



KIRBY INSTITUTE

Annual Report

2017





The Kirby Institute
is a leading global research
institute dedicated to the
prevention, treatment and
cure of infectious diseases.

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Kirby Institute staff and students Sophia Amjad, Eithandee Aung, Steven Philpot, and Ian Wong.

MESSAGE FROM THE MANAGEMENT COMMITTEE

The opening words in the Kirby Institute Annual Report would normally come from the Director. However, we have been without a Director since March 2018, when our dear colleague and friend Professor David Cooper passed away after a short illness. It is therefore with both sadness and respect that, on behalf of the whole Kirby Institute, the interim Management Committee introduces the 2017 annual report and dedicates it to David's memory.

David was the inaugural Director of the national research centre formed in 1986 that ultimately became the Kirby Institute, so is the only Director we have known. Under his leadership, we grew from an organisation with a handful of staff responding to the emerging HIV crisis, into a globally renowned research institute of over 300. We have fulfilled David's vision of working at the forefront of discovery and innovation in a range of globally important infectious diseases, including HIV, viral hepatitis and sexually transmissible infections. We have maintained his principles of maintaining research excellence while working through close partnerships with affected communities, policy makers, and a wide range of researchers nationally and internationally.

We are proud to present this report of our work, a testament to David's vision and principles.

Kirby Institute Management Committee, on behalf of the entire Kirby Institute team



MESSAGE FROM OUR PATRON

The Hon. Michael Kirby AC CMG

This annual report for the year 2017 must start with the great blow that was suffered by the Kirby Institute in the early weeks of 2018. Institutes and human beings are tested in times of challenge. The year 2017, and its immediate aftermath, have been such times.

The death of the inaugural Director of the Institute, Professor David Cooper AC, was a huge blow. It was larger because of the fact that David Cooper had been present at the creation. He helped steer the Institute during frightening, dangerous and uncertain times of blood borne diseases, and especially HIV, in Australia and worldwide. To have at the helm a person who was not only a brilliant and creative scientist but also a passionate physician, a natural leader and a kind and creative man, meant that his death was a shock. It was unexpected. It followed closely the happy celebration of the Institute's 30th anniversary year.

The year 2017 opened with praise heaped upon us and the provision of renewed funding; and great expectations of important new challenges and adventures with applied and pure science. It was towards the end of the year that Professor Cooper fell ill. We all expected him to revive. With such a charismatic figure, we expected him soon to be back at his desk and in the laboratory. Then on 18 March 2018 came the news of his death.

I pay a tribute to the courage and strength of David's wife, Dorrie and his daughters Becky and Ilana. We held their hands. As they held ours.

The huge space of the Sydney Town Hall was filled with scientists and citizens from Australia and overseas on 14 June 2018. At the World AIDS Conference in Amsterdam that quickly followed, I was invited to speak to the global community

of an Australian scientist who had really mattered in the epidemiology of AIDS. It was a painful time.

Yet, we have got through those hard days. The Kirby Institute kept doing what it is best at. And what David Cooper demanded of it. It kept working with professional skill on the problems of infection and immunity. This was what the professionalism of the Institute's staff demanded. It is what David Cooper would have expected. Equally important, it was what discipline and dedication for the patients and the tasks in hand demanded. Without delay, a management committee was formed. It comprised the scientific leaders of the Kirby Institute whom we had seen honoured and respected by colleagues from around the world. A search was promptly initiated to find our new Director. The new Director will, we are sure, come with new ideas and fresh energy. This is the way of the world. In striving for this goal, the Kirby Institute and UNSW Sydney are jointly dedicated.

Many research and other achievements of 2017 can be remembered and celebrated:

- The Lord Mayor of Sydney (Councillor Clover Moore) presented the Kirby Institute with the Key to the City of Sydney: the highest honour that could be conferred on an individual or organisation;
- A report in the *Medical Journal of Australia* showed a marked drop in genital warts amongst young Aboriginal and Torres Strait Islander citizens, an area that has had the special attention of the Kirby Institute;
- The Institute's research stimulated the provision of new and more effective HIV treatment through the United States PEPFAR Program;

- Researchers of the Kirby Institute conducted the first evaluation of a point of care hepatitis C test, to detect any active infection from a finger stick sample of blood;
- A research collaboration between the Kirby Institute and medical scientists in Myanmar promoted a new emphasis on the work against HIV, tuberculosis and malaria in that country. Others have followed; and
- The Kirby Institute's "Opposites Attract" study affirmed that HIV positive men, conforming to ART treatment, do not transmit HIV to their sexual partners.

These achievements of 2017 were soon to be recognised in the following year by outstanding funding awards to the Kirby Institute personnel in 2018. These awards will be listed with pride in the next Annual Report. But they can be heralded here as an indication that a corner has been turned. The innovative work of the Kirby Institute goes on with renewed zeal. Times of loss and mourning are now behind us. The greatest legacy of David Cooper will be the ongoing and increasing success of the Kirby Institute: undaunted, strong, resilient.



REMEMBERING OUR DIRECTOR

David Cooper

1949 – 2018

The Kirby Institute's founder and director, Scientia Professor David Cooper AC, passed away on Sunday 18 March 2018 after a short illness. David was one of Australia's most distinguished academic leaders and was internationally renowned, initiating ground-breaking, collaborative infectious disease research that has saved countless lives in Australia, and throughout the world. He was among the first responders when the HIV epidemic reached Australia in the early 1980s and established Australia's ongoing global leadership in the fight against the global HIV epidemic. To this end, he was the inaugural director of the research centre founded in 1986 that grew to become the Kirby Institute.

Having completed his doctorate at St Vincent's Hospital in Sydney through UNSW, David was working at the Dana-Farber Cancer Institute in Boston in the early 1980s, when blood samples started arriving from New York for testing. The blood was from very ill gay men and showed signs of the devastation that the HIV virus, then unknown to the world, was able to cause to the body's immune defences.

In an interview on ABC Radio National in 2015, David said: "I thought, I know where St Vincent's is. If the key risk groups are the same [in Australia], which I'm sure they are, then we were going to be seeing it at St Vincent's." Sure enough, on his return to Sydney, David was soon seeing the same disease patterns in the local gay community, and St Vincent's location quickly made it the hub of efforts to care for people with this new and frightening condition.

David, with the support of colleagues, enrolled a number of young men who were patients at local general practices into one of Australia's first clinical HIV research studies. The results, published in *The Lancet* in 1985, led to the first description anywhere in the world of the so-called "seroconversion illness," which defines initial HIV infection in many people.

With the HIV/AIDS epidemic in full force, in 1986 the Australian Government, through the National Health and Medical Research Council, funded the establishment of the National Centre in HIV Epidemiology and Clinical Research (which became the Kirby Institute) to undertake research to inform Australia's response to the virus, and appointed David its Director. At the same time, as a young physician, he was serving as Director of the recently established St Vincent's AIDS Unit. He spoke often about the effects of ignorance and stigma on his patients, with some staff refusing to take food trays into their rooms. His approach, embraced by the Sisters of Charity, the religious order which ran St Vincent's Hospital, was that every patient deserved dignity, care and compassion, and that none would be turned away.

From the earliest days, David understood that rigorous research would be required to discover the treatments needed to stop HIV in its tracks and prevent its destructive effects. He saw that the best way to find the right drugs was to actively involve those affected by HIV in decisions about how trials would run and what would happen if a drug showed promise. In the early days, with the specialised

hospital wards stretched beyond capacity and the frequency of funerals rising relentlessly, there was considerable anger from the gay community about delays and bureaucratic barriers in drug development. David was always accessible to community treatment activists, and used his considerable scientific and political influence to make sure the system was overhauled. At the same time, he was an international leader in the clinical trials of new drugs that had started to appear and, used in combination, proved to be the breakthrough that stopped people dying from AIDS from 1996. Almost immediately, people with HIV in Australia were able to freely access life-saving treatments, and over the next two decades, David led trials that contributed to enormous improvement of the treatments, to minimise their side effects and make them easier to take.

With HIV becoming one of the most intensively studied infections of all time, the development of a daily, single-pill treatment which is not a cure but virtually eliminates the ongoing effect of the virus was what David called “a modern medical miracle.”

While the advent of effective HIV treatments in the 1990s reduced the sense of crisis in rich countries, David’s work was far from done. Turning his attention to the many countries of the world facing HIV that were far less developed than Australia, he asked the simple question: Why should the accident of where a person lives affect their access to life-saving drugs? This was a radical idea at a time when extreme inequality in health access was generally taken for granted. Having recently assumed the presidency of the International AIDS Society, David was in a position to make a difference. Urged by his advocacy, the Society took a strong and effective position. By the time of the Society’s 2000 conference, which took place in Durban at the heart of the global epidemic,

a paradigm shift had taken place and the world was ready to find ways to treat everyone with HIV.

David also strongly believed that affected countries needed to be able to conduct their own research to make a difference, just as Australia had done so effectively from the start. In 1996, David, along with colleagues from the Netherlands and Thailand, established a research centre in Bangkok called HIV-NAT, with the ambition to be the focal point for developing new treatments for Asian countries facing increasing HIV rates. David worked intensively to build and support HIV-NAT in its first years, and was proud to be able to stand back as it became a fully independent centre of excellence and training in South East Asia. More recently, he launched HIV clinical research collaborations in Indonesia and Myanmar.

While treatment was David’s passion, under his leadership the Kirby Institute took on the whole spectrum of research needed to respond to the HIV epidemic, including public health surveillance, social science, and laboratory studies. He also ensured that the Institute expanded its scope to encompass other diseases, particularly hepatitis C and a range of sexually transmissible infections. The unifying theme was always that people should have access to the best available options for treatment and prevention, regardless of their social or personal circumstances. David received many professional accolades; he was made an Officer in the General Division of the Order of Australia (AO) in 2003, and was posthumously appointed Companion in the General Division of the Order of Australia (AC) in June 2018, just days before the public memorial held in his honour.

David took immense pride in his family. His wife Dorrie and their daughters Bec and Ilana were as unflinchingly supportive of his work as he was of them. To them, we extend our deepest condolences.

Perhaps David’s approach to life is best summed up by his own words: “It’s unusual in a medical career to see the evolution of a disease from its beginnings – to a disease that emerged as a global health catastrophe – to this point now, where medical research is bringing it under control,” he says. “I feel valued to be involved in this work and to have been able to make a difference for so many people.” The Kirby Institute is David’s legacy, and it is one we will continue to carry forward with the passion and pride that he did.

Vale David Cooper.



1. David with the Kirby Institute leadership team in 1994. 2. David on holiday in Scotland. 3. David with colleagues Ann Hill (left) and Ron Penny (right) in the mid 1980s. 4. Dorrie and David (left), and daughter Ilana (far right) with colleagues in the 2007 Kirby Institute Mardi Gras float. 5. Michael Kirby, Ralph Heimans and David in front of a painting by Ralph Heimans for the launch of the Kirby Institute in 2012.



TRIBUTES OVERFLOW: CELEBRATING THE LIFE AND WORK OF PROFESSOR DAVID COOPER AC

On Thursday 14 June 2018, over a thousand people gathered at Sydney Town Hall to remember Professor David Cooper's contributions to science, medicine, academia and society.

David was remembered by colleagues, patients, family and friends for his significant contributions to HIV treatment and prevention that saved countless lives in Australia and globally. The service was coordinated by the Kirby Institute in partnership with the Cooper family, and other key institutions and stakeholders David worked closely with throughout his career: St Vincent's Hospital and UNSW Sydney, as well as the HIV community being represented by ACON and Positive Life NSW.

The Hon. Michael Kirby AC CMG, patron of the Kirby Institute, spoke about David's leadership and legacy, and the importance of ensuring the continuation of his research aimed at eliminating HIV around the world.

"David Cooper was tireless in the preparation. He was superbly professional. He gathered together a magnificent team. He reached out, beyond our country. We should be proud of such a scientist and of our country, its universities and the institutions, that produced him," said Michael Kirby. "His family that nurtured him. His religion that taught him. The patients that loved him. But he was not ours alone. He belonged to the world of science. Today, we honour him as a global hero."

Professor Ian Jacobs, President and Vice-Chancellor of UNSW Sydney, remembered David Cooper as a "wonderful leader, colleague, mentor and a brilliant mind."

"He was the first academic I met when I accepted the role of Vice-Chancellor of UNSW. He travelled to Manchester to welcome me, and share his invaluable

insights into UNSW. Above all, David ensured I knew just how important the work of the Kirby Institute was," said Professor Jacobs. "There are few people I have met, not just in medical research but anywhere, who combined David's intellect, passion and compassion. His dedication to his research was surpassed only by the care and dignity with which he treated his patients."

Other speakers at the memorial service included Clover Moore, Lord Mayor of Sydney; Associate Professor Anthony Schembri, Chief Executive Officer at St Vincent's Hospital Sydney; Craig Cooper, Chief Executive Officer of Positive Life NSW; Scientia Professor John Kaldor of the Kirby Institute, international friends and colleagues, and his daughters, Bec and Ilana Cooper. Ita Buttrose hosted the service.

Guests included former Labor Health Minister Neal Blewett, former Liberal Senator Peter Baume, former NSW Health Minister Jillian Skinner, former Governor of NSW Marie Bashir, and Deputy Leader of the Opposition Tanya Plibersek.

Just days before the memorial, Professor Cooper was appointed a Companion of the Order of Australia (AC). He was recognised for "eminent service to medicine, particularly in HIV/AIDS research, as a clinician, scientist and administrator, to the development of therapies and to health programs in South-East Asia and the Pacific."

Of the honour, Michael Kirby said: "To honour David, and to do so this week, has allowed Australia to speak with one loud, clear voice. David was one of our finest, bravest and best of scientists and citizens. A golden decoration reflects the wattle of his beloved country. It is a shining consolation for Dorrie and the family. And for his colleagues at the Kirby Institute, and far beyond."



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1. Ita Buttrose, Master of Ceremonies at the David Cooper Memorial. 2. International colleagues and friends of David pay tribute. Left-right: Professor Alan Landay, Daniel Kuritzkes MD, Dr Veronica Miller, Michael Lederman MD, William Powderly MD, and Professor Peter Reiss. 3. Over a thousand guests gathered at Sydney Town Hall to remember the life and work of Professor David Cooper. 4. Left-right: Bill Bowtell AO, The Honourable Tanya Plibersek MP, and The Honourable Jillian Skinner. 5. David's daughters, Bec and Ilana Cooper, share special memories of their father.

GLOBAL RESEARCH LEADERS GATHER TO HONOUR DAVID COOPER'S LEGACY

To commemorate and carry forward Professor David Cooper's research legacy, the Kirby Institute, together with partners, held a scientific symposium at UNSW Sydney on Friday 15 June 2018 to reflect on a topic that was central to David's research endeavours throughout his career: universal access to treatment and prevention.

UNSW President and Vice-Chancellor, Professor Ian Jacobs, welcomed guests to the symposium by paying tribute to David's extraordinary research career spanning UNSW and St Vincent's Hospital and influencing global research into HIV and other infectious diseases. The Honourable Lisa Singh, Senator for Tasmania and Co-chair of the Parliamentary Group on HIV/AIDS and Blood-borne Viruses, officially opened proceedings, noting David's significant contributions to the policy response to HIV/AIDS in Australia. The Honourable Greg Hunt MP, the Federal Minister for Health, sent a video message honouring David's global impact.

The morning session featured a special conferral of an honorary Doctor of Medical Science degree upon Professor Praphan Phanuphak, Director of HIV-NAT, the Thai research collaboration centre that he and David co-founded in 1996 along with the late Joep Lange from the Netherlands. The degree was conferred by Jillian Segal AM, Deputy Chancellor, UNSW Sydney and Professor Rodney Phillips, Dean of Medicine at UNSW Sydney. To do so at the David Cooper Symposium was particularly poignant, as David himself had nominated Professor Phanuphak for the award late last year. Professor Phanuphak had written to David in December when he was advised that he would be receiving the honorary degree, stating that it was "the greatest honour" of his professional life.

Professor Phanuphak then led the program of presentations and delivered the Brett Tindall Memorial Lecture, on his work with HIV-NAT in Thailand and the pursuit of ending AIDS in the region.

The symposium featured a packed schedule of academic presentations by some of the most esteemed HIV and infectious disease researchers from Australia and around the world, all of whom were colleagues of David's throughout his career.

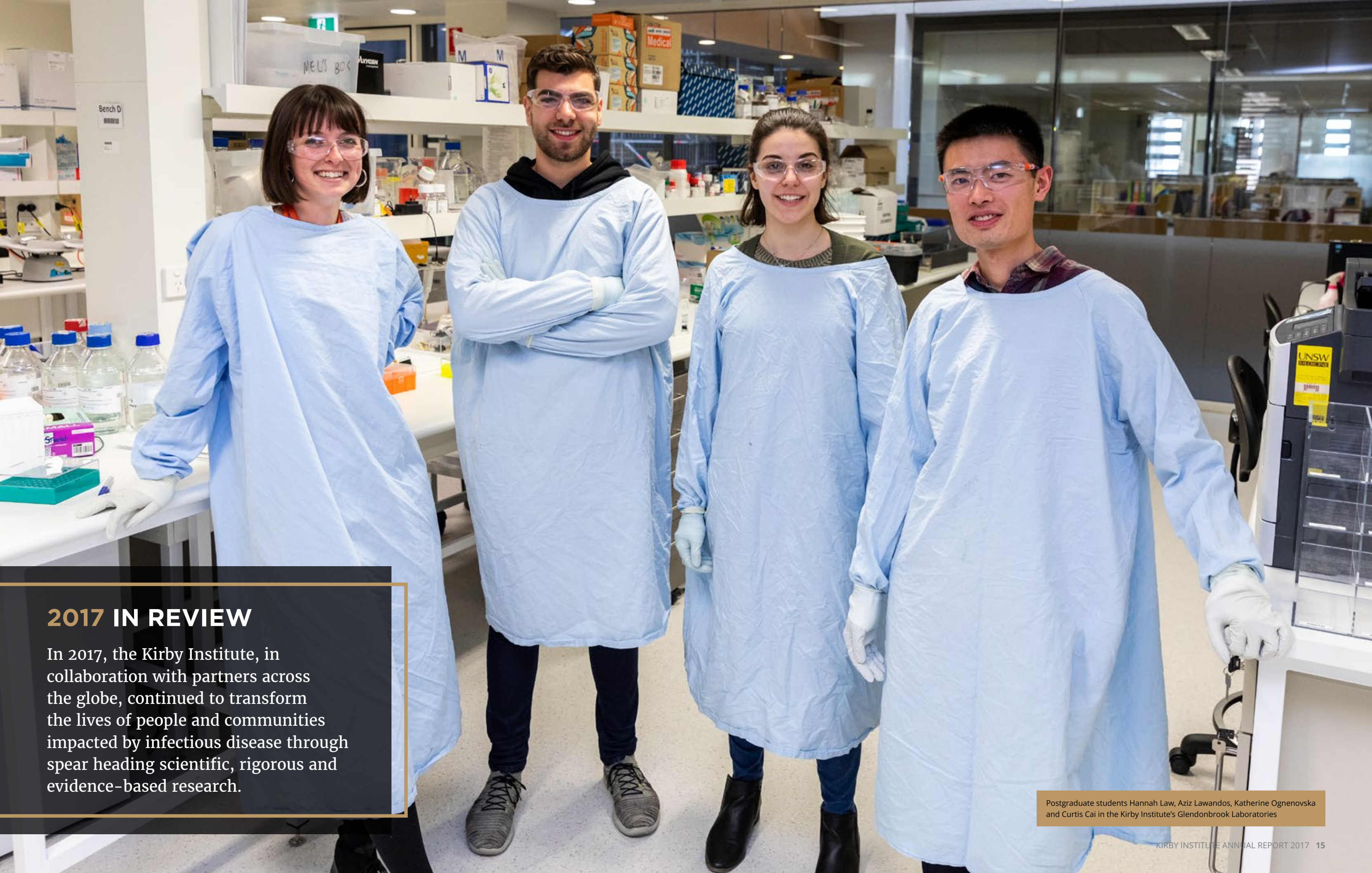
Among the highlights were H. Clifford Lane M.D., Deputy Director of the National Institute of Allergy and Infectious Diseases in the US, who spoke on the role of research in global health, particularly in managing epidemics, and South Africa's Professor Linda-Gail Bekker, President of the International AIDS Society (a role that David held from 1994 to 1998) who, keeping with the theme of global health, spoke of the global politics involved in obtaining universal access to treatment and prevention. Professor Brian Gazzard from the Imperial College, London gave a lively overview of the various research methodologies used when looking at HIV and ageing.

Other speakers included Kirby Institute Professors Tony Kelleher, Matthew Law, Basil Donovan and Gail Matthews; Kirby alumnus Dr Sarah Pett and Professor Paddy Mallon; Associate Professor Phillip Cunningham from St Vincent's Hospital Sydney; community advocate and Deputy Chair of the PBAC, Jo Watson; The Doherty Institute's Professor Sharon Lewin; and Kirby PhD student Dr Angie Pinto. A panel, facilitated by Dr Bridget Haire, concluded the event, where international guests Professor Bekker, Dr Lane and Professor Phanuphak were joined by Dr Kerry Chant of NSW Health; Director of UNSW's Centre for Social Research in Health, Professor Carla Treloar; and former NSW policy advisor on HIV and community advocate, Geoff Honnor.

The symposium carved out a clear research agenda to take David's vision into the future, with all speakers paying tribute and highlighting David's contribution to their various fields of research. As Professor Gazzard fittingly concluded his presentation, "David's soul is eternal. His life will live on through his good work."

1. Professor Tony Kelleher, Kirby Institute, pays tribute to his colleague and friend, David Cooper. 2. Professor Ian Jacobs welcomes guests to the David Cooper Symposium. 3. Guests and speakers included (left-right): Professor Rodney Phillips; Professor Ian Jacobs; Professor Emeritus Praphan Phanuphak; The Honourable Lisa Singh; Professor John Kaldor, Kirby Institute; Professor Tony Kelleher; and the Honourable Michael Kirby, Patron of the Kirby Institute. 4. Professor Praphan Phanuphak receives his honorary degree, nominated by the late Professor Cooper. Left-right: Professor Rodney Phillips, Professor Praphan Phanuphak, and Jillian Segal AM. 5. Dr Sarah Pett, University College London, presents at the symposium.





2017 IN REVIEW

In 2017, the Kirby Institute, in collaboration with partners across the globe, continued to transform the lives of people and communities impacted by infectious disease through spear heading scientific, rigorous and evidence-based research.

Postgraduate students Hannah Law, Aziz Lawandos, Katherine Ogenovska and Curtis Cai in the Kirby Institute's Glendonbrook Laboratories

KIRBY AT A GLANCE

The Kirby Institute is a leading global research institute dedicated to the prevention, treatment and cure of infectious diseases.

We were established in 1986 in response to the then-emerging HIV epidemic. We now contribute to knowledge on a broad range of diseases, including viral hepatitis and sexually transmissible infections.

Our primary work relates to the coordination of national surveillance programs, population health and epidemiological research, clinical and behavioural research, and clinical trials. Our research projects are conducted in partnership with communities most affected by epidemics. Together we implement trials of behavioural and biomedical interventions designed to prevent the spread of infectious diseases in vulnerable populations.

Our work in the laboratory is focused on finding ways to control infections, develop new therapies and

ultimately towards the development of preventative vaccines. Outside of the laboratory, we provide critical leadership to decision makers in Australia and internationally on the most effective, efficient and sustainable strategies to address deadly epidemics.

Our research has increasingly taken on a regional focus. Over the past two decades, we have developed collaborative programs in several countries that have involved training health workers and health researchers in the Asia Pacific region, advising governments on public health and clinical policy, informing international treatment guidelines, and working to increase access to essential medicines. We have particularly strong partnerships in Thailand, Papua New Guinea, Indonesia, Cambodia, Myanmar, Fiji and the Solomon Islands.

Our world-class team comprises over 300 public health, clinical and laboratory scientists, research assistants and postgraduate students.

272

peer reviewed publications in 2017

More than

650

collaborations in over 40 countries on 6 continents

More than

300

staff

More than

50

students

9

PhD graduations

20

international students studying their PhD



3 NHMRC Program Grants



13 NHMRC Project Grants



7 NHMRC Partnership Grants



2 ARC Discovery Projects



21 NHMRC Fellowships

\$30,774,757

funding from external grants in 2017

\$906,134

in donor funding in 2017



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INVESTING IN GLOBAL PARTNERSHIPS

The Myanmar-Australia Research Collaboration for Health (MARCH)

"It is our responsibility to take the clinical lessons we've learned in Australia and share them with those in our region." This is the ethos that Professor David Cooper brings to his work, and it moved him and Dr Josh Hanson to initiate a much-needed collaboration in Myanmar between the Kirby Institute and the University of Medicine 2 (UM2) in Yangon, Myanmar.

MARCH (Myanmar-Australia Research Collaboration for Health) is a collaboration between the two institutions, and was established in 2017 to improve the management of infectious diseases in Myanmar. A delegation of federal politicians from Myanmar and Australia opened the MARCH office in June, demonstrating the support that the collaboration has at the highest level in both countries. A Memorandum of Understanding was signed in September.

Josh coordinates the program in Myanmar and visits regularly. He has been appointed as a senior lecturer at UM2 and is presently overseeing three doctoral candidates and one masters student in

areas as diverse as tuberculosis, bacterial sepsis and encephalitis. Hospital ward rounds are a highlight of his visit, where the commitment and ingenuity of the local clinicians always makes an impression: "I never cease to be amazed by how much the local health workers can do with so little; it certainly puts any complaints we have about the Australian health system into some context," says Josh.

The Kirby Institute's infectious disease research has informed Australian public health policy, as well as regional and international guidelines, and it is hoped that MARCH will have a similar impact in Myanmar. Professor Aye Tun, UM2's rector, has been central to the success of the collaboration. With decades of experience as a general physician in Myanmar, he is a strong advocate for developing local research capacity and training the next generation of doctors in Myanmar.

In collaboration with the Kirby Institute, he is optimistic about the future of research and clinical

1. David and Nola Marino MP, Member for Forrest, cut the ribbon to launch the research collaboration in June 2017. 2. David and Mr U Naing Ngan Lin, Minister for Social Affairs, planting a kant kaw (meaning 'raising up good fortune') tree, a symbol of higher education in Myanmar. 3. Dr Ne Myo Aung (left) talks to one of his patients during a ward round with Dr Josh Hanson, Dr Thin Zar Cho Oo and Dr Nan Phyu Sin Toe Myint.

development in his country. "Our quest for new knowledge will never end," says Professor Aye Tun. "Our curiosity to find the best way for our patients will drive us forward. And our research works will continue forever."

Myanmar's new democratically-elected government is trying to address some of the barriers to improving the health of its population. While MARCH currently has a particular focus on HIV, tuberculosis and malaria, which are all endemic in the South-East Asian nation, local clinicians have also identified gastrointestinal infections as a priority and projects in this field are also underway, indicating that opportunities to expand the research collaboration into areas of health that require attention in Myanmar may continue to present themselves.

UNSW Sydney's Institute of Global Development awarded MARCH two seed funding grants in October. The first will build laboratory capacity to expand research into new diseases, including hepatitis C and

human papillomavirus. Kirby Institute researchers Professor Tony Kelleher and Associate Professor Philip Cunningham are working with local practitioners to bring laboratory facilities to internationally recognised standards. The MARCH laboratory will open in April 2018.

The second grant was awarded to boost medical education, to develop medical curricula at both the undergraduate and postgraduate level, and adapt strategies that have been successful at UNSW. This project is led by the Kirby Institute's Ms Liza Doyle in collaboration with colleagues at UM2.

Like Professor Aye Tun, Josh is inspired by the transformations to health facilities that have already taken place, and looks forward to continuing to work with the current and next generation of local clinicians and researchers. "We have achieved so much this year", says Josh, "but there is a lot more to do!"

SCALING UP A CURE

Can we eliminate hepatitis C in people living with HIV?

At the end of 2015, prior to the availability of highly curative direct acting antiviral (DAA) therapy, an estimated 230,000 Australians were living with hepatitis C virus (HCV). Of the 25,000 Australians living with HIV, around 10% were also living with hepatitis C. People living with HIV-HCV coinfection have an increased risk of progressive liver disease, liver cancer and associated death. They are also at higher risk of other organ disease including renal, bone and cardiovascular disease. New HCV transmissions within this group had been increasing over the previous decade.

Since March 2016, DAA treatments with cure rates around 95% have been available on the Pharmaceutical Benefits Scheme (PBS) for all adults living with HCV within Australia. The Kirby Institute is leading a national study called CEASE (Control and Elimination within Australia of Hepatitis C from people living with HIV) which has been evaluating the impact rapid DAA scale-up on the hepatitis C burden among people with HIV-HCV coinfection in Australia.

By and large, people living with HIV today who are on daily HIV treatment live long and healthy lives, and eliminating hepatitis C coinfection will further improve health outcomes. But until recently, treatment of hepatitis C in HIV-positive individuals has been largely unsuccessful.

“Toxicity and tolerability issues with older interferon-based therapies complicated treatment of hepatitis C in those living with HIV,” explains Associate Professor Gail Matthews, co-Chief Investigator on CEASE. “But today’s DAA treatments are far better tolerated, involve a shorter course of treatment, and as we have seen in the clinic, are equally successful at curing hepatitis C in HIV positive and negative individuals.”

The study consists of several components, each of which focusses on a different element of tracking and evaluating DAA treatment scale-up among the HIV-HCV coinfecting population. The surveillance component (CEASE-D) is now in its second phase and will monitor and analyse clinical data as well as participants’ behaviours and experiences across three cross-sectional visits, including sexual risks, drug and alcohol use, mood, and quality of life. Data from

CEASE-D will monitor both the reduction in active HCV infection within the population and the number of reinfections. This data will inform the modelling component (CEASE-M), to examine various treatment strategies and progress towards achieving the World Health Organization’s 2030 HCV elimination goals.

Australia was one of the first countries in the world to offer widespread availability of DAA therapy, thanks to its listing on the PBS in 2016. A key feature of the Australian DAA program has been that general practitioners are able to prescribe these treatments; a pivotal aspect given their role in HIV management. “Community-based prescribers will be key to facilitating hepatitis C treatment scale-up, especially for the HIV-coinfecting population,” says Gail. To address this, the study includes an education component (CEASE-E) to train HIV prescribers in administering HCV treatments too. “The HIV positive community are already able to access HIV treatments through community-based care providers, so by training up and broadening the prescriber base, we’ll be able to get more people on hepatitis C treatment than ever.”

Given the extremely high efficacy of the DAA treatments it is anticipated that very few people will fail treatment, but for those patients that do not achieve a hepatitis C cure, or become reinfected following treatment, they will be invited to participate in CEASE-V – a study of resistance patterns and retreatment outcomes.

In combination, the various components of CEASE will provide robust data to support rapid scale-up of DAA treatment for all people living with hepatitis C, including those living with HIV.

“In Australia, we are uniquely placed to eliminate hepatitis C among those also living with HIV,” says Gail. “With a high proportion of HIV-positive people already engaged in care, coupled with universal access to DAA drugs, we are confident that with continued targeted intervention, hepatitis C elimination in this population is possible. CEASE will provide critical evidence to support Australia’s progress towards meeting the WHO 2030 targets.”

“Today’s DAA treatments are far better tolerated, a shorter course of treatment, and as we have seen in the clinic, equally successful at curing hepatitis C in HIV positive and negative individuals.”

Associate Professor Gail Matthews



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1. A clinician takes a finger stick blood sample to test for hepatitis C.
2. Results of a liver scan are explained to a patient, indicating their risk of hepatitis C infection.



Dr Ben Bavinton and Professor Andrew Grulich

CHALLENGING STIGMA WITH EVIDENCE

Informing international guidelines on undetectable viral load and HIV transmission

Among couples of differing HIV status, negotiating sexual relationships has long involved questions about how infectious HIV is, and the extent to which effective treatment can prevent the transmission of the virus from a positive partner to a negative partner. In the absence of evidence, these questions can be clouded by fear and stigma.

HIV treatment works by suppressing the level of virus in a person living with HIV, so that immune system damage is halted and even reversed. When HIV treatment is taken consistently, the virus levels become so low that they are undetectable in the blood. In order to understand whether undetectable levels of virus reduce the risk of HIV transmission, researchers at the Kirby Institute designed a cohort study called Opposites Attract, to monitor transmission risk among serodiscordant couples.

In 2017, the results of this study provided conclusive evidence to confirm that when HIV positive gay and bisexual men take treatment that makes the virus undetectable, there is effectively zero risk of HIV transmission to their partners. During the course of the study, the 343

participant couples reported over 12,000 acts of anal-intercourse without a condom, none of which resulted in HIV transmission.

The project leader for Opposites Attract is the Kirby Institute's Dr Ben Bavinton. "We were delighted when our research confirmed that HIV treatment as prevention works," he said. "Opposites Attract is only the second study of treatment as prevention in gay couples, and the first one to provide data from gay couples in middle income countries. Combined with results from other studies, it means we can now say, with confidence, that effectively treated HIV blocks transmission in couples of differing HIV status."

Professor Andrew Grulich, Chief Investigator on the study, presented the results of the research at the International AIDS Society conference in Paris in July 2017. The presentation received international media coverage, and helped spread the important message that effective HIV treatment makes the virus non-infectious. The global response to the research exemplifies a core Kirby Institute principle; that rigorous, scientific research can overcome the stigma and discrimination often associated with infectious diseases.

Illustrating this point, Brent Allen, the CEO of Living Positive Victoria, highlighted issues of stigma and rejection often experienced by people living with HIV. "Now, based on proven scientific evidence, we can let go of some of the fear and anxiety and feel confident that the sex we negotiate with our partners cannot inadvertently result in an HIV infection," Brent said in response to the Opposites Attract results.

Opposites Attract was cited in a consensus statement endorsed by global leaders and organisations on risk of sexual transmission of HIV from a person living with HIV who has an undetectable viral load. It is also referenced by the World Health Organization, the US Centers for Disease Control, ASHM and UNAIDS in their official policy documents. "It is wonderful to see our research informing international policy and guidelines, because it is through influencing these systems that our research practically and positively impacts the lives of people living with HIV," said Andrew.



“Trachoma is completely preventable, so it is essential that we continue to work with affected jurisdictions to eliminate this health risk in Australia by providing timely and accurate evidence.”

Asking questions to develop better solutions

Qualitative research can help us understand the real-life experiences behind the disproportionate burden of disease that Aboriginal people and communities experience in Australia. This year, the Kirby Institute received funding from the NSW State Government to address increasing sexual health risk and vulnerability in young Aboriginal Australians in NSW. The project, called Talking Story, is being led by Dr Stephen Bell, Senior Research Fellow at the Kirby Institute, and involves speaking with Aboriginal young people about their experiences with sexual health services, and knowledge of sexual health broadly. He hopes it will support the development of targeted, youth-centred, culturally appropriate services and community programs to close the gap on HIV and other STIs in Aboriginal youth in NSW. “The information and stories we hear through working with vulnerable groups are critical in developing effective, culturally appropriate strategies to

address these health problems,” says Stephen. “We need to understand young people’s experiences, concerns and ideas in order to put strategies in place that ensure appropriate, equitable and safe access to good health and wellbeing, which is a fundamental right for all of us.”

Crunching the numbers

Of course, effective public health strategies and programs would not be possible without robust evidence, where engagement with people and communities is combined with comprehensive data analysis of interventions to assess their effectiveness in practice.

Through our work with Aboriginal communities, and through collecting and analysing data from Indigenous health services around the country, our researchers identify some key areas for targeted research and public health interventions.

One of these areas is trachoma. “Australia is the only developed country to have endemic trachoma, with outbreaks occurring in remote and very remote Aboriginal and Torres Strait Islander communities,” explains Carleigh Cowling, who works with the National Trachoma Surveillance and Reporting Unit. This conjunctival eye infection, which can cause blindness, is not experienced by the non-Indigenous population.

Kirby Institute researchers are working to achieve the World Health Organization’s goal of eliminating trachoma as a public health problem by 2020 through our work leading the National Trachoma Surveillance and Reporting Unit, which is funded by the Australian Government. “Trachoma is completely preventable, so it is essential that we continue to work with affected jurisdictions to eliminate this health risk in Australia by providing timely and accurate evidence,” says Carleigh.

Another area of focus is human papillomavirus, or HPV, which is an infection that causes a number of health issues including genital warts and cervical and other cancers. Cervical cancer rates are twice as high among Indigenous women than in non-Indigenous women.

Kirby Institute researchers collect and analyse data to determine the effectiveness of the vaccine among Indigenous women and communities. In 2017, we reported marked declines in the number of genital warts, and a 94% decline in prevalence of vaccine-preventable HPV strains among Indigenous women attending clinics. “Widespread coverage has been achieved with this vaccine program, and this has led to the world’s first recorded population-level reduction in HPV infection,” says

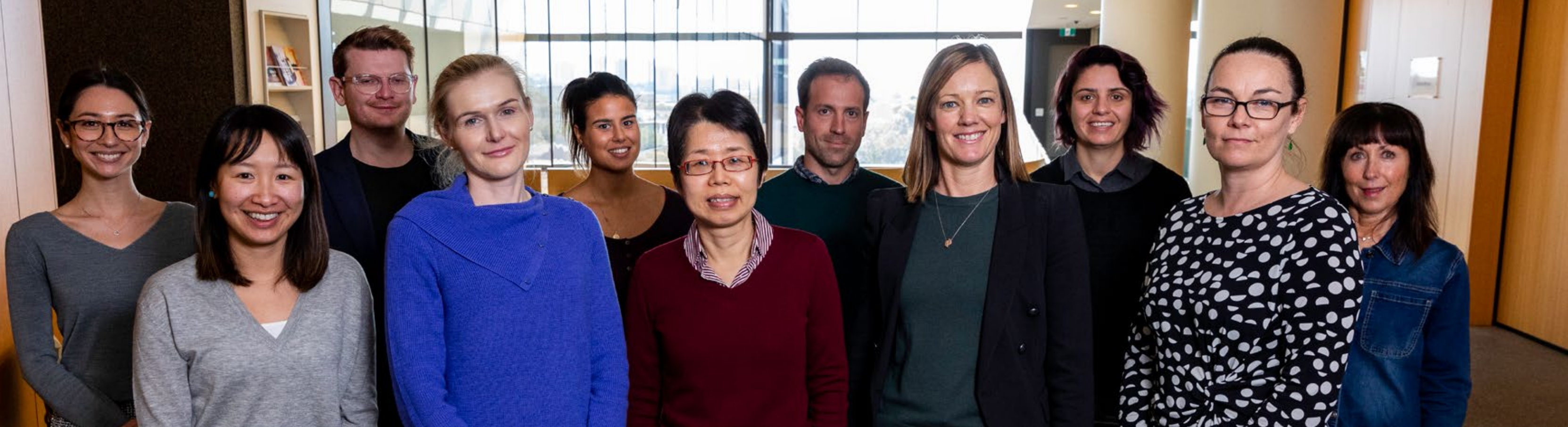
Dr Skye McGregor, an epidemiologist from the Kirby Institute’s Surveillance, Evaluation and Research Program. “It can be challenging to address health issues in remote communities where access to health services and health literacy are limited. But these promising data demonstrate what can be achieved when we work in partnership with communities, health services and policy makers to implement measures that improve the health of our Indigenous populations.”



1. A community in Central Australia where Kirby Institute researchers work to understand how to increase access to STI testing among young Aboriginal people. Credit: Stephen Bell. **2.** Aboriginal girls at Murray Street Mall, Perth, Western Australia. Credit: [Alamy Stock Photo](#) / Thomas Cockrem. **3.** Epidemiologists Dina Saulo, World Health Organization and Dr Skye McGregor, Kirby Institute, worked on the report that showed marked declines in genital warts and vaccine preventable HPV strains among Indigenous women attending clinics.

WORKING TOGETHER TO IMPROVE INDIGENOUS HEALTH

Aboriginal and Torres Strait Islander communities continue to bear a disproportionate burden of disease compared to Australia’s non-Indigenous populations. Across a range of research disciplines, our researchers are identifying, monitoring and reducing infectious disease rates in Indigenous communities. We work in close partnership with Aboriginal communities and Community Controlled Health Organisations to support and monitor health interventions designed to improve Indigenous health outcomes.



AT THE CENTRE OF A CLINICAL TRIAL

Meet the hardworking people who coordinate our world-leading clinical research

Left-right: Yumi Sheehan, Elise Tu, Eamon Brown, Marianne Byrne, Sophia Amjad, Barbara Yeung, Gerard Estivill, Sally Hough, Jodi Van Dyk, Sarah Davidson, and Amanda Erratt.

The Kirby Institute is a world leader in clinical research, and has been coordinating large-scale trials, in Australia and internationally, for more than 25 years. Our clinical research portfolio spans trials of treatments for HIV, viral hepatitis and sexually transmissible infections and we work closely with partners from a range of sectors, along with affected communities and individuals, to ensure the safe, practical and effective roll out of advances in treatment and medications.

Clinical research bridges the gap between the science of treatment development, and its implementation in the real world, and the innately collaborative approach to this work requires the leadership of skilled coordinators bringing multiple stakeholders together. Sally Hough runs the ADVICE trial, an international collaborative project between Australia and the USA. "I work closely with the communities impacted by the trial, our academic collaborators, lab scientists, statisticians, data managers and trial coordinators all over the world," she says. "It's these collaborations that allow us to produce cohesive and high-quality research." The project is trialling

the effect of an anti-clotting medication with people living with HIV who are on treatment, with the aim of reducing the blood clotting, immune activation and inflammation that can lead to cardiovascular disease and cancers. If successful, this study has the potential to directly improve the longer-term health outcomes of people living with HIV.

"Running a clinical trial requires an extraordinary amount of team work, from the healthcare practitioners on the ground, to the staff and researchers at the Kirby," agrees Marianne Byrne, who coordinates the Kirby Institute's STOP-C trial, a world-first investigation of hepatitis C treatment-as-prevention in prison populations. But she also points to the importance of trial design, to make it a process that encourages participation. "If implementation of the trial is convoluted, who would want to participate in that?"

Barbara Yeung coordinates the EPIC-NSW trial, the world's largest implementation trial of the HIV prevention pill, preexposure prophylaxis (or PrEP). She also agrees that collaboration is a major part of a

clinical trial's success, and that it is the Kirby Institute's approach to working with affected communities that makes our work unique. "The Kirby is well known for conducting research with disadvantaged populations," says Barbara. "EPIC-NSW goes further than proving PrEP works at the individual level. It looks at population-level impact, and examines whether rapid, targeted, and high-coverage rollout of a medication like PrEP in an epidemic cohort would reduce transmission and infection rates at a large scale."

It is the ability to achieve real-world results that those who work in the field find rewarding, and with EPIC-NSW already reporting reductions in the transmission of HIV among men who have sex with men in NSW since the trial began, the impact is already being felt. "Clinical research is the way to enable advancement in treatment, disease prevention, and improve people's lives in general," says Barbara.

Marianne has a similar experience working with prison populations, particularly in a time where hepatitis C medication has advanced to a state that is well tolerated, highly curative, and widely available in

Australia, thanks to its listing on the Pharmaceutical Benefits Scheme (PBS) in 2016. "Being involved in clinical research, particularly in the hepatitis C field, is very exciting," she says. "When the data reports highlight the number of cured participants, it is incredibly satisfying that people are getting something back from their participation."

Of course, the ripple effect of a successful trial is felt beyond the individual, and Kirby Institute clinical trials ultimately aim to impact access to prevention and treatments for entire populations. Access to good health is made possible thanks to the round table that our clinical trials coordinators facilitate. "Working in clinical research provides a wonderful opportunity to work with a huge range of professionals from across the globe in different health sectors to be at the forefront of research that ultimately aims to help improve the quality of people's lives," says Sally. "It can offer new medicines, new ways of using existing medicines, and help change health policy for the better."



“Working in clinical trials is great because of the collaborative nature of the teamwork. It’s also incredibly rewarding seeing the positive effect on the individual, that can then be scaled up to population level.”

Clinical Project Coordinator Hannah Reid explains to a patient the results of a liver FibroScan, which is used to assess the health of the liver. The scan is useful for assessment of patients with chronic liver disease, including hepatitis C, hepatitis B, alcohol abuse and fatty liver.

YOUNG OFFENDERS' MENTAL HEALTH, SEXUAL HEALTH AND REPRODUCTIVE HEALTH STUDY

The challenge

The information currently available about the mental, sexual and reproductive health of young people (14–17 years) in contact with the criminal justice system is limited in many Australian states. This is a hard-to-access population, as many of these young people do not have a fixed address and do not attend school, and so are often excluded from school-based surveys.

How we are helping

Researchers at the Kirby Institute are investigating the extent of mental, sexual and reproductive health issues among young people who have been in contact with the criminal justice system. There were 465 study participants, aged between 14 and 17 years, who had had prior contact with the criminal justice system. An anonymous survey was delivered by CATI (Computer Assisted Telephone Interview) by trained telephone interviewers based in Sydney. Investigators compared the results with similar survey data on young people in the general population who participated in school-based surveys.

Impact

Knowledge gained from this research will provide comprehensive data that helps us to understand the nature and extent of these health problems. This information can be used to develop informed, effective and appropriate interventions among youth who have been in contact with the criminal justice system. The data can also be used to develop cost-effective prevention intervention models to assist with government planning and spending.

Funded by the National Health and Medical Research Council of Australia.

MODELLING THE DYNAMICS OF MALARIA INFECTION

The challenge

Malaria is responsible for half a million deaths globally every year, with the vast majority of deaths occurring in children under five years of age. No highly effective vaccine exists for malaria, but adults living in areas with high malaria prevalence have naturally acquired immunity. Understanding this natural protection could lead to the development of a vaccine that could protect vulnerable populations around the world.

How we are helping

Mathematicians in the Infection Analytics program are working closely with clinicians and experimentalists to study and model the dynamics of malaria infection in mice and in humans. Mathematical models, based closely on experimental and field data, can help us understand how drugs and immunity control infection.

Impact

Malaria parasites reside inside red blood cells, and it is often assumed that the immune system targets these infected cells. However, our research in mice has revealed that the immune system is better at stopping malaria parasites from invading red blood cells in the first place. Exploring how to help the immune system better target parasites inside red blood cells might inform new approaches to the development of vaccines for malaria. Kirby Institute researchers have also identified a previously unknown mechanism of immune control, where the immune system can suppress parasite development inside a red blood cell, rather than completely destroying the infected cell.

Funded by the Australian Research Council and the National Health and Medical Research Council of Australia.

NEW THERAPEUTIC STRATEGIES FOR FLU TREATMENT

The challenge

Despite the use of vaccines and antiviral drugs, influenza is responsible for substantial world-wide morbidity and mortality annually. Better influenza treatments are needed for all stages of disease severity.

How we are helping

As part of the FLU-IVIG study, researchers at the Kirby Institute, together with researchers in the UK, Europe and USA, are investigating whether a new anti-influenza treatment, hyper-immune intravenous immunoglobulin (IVIG), when added to standard of care treatment is superior to placebo in reducing the severity and duration of disease in adults hospitalised with influenza.

Impact

Better treatments for influenza are needed, especially for those at increased risk of severe disease: pregnant women, the very young and very old, and those with chronic underlying medical conditions. Pandemic influenza is a global health threat. Having new therapeutic strategies in place that can be rapidly implemented in an outbreak is crucial.

Funded by the US National Institute of Allergy and Infectious Diseases.

IMPROVING STI TESTING IN REMOTE ABORIGINAL COMMUNITIES

The challenge

In many remote Aboriginal communities, there are significant geographical distances between health services and laboratories, which can lead to significant delays in young people being treated for sexually transmissible infections.

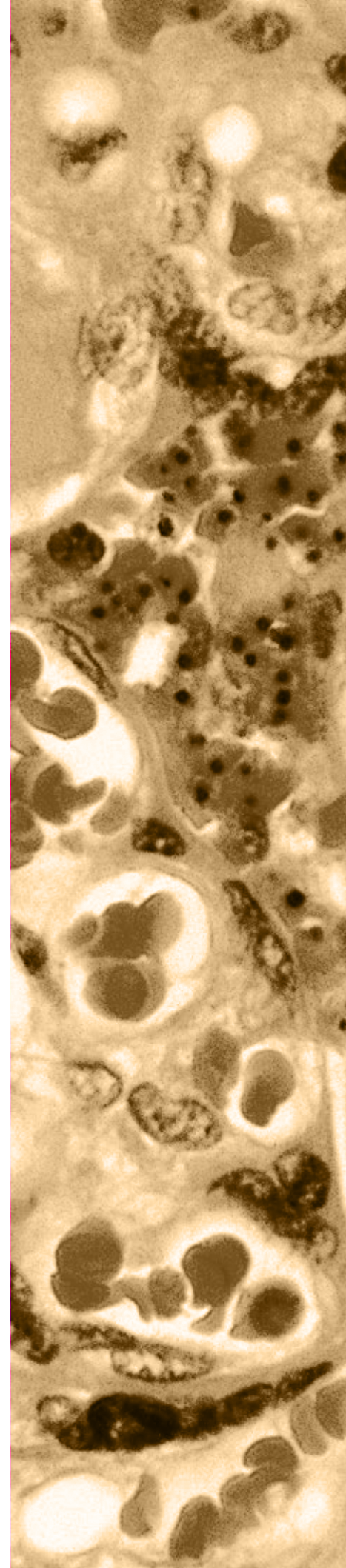
How we are helping

In partnership with community organisations, health departments, researchers, laboratories and industry (Cepheid), Kirby Institute researchers completed a randomised trial which showed new molecular point-of-care tests could address this challenge. The partnership is now translating the findings into a routine program.

Impact

Point-of-care testing delivers results on the spot, allowing treatment to be delivered to the patient within the one visit or soon after. Our research has found that these tests are effective and accepted by people living in remote Aboriginal communities and the staff at the clinics. We can now use this technology to improve the rates of STI testing and treatment among young people in remote communities, with the aim of ultimately reducing transmission rates.

Funded by the National Health and Medical Research Council of Australia, with in-kind funding from Cepheid.



MONITORING HPV AND CERVICAL CANCER INCIDENCE IN INDIGENOUS AUSTRALIAN WOMEN

The challenge

Indigenous Australian women have more than twice the incidence of cervical cancer as non-Indigenous women, largely due to low screening rates.

How we are helping

Human papillomavirus, or HPV, is the virus that can lead to cervical cancer. The Australian Government is funding the world's most extensive HPV vaccination program. Since the program's introduction in 2007, Kirby Institute researchers have been assessing its effectiveness by analysing national clinical data on HPV-related disease among Indigenous and non-Indigenous women.

Impact

We have been able to document dramatic declines in the incidence of genital warts in young Indigenous women and men, comparable to the declines in the non-Indigenous population. As genital warts are the earliest clinical sign of HPV infection, this indicates that we should see comparable declines in cervical cancer in Indigenous women in the coming decades.

Funded by the Australian Government Department of Health.

POINT-OF-CARE TESTING AND TREATMENT OF SEXUALLY TRANSMISSIBLE INFECTIONS TO IMPROVE BIRTH OUTCOMES IN HIGH-BURDEN, LOW-INCOME SETTINGS

The challenge

Women in many low-income countries face a high and unacceptable burden of adverse pregnancy outcomes. Curable sexually transmitted and genital infections such as chlamydia, gonorrhoea, trichomonas and bacterial vaginosis are major contributors. This is because the majority of infections go untreated, as they are mostly asymptomatic, and access to affordable, easy-to-use and accurate diagnostic tests is limited. At the same time, there is conflicting evidence on the potential risks and benefits of STI screening and treatment in pregnancy, hindering policy and practice and leading to calls for definitive field trials.

How we are helping

The Papua New Guinea Institute of Medical Research and the Kirby Institute, in collaboration with academic partners in PNG, Europe and Australia, commenced the Women And Newborn Trial of Antenatal Interventions and Management (WANTAIM) in July 2017. WANTAIM will investigate if point-of-care testing and immediate treatment of STIs in pregnant women will lead to improved birth outcomes. WANTAIM will also evaluate the cost-effectiveness, acceptability and health system implementation requirements of antenatal point-of-care STI testing and treatment. It will be the largest clinical trial ever conducted in Papua New Guinea.

Impact

If proven to work, the WANTAIM trial will hasten access to point-of-care technologies and has the potential to improve maternal and neonatal health in other high-burden, low-income settings worldwide.

Funded by a UK Department for International Development/UK Medical Research Council/Wellcome Trust Joint Global Health Trials grant, the National Health and Medical Research Council of Australia, and a Research for Development grant from the Swiss National Science Foundation.

EVALUATING EARLY TREATMENT TO PREVENT HPV-ASSOCIATED CANCERS

The challenge

Human papillomavirus (HPV) causes most anal and genital cancers, and current treatments are not well tolerated, toxic and can be ineffective. However, it is possible to detect pre-cancerous lesions, and treatment at this early stage may prevent cancer development.

How we are helping

Pomalidomide is an immunomodulatory, anti-angiogenic drug that stimulates the body's immune system and may help control HPV infection and lesions, preventing development of cancer. The clinical trial, led by the Kirby Institute, is the first to evaluate treatment of HPV-associated anal cancer precursors and the only study of immune modulation in this disease.

Impact

Understanding the efficacy, tolerability and feasibility of this treatment in a clinical setting has the potential to improve the treatment of HPV-associated anal and genital cancers. Given that current cancer therapies are problematic, early intervention and prevention of cancer would be significant for affected communities, offering an entirely new approach to cancer prevention.

Funded by the Cancer Institute of New South Wales and Celgene.

ESTIMATING FUTURE TRICHOMONAS VAGINALIS TRENDS FOLLOWING CHANGES TO THE NATIONAL CERVICAL SCREENING PROGRAM

The challenge

Trichomonas vaginalis (TV) is a sexually transmitted infection that causes serious reproductive complications and facilitates HIV transmission. In Australia, TV was detected opportunistically on Pap smears from women participating in the National Cervical Screening Program (NCSP). However, in 2017 the NCSP transitioned from cytology-based screening (Pap smear) to human papillomavirus (HPV) testing, which detects the virus that causes cervical cancer but does not detect TV. So, while the new screening program is expected to be more effective at preventing cervical cancer and more cost-effective, it will result in fewer cases of TV being detected and treated.

How we are helping

Researchers at the Kirby Institute used mathematical modelling to estimate the likely increase in TV prevalence in Australia over time. The findings of this study suggest that TV prevalence could increase approximately 7-fold (from ~0.4% to ~2.8%) over 20 years if supplementary TV testing is not introduced. Follow-up work suggests that TV testing coverage of around 20% of people aged 16-30 is required to prevent TV prevalence from rising substantially.

Impact

This work provides important evidence to inform current STI clinical guidelines regarding the need to include TV testing in routine clinical practice, as well as impetus to closely monitor TV prevalence over the coming years.

This research is made possible by the National Health and Medical Research Council of Australia.

MONITORING THE ELIMINATION OF HEPATITIS C AMONG PEOPLE WHO INJECT DRUGS: THE AUSTRALIAN NEEDLE SYRINGE PROGRAM SURVEY

The challenge

The World Health Organization (WHO) has set targets to eliminate hepatitis C virus (HCV) as a public health threat by 2030. The targets aim to reduce HCV incidence by 80%, and to ensure that 80% of people living with chronic hepatitis C are treated for their infection. In Australia, scaling-up HCV treatment among people who inject drugs (PWID) will be key to achieving major reductions in HCV incidence.

How we are helping

The Australian Needle Syringe Program Survey (ANSPS) has provided annual estimates of HIV and HCV antibody prevalence among PWID since 1995. Led by the Kirby Institute, the survey is conducted at around 50 needle syringe programs (NSPs) over a one to two week period in October. Participants complete a brief self-administered questionnaire and provide a capillary dried blood spot.

Impact

The ANSPS enables Australia to monitor progress against the objectives of Australia's hepatitis C elimination efforts. Recent results indicate that the proportion of PWID who have been treated for their HCV infection increased from 10% in 2015 (pre DAA therapy) to 41% in 2017 (post DAA therapy). Over the same time-period, prevalence of chronic hepatitis C among PWID declined from 43% to 25%.

Funded by the Australian Government Department of Health.

SCALING UP HEPATITIS C TREATMENT IN PRISONS

The challenge

With highly effective direct acting antiviral treatments now available to treat chronic hepatitis C, the key challenge is achieving scale-up of treatment provision for more than 230,000 Australians living with the infection.

How we are helping

Researchers at the Kirby Institute are focussing on the development of efficient models of service delivery for prisons, where very large numbers of people who inject drugs and are affected by chronic hepatitis C are located. A nurse-led model of care with task transfer to hepatitis-skilled nurses has proven both very safe and effective. The model was developed in correctional centres in NSW and has now been implemented in Victoria, with similar models in other states.

Impact

Through partnerships between researchers, clinicians and the prison sector, we have the potential to make a major contribution to the national goal of hepatitis C elimination by 2030.

Funded by a National Health and Medical Research Council of Australia Partnership Grant.

STUDYING SINGLE CELLS USING INNOVATIVE COMPUTER SYSTEMS TO GUIDE VACCINE DEVELOPMENT

The challenge

Studies of white blood cells that are involved in antiviral immune responses are at the cutting edge of vaccine research to inform vaccine design, but identification of the unique features of individual cells participating in the responses is very challenging.

How we are helping

Researchers at the Kirby Institute have developed the tools in the laboratory to isolate the specific white blood cells (called T or B lymphocytes) that work in the body's immune response against a virus such as hepatitis C. They have also used computing techniques to analyse all of the genes expressed by the individual cell, and also to determine which genes contribute to building the many different clones that make up the immune response against the virus (called the T cell receptor and the B cell receptor repertoires). These bioinformatic techniques were combined into a new software developed by the team called VDJ Puzzle, which is now being used by immunology researchers worldwide.

Impact

Single cell studies using these new techniques will dissect the elements of successful antiviral immunity to guide vaccine design.

Funded by National Health and Medical Research Council of Australia program and project grants.

EXPLORING GENE DELIVERY FOR AN HIV CURE

The challenge

In our efforts to develop an HIV cure, the delivery of any treatment to the rare cells harbouring dormant HIV-1 is an important challenge. These cells make up what is called the latent reservoir, and it is essential that they be reached if we are to eliminate the virus in a person living with HIV.

How we are helping

Researchers at the Kirby Institute are investigating how to improve targeted delivery of RNA therapeutics to the latent reservoir. This involves two alternate methods, one of which uses nanotechnology and has shown promising results in targeting cells of the HIV-1 latent reservoir.

Impact

Improving delivery of RNA therapeutics directly to the latent reservoir will assist in the development of an HIV-1 curative treatment and can provide a roadmap for approaches to gene therapy in other diseases.

Funded by the National Health and Medical Research Council of Australia.

WE ARE KIRBY

A global research institute is made up of many people, doing a myriad of different jobs to make the place work. Here is a glimpse into the minds of some of the people who make up the Kirby.



Griselda Buckland and Brian Acraman

I have worked as a health economist for the past 20 years in Low and Middle-Income Countries (LMICs). I joined the London School of Hygiene & Tropical Medicine (LSHTM) in 2001 and in 2013 I took up a joint position at UNSW, first in the School of Public Health & Community Medicine and then this year I moved across to the Kirby Institute. It is my view that health economics has a major role to play in addressing the burden of disease amongst the poor and disadvantaged by ensuring the delivery of cost effective interventions and by protecting people from the financial consequences of illness. Most of my early research at LSHTM was on the economics of malaria in sub-Saharan Africa with a focus on the use of malaria rapid diagnostic tests for the targeted use of new malaria medicines. That work has provided a useful foundation for my current research at the Kirby on scaling-up new diagnostics for HIV and other STIs in the Asia-Pacific. Colleagues and I also have ongoing studies in Fiji, Cambodia and Indonesia measuring equity and financial protection for the costs of health care and a new study in Indonesia to improve the use of antibiotics in the private sector.

The Kirby is a great place to work! Prior to officially coming on board in 2017, I was already collaborating with some very talented and dedicated people from the institute who had a genuine interest in health economics and health systems strengthening. With the Kirby's support, health economics at UNSW has never been stronger, with more than 30 health economists across the faculty drawing large amounts of competitive funding for programs of research that address important economic questions in public health. It is my intention to offer women the same kind of mentorship and support that I have received during my career, especially those working in LMICs where most of my research takes place. We currently have five female health economists at the Kirby, three from developing countries and we envisage that the support they receive here will place them in good stead to build health economics and health systems capacity in their own countries. It is my goal to double this number of women by 2020.



VIRGINIA WISEMAN
Associate Professor

DAVID KHOURY

Postdoctoral Fellow



My background is in applied mathematics, and initially I applied modelling to understand honey bee colony failures throughout North America and Europe. I joined the Kirby Institute in 2015 and am now a Postdoctoral Research Fellow with the Infection Analytics Program.

My focus is malaria, a disease that impacts hundreds of millions of people across the globe and is responsible for almost half a million deaths a year, predominately in young children. Malaria is treatable, but our leading antimalarial drugs are becoming ineffective in nearby South-East Asia, and there is no highly effective vaccine. This highlights two of my research priorities: understanding drug activity to develop and assess next generation antimalarials as efficiently as possible, and understanding the mechanics of immunity in malaria to aid the development of a vaccine. As an interdisciplinary researcher, I work with experimental biologists and clinicians to inform experimental design and contribute to modelling and interpretation of experimental and clinical data.

The Kirby Institute has an incredible track record working to improve the health of marginalised people. This organisational focus is inspiring, and by partnering with those most affected by infectious diseases, the Kirby demonstrates that it is possible to make amazing contributions to improving health for those communities, with great benefits for the broader community. It is exciting to contribute to such important work.

ANGIE PINTO

PhD Student



I trained as an infectious diseases physician and clinical microbiologist and joined the Kirby Institute in 2013 to commence my PhD after completing my clinical specialty training.

My research focuses on evaluating various aspects of primary HIV infection. The project involves monitoring rates of antiretroviral drug resistance and looks at molecular epidemiology of HIV in NSW. Molecular epidemiology is a rapidly emerging field that can help us understand how a virus evolves and is transmitted within populations. These techniques allow us to visualise the impact of public health strategies and interventions on controlling or even halting an epidemic. We established a state-wide database of HIV drug resistance mutations, which allows the ongoing surveillance of antiretroviral resistance rates, which is of particular interest as the use of antiretrovirals for pre-exposure prophylaxis increases.

The Kirby has a multidisciplinary approach to research and addresses problems of global health significance. As a result, it has earned itself a globally recognised reputation for impactful clinical trials and studies across multiple disciplines. It has a vibrant, inclusive community that welcomes students and staff from all walks of life and all over the world, and has established a culture where people can develop their unique skills, realise their potential and thrive. It brings together people from all corners of the globe and fosters a nurturing, collaborative research environment.

HAO BUI

International PhD Student

I completed my undergraduate and postgraduate degrees in Public Health from Hanoi Medical University (HMU), Vietnam, and worked at the HMU Center for Research and Training on HIV/AIDS (CREATA) since graduating in 2003. In 2014, I received an Australia Award Scholarship to commence my PhD study at the Kirby Institute.

At CREATA, my studies looked at HIV risk behaviours among key populations, including people who inject drugs and men who have sex with men, using both qualitative and quantitative research methods. When I was considering doing a PhD, I found that Professor Lisa Maher's research interests matched mine. I am happy in my decision to choose the right supervisor at the right institution.

The Kirby is known for its global research, which I am excited to be part of. When I commenced my study at Kirby in 2015, the results of the START study had just been released, showing that early treatment was associated with better health outcomes for people living with HIV. This has contributed to changes in HIV treatment practices around the world.

The best thing here is that, while the Kirby is an academic organisation, it has great connections and works closely with marginalised populations, and is integrated with these populations, such as its presence in the annual Sydney Mardi Gras.



I am originally from Bangladesh. I graduated in Aeronautical Engineering from the Indian Institute of Technology, Bombay. For 25 years I worked in aviation as a flight engineer which took me all around the world.

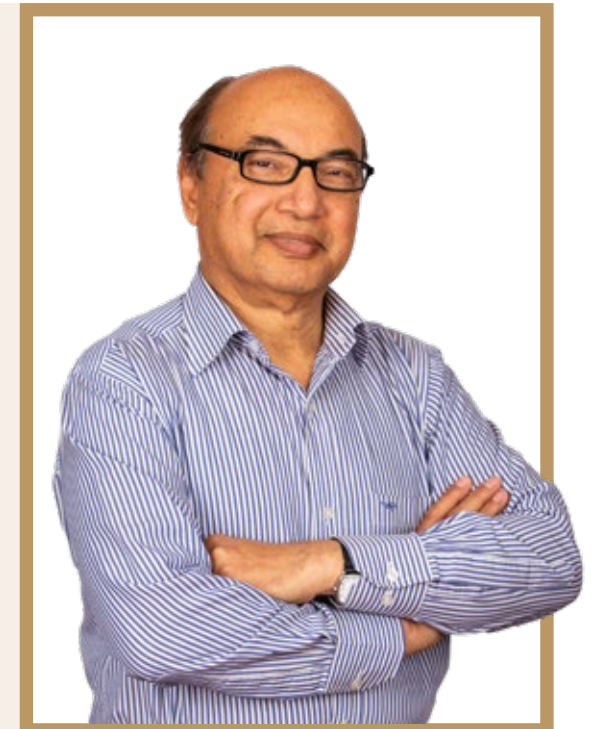
After migrating to Australia, I completed a Masters in Computer Science, majoring in Software Engineering. I joined the Kirby Institute in April 2001, which was then known as the National Centre in HIV Epidemiology and Clinical Research (NCHECR).

I work across a number of programs at the Kirby Institute. As part of the Therapeutic and Vaccine Research Program, I develop and maintain vaccine trial applications. I also support and develop other databases for the Surveillance Evaluation and Research Program, and the Biostatistics and Databases Program.

To me, the Kirby is an interesting institute which suits my knowledge and I can contribute using my database development skills. I really enjoy getting to work across the different programs, where I work with staff and students from a range of backgrounds.

NOORUL ABSAR

Computer Systems Officer



ACHIEVEMENTS AND AWARDS



08.06.17

Kirby Institute researcher announced as one of Australia's Top 5 Under 40

Kirby Institute research fellow, Dr Denton Callander, was selected for the ABC's Top 5 Under 40 program. The Top 5 Under 40 initiative gives voice to the next generation of researchers in the fields of science, technology, engineering, mathematics and medical research. The winners undertook a two-week media residency in Sydney at Radio National, the ABC's national ideas network.

Denton is a medical science researcher in the Sexual Health Program at the Kirby Institute. He studies the intersection between sex, sexually transmissible infections and technology.



30.06.17

MARCH collaboration launch in Myanmar

The international infectious disease research collaboration between the Kirby Institute at UNSW Sydney and the University of Medicine 2 (UM2) in Myanmar was launched in Yangon. The collaboration was announced by Australia's Chargé d'Affaires in Myanmar, Mr Nick Cumpston and attended by David Cooper, and a high-level Australian parliamentary delegation.

The collaboration between the Kirby Institute and UM2, will build research capacity in infectious diseases in Myanmar, with a particular emphasis on HIV, tuberculosis and malaria. The work is expected to inform local public health policy as well as national, regional and international management guidelines for these diseases.



23.08.17

HIV diagnoses in NSW lowest on record since 1985

NSW Health announced a rapid and dramatic decline in HIV infections in New South Wales. The number of people diagnosed with HIV in the first half of 2017 is the lowest on record for any January to June period since the beginning of the HIV epidemic in NSW.

The Kirby Institute is a key player in NSW's partnership response to HIV and is runs the NSW PrEP trial – EPIC-NSW. Kirby Institute Director, David Cooper said the decline marks a moment in history for HIV in Australia.

Image credit: NSW Ministry of Health.



27.10.17

Kirby Institute recognised at the ACON Honour awards

The Kirby Institute and our Director David Cooper received the prestigious President's Award at the 2017 ACON Honour Awards.

The Honour Awards is an annual event which celebrates outstanding service to, and achievements within, NSW's LGBTI community.

Since the beginning of the HIV epidemic in Australia, ACON and the Kirby Institute have worked in close partnership in the fight against HIV, through extremely dark periods for the LGBTI community.

The award was accepted by Professor Andrew Grulich on behalf of Professor Cooper and the Kirby Institute. "We are driven by the principle that access to good health is a human right; that every human being deserves equal access to good health. I am so pleased to be here tonight, to celebrate equality, diversity, and all the people that go above and beyond to make our community healthier, more inclusive, and stronger", he said on the night.

Image credit: ACON / Deep Field Photography.



31.08.17

World-first trials win prestigious Eureka Prize

The Scabies Research Team - a collaboration between the Kirby Institute, the Murdoch Childrens Research Institute, St Vincent's Hospital Sydney and Menzies School of Health Research - won the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research.

The prize was awarded based on two world-first trials involving mass administration of a drug that virtually eliminated scabies; the Skin Health Intervention Fiji Trial (SHIFT) and the Azithromycin Ivermectin Mass drug administration (AIM) trials.

Image credit: Australian Museum.

Other awards

Associate Professor Rebecca Guy was honoured at the National Health and Medical Research Council (NHMRC) Research Excellence Awards for her research on HIV and sexually transmitted infections. She won the Elizabeth Blackburn Fellowship, one of three awarded annually for the top-ranked female applicants in 2016, in the clinical, biomedical and public health areas of the research fellowship scheme.

Professors Lisa Maher and Andrew Lloyd were elected to the Australian Academy of Health and Medical Sciences (AAHMS). Fellows provide the Australian Government, industry and the community with independent advice on issues relating to evidence-based medical practice and medical research in Australia.

Dr Angela Kelly-Hanku was appointed a Scientia Fellowship by UNSW. This prestigious accolade is part of the University's global drive to recruit the best researchers in the world and helps to build UNSW's research capacity across a broad range of contexts.

Dr Muhammad Jamil was one of two recipients of the 2017 Dean of Medicine's Award for Outstanding Contribution to Research by a Higher Degree Research Student.

2017 MEMORABLE MOMENTS

INTERNATIONAL WOMEN'S DAY

07.03.17

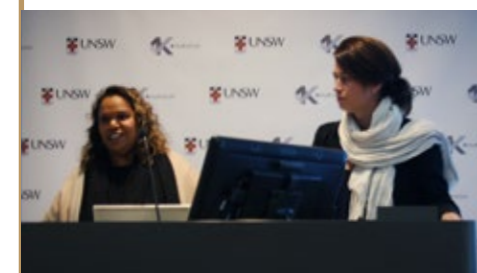
We hosted a special seminar "Women in research: Bold perspectives. Positive change." to celebrate the successes of women in research.



CATHERINE KING VISIT

02.05.17

The Shadow Minister for Health, the Honourable Catherine King, met with our executive team to discuss the latest Kirby Institute research.



WORLD HEPATITIS DAY

28.07.17

This year, the Kirby Institute hosted a special seminar, to discuss the success of hepatitis C treatment uptake since the listing of direct-acting antivirals on the PBS, and how to scale-up access.



TANYA PLIBERSEK VISIT

07.04.17

Deputy Leader of the Opposition, The Honourable Tanya Plibersek met with Kirby Institute research leaders to hear about our important work in Australia and the region.



NAIDOC

04.07.17

Shining a spotlight on Indigenous health research.



WEAR IT PURPLE DAY

25.08.17

The Kirby Institute participates in this annual expression of support and acceptance of rainbow young people.



MYANMAR VISITORS

08.11.17

We were delighted to welcome some of our counterparts from the collaborative office in Myanmar to the Kirby Institute.



PENNY WONG VISIT

10.11.17

The Honourable Penny Wong, Senator for SA, Shadow Minister for Foreign Affairs, visited the Kirby Institute to discuss our life-saving work in the Asia-Pacific region.



BRETT TINDALL MEMORIAL LECTURE

23.11.17

Professor Jean-Michel Molina from University of Paris 7; Department of Infectious Diseases at the Saint-Louis Hospital; and ANRS (French Agency for Research on AIDS and Viral Hepatitis) gave this year's Brett Tindall Memorial Lecture, on the topic "On-demand PrEP for High Risk MSM: Only for Europe?"

MINISTER GREG HUNT ANNOUNCEMENT

09.11.17

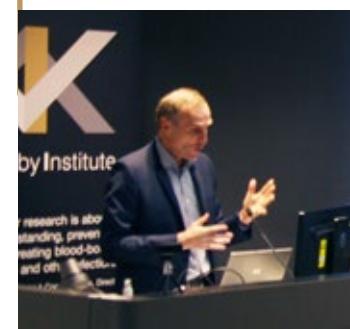
The Federal Health Minister visited the Kirby Institute to announce a \$70m funding boost to build the capacity of Australia's next generation of medical researchers.



AUSTRALIA VOTES YES TO MARRIAGE EQUALITY

15.11.17

The Kirby Institute came together to celebrate this important milestone.



Student successes

The Kirby Institute attracts many diverse and successful students completing higher degree research across our research spectrum.

PhD graduations in 2017:

Adeshina Adekunle
Benjamin Bavinton
Nicole De La Mata
Lise Lafferty
Marianne Martinello
Arnold Reynaldi
Andrew Shattock
Kirsty Smith
James Ward

PhD students **Chaturaka Rodrigo** and **Jerome Samir** received awards at the Australian Centre for HIV and Hepatitis Virology Research Annual Workshop in the Barossa Valley, South Australia, held 7-9 June this year. Chaturaka received the Robert Dixon Award for Best Oral Presentation, while Jerome received the Westmead Institute for Medical Research Young Achiever Award (Hepatitis).

The Kirby Institute's 2017 Postgraduate Student Prize for the most impactful first author paper by a Kirby Institute student, published in the previous calendar year went to **Marianne Martinello**, for her paper "Acute HCV: How short can we go?".

Sofia Bartlett, a PhD student, received the prestigious People's Choice Award from AMP Australia at the Amplify Ignite PhD Pitch Competition in April, as well as The Chris Burrell HCV International Travel Award, from the Australian Centre for Hepatitis Virology in May.

Lise Lafferty received an award for Postgraduate Student Best Abstract at the Social Sciences at the International Symposium of Hepatitis Care in Substance Users in New Jersey, USA.

Dr Tanya Applegate received the UNSW Sydney Outstanding Postgraduate Research Supervisor Award in recognition of "outstanding supervisory conduct and invaluable contribution to the supervision of higher degree research candidates."

2017 FUNDING

National Health and Medical Research Council (NHMRC)

| Program grants | AUD\$ |
|--|-----------|
| Discovery and translation of interventions to control sexually transmitted infections and their consequences | 1,300,388 |
| Hepatitis C infection: epidemiology, pathogenesis, and treatment | 632,802 |
| HIV latency, pathogenesis and immunity | 1,712,197 |
| Development grants | |
| Development and validation of a latent tuberculosis diagnostic | 185,453 |
| Project grants | |
| A randomised trial to compare dolutegravir+darunavir/r versus recommended standard of care antiretroviral regimens in patients with HIV infection who have failed recommended first-line therapy | 896,089 |
| Aboriginal and non-Aboriginal women perpetrators of violence: a trial of a prison-based intervention (Beyond Violence) | 173,104 |
| Dissecting the dynamics of malaria infection | 148,910 |
| HIV treatment as prevention: a longitudinal assessment of population effectiveness | 121,778 |
| New strategies to increase testing and treatment for endemic sexually transmitted infections in remote Aboriginal communities | 166,052 |
| Point-of-care diagnosis of sexually transmitted infections to improve maternal and neonatal health outcomes in resource-limited, high-burden settings | 423,712 |
| Point-of-care HPV-DNA testing for cervical cancer screening in high-burden, low-resource settings | 307,640 |
| Resolving human immunodeficiency virus (HIV) transmission | 278,901 |
| Risk factors for long-term chronic disease events in HIV-positive persons: the D:A:D cohort study | 144,722 |
| Risk of hepatitis C reinfection among people with current injecting drug use following successful HCV treatment (SHARP-P and SHARP-C) | 512,408 |
| Serological responses to anal HPV infection: characterising the natural history of anal HPV | 70,433 |
| Solving delivery of gene therapy for control of human immunodeficiency virus (HIV) infection | 268,858 |
| The sexual health and attitudes of Australian prisoners | 99,597 |
| Partnership grants | |
| Enhancing treatment of hepatitis C in opioid substitution settings II (ETHOS II) | 860,518 |
| Reducing impulsive behaviour in repeat violent offenders using a selective serotonin reuptake inhibitor | 10,000 |
| Striveplus: refinement and translation of an intervention designed to improve sexual health service delivery in remote communities | 257,895 |
| Surveillance and treatment of prisoners with hepatitis C (SToP-C) | 320,664 |

| | |
|--|---------|
| The HIV prevention revolution: measuring outcomes and maximising effectiveness | 125,376 |
| Uptake, sustainability and impact of scaling up point-of-care testing for sexually transmissible infections in remote and regional Aboriginal communities (TTANGO 2) | 213,216 |

Centres of Clinical Research Excellence

| | |
|-----------------|---------|
| Offender health | 426,394 |
|-----------------|---------|

European Union Collaborative Research Grants

| | |
|---------------------------------------|--------|
| European AIDS vaccine initiative 2020 | 50,000 |
|---------------------------------------|--------|

Fellowships

| | |
|--|---------|
| Dr Hammad Ali (Early Career Fellowship) | 54,388 |
| Dr Benjamin Bavinton (Early Career Fellowship) | 40,369 |
| Prof. Tony Butler (Research Fellowship) | 169,908 |
| Prof. Miles Davenport (Senior Research Fellowship) | 141,475 |
| Prof. Basil Donovan (Practitioner Fellowship) | 115,437 |
| Prof. Gregory Dore (Practitioner Fellowship) | 115,438 |
| Dr Jason Grebely (Career Development Fellowship) | 119,181 |
| Prof. Andrew Grulich (Principal Research Fellowship) | 154,908 |
| Prof. Rebecca Guy (Research Fellowship) | 156,474 |
| Dr Bridget Haire (Early Career Fellowship) | 80,738 |
| Dr Behzad Hajarizadeh (Early Career Fellowship) | 80,738 |
| Dr Jennifer Iversen (Early Career Fellowship) | 80,738 |
| Prof. John Kaldor (Senior Principal Research Fellowship) | 175,200 |
| Prof. Anthony Kelleher (Practitioner Fellowship) | 90,701 |
| Prof. Matthew Law (Principal Research Fellowship) | 154,908 |
| Prof. Andrew Lloyd (Practitioner Fellowship) | 115,438 |
| Prof. Lisa Maher (Senior Research Fellowship) | 128,042 |
| Dr Mark Polizzotto (Early Career Fellowship) | 88,238 |
| A/Prof. Andrew Vallely (Career Development Fellowship) | 119,182 |
| A/Prof. Vanessa Venturi (Career Development Fellowship) | 59,591 |
| Dr Huachan Zou (Early Career Fellowship) | 115,350 |

Postgraduate scholarships

| | |
|----------------|--------|
| Dr Angie Pinto | 16,554 |
|----------------|--------|

| Australian Research Council (ARC) | Discovery projects | AUD\$ |
|---|--|--------------|
| | Male sex workers and their clients | 108,903 |
| | Understanding global biomedical technologies in local realities | 148,155 |
| Australian Government | Federal Department of Health | |
| | Extended genital warts surveillance network | 244,019 |
| | National trachoma surveillance and reporting 2015–2017 | 400,590 |
| | Real-world efficacy of antiviral therapy in chronic hepatitis C (REACH-C) | 891,230 |
| | Research activities for blood borne virus and sexually transmissible infections | 537,420 |
| | Surveillance activities | 2,243,716 |
| | NSW Ministry of Health | |
| | EPIC-NSW: extended PrEP implementation in communities in NSW | 212,518 |
| | The HIV prevention revolution: measuring outcomes and maximising effectiveness | 261,000 |
| | The NSW prevention research support | 249,285 |
| | The NSW research program for HIV, STIs and viral hepatitis | 350,810 |
| | Other government departments | |
| | ACT arm of EPIC-NSW (ACT Health) | 21,185 |
| | HIV (PrEP) Implementation (WA Health) | 130,000 |
| | National HIV seroconversion study (QLD Health) | 35,586 |
| | Population-based linkage study (WA Health) | 40,000 |
| National Institutes of Health, USA | | |
| | A randomised study of interferon-free treatment for recently acquired hepatitis C in people who inject drugs and people with HIV coinfection (the REACT study) | 968,663 |
| | AIDS Malignancy Consortium (AMC) and ANCHOR | 68,762 |
| | Anti-influenza hyperimmune intravenous immunoglobulin (FLU-IVIG) international | 163,085 |
| | Asia Pacific HIV research collaboration: cancer studies (subcontract with American Foundation for AIDS Research) | 169,135 |
| | INSIGHT – FLU 002 and FLU 003 (subcontract with University of Minnesota) | 471,636 |
| | Mechanisms limiting neonatal immunity (subcontract with Cornell University) | 43,874 |
| | START study (subcontract with University of Minnesota) | 3,253,023 |
| | TREAT Asia HIV observational database (subcontract with American Foundation for AIDS Research) | 316,447 |
| | TREAT Asia pediatric HIV observational database (TAPHOD) (subcontract with American Foundation for AIDS Research) | 227,820 |

| Other grants and contracts | Australian | |
|-----------------------------------|---|-------------------|
| | Filling in the gaps – using a big data approach and text mining to enrich cops data to inform prevention strategies in domestic and family violence (Australian Institute of Criminology) | 27,926 |
| | Future Research Leadership Fellowship – Dr Mark Polizzotto (Cancer Council NSW) | 161,403 |
| | IMPACT study (The Royal Women’s Hospital Melbourne) | 53,950 |
| | Preventing morbidity and mortality from anal cancer (Cancer Council NSW) | 387,358 |
| | The impact of improving hepatitis C treatment on hepatocellular carcinoma (Cancer Council NSW) | 146,376 |
| | International | |
| | D ² EFT study (UNITAID) | 2,574,153 |
| | Key population integrated bio-behavioural survey in Papua New Guinea (Oil Search Foundation Limited) | 424,169 |
| | Point-of-care testing and treatment of sexually transmitted infections to improve pregnancy outcomes in resource-limited, high-burden settings (PNG Institute of Medical Research) | 423,019 |
| | Scholarship Alison Marshall (Canadian Institutes of Health Research) | 14,898 |
| | Scholarship Evan Cunningham (Canadian Institutes of Health Research) | 24,843 |
| | The epidemiology and treatment of advanced liver disease among people with hepatitis C in Australia, Scotland and Canada (European Commission) | 15,313 |
| Pharmaceutical industry | | |
| | AbbVie Pty Ltd | 1,763,451 |
| | Bristol-Myers Squibb Australia | 360,840 |
| | Callimmune Australia Pty Ltd | 55,805 |
| | Gilead Science Inc (USA) | 230,407 |
| | Gilead Science Pty Ltd | 12,500 |
| | Merck Sharp & Dohme | 449,048 |
| | ViiV Healthcare UK Ltd | 12,334 |
| | TOTAL | 30,774,757 |
| | DONATIONS | 906,134 |

It is through the valued support of our funders that the Kirby Institute is able to conduct the leading-edge research that is improving health outcomes in Australia and beyond.



Together, we can work towards developing new therapies, preventative vaccines and better solutions for those who are currently affected by infectious diseases and for those who are most at risk.

Scott Ledger removes a rack of samples from the "Vapour Phase storage tanks" in the Kirby Institute cryogenics facility. Samples are cryo-preserved, stored at approximately -190°C under nitrogen vapour. At this ultra-low temperature, cellular mechanisms are slowed down which allows for long-term storage of precious samples.

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ISSN No.1441-2640

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