

KIRBY INSTITUTE

Annual Report

2018





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

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Michelle Bailey, working in a controlled environment in our Glendonbrook Laboratories, diluting highly sensitive and specifically designed primers to precise amounts, in order to create a reaction to identify HIV DNA.



MESSAGE FROM OUR DIRECTOR

Professor Anthony Kelleher

For the Kirby Institute, 2018 was punctuated by the death of our inaugural Director, Professor David Cooper AC, on 18 March. David was a giant in both academic and clinical circles, and was the guiding force of the Kirby Institute for over 30 years.

He set us on the path we find ourselves on today and established one of the world's leading infectious disease research institutes. Over the years, he assembled a group of Australia's finest researchers across basic science, clinical research, public health, biostatistics and epidemiology working across a range of infectious diseases. Through this Institute, initially established in the midst of the accelerating HIV epidemic in Australia, David led the way, recognising that a cross-disciplinary, collaborative approach, inclusive of the affected community, was what was required to develop the knowledge and solutions to curb the devastation of HIV/AIDS. He went on to apply that ethos across the spectrum of research areas that the Kirby Institute contributes so significantly to today.

HIV, hepatitis, human papillomavirus, sexually transmissible infections, neglected tropical diseases and influenza are all major public health issues that are manageable, provided that the motivation across academia, the clinic, the community and in public policy is present. The Kirby Institute is firmly committed to this inclusive approach. We continue to contribute impactful, evidence-based research to the endeavour of better control of these infectious diseases.

I would like to take this opportunity to express gratitude on behalf of all at the Kirby Institute to the Management Committee that was formed during David's illness. We were tasked with the difficult, but necessary, mission of guiding the Kirby Institute at a time when the news of David's death was being processed by all of us. Greg Dore, Daren Draganic, Andrew Grulich, Rebecca Guy, and Chairs John Kaldor and John Watson did a superb job of not only ensuring our Institute continued to pursue its ongoing work, but also ensuring that new opportunities were identified. The committee provided unified and effective leadership during a difficult time.

Even more importantly, throughout 2018, our team at the Kirby Institute continued to steadfastly produce high quality research outputs that tested novel interventions aimed at improving health outcomes, challenging stigma and creating more equitable and effective access to good health globally. In a world-first, our researchers labelled and tracked the immune cells that fight viruses in the body, called CD8+ T cells, unlocking the potential to predict how individuals might respond to infection and ultimately enable more targeted treatment. We received peer-reviewed funding to establish a number of research projects in our region, including a Centre for Research Excellence to scale up new point-of-care diagnostic technologies, an Australian Centre for the Control and Elimination of Neglected Tropical Diseases, and a project investigating antimicrobial resistance in Indonesia. We also launched Australia's first national survey for trans and gender diverse sexual health.

Of course, these are just a few representative examples, and you will read about more of our achievements, in more detail, in this report.

The opportunity to lead and support the wide-ranging research activities of the Kirby Institute is an incredible privilege, opportunity and challenge. I am delighted to be the Director of this highly successful Institute, and I look forward to supporting and leading it into the future.

MESSAGE FROM OUR PATRON

The Hon. Michael Kirby AC CMG



The year 2018 began with the terrible news of the grave illness of the inaugural Director, Professor David Cooper. All too soon, he died on 18 March 2018. It was a great blow to the Institute, the general community and the particular communities of vulnerable people whom David Cooper served so long and so faithfully. He was not just a brilliant scientist, respected worldwide. He was also a greatly loved physician, a team leader with his work colleagues and an inspiration to the fellowship of Australian scientists.

David Cooper's funeral overflowed with family, friends and mourners from the profession and civil society. A huge audience in the Sydney Town Hall in June 2018 heard community leaders and overseas admirers. Many had crossed the world to pay tribute to him. The nation paid tribute by awarding him the highest civil honour in its gift: Companion of the Order of Australia. This award was announced in the Queen's Birthday Honours List that coincided with the memorial tribute.

I thank the Management Committee of the Kirby Institute for providing leadership throughout 2018. I mention specially Scientia Professor John Kaldor. He and his colleagues ensured that the vital work of the Institute continued seamlessly, despite the time of grief. Everyone knew that nothing less would be expected by David Cooper.

A worldwide search was undertaken for a new Director, under the aegis of the Dean of UNSW Medicine. I thank them for their devoted work. In the end, having considered outstanding local and overseas candidates, the University accepted the recommendation that Professor Anthony Kelleher, long-time associate of David Cooper, should succeed to David Cooper's mantle. He will maintain the same high traditions. But he will also dream his own dreams as to where the Kirby Institute should be and where it should take its unique research capabilities in the years ahead. With the appointment of Professor Kelleher in January 2019, the Kirby Institute began a new chapter, full of confidence and with great expectations.

I pay tribute to David Cooper's family, and particularly to his widow, Dorrie Cooper. She gave us strength whilst mourning David Cooper the man and husband. At the International AIDS Society meeting in Amsterdam in September 2018, along with the top HIV scientists of the world, I paid tribute to David Cooper. Now, as he would insist, we are back to total focus on our work. Three of the senior scientists of the Institute were promoted during the year for their outstanding work and reputations. Professor Greg Dore to Scientia Professor of UNSW. Professor Jason Grebely and Professor Andrew Vallely had their outstanding scientific work recognised by appointment to full chairs of the University. We rejoice in these promotions.

Also during 2018, the work of the Institute went on with great vigour. This document reports, with proper pride, on these achievements and I offer praise and felicitations.

For all of us, year 2018 was a time of grief and storms. But through it all, the world class research, often in collaboration with leading institutions beyond Australia, has continued. It will go on flourishing. All of us have taken energy from the memory and example of David Cooper. All of us now look to the future with optimism under the new leadership of Anthony Kelleher. The best legacy that David Cooper has left us is his challenge to push relentlessly the boundaries of science and human knowledge. And to advance the struggle for access to essential medicines for all, envisaged by the United Nations Sustainable Development Goals 2015.

2018 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, to develop 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.

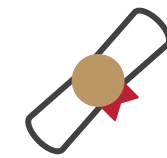
Our research has increasingly taken on a regional focus. Over the past two decades, we have developed collaborative programs in several countries that have involved training health workers and health researchers in the Asia Pacific region, advising governments on public health and clinical policy, informing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

Our world-class team comprises over 350 public health, clinical and laboratory scientists, research assistants, professional staff and postgraduate students.



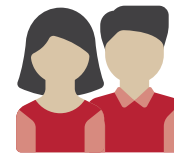
274

staff members



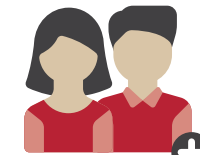
8

academic promotions



79

postgraduate students in total



23

new postgraduate students who started in 2018



12

UNSW Scientia PhD students



35

international postgraduate students from **23** countries



10

PhD graduations



51

Kirby Institute Seminar Series talks held



17

international speakers at the Kirby Institute Seminar Series



24

female speakers at the Kirby Institute Seminar Series



728

collaborations in **49** countries on **6** continents



330

peer reviewed publications in 2018



3 NHMRC Program Grants



16 NHMRC Project Grants



7 NHMRC Partnership Grants

\$36,569,556

funding from external grants in 2018



25 NHMRC Fellowships



3 ARC Discovery Projects



2 Centres of Research Excellence Grants

\$2,346,842

in donor funding in 2018



“The generosity and far-sightedness of our supporters will set the stage for remarkable discoveries and innovations that will make a difference to some of the most vulnerable people in Australia, our region, and the world.”

**Professor David Cooper AC
Inaugural Director of the
Kirby Institute, 1983–2018**

The David Cooper Memorial Fund will ensure that the Kirby Institute can continue to carry forward David’s vision of equitable access to infectious disease prevention, treatments and cures, today and into the future.

To find out more and make a donation, visit kirby.unsw.edu.au/dcmf or call +61 (2) 9385 0900.

THE DAVID COOPER MEMORIAL FUND: CONTINUING HIS LEGACY

The late Professor David Cooper AC firmly believed that health is a fundamental human right, and that innovations in infectious disease prevention and treatment must be accessible to all. The David Cooper Memorial Fund facilitates bringing together the brightest scientific minds to undertake world-leading, impactful research and education activities that will expand access to prevention programs, transform treatments and save lives.

Following David’s death in March 2018, the Kirby Institute was overwhelmed by the outpouring of support. Over the three-decade lifespan of the Institute, David cultivated a network of dedicated individuals from across the research spectrum; he collaborated with colleagues in Australia and around the world, striving for the common goal of controlling HIV and infectious diseases. He fostered links between researchers and politicians, who have the power to influence political decision-making with an evidence base. And most vitally, he approached affected individuals and communities with respect, ensuring that their voices were heard, that they were involved in the design of trials, and remained informed every step of the way.

David achieved more in his life than most people, but his work was nowhere near complete when he passed away. He was acutely aware of health injustices and believed it was unacceptable that infectious diseases disproportionately impact the world’s most disadvantaged communities.

The research that David conducted through the Kirby Institute was dedicated to innovative, effective and scalable innovations that would lead to large-scale improvements in global health.

It is in the name of continuing his important, life-changing work that the David Cooper Memorial Fund was established.

Remembering David

The loss of David Cooper was felt deeply around the world. In June 2018, we collaborated with our partners to hold a public memorial to honour David’s life and work. It was attended by more than 1,000 people: colleagues, patients, friends and his loving family. The following day, his research legacy was celebrated with an academic symposium held at UNSW Sydney. Throughout the day, delegates heard from over a dozen international infectious disease research leaders, each of whom had worked with David and paid tribute to his extraordinary contribution and legacy.

In the days just prior to the Symposium, David was posthumously made Companion in the General Division of the Order of Australia (AC), for his service to medicine in the area of HIV/AIDS research. Of the acknowledgement, the Hon. Michael Kirby, Kirby Institute patron, 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.”

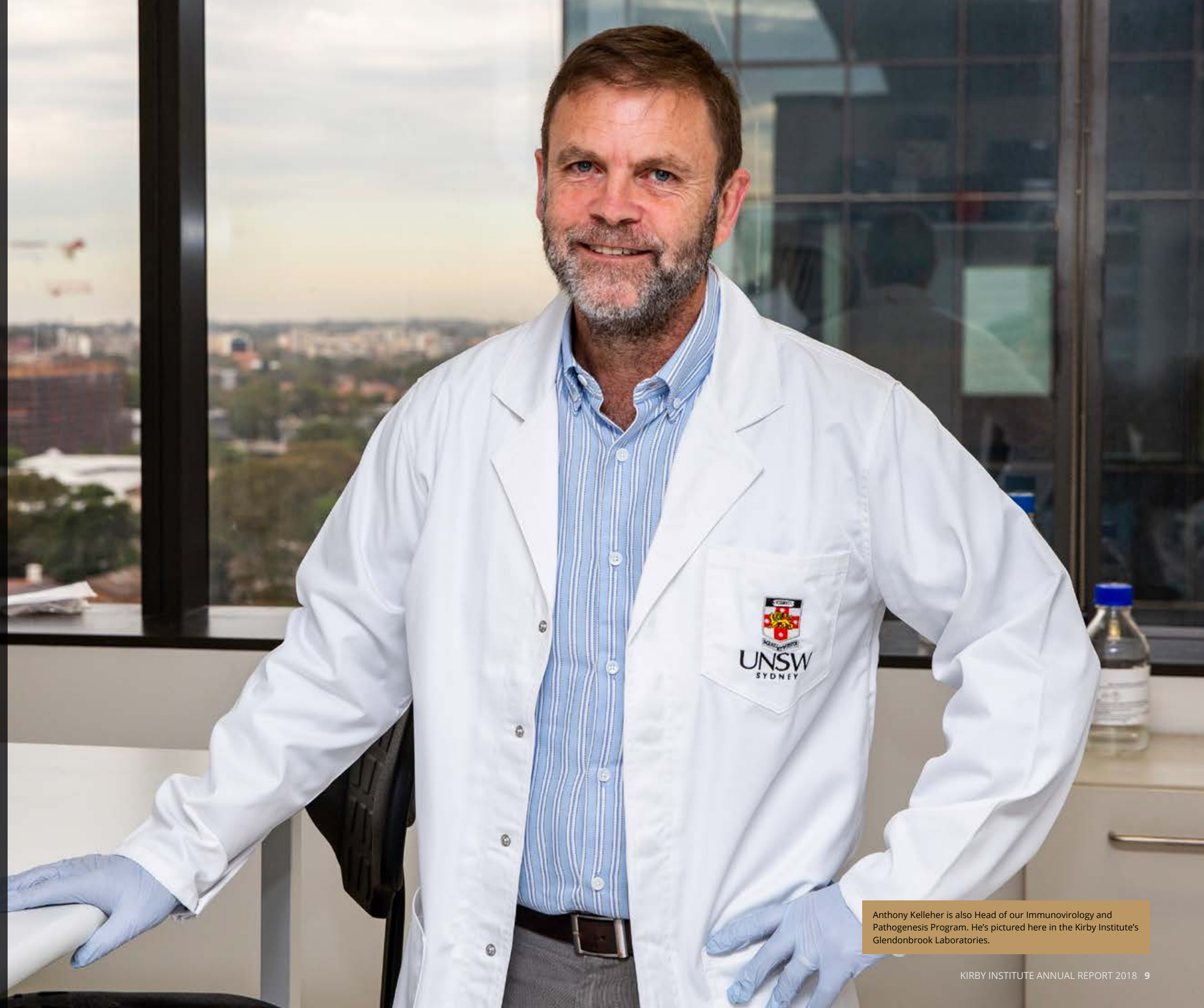
Top–bottom: **1.** David Cooper Memorial at Town Hall, Sydney. **2.** Kirby Institute Patron Michael Kirby and David at the 1988 International AIDS Conference in Stockholm, Sweden. **3.** David at the opening of the National Center for HIV/AIDS, Dermatology and STDs (NCHADS) Social Health Clinic in Cambodia, 2006. **4.** Senator the Hon. Lisa Singh speaking at the David Cooper Symposium.



**OUR RESEARCH
FROM MOLECULES
TO POPULATIONS**

*“From molecules
to populations,
our research finds
innovative health
solutions and
ensures they can be
accessed by all.”*

Professor Anthony Kelleher
Director



Anthony Kelleher is also Head of our Immunovirology and Pathogenesis Program. He's pictured here in the Kirby Institute's Glendonbrook Laboratories.



The Kirby Institute's Infection Analytics Program applies a mathematical lens to biological challenges, gaining a better understanding of infectious diseases.

INFECTION BY NUMBERS: USING MATHEMATICS TO UNDERSTAND INFECTION AND IMMUNITY

The Kirby Institute employs a team of world-class mathematicians, who work to unlock critical new information from existing clinical study data. Professor Miles Davenport, Head of the Infection Analytics Program, shares some insights on why maths is an important part of scientific discovery.

Mathematics underpins our practical understanding of the world, and increasingly, is helping us to better understand infection and immunity. Clinical research provides the basis for the development of new treatments, cures, and testing methods by trialling these developments among populations. From there, detailed data are collected to analyse whether or not the method trialled was effective. However, there are often big gaps in our understanding of the basic dynamics of an infection in the first place, so answers as to why something does or does not work require further investigation. This is where the mathematicians come in.

"Transforming experimental results from 'raw data' to 'useful insights' requires an intimate collaboration between the experimentalists and clinicians producing the data, and the mathematicians who are able to analyse and model it," explains Professor Miles Davenport, Head of the Kirby Institute's Infection Analytics Program. "The major barrier to this has been a lack of shared language between mathematicians and biologists, and the common misconception that biology is too complex to follow simple mathematical rules, as we are familiar with in physics. There is a misconception that mathematics is too obscure to be of practical relevance

to biologists. In the Infection Analytics Program, we bridge the gap between mathematics and biology by establishing a common framework through which we can combine both mathematical and clinical ideas."

Miles leads a world-class group that employs 11 mathematicians, along with computer scientists and physicists. They collaborate with experimental scientists and clinicians from around the world to develop new ways of understanding 'the mathematics of infection'. The team use these insights to design and optimise treatment and vaccination for the major infectious diseases of our time. One of their major areas of study is the hidden pool of cells infected with HIV, a key focus for many HIV researchers in their continued quest for a vaccine and a cure.

The calculations for an HIV cure

HIV research and development has come a long way in the past three decades. Countless clinical trials have tested a myriad of treatments and therapies, but a vaccine, and a cure, remain elusive.

Miles and his team are playing a crucial role in the quest to better understand HIV, using mathematics to enrich the wealth of clinical data that is being collected.



The Infection Analytics Program specialises in research into the three infectious diseases that cause the most mortalities worldwide: HIV, malaria and tuberculosis.

OUR COLLABORATOR

Professor Stephen Kent
Head of Laboratory,
University of Melbourne

"I have been working with colleagues at the Kirby Institute for about 15 years. Around 2005, Miles and I were talking about the dynamics of immune escape of HIV. Through our clinical and pre-clinical research at the University of Melbourne, we had large datasets that lent themselves to more insights, which we took to Miles' Infection Analytics Program.

Our main work together involves planning and analysing data, predominantly focusing on how antibodies control influenza and HIV. Commonly, Miles' group will both add value to our data, and suggest the next exciting set of experiments.

Across these research areas, as we accumulate more data, interpreting it and gleaming clear insights is becoming more important. The Infection Analytics Program are indispensable in this.

We look forward to maintaining our close collaboration into the future, as we are embarking on a new NHMRC program grant together in 2019 which will produce a large number of new projects."



Members of the Infection Analytics Program. Left-right: Michael Lydeamore, Rosemary Aogo, Mykola Pinkevych, David Khoury, Miles Davenport, Steffen Docken, Yuhuang Wu, Georges Ferdinand Randriafanomezantsoa Radohery, Arnold Reynaldi.

HIV is a complex virus. The antiretroviral treatments (ARTs) available are able to reduce the viral load within the body to such a point that the virus does not attack the immune system. Despite treatment, the infected cells remain present, lying dormant, or 'latent'. Currently, there is no way to directly access this 'latent reservoir', or control how or when it reactivates to reignite an active infection.

By applying a quantitative, analytical lens, the Infection Analytics team hope to uncover how the HIV virus behaves throughout its lifecycle. Most studies of latency have focused on measuring the low number of latent cells. However, an important clinical interest lies in trying to understand when and how reactivation from latency to active infection occurs, and this is where mathematical modelling and analysis are crucial. Ultimately, they hope that their work will provide the evidence base to develop new ways to target and eliminate HIV.

Working with clinical collaborators at the Kirby Institute, University of Melbourne, and in Denmark, Miles and his team have developed mathematical tools that allow researchers, for the first time, to use the 'visible' portion of active HIV infection to understand the 'invisible' dynamics of latency.

They have achieved this by modelling existing data from clinical studies to determine how long it takes for HIV to reactivate after stopping treatment.

"Most patients have detectable virus within a few weeks of stopping treatment, and by modelling the curve of 'time-to-detection' across patient cohorts, we can estimate how frequently HIV 'wakes up' from latency," says Miles. "For the first time, we've provided a direct estimate that this process occurs around once a week, which is 20 to 30 times less frequently than previously thought".

Understanding the 'normal' frequency of HIV reactivation allows researchers to test the effects of new drugs aimed at eradicating the HIV latent reservoir, which would be a game-changer for treatment development.

The power of mathematics

Much of Miles' work is collaborative, involving everything from modelling of already-published data, through to planning of optimal study design to maximise the ability to extract information from studies. Applying a higher level of statistical analysis can radically change perspectives on a clinical problem. "My research vision is to use mathematics to transform our understanding of the basic biology of infection," says Miles. "We hope that by contributing to a better and more quantitative understanding of how infection behaves, our work can support clinicians and scientists in finding even more effective solutions to improve health."



OUR PEOPLE

Yuhuang Wu
International PhD Student, Kirby Institute

"I'm an international student from China. My background is in mathematics, and previously I worked on applying mathematical modelling to understand the mechanism of metabolism. I joined the Kirby Institute in 2018 as a PhD Student in the Infection Analytics Program.

My research focuses on understanding the latency of HIV, and involves developing novel mathematical models and applying data analysis to explore the dynamics of HIV latency, collaborating with clinicians and experimental biologists.

The results of this work will have a direct impact on current and future studies for the cure of HIV, which aims at eliminating HIV completely from infected patients.

The Kirby Institute provides solid support to carry out interdisciplinary research and has made great contribution to address global health problems, especially for marginalised populations. It is exciting to work at Kirby, in such a friendly working environment, together with researchers from different backgrounds and with the same goal."



Hannah Reid explaining results of a patient's liver fibrosis assessment using Fibroscan.

IMPROVING THE LIVES OF PEOPLE WHO USE DRUGS

Funded by the National Health and Medical Research Council, the ASCEND Program Grant is a partnership between the Kirby Institute and the National Drug and Alcohol Research Centre (NDARC). The Program addresses both hepatitis C and drug dependence among people who use drugs.

"The public health response to drug use is often clouded by questions of morality and judgment. But, the only questions we should be asking are how can we better understand the health needs of this group, and what can we do to address these needs," says Professor Greg Dore who is the of Head of the Kirby Institute's Viral Hepatitis Clinical Research Program. He has been a central figure in Australia's hepatitis C elimination program, undertaking critical research activities to inform and enhance the national rollout of hepatitis C cures.

Greg is also a clinician working at St Vincent's Hospital. Having worked as an infectious disease clinician for more than 20 years, he has a close understanding of the health needs, challenges and experiences of people who use drugs.

"As researchers and clinicians, we need to develop non-judgemental and holistic approaches to healthcare. We need to listen to what people who use drugs tell us they need, and we need to collaborate strategically with those who offer expertise and value," says Greg.

In 2018, the Kirby Institute and NDARC were awarded \$9 million from the National Health and Medical Research Council for a five-year research program, which they've named 'Advancing the health of people who use drugs: hepatitis C and drug dependence', or ASCEND.

"This Program Grant brings together leading research centres in drug dependency and infectious disease research," says Greg. "Together with NDARC, and working in close partnership with affected communities, this collaboration will build our understanding of the key health issues among people who use drugs. We will also explore the effectiveness of drug dependence management, evaluate strategies to test for hepatitis C, and monitor the relationship between drug dependence and hepatitis C in Australia".

In Australia, an estimated 93,000 people have recently injected illicit drugs, an estimated 160,000 people are methamphetamine dependent, and either inject methamphetamine, or are at risk of transitioning to injecting. A further 136,000 people are estimated to be opioid dependent. More than half of the 93,000 Australians who have recently injected drugs have been infected with hepatitis C.

The Australian Government provides hepatitis C cures at low cost through the Pharmaceutical Benefits Scheme, but a key challenge for the medical profession, and researchers like Greg, is trying to get these life-saving treatments in the hands of those most in need.

Greg says that to see hepatitis C elimination in Australia, we must engage with marginalised and vulnerable



4 in 5 of the estimated 227,000 people living with chronic hepatitis C in Australia acquired the infection through injecting drug use.



OUR COLLABORATOR

Professor Michael Farrell
Director, National Drug and Alcohol Research Centre

"The Kirby Institute and the National Drug and Alcohol Research Centre (NDARC) have both been in existence for over thirty years and over that time, researchers in both research centres have undertaken collaborative work.

A number of years ago, our two centres collaborated on a project to look at the global response to hepatitis C among people who inject drugs. We have completed a number of other epidemiological studies including estimating the burden of hepatitis C among people who inject drugs globally, regionally and nationally. More recently, we have developed a joint project around a national study of depot buprenorphine for the treatment of opioid dependence and the six clinical sites are just embarking on the study at the moment.

The ASCEND Program brings together two of Australia's premier research groups to undertake the country's first integrated program of research on drug dependence and hepatitis C. NDARC contributes its knowledge and expertise in clinical care of people with substance use disorders, complementing the expertise of Kirby investigators in clinical trials for treatment of hepatitis C.

Collaboration between NDARC and the Kirby Institute is very important in combining the strengths of both research centres to deliver policy and treatment impact to this very important population."



Greg Dore speaking to patients outside St Vincent's Hospital, Sydney.

"With a cure, they are not just free from the significant health burden of hep C, they are also free of the stigma that is too often associated with this virus."

Greg Dore

populations, in particular, those who are incarcerated. "One in five prisoners in Australia are infected with hepatitis C, and while there has been an encouraging increase in treatment over the last three years, this scale-up needs further enhancement," says Greg. "We have an understaffed health workforce, short-term prison incarceration, and frequent prisoner movement between correctional centres, and this makes treatment and care challenging. As part of the ASCEND Program, the Kirby Institute's Professor Andrew Lloyd will design and evaluate a 'one-stop-shop' intervention that uses innovative new finger-testing for hepatitis C on entry into prison. This will allow us to immediately diagnose hepatitis C in those who are positive, and shortly after, we can initiate treatment. This will dramatically improve the health of prisoners, but also, it will reduce the risk of onward transmission in prison."

Greg is determined in his belief that every individual living with hepatitis C has a right to treatment. "It's impossible to underestimate the impact that being cured of hepatitis C has on a person's life, particularly those people who are facing multiple significant challenges. With a cure, they are not just free from the significant health burden of hep C, they are also free of the stigma that is too often associated with this virus."

"For many people, the hep C cure provides closure in relation to past drug use. Equally important, for people who continue to use drugs, hep C cures provide improved quality of life and often a feeling of optimism within a complex social and health individual context."

OUR PEOPLE

Marianne Byrne
Clinical Project Coordinator,
Kirby Institute and National Drug and Alcohol Research Centre

"I coordinate the ASCEND Program and work across both the Kirby Institute and NDARC to oversee key projects and help support the establishment of new collaborative projects, bringing together the disciplines of hepatitis and drug dependence research for mutual benefit. The focus on marginalised community groups, and the impact of this work is incredibly satisfying. The ASCEND Program is an exciting opportunity to contribute to new knowledge which will inform policy, practice and models of care, with global impact.

The Kirby Institute is a very welcoming, inspiring place to work, with strong leadership and support. Conducting clinical trials at the Kirby is unique as the Viral Hepatitis Clinical Research Program and Viral Immunology Systems Program have both staff and researchers working side by side in clinical trial research. This facilitates great transdisciplinary collaboration because the researcher has the ongoing opportunity to learn from the operational team and vice versa. It is an important symbiotic relationship because, from concept to dissemination, the research project receives critical insight from both viewpoints."





Community reporters at Mugil Rural Hospital, Madang Province, Papua New Guinea, who assist in community awareness and recruitment of women into PNGIMR/Kirby Institute collaborative studies.

PREVENTING CERVICAL CANCER AMONG WOMEN IN PAPUA NEW GUINEA

Papua New Guinea (PNG) has among the highest rates of cervical cancer in the world, with an estimated 1,500 deaths per year. The development of new point-of-care testing methods means it is now possible for the first time to detect women at greatest risk of cervical pre-cancer and offer them same-day curative treatment to prevent the development of cancer.

New point-of-care testing methods target the early detection of infection with specific types of human papillomavirus (HPV) that cause cervical cancer, the most common cancer among women in PNG and a leading cause of premature death. With the PNG Institute for Medical Research, the Kirby Institute's Professor Andrew Vallely and his team are rolling out an expanded trial of point-of-care testing for HPV across four new sites in PNG, following an earlier successful field evaluation that concluded last year.

"No woman should die from cervical cancer," says Andrew. "Now that we have the technology to detect HPV at point-of-care, we are working with local health services in PNG to ensure all women in the country have access to this life-saving innovation."

Many women in PNG have to travel very long distances to visit a clinic, often on foot, so it is critical to make the most of their time when they are there. Point-of-care test results for HPV infection are available within an hour on the spot, so treatment can be provided during the same visit. "We know that women aged

30-59 years who have a positive result on the HPV test are at high risk of also having cervical pre-cancer in PNG. If we can provide same-day treatment for HPV-positive women, we will be able to successfully detect and treat over 90% of all women who have underlying cervical pre-cancer. This method is a game-changer for a country like PNG, where medical resources are limited, and there are extremely high rates of cervical cancer due to HPV infection," says Andrew.

"Perhaps the greatest innovation with point-of-care testing is that it allows women to self-collect a vaginal specimen for the HPV DNA test," Andrew continues. "Not only is this more acceptable to women in PNG, but it reduces the burden on the health system, as clinical examinations are not necessary for screening." The results are produced automatically by the point-of-care test machine, minimising the need for high-level specialist training.

The challenges of implementing an innovation like this at a national level are not insignificant. Around 90% of Papua New Guinea's population is located in

An estimated
1,500
women die from
cervical cancer in PNG
each year.

OUR COLLABORATOR

Professor William Pomat
Director, Papua New Guinea Institute of Medical Research (PNGIMR)

"PNGIMR has been working with the Kirby Institute for more than 10 years. The collaboration began through our shared interest in sexual and reproductive health and work among HIV/AIDS patients. Despite the relatively low rates of HIV in PNG, communities of people who sell sex and sexually and gender diverse people continue to be at risk as they are stigmatised and as such they often hide their HIV status.

PNG also has among the highest rates of maternal and neonatal deaths in the world, and together we are finding interventions to minimise these high rates. By harnessing our strengths and expertise, and working collaboratively, we work together to find practical solutions.

Collaboration and partnerships are very important in research. They allow us to link up with experts from other organisations and diversify the way we think and do things, helping to improve health and create new knowledge or new ways of thinking about the same thing. It also brings in new technology that we may not have read about as well as identify different areas for funding."



rural and remote areas, and health services vary from region to region. "An important part of our research will be conducting interviews with research nurses, clinic staff and health managers to evaluate what is required at a regional level to ensure that all women in PNG have access to this screening," says Associate Professor Angela Kelly-Hanku, who leads the qualitative and behavioural research component of the study. "Part of this will involve evaluating the health system implementation requirements, cost-effectiveness and cultural considerations, in order to make this available to the entire population."

With an estimated one million women in PNG aged 30–59 years old requiring cervical screening, Andrew hopes this research will support a change in public health policy and clinical practice not only in PNG, but in other high-burden, low-resource settings worldwide.

Professor John Kaldor, head of the Public Health Interventions Research Group at the Kirby Institute, and a collaborator on the project, agrees. "Point-of-care technology has the potential to drive down infectious diseases globally, provided that it is implemented in full partnership with local health departments, clinicians and communities," he says. "International public health is littered with great innovations that have not been successfully scaled up, because of a failure to engage and understand local settings and resources. Our work in PNG on cervical cancer has followed best practice, not only for the effectiveness of HPV screening to prevent cervical cancer, but also for how to work in partnership with local communities to ensure the greatest possible impact from technological developments."

This research was funded by the Government of Papua New Guinea through a PNGIMR Internal Competitive Research Award Scheme (ICRAS) Grant and by the Australian National Health and Medical Research Council (NHMRC Program Grant).

1. Josephine Gabuzzi (far left) and Barne Willie (second right), from the PNGIMR/Kirby collaborative research team, training clinical staff in Mount Hagen, PNG on point-of-care HPV-DNA testing **2.** Left-right: John Kaldor, Angela Kelly-Hanku, William Pomat, and Andrew Vallely celebrating the 50th anniversary of PNGIMR and William's appointment as the new Director.



OUR PEOPLE

Pamela Toliman
International PhD Student, Kirby Institute

"I am from PNG and am completing my PhD on cervical cancer screening in this country. I have a BSc(Hons) in microbiology and genetics, a BA in sociology and a MMedSc.

The focus of my research, and specifically my PhD, is the evaluation of clinical screening algorithms for the detection of cervical pre-cancer in women in PNG.

PNG has among the highest estimated burdens of cervical cancer globally, but currently has no national cervical screening program. Since 2012, I have been involved in a number of studies undertaken by the PNGIMR and its collaborators, including with the Kirby Institute, aimed at identifying a locally appropriate model for cervical screening and early treatment. Within the PNG context, there are many challenges and opportunities for research and support of a national cervical cancer prevention program, which is exciting.

I applied to undertake my PhD at UNSW because of the long-standing collaborative research relationship between the Kirby Institute, and the PNGIMR. In particular, Professor Andrew Vallely, one of my PhD supervisors, has been instrumental in leading much of the research into cervical cancer and HPV in PNG, so it made sense to join the Kirby Institute because my PhD is in this area. I have had great supervision and support throughout my PhD journey and can honestly say that it's been a joy to be part of the Public Health Interventions Research Group. I've learnt and grown so much as a researcher."



Tony Butler and team discuss recruitment strategies for the JOSH Study.

UNDERSTANDING THE SEXUAL HEALTH RISKS AND NEEDS OF VULNERABLE YOUNG PEOPLE

Young people in the community who are in contact with the criminal justice system are one of the most vulnerable groups in society, especially when it comes to their sexual health needs. But the Kirby Institute’s Professor Tony Butler believes they are also a group where health interventions have a good chance of leading to positive and lasting impact.

The challenge is that researchers currently do not have accurate information about this population’s experiences. “We can’t design effective interventions unless we understand the experiences, health problems, behaviours and associated risk behaviours of these young people,” says Tony.

This is where the Kirby Institute’s Juvenile Offender Sexual Health Survey (or JOSH) comes in. The JOSH Survey is a world-first survey, designed to uncover the sexual health behaviours, attitudes and needs of young people in the community who come into contact with the justice system, as well as their mental health needs.

In 2017–18, 10,638 young people experienced juvenile justice supervision or incarceration across Australia. Sexually transmissible infections (STIs) are common among this group, as well as among the partners of young people who have been incarcerated.

“These young people mostly come from disadvantaged social and family backgrounds, many have histories of

abuse, poor mental health, have poor education attainment, and many engage in risky sexual health behaviours,” says Tony. “However, because they have contact with the justice system, we have an opportunity and responsibility to better engage these young people and provide them with targeted information about their sexual health and other health issues. If we can better understand their attitudes to sex and relationships, we can design programs and interventions to assist them to negotiate and navigate healthy sexual relationships in the future.”

Reaching youth at high risk for STIs and blood-borne viruses is important from a public health perspective. Young people in contact with the criminal justice system report higher levels of sexual activity than community peers and do not routinely access sexual health services. Despite the complex health needs of this population, young people involved in the justice system are mostly excluded from community surveys based on household or school sampling methods and may have disengaged from the traditional educational sector.

“This survey will give us a much better understanding of the sexual health and mental health needs of young, justice-involved people.”

Tony Butler



OUR COLLABORATOR

Dr Jocelyn Jones
Senior Research Fellow,
University of Western Australia

“As a Nyungar woman from Western Australia, I am committed to helping young vulnerable people, particularly young Aboriginal men and women who are over-represented in the justice system. I first met Professor Tony Butler when I was working in the justice field in Western Australia in 2002 and Tony was working at Justice Health. Our paths crossed again in 2009 when I became involved with the Offender Capacity Building Grant on which Tony was lead investigator. That grant supported my doctoral studies, and provided access to a range of expert and multidisciplinary researchers in the offender health field, as well as opportunities to participate in research collaborations interstate and internationally.

I am an associate investigator on the JOSH research project and the Western Australian hub manager. This study found that young people living in the community and in contact with the criminal justice system have extremely high rates of mental disorder and represent an at-risk population for whom mental health interventions are critical. I hope to use the findings from WA to influence policy and programs in the Department of Health and Corrective Services.

Strong long-term collaborations with expert leaders in the field between NSW and WA have built the foundation for continuing research in this area and are extremely important in influencing policy and program development to the offender population.”

In 2017-18* in Australia:

10,638

young people experienced juvenile justice supervision.



More than 4 in 5 young people under supervision on an average day were supervised in the community, and **almost 1 in 5** were in detention.

Of those in detention, over

90%

are boys and young men.

Aboriginal and Torres Strait Islander young people are significantly overrepresented among juvenile offender populations, accounting for

40%

of those under supervision, and over

50%

of those in detention.



*According to the Australian Institute of Health and Welfare, Youth Justice in Australia 2017-2018 Report



Dr Jocelyn Jones testing interview questions for the JOSH Survey.

“Youth in contact with the criminal justice system can be regarded as a forgotten population and until now, a knowledge gap has existed with regard to their sexual health needs,” says Tony.

During 2018, Kirby Institute researchers conducted surveys among young people aged 14-17 with histories of contact with the criminal justice system. The results, expected in early 2019, will inform the design of health promotion programs and initiatives to improve the sexual health of young people.

“This survey will give us a much better understanding of the sexual health and mental health needs of young, justice-involved people which will form the basis for developing multi-agency interventions for this group,” says Tony.

Improving the health of incarcerated Australians

The JOSH survey is part of an innovative range of research projects at the Kirby Institute that focus on the health needs of those people engaged with the justice system. Prisoners are a high-risk group for contracting infectious diseases, in particular, hepatitis C.

The Kirby Institute’s world-leading research on infectious diseases and blood-borne viruses has provided a strong foundation for our expansion into justice health. In addition to the JOSH study, we monitor and analyse trends in blood-borne viruses and STIs and produce the National Prison Entrants’ Blood-borne Virus and Risk Behaviour Survey. Our SToP-C trial is the first treatment-as-prevention study for hepatitis C worldwide and is being conducted in maximum security prisons in NSW. We also lead an NHMRC Centre of Research Excellence (CRE) in Offender Health. The CRE brings together a team of internationally recognised researchers from across Australia who specialise in various aspects of offender health in the areas of mental health and infectious diseases.

OUR PEOPLE

Dr Paul Simpson
Research Fellow, Kirby Institute

“My background is multidisciplinary, stemming from my undergraduate studies in the psychological sciences and my PhD studies which examined relationships between illness (hepatitis C), identity and ideology. Today, I would say my work sits within the intersections of public health and criminology.

My research work at the Kirby Institute centres on justice system-involved populations with a focus on sexual and mental health, marginalisation and ethics. I’m a fan of utilising diverse methodologies; from standard public health ones to novel ones like deliberative methods. I hope my research helps to create better public discourse and policy in terms of more humane and effective options and treatment for those in contact with the justice system.

I was attracted to the Kirby Institute because of its history and reputation in working to improve the health and wellbeing of marginalised peoples. Having a dedicated research program for justice system-involved populations is nationally significant. This population experiences some of the worst health and economic outcomes, greater than anyone in the community. To be involved in work that seeks to improve health outcomes and reduce justice system contact of these groups is important and meaningful.”



2018
IN REVIEW

Together, we are finding innovative health solutions to empower those affected by infectious diseases, in Australia and globally.



Eithandee Aung and Steven Philpot from our HIV Epidemiology and Prevention Program.

OUR COLLABORATIONS

We collaborate with organisations around the globe, creating solutions to global health challenges and driving our collective research success into the future.

Our researchers collaborated with the London School of Hygiene and Tropical Medicine on a number of projects involving infectious diseases globally. In 2018, our institutions were awarded a \$2million grant by the Australian Government's Indo-Pacific Centre for Health Security to investigate antimicrobial resistance, which is rapidly becoming a major public health issue in Indonesia.

We have an extensive clinical trials network, and collaborate with study sites across the globe. For our D²EFT study, a large clinical trial for second-line HIV treatment, we recruit patients from sites in more than 14 countries. In Latin America alone, we collaborate with four sites in Argentina, three in Mexico, and one each in Brazil, Chile and Colombia. These collaborations strengthen the global relevance and impact of our research findings.

We collaborate with hundreds of institutions and community organisations across Australia to produce a broad spectrum of impactful research. In particular, our Annual Surveillance Report on HIV, viral hepatitis and STIs in Australia requires the valued contributions of many partners. By collecting and analysing national data, the report provides vital information to inform the public health response to these infections in Australia, particularly among different affected populations and demographics.

Our global collaborations by the numbers

Argentina	13	France	7	Mexico	3	Solomon Islands	1
Bangladesh	1	Germany	13	Myanmar	4	South Africa	6
Belgium	3	Guinea	1	Netherlands	8	Spain	2
Brazil	3	India	7	New Caledonia	1	Sweden	2
Cambodia	1	Indonesia	24	New Zealand	12	Switzerland	12
Canada	22	Iran	2	Nigeria	2	Taiwan	1
Chile	1	Israel	2	Norway	2	Thailand	18
China	9	Italy	1	Pakistan	1	Timor-Leste	2
Colombia	2	Japan	2	Philippines	2	UK	22
Denmark	3	Korea	1	PNG	19	USA	50
Ethiopia	3	Malaysia	5	Portugal	2	Vietnam	6
Fiji	3	Mali	1	Singapore	1	Zimbabwe	1

The Myanmar Australia Research Collaboration for Health (MARCH) is the Kirby Institute's collaborative venture with the University of Medicine 2 (UM2) in Yangon, Myanmar. It is an opportunity to share information about Myanmar's public health issues, and lend expertise to help train the next generation of local health professionals.

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collaborations in
Australia

OUR IMPACT

From bench to bedside, our discoveries have made us world leaders in the response to infectious diseases and blood-borne viruses. We empower communities to lead research that matters to them and we invent practical and meaningful solutions to defeat epidemics. Today, the impact of our work is felt around the world.

DRIVING DOWN NEW HIV INFECTIONS IN NSW

As HIV rates continue to decline in NSW, the impact of collaborative research cannot be overlooked.

In 2018, the results of the Kirby Institute-led pre-exposure prophylaxis (PrEP) trial, called EPIC-NSW, were published in *The Lancet HIV*, detailing a decline of almost one third in HIV transmissions in gay and bisexual men in NSW, following the launch of the trial.

Funded by NSW Health, and conducted in close partnership with community organisations, EPIC-NSW is the first study globally to measure the impact of PrEP on reducing HIV in a large population. PrEP is a medication which, when taken daily by an HIV-negative person, prevents them from contracting the virus.

“The speed of the decline in new HIV infections in gay and bisexual men in NSW is a world first. In the year following the trial, state-wide new HIV infections in this population decreased by one third, from 149 infections in the 12 months prior, to 102 in the 12 months after. These numbers are the lowest on record since HIV surveillance began in 1985,” says Professor Andrew Grulich, who is chief investigator on the trial. “Our research tells us that these reductions are a result of PrEP, implemented on a background of high and increasing HIV testing and treatment rates.”

Andrew credits the success of EPIC-NSW to a collaborative approach and the commitment of multiple partners across clinics, community and research, as well as leadership from the NSW government.

“The results from EPIC-NSW provide an important evidence base to inform our response to HIV globally,” adds Andrew. “We now know that PrEP implemented quickly, at a large scale, and targeted to high-risk populations can help turn the HIV epidemic around.”



Former NSW Health Minister the Hon. Jillian Skinner (left) and Andrew Grulich (second left) with partners on the EPIC-NSW trial.

EPIC-NSW ceased enrolling on 30 April 2018, following PrEP being made available through the Pharmaceutical Benefits Scheme (PBS). Poignantly, the announcement was made the day after the funeral of Professor David Cooper, the Kirby Institute’s inaugural director. “EPIC-NSW was initiated by the late David Cooper back in 2015,” says Andrew. “The reality that research, conducted in partnership with communities and supported by government, has led to a life-saving HIV prevention medication being placed on the PBS was exactly what David had in mind when he founded the Kirby Institute.”

IMPACT HIGHLIGHTS

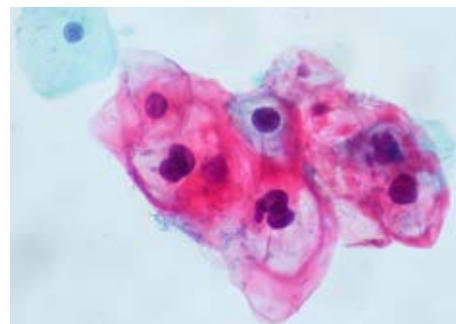


National HIV diagnoses hit seven year low

For over twenty years, the Kirby Institute has collected and analysed data relating to the occurrence of HIV, viral hepatitis and sexually transmissible infections (STIs) in Australia. The *Annual Surveillance Report* provides vital information to inform the public health response to blood-borne viruses and STIs in Australia, particularly among different affected populations and demographics.

According to the 2018 report, the number of newly diagnosed cases of HIV in Australia declined by 7% over the past five years, following a steady increase since 1999. This represents the lowest number of new HIV diagnoses in seven years.

We also reported that an estimated 199,230 people were living with chronic hepatitis C infection at the beginning of 2017, decreasing to 182,144 by the end of 2017, with over 20,454 people cured of hepatitis C since the end of 2016, thanks to increased access to new treatments subsidised by the Pharmaceutical Benefits Scheme.



Monitoring success: genital warts decline among Aboriginal young people

Genital warts, once the most common STI managed at sexual health clinics, have decreased significantly, following the introduction of the national vaccination program for human papillomavirus (HPV) in 2007, according to a study conducted by the Kirby Institute. Since then, Aboriginal and Torres Strait Islander people aged 21 years or younger being diagnosed with genital warts at their first sexual health clinic visit has reduced by 82% in men and 100% in women.

Researchers attribute the drastic reductions to the impact of Australia's highly successful National HPV Vaccination Program, a fully funded program which remains unique in its ambitious scale, offering the vaccine to all females aged 12 to 26 years in a mass catch-up program. It was introduced in 2007 and 1.5 million girls and women were vaccinated in the first three years. Genital warts are caused by HPV, and monitoring the prevalence of warts in a population is an early indicator for the reduction in prevalence of HPV.



Two for one: mass drug administration has the potential to eliminate neglected tropical diseases

Kirby Institute researchers have partnered with researchers at the Murdoch Children's Research Institute and colleagues in the Solomon Islands to advance the fight against neglected tropical diseases in the Pacific by proving that it is possible to safely treat large populations for trachoma and scabies simultaneously.

For the study, an entire population (of over 26,000 people) in the Choiseul Province of Solomon Islands was given antibiotics to treat these highly infectious neglected tropical diseases. Both scabies and trachoma are very easily treated by the antibiotics, ivermectin and azithromycin. This research found that mass administration of these antibiotics simultaneously was both safe and practical in a large population. It paves the way for the development of new studies to assess the safety and effectiveness of co-administration of treatments for other neglected tropical diseases.



Affordable treatment leads to fewer deaths from hepatitis C

Kirby Institute data, presented for the first time this year at the Australasian Viral Hepatitis Conference in Adelaide, show that there has been a 20% decline in deaths from hepatitis C since new, highly effective direct acting antiviral (DAA) therapies have been made available nationally on the Pharmaceutical Benefits Scheme.

The decline, based on NSW data from more than 100,000 people with a hepatitis C diagnosis, is the first large scale evidence of the impact of new DAA treatments on liver-related mortality in Australia. In the decade before these treatments were available, there had been a three-fold increase in the number of people with hepatitis C dying from liver failure and liver cancer.



Informing international guidelines on undetectable viral load and HIV transmission

Results from a large Kirby Institute-led study of HIV transmission risk among homosexual male couples with differing HIV status were published in July 2018. The study, called *Opposites Attract*, contributes to global evidence demonstrating that when the HIV-positive partner is on daily antiretroviral therapy (ART) and has an undetectable viral load, the risk of sexual transmission to the HIV-negative partner is effectively zero.

These results form a significant part of the evidence base for the international community-led Undetectable=Untransmissible, or U=U campaign, which highlights the fact that people living with HIV can now live long and healthy lives, with effectively zero chance of sexually transmitting the virus to others, provided their viral load is undetectable due to effective ART. The study has been cited in the Consensus Statement endorsed by HIV global leaders and organisations.



Young investigators tackle infectious diseases in Myanmar

The Myanmar-Australia Research Collaboration for Health, or MARCH, is a collaboration between the Kirby Institute and the University of Medicine 2 in Yangon, Myanmar, and aims to improve the management of infectious diseases in Myanmar. The collaboration has a particular focus on encouraging young local clinicians to perform research that addresses the problems that they encounter every day in Myanmar's under-resourced public health system.

Senior MARCH clinicians Professor Mar Mar Kyi and Dr Ne Myo Aung have been collaborating with researchers from the Kirby Institute since 2013, examining diseases as diverse as malaria, HIV and rabies. With their support, a group of young Myanmar clinicians is addressing a variety of new infections in partnership with researchers from the Kirby Institute. The collaborative approach to training and research is raising the next generation of trained local researchers, and the locally-led research has the ability to impact future public health and education policy in Myanmar.



Mohamed Hammoud is a Senior Research Manager in the HIV Epidemiology and Prevention Program. He manages the Flux study.

Flux study sheds light on sex and drug use among gay and bisexual men

Flux, which stands for 'Following Lives Undergoing Change,' is Australia's first entirely online cohort study of licit and illicit drug use among gay and bisexual men. Led by the Kirby Institute, it focuses on the often-controversial topic of 'chemsex', which involves the use of drugs to enhance sexual pleasure. With over 4,000 Australian gay and bisexual men taking part in the study since 2014, it is among the world's largest studies in this area.

Flux monitors changes in drug-using behaviours, beliefs and attitudes, and engagement with gay community networks over time. Through ongoing community consultations, the study has identified the need for a nuanced approach to community-based interventions. It highlights the importance of pleasure, but also acknowledges the risk of drug use, and emphasises the need to shift from a paradigm of 'war on drugs' to one of evidence-based harm reduction, including the use of biomedical HIV prevention strategies among chemsex networks.

Following the success of Flux in Australia, this study launched in New Zealand in 2018 and will be expanding into the lesbian, bisexual and queer women communities in 2019.



DONOR IMPACT

Distinguished GP continues his legacy

Our gratitude and appreciation are with the late Dr Lynn Joseph and his family whose bequest of \$1.4 million continues to be used to engage general practitioners in the management of hepatitis C.

Dr Lynn Joseph was a general practitioner and World War II veteran with a lifetime commitment to health care, particularly at the community level. He had a strong commitment to holistic care for patients, and recognised the crucial role of community in improving health. His bequest has been directed to programs working to establish the best ways of engaging general practitioners in the management of infectious diseases.

Professor Greg Dore, together with his team, have continued to use the much-needed funds to investigate the best ways to engage general practitioners in the management of hepatitis C and provide training to administer new and highly effective direct-acting antiviral treatment, which is now available in Australia as part of the Pharmaceutical Benefits Scheme.

OUR INNOVATIONS

Now is not the time to stand still. We are on the precipice of major breakthroughs in our quest to end HIV, hepatitis C and other infectious diseases. But there is more to do.

Lasting change requires brave determination, not merely to test boundaries, but to completely reshape them. It's a challenge that energises us every day. It's why we remain focused on breaking new ground in the response to epidemics. We are well positioned to lead communities toward a future free from the burden of disease.

ENHANCING DETECTION AND TREATMENT OF ANAL CANCER PRECURSORS

Human papillomavirus (HPV) causes around 5% of all cancers, including an increasing number of anal cancers. These are preceded by precancerous lesions, which provides us with a potential opportunity to intervene early to prevent anal cancer. However, there is no proven, effective treatment for these pre-cancers.

"If we can detect and treat these early lesions, we may be able to prevent the development of cancer," says Associate Professor Mark Polizzotto, who is head of the Kirby Institute's Therapeutic and Vaccine Research Program, and a consultant haematologist at St Vincent's Hospital, Sydney. "We are addressing the challenges of detection and treatment in parallel through clinical capacity development and novel research."

HPV-associated anal lesions are detected through a procedure called High Resolution Anoscopy, or HRA. There are only a handful of clinicians nationwide who are trained in this highly specialised procedure. This year, with support from the Glendonbrook Foundation, the Kirby Institute has begun training clinicians in HRA. The first of these, Dr Ian Wong, is also a PhD candidate at the Kirby Institute.

"Increasing the numbers of trained anoscopists will improve access to this important diagnostic procedure. But, identification is not enough – once we diagnose these lesions, we need an effective way of treating them," says Mark. "That's where our SPACE study comes in".

SPACE, which stands for the Study of Pomalidomide in Anal Cancer Precursors, is the first study globally to test whether we can treat HPV-associated anal lesions by enhancing the body's own immune response to HPV. Pomalidomide is an oral medication that enhances the body's

immune system and based on its use in studies to treat other cancers, Mark believes it may help control HPV infection and lesions and prevent them developing into cancer.

Study participants receive pomalidomide for 6 months. HRAs are conducted at baseline and throughout the trial, to monitor the effectiveness of pomalidomide treatment over time. In 2018, the trial completed enrolment, with early results expected in 2019.

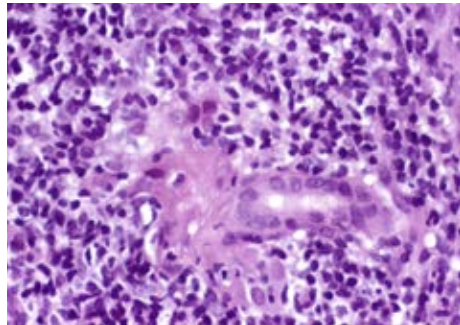


Dr Ian Wong (right) demonstrating the Digital Ano-Rectal Examination in a workshop held at the Kirby Institute.

The populations at highest risk of HPV-associated anal cancer include people with immunodeficiencies including HIV, men who have sex with men, transgender people, and women with prior cervical HPV disease.

"Through enhancing workforce capacity to detect anal cancer, and trialling medication that can provide effective treatment, we're adding essential strategies to the toolkit for anal cancer elimination," says Mark. "It is this innovative, multi-faceted approach that makes Kirby Institute research unique."

INNOVATION HIGHLIGHTS



New research uncovers high burden of hepatitis C among people who inject drugs

More than one in three people who have injected drugs in the last year are living with hepatitis C infection, new Kirby Institute research has found. The greatest numbers of people with hepatitis C who have recently injected drugs live in Eastern Europe, East and Southeast Asia, and North America. Globally, half of all people with hepatitis C who have recently injected drugs live in four countries: the Russian Federation, the United States, China and Brazil.

This research helps to outline priorities for expanding hepatitis C prevention, testing and treatment strategies among people who inject drugs in order to achieve global hepatitis C elimination.



\$2 million grant will devise new strategies to improve antibiotic dispensing in Indonesia

The Kirby Institute, the London School of Hygiene and Tropical Medicine and university partners in Indonesia were awarded almost \$2 million to investigate antimicrobial resistance (AMR) in Indonesia.

AMR occurs when germs such as bacteria become resistant to the medicines meant to treat them. The widespread over-the-counter dispensing of antibiotics, without prescription in many low- and middle-income countries, leads to inappropriate use of the drugs, and is a key risk for AMR.

This new grant was announced at the 1st Malaria World Congress by the Hon. Julie Bishop MP, former Minister for Foreign Affairs as part of the Government's \$300 million Indo-Pacific Health Security Initiative, and will address this growing threat to regional health security.



Catalysing health innovations and health security in the Indo-Pacific region

In June, the Kirby Institute was pleased to host Mr Lelio Marmorola, Executive Director, Mr Robert Matiru, Director of Operations, and other members of the Unitaid leadership team for a bilateral meeting and health innovation forum.

In his opening remarks, Mr Marmorola noted that this was Unitaid's first official visit to Australia, and that they were pleased to mark the occasion with the innovation forum at the Kirby Institute.

"Unitaid's work is fundamentally focused on identifying and bringing to market innovations that can be game-changers in the global health response," said Mr Marmorola. "One of our key objectives during our visit is to hear more about the innovations in the region on HIV/AIDS, tuberculosis and malaria but also on other issues that threaten health security."



World-first Australia-Papua New Guinea study will set roadmap for HIV services

The Kirby Institute collaborated with researchers at Papua New Guinea's Institute of Medical Research and the US Centers for Disease Control and Prevention to provide Papua New Guinea's first representative survey of people most at risk for HIV in Port Moresby.

The study found that in one in six sex workers in Port Moresby are HIV positive, and more than half of all sex workers have a sexually transmissible infection (STI) other than HIV. Among men who have sex with men and transgender, almost one in 10 are HIV positive, and more than a third are positive for an STI.

This is the first time a study of this kind has been able to test for so many STIs at point-of-care and represents an important breakthrough in HIV and STI monitoring, testing and treatment in low resource settings.



HIV research given a boost with half a million-dollar grant

In partnership with ViiV Healthcare, the Kirby Institute announced a new grant of over half a million dollars to support HIV research capacity in the region. The unconditional education grant makes possible a research and training program initially proposed by the late Professor David Cooper, inaugural Director of the Kirby Institute.

Australia has been a global exemplar in its response to HIV, making significant progress towards eliminating new HIV transmissions and improving the lives of those living with HIV. The Cooper HIV/AIDS Research Training Program (CHART), will help transfer Australian learnings and train experts to ensure the best scientific evidence underpins local HIV policy and practice.



Expanding HPV elimination to South Africa

The Kirby Institute will work with a team of Australian and South African investigators (primarily from Witwatersrand Reproductive Health and HIV Institute) to investigate the impact of human papillomavirus (HPV) vaccination on prevalence of infection in South African adolescent girls.

South Africa is a socially and economically diverse country and has high levels of HIV infection which might affect how well the vaccine works to prevent HPV. Through providing new knowledge on the impact of both 2 and 1 dose vaccinations in this setting, we hope to uncover important information to inform HPV vaccination programs in other low- and middle-income countries.



Rebecca Guy is a Professor and Head of the Surveillance, Evaluation and Research Program. She is the Chief Investigator for the Centre for Research Excellence in scaling up new point-of-care diagnostic technologies.

Centre for Research Excellence in scaling up new point-of-care diagnostic technologies

The Kirby Institute will lead a Centre for Research Excellence (CRE) focussing on scaling up new point-of-care diagnostic technologies for infectious diseases of global importance, including HIV, hepatitis C, tuberculosis, HPV and STIs.

Our previous work in this area has shown that point-of-care testing in primary care works to improve infectious disease diagnosis in remote Aboriginal communities in Australia, and the CRE collaboration is well placed to scale up this method in other settings in Australia and our region.

This project will break down barriers to treatment access, ultimately leading to major reductions in the associated illnesses, and improvements in the overall health of communities.



DONOR IMPACT

Enhancing GP skills in anal cancer detection

With the incredible generosity of the Glendonbrook Foundation, the Kirby Institute, led by Associate Professor Mark Polizzotto and Professor Andrew Grulich, have established a pilot training workshop to train general practitioners and raise awareness about anal cancer detection. The main risk factor for the development of anal cancer is anal exposure to human papillomavirus (HPV) and HPV-associated anal lesions.

In November, the Kirby Institute hosted the first of a series of workshops training general practitioners in techniques to improve screening for anal cancer.

Dr Carmella Law, who holds a conjoint senior lecturer position at the Kirby Institute along with her appointment at St Vincent's Hospital, Sydney, is one of these trained clinicians, and using her expertise in High Resolution Anoscopy, she developed this innovative workshop that provides both theoretical and hands-on training in digital ano-rectal examination, which detects early anal cancers.

With the support of the Glendonbrook Foundation, the next generation of clinicians will be able to better diagnose and detect this disease and ultimately save lives.



EXPANDING INTO NEW RESEARCH AREAS: BIOSECURITY

In 2018, the Kirby Institute established a new biosecurity research program, headed by Professor Raina MacIntyre, a globally renowned leader in biosecurity, vaccinology and public health research.

“Our research is focused on emerging infectious diseases, control of epidemics and bioterrorism,” says Raina. “Health security is an increasingly important and complex issue in a changing geopolitical and biotechnology landscape.”

The Biosecurity Program is a multidisciplinary program of 15 researchers and students that engage with experts in health, field epidemiology, emergency management, defence, law enforcement and ethics. The team will launch a new academic journal, *Global Biosecurity* in 2019.

“The Kirby Institute has collaborated with Professor MacIntyre for many years, and we’re thrilled she has formally joined us,” says Professor Tony Kelleher, Director of the Kirby Institute. “Raina and her team bring new skills and expertise to our cross-disciplinary team at the Kirby Institute. The Biosecurity Program will enhance our ability to examine, prevent and respond to global epidemics, and introduce new strengths in the response and control of emerging infectious diseases and

bioterrorism. This is an exciting new area for the Kirby Institute.”

One of the first projects the Biosecurity Program led at the Kirby Institute was a hypothetical scenario designed to test global preparedness and response to a bioterrorist attack in our region. The exercise brought together key international representatives from departments of health, foreign affairs, defence, police, non-government agencies, vaccine manufacturers and other global stakeholders. The focus of the scenario was an outbreak of smallpox incorporating lessons from real outbreaks and underpinned by modelling research.

“The scenario demonstrated that our coordinated regional response must start within seven days of identifying the first case to ensure the best possible outcome and early termination of the epidemic,” says Raina. “We looked at a worst-case scenario, because the purpose of an exercise like this is to prepare for the worst, while hoping for the best. It is a mammoth task to ensure that the health systems work in close partnership with military, police, emergency services, vaccine and drug manufacturers, the World Health Organization and many other agencies.”

The scenario highlighted the need for a coordinated response across all levels of

society, and identified factors within our control which can be modified to prevent a worst-case scenario.

The Biosecurity Program also conducts research on vaccine-preventable infections including influenza, vaccines, personal protective equipment and emerging infections. The team conduct clinical trials, and epidemiology and modelling research. They have a particular focus on field epidemiology and epidemic response, with an NHMRC Centre for Research Excellence in epidemic response, which has developed an epidemic observatory, called Epiwatch, as a flagship project. Other important research conducted by the Biosecurity Program includes the development of automated rapid epidemic intelligence using open source data, which will help to overcome shortages of skilled staff for disease surveillance.

The smallpox workshop was funded by the National Health and Medical Research Council (NHMRC) Centres for Research Excellence, Integrated Systems for Epidemic Response (ISER), along with Emergent Biosolutions and Bavarian Nordic.

Some of the members of the Biosecurity Program. Left–right: Shovon Bhattacharjee, Mallory Trent, Aye Moa, Raina MacIntyre, Jessie Chen, Dillon Adam, Mohana Kunasekaran.

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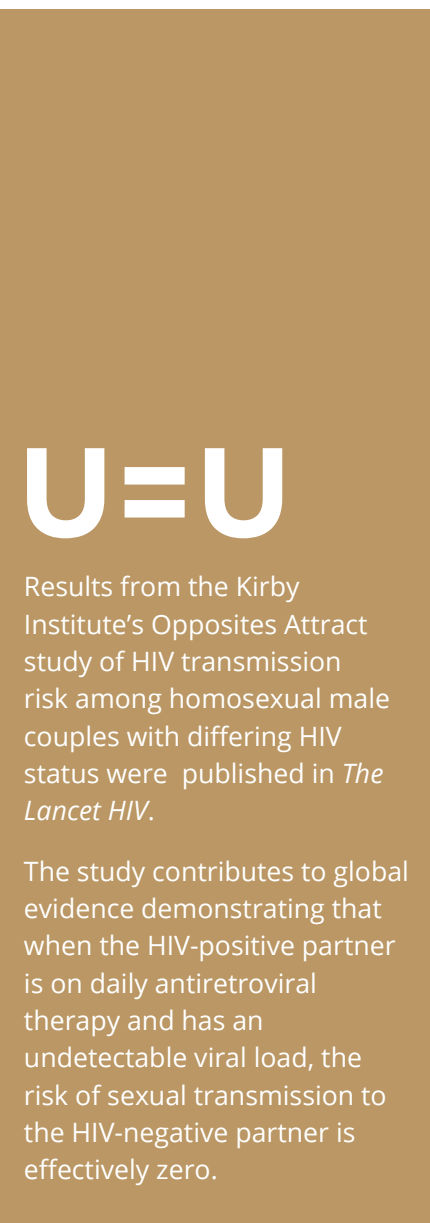
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This prize is awarded annually for the most impactful first author paper by a Kirby Institute student, published in the previous calendar year.

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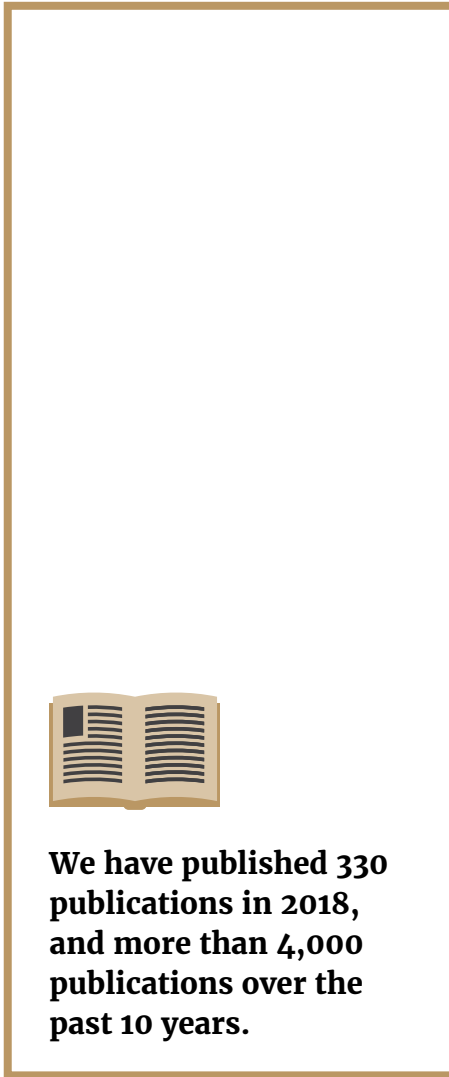
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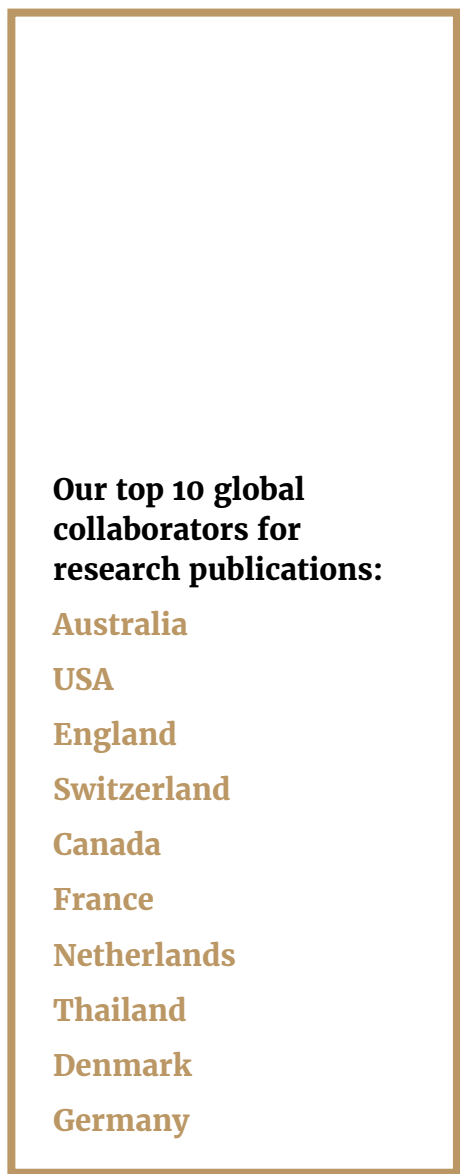
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Daren Draganic is the Kirby Institute's Manager. Daren oversees the operations of the Kirby Institute, including finance, human resources, administration, information technology and communications. Together with his team, Daren provides invaluable support to all Kirby Institute research activities.

2018 EXTERNAL FUNDING

National Health and Medical Research Council (NHMRC)

Program grants	AUD\$
Discovery and translation of interventions to control sexually transmitted infections and their consequences	1,318,594
Hepatitis C infection: epidemiology, pathogenesis, and treatment	667,079
HIV latency, pathogenesis and immunity	1,749,789
Development grants	
Development and validation of a latent tuberculosis diagnostic	217,039
Equipment grants	
Bio-safety cabinet	495,000
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	470,746
Aboriginal and non-Aboriginal women perpetrators of violence: a trial of a prison-based intervention (Beyond Violence)	273,620
Developing youth-centred health promotion strategies to prevent and mitigate the adverse health impacts of adolescent pregnancy in PNG	230,818
HIV treatment as prevention: a longitudinal assessment of population effectiveness	91,066
Modelling the impact of strategies to control gonorrhoea and minimise the threat of antimicrobial resistance in remote Indigenous and other high-risk populations	155,322
New strategies to increase testing and treatment for endemic sexually transmitted infections in remote Aboriginal communities	9,449
Point-of-care diagnosis of sexually transmitted infections to improve maternal and neonatal health outcomes in resource-limited, high-burden settings	211,357
Point-of-care HPV-DNA testing for cervical cancer screening in high-burden, low-resource settings	322,373
Resolving Human Immunodeficiency Virus (HIV) transmission	267,383
Risk factors for long-term chronic disease events in HIV-positive persons: the D:A:D cohort study	172,453
Risk of hepatitis C reinfection among people with current injecting drug use following successful HCV treatment (SHARP-P and SHARP-C)	343,229
School versus community-based albendazole deworming for control of soil transmitted helminths in school-age children in the Philippines	427,847
Serological responses to anal HPV infection: characterising the natural history of anal HPV	87,058
Solving delivery of gene therapy for control of Human Immunodeficiency Virus infection	262,340
The sexual health and attitudes of Australian prisoners	961,581
Use of molecular resistance assays to provide alternative oral treatment strategies for gonorrhoea in Indigenous and other high-risk populations; a randomised cluster trial	105,866

Partnership grants

Developing and implementing systems to optimise treatment, care and support among people diagnosed with HIV	215,765
Enhancing treatment of hepatitis C in opioid substitution settings II (ETHOS II)	241,944
Identifying and addressing gaps in Australia's adolescent HPV vaccination program	290,847
Striveplus: refinement and translation of an intervention designed to improve sexual health service delivery in remote communities	113,525
Surveillance and treatment of prisoners with hepatitis C (STOP-C)	351,845
The HIV prevention revolution: measuring outcomes and maximising effectiveness	193,980
Uptake, sustainability and impact of scaling up point-of-care testing for sexually transmissible infections in remote and regional Aboriginal communities (TTANGO2)	199,455

Centres of Clinical Research Excellence

Integrated systems for epidemic response (ISER)	273,014
Offender health	324,273

European Union Collaborative Research Grants

European AIDS vaccine initiative 2020	50,000
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Fellowships

Dr Benjamin Bavinton (Early Career Fellowship)	81,798
Dr David Boettiger (Early Career Fellowship)	105,665
Prof Tony Butler (Research Fellowship)	172,076
Prof Miles Davenport (Senior Research Fellowship)	143,455
Prof Basil Donovan (Practitioner Fellowship)	117,054
Prof Gregory Dore (Practitioner Fellowship)	117,054
A/Prof Jason Grebely (Career Development Fellowship)	120,850
Prof Andrew Grulich (Principal Research Fellowship)	157,077
Prof Rebecca Guy (Research Fellowship)	158,455
Dr Bridget Haire (Early Career Fellowship)	81,798
Dr Behzad Hajarizadeh (Early Career Fellowship)	81,798
Dr Jennifer Iversen (Early Career Fellowship)	81,798
Prof John Kaldor (Senior Principal Research Fellowship)	177,653
Dr David Khoury (Early Career Fellowship)	81,798
Prof Matthew Law (Principal Research Fellowship)	157,077
Prof Andrew Lloyd (Practitioner Fellowship)	107,298
Prof Raina MacIntyre (Research Fellowship)	117,808
Prof Lisa Maher (Senior Research Fellowship)	129,835
Dr Mark Polizzotto (Early Career Fellowship)	89,298

Dr Lucia Romani (Early Career Fellowship)	20,450
A/Prof Andrew Vallely (Career Development Fellowship)	120,850
Dr Lisa Vallely (Early Career Fellowship)	81,798
A/Prof Vanessa Venturi (Career Development Fellowship)	110,779
A/Prof Virginia Wiseman (Career Development Fellowship)	100,709
Dr Huachan Zou (Early Career Fellowship)	92,502

Postgraduate scholarships

Dr Nila Dharan	42,575
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Discovery projects

An interdisciplinary approach to host-pathogen interactions in infection	109,935
Male sex workers and their clients	95,868
Understanding global biomedical technologies in local realities	232,498

Federal Department of Health

Australian collaboration for co-ordinated enhanced sentinel surveillance (ACCESS)	172,540
Extended genital warts surveillance network	122,000
National trachoma surveillance and reporting 2015–2017	180,000
Research activities for blood borne virus and sexually transmissible infections	2,041,400
Surveillance activities	2,145,455
Modelling national medical stockpile requirements	91,636
Services to operate the national trachoma surveillance and reporting unit 2018–2021	500,000

NSW Ministry of Health

Developing and implementing systems to optimise treatment, care and support among people diagnosed with HIV	29,392
Enhancing treatment of hepatitis C in opioid substitution settings II (ETHOS II)	150,000
EPIC-NSW: extended PrEP implementation in communities in NSW	484,720
Identifying and addressing gaps in Australia's adolescent HPV vaccination program	60,000
Patient delivered partner therapy in publicly funded sexual health clinics	36,455
PrELUDE: Implementation of HIV pre-exposure prophylaxis with antiretroviral medications among people at high risk for HIV infection	25,617
The HIV prevention revolution: measuring outcomes and maximising effectiveness	342,000
The NSW prevention research support program	499,050
The NSW research program for HIV, STIs and viral hepatitis	586,591

Australian Research Council (ARC)

Australian Governments



Dianne Carey is a Senior Research Officer in our Therapeutic and Vaccine Research Program. Among other Kirby Institute studies, she manages FLU 003 Plus, a study funded by the National Institutes of Health that looks at risk factors and outcomes of individuals hospitalised with influenza viruses over time and by location.

National Institutes of Health, USA

Other Government Departments

ACT arm of EPIC-NSW (ACT Health)	3,303
Developing and implementing systems to optimise treatment, care and support among people diagnosed with HIV (WA Health)	21,646
Evaluation of the electronic monitoring of domestic violence offenders program (NSW Department of Justice)	49,994
HIV (PrEP) Implementation (WA Health)	250,000
Identifying and addressing gaps in Australia's adolescent HPV vaccination program (WA Health)	50,000
Improving the dispensing of antibiotics by private drug sellers in Indonesia (Department of Foreign Affairs and Trade)	550,000
National HIV seroconversion study (QLD Health)	27,445
Population-based linkage study (WA Health)	10,000
Reducing impulsivity in repeat violent offenders using a selective serotonin reuptake inhibitor (NSW Department of Justice)	1,050,000

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)	1,273,632
AIDS malignancy consortium (AMC) and ANCHOR	36,936
Anti-influenza hyperimmune intravenous immunoglobulin (FLU-IVIG) international	287,619
Asia-Pacific HIV research collaboration: cancer studies (subcontract with American Foundation for AIDS Research)	91,144
Ecology of African highland malaria (subcontract with University of California)	9,506
INSIGHT - FLU 002 & FLU 003 (subcontract with University of Minnesota)	349,584
Mechanisms limiting neonatal immunity (subcontract with Cornell University)	30,736
START study (subcontract with University of Minnesota)	1,129,957
TREAT Asia HIV observational database (subcontract with American Foundation for AIDS Research)	377,412
TREAT Asia pediatric HIV observational database (TApHOD) (subcontract with American Foundation for AIDS Research)	243,896

Other grants and contracts

Australian

Future Research Leadership Fellowship - Mark Polizzotto (Cancer Council NSW)	160,000
Investigating the association between fatigue and pain, and the factors that influence them, in patients with chronic fatigue syndrome (JJ Mason & HS Williams Memorial foundation)	98,000
Scholarship - Robert Monaghan (The Lowitja Institute)	48,888

Pharmaceutical industry

International

CanHepC trainee competition (Canadian Network on Hepatitis C)	40,866
Independent evaluation of the structured operational research and training initiative on Ebola conducted in Liberia and Sierra Leone (World Health Organization)	15,959
Influenza vaccination after myocardial infarction (Orebro University Hospital)	211,500
Key population integrated bio-behavioural survey in Papua New Guinea (Oil Search Foundation Limited)	82,916
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)	140,692
D ² EFT study (UNITAID)	1,336,678
Implementation of 'Test and Treat' strategies for HIV treatment and prevention (World Health Organization)	52,920

AbbVie Pty Ltd	2,643,009
Cepheid Inc	44,093
Gilead Science Inc (USA)	1,057,851
Gilead Science Pty Ltd	170,000
Janssen-Cilag Pty Ltd	25,000
Leidos Biomedical Research, Inc	1,806,745
Merck Sharp & Dohme	209,010
Seqirus Australia Pty Ltd	378,323
ViiV Healthcare Pty Ltd	75,000

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