tick)

- Visa
- Mastercard
- Amex

Expiry date _____

Amount being paid \$ _____

Name on card _____

Signature _____

Have you considered leaving a gift in your Will to St Vincent’s Institute?

- I have already included St Vincent’s Institute in my Will
- I am intending/considering leaving a gift to St Vincent’s Institute in my Will
- I am considering leaving a gift to St Vincent’s Institute and would like some further information

For more information or to give online:
svi.edu.au/support/donate