



UNSW  
Kirby Institute

# Kirby Institute

## Annual Report

# 2020



UNSW  
SYDNEY



The Kirby Institute is a world-leading health research institute at UNSW Sydney.


We work to eliminate infectious diseases, globally. Focused in Australia and the Asia-Pacific region, our work improves and protects human health, wellbeing and ability to thrive.

The SARS-CoV-2 P.1/Gamma lineage entering cells, 2–3 days post culture, 20x microscope objective.

 Kirby Institute – Stuart Turville

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**Front cover:** Dr Anupriya Aggarwal with Associate Professor Stuart Turville and Dr Alberto Ospina Stella in the background, working inside Kirby Institute's PC3 containment lab.  Kirby Institute/UNSW – Richard Freeman.



## Message from our Director

Professor Anthony Kelleher

2020 was an extraordinary year. The COVID-19 pandemic had a dramatic impact on the way we work and live, and on the research activities at the Kirby Institute.

You will read in this report about the broad program of research that we established to respond to the urgent and evolving situation. Thanks to our expertise across the full spectrum of research disciplines, we were able to adapt quickly, leverage our existing collaborative networks, and help uncover important insights into this virus which has already had such a dramatic global impact.

While we took on a very substantial portfolio of COVID-19 research, it has been absolutely essential that we continue to conduct our broader infectious disease research. HIV, hepatitis C, sexually transmissible infections, neglected tropical diseases and other blood borne viruses remain a significant focus for us, and COVID-19 has brought about new challenges particularly for those most impacted by these illnesses.

COVID-19 has impacted on how we conduct our work, but infectious disease doesn't stop. 2020 was about adapting, and I have been proud of the unequivocal responses of our dedicated researchers at the Kirby Institute who have rapidly, redeployed their skills, knowledge, and expertise to meet unpredictable and unprecedented national and global health challenges. It was what was required, and our teams have made an enormous contribution to uncovering critical new knowledge, some of which you will read about in this report.

Whilst being physically separated for much of the year, I was proud to celebrate the achievements of our staff. Promotions and graduations continued, albeit at a distance, and it is a testament to the talent of our staff and the impact of their work that we are able to once again present an impressive Kirby Institute Annual Report.



## Message from our Patron

The Hon. Michael Kirby AC CMG

We launch the 2020 annual report at a remarkable moment in time. This report represents a year during which the advancement of medical science occurred at an unprecedented rate in response to a sudden global pandemic, the likes of which has not occurred in over a century.

The teams of researchers at the Kirby Institute, I am proud to say, made enormous contributions to global efforts to understand and control COVID-19. Their work has reduced deaths. It has uncovered important insights to pave the way for optimal preventions and treatments. And the vast international clinical networks, established in part by the Institute's inaugural director, the late Professor David Cooper AC, along with many colleagues across the world, with such foresight in the 1980s in response to the HIV epidemic, have continued. These networks have been critical in setting up lifesaving clinical trials to develop therapeutics for COVID-19 and understand its impact on the health of people with existing conditions like HIV.

There are many parallels that can be drawn between COVID-19 and other infectious disease epidemics and crises, in which

the Kirby Institute has worked for over three decades. First, that the burden of illness is unequal. Whilst the virus itself doesn't discriminate, the ability to prevent the spread of disease, and of health systems' capacity to deal with the sick, varies greatly across the globe and is heavily dependent on resources. Second, access to treatments, vaccines and other medical interventions must be universal to save lives and eliminate the disease. Australia needs to rapidly step up the roll out of vaccines both at home and abroad. And third, it is remarkable what can be achieved when the scientific community is substantially united in a common cause. The progress that has been made in the last year has been dramatic, and I am hopeful that, with the brilliant work of scientists the world over, including those at the Kirby Institute, we can look forward to resuming our globalised lives, with a shared sense of community.



### We fight disease by spreading solutions.

Infectious diseases work by spreading through individuals, communities and populations. At the Kirby Institute, we deliver solutions the same way. As a world-leading health research organisation, we focus on putting communities at the heart of our research. That way, we are better able to design tests, treatments and cures that have the greatest chance of success, helping us to eliminate infectious diseases globally.

### We discover, develop, implement, and evaluate solutions to infectious diseases.

What makes these solutions unique is that they are designed to be scaled for maximum impact across diverse communities, populations, and regions.

We do this via a highly successful, three step approach:

1. **Understanding:** the impacts of infectious diseases in individuals and populations.
2. **Intervention:** a holistic approach to developing, testing, and evaluating new strategies to prevent and treat infectious disease.
3. **Implementation:** a consultative approach to working with affected and at-risk communities to deliver evidence-based health solutions.

### Equality drives us

Infectious diseases disproportionately affect marginalised populations.

We work with at-risk communities, ensuring the most effective interventions and treatments reach those who need them the most.



**Above:** Associate Professor Rowena Bull and Mr David Agapiou from our Viral Immunology Systems Program, working on COVID-19 patient samples in the Kirby Institute's Glendonbrook Laboratories.  
© Kirby Institute/UNSW – Richard Freeman



**3**  
NHMRC Program Grants



**13**  
NHMRC Project Grants



**6**  
NHMRC Partnership Grants



**25**  
NHMRC Fellowships and Investigator Grant



**5**  
NHMRC Centre for Research Excellence Grants



**15**  
National Institutes of Health (USA) Grants

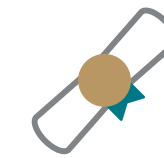


**2**  
Medical Research Future Fund Grants

## 2020 by the numbers



**242**  
staff members



**4**  
UNSW academic promotions



**18**  
PhD completions



**79**  
postgraduate students



**39**  
international postgraduate students from **24** countries



**36**  
Kirby Institute Seminar Series talks held



**961**  
collaborations in **48** countries on **6** continents



**626**  
peer reviewed publications\*

\*BORIS, UNSW



## COVID-19

2020 was the year that changed everything, and at the Kirby Institute, we changed too. In early 2020, there were no COVID-19 experts anywhere in the world, but by the end of the year, our institute was home to many.

For 35 years we have sought to understand viruses, how they move through our bodies, how they move through populations, and most importantly, how to prevent their spread.

In 2020, we applied our skills and expertise to COVID-19, providing impactful research solutions that have influenced public health policy, and saved lives.

## Scientists unite in the fight against COVID-19

Is the virus mutating? Can it be transferred through breast milk? How can we harness antibodies to fight the virus? These are some of the questions our scientists answered in 2020.

With the outbreak of COVID-19 in late 2019, Kirby Institute researchers spent the early months of 2020 rapidly repurposing our laboratories to conduct COVID-19 research. Our labs are one of only a few labs in Australia cleared to work with the live SARS-CoV-2 virus.

By March, teams of virologists, immunologists and biologists, led by Associate Professor Stuart Turville, were investigating the virus' lifespan, creating safe virus lookalikes, and planning studies of immunotherapeutic solutions to COVID-19.

A key immunotherapy, called passive immunisation, was explored in 2020 as a potential therapy for COVID-19 patients, led by the Kirby Institute's Director, Professor Anthony Kelleher.

"We screened the blood of people, including donors across the Lifeblood's national blood donor network, who have recovered healthily from the virus to determine how active their antibodies are against the virus," said Prof Kelleher. "This knowledge enabled our team to develop plasma-derived therapies for treating people with serious, progressive COVID-19 infection."

Another antibody-based collaboration with the Garvan Institute investigated whether monoclonal antibodies – lab-made molecules engineered to work as substitute antibodies – could be used in potential therapies.

Simultaneously, our teams were involved in large international trials testing this passive immune-therapy approach in hospitalised patients, coordinating the recruitment of patients from our region; and successfully completing the first clinical trials of this kind in this space. These trials will continue into 2021.

## Tracing COVID-19 with rapid genomics


Kirby Institute researchers pioneered the use of rapid genomic sequencing technology to efficiently and accurately track the source and spread of coronavirus cases, in collaboration with the Garvan Institute.

In partnership we developed the most rapid coronavirus genome sequencing strategy in Australia to date. The technological advance has provided critical, timely clues on how cases of SARS-CoV-2 infection are linked.

"Every time the SARS-CoV-2 virus passes from person to person, it may make copying errors that change a couple of its 30,000 genetic letters. By identifying this genetic variation, we can establish how different cases of coronavirus are linked – to know where a case was potentially picked up from and who they may have given it to," said the Kirby Institute's Associate Professor Rowena Bull. She was co-first author on the paper published in *Nature Communications*.

A/Prof Bull says genomic testing is crucial for tracking virus transmission in cases where the source remains unclear from investigating known epidemiological contacts alone.

"By reconstructing the virus' evolutionary history, or 'family tree', we can understand the behaviours that help spread COVID-19 and identify so-called 'super-spreaders'," she said.

**Left:** [Novel Coronavirus SARS-CoV-2](#). Colourised scanning electron micrograph of a cell (pink) heavily infected with SARS-CoV-2 virus particles (teal and purple), isolated from a patient sample. Image captured at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland.  NIAID/Flickr ([CC BY 2.0](#))



“This project has provided valuable insights into the first wave of COVID-19 in Sydney, and through this work we have also established a system for monitoring COVID-19 seroprevalence over time, not just in Sydney, but nationally.

**Dr Dorothy Machalek**  
Research Fellow, Kirby Institute and  
Coordinator on the Sydney Serosurvey

## Measuring the first wave spread of COVID-19 in Sydney

The Kirby Institute conducted Australia’s first population-level antibody study to shed light on how many people contracted COVID-19 in Sydney after the first epidemic wave. The work was co-led by Professor John Kaldor and coordinated by Dr Dorothy Machalek in collaboration with the National Centre for Immunisation Research and Surveillance (NCIRS), NSW Health Pathology, Australian Red Cross Lifeblood, public and private pathology laboratories, with support from NSW Ministry of Health.

The study was conducted between April and June 2020, capturing infections up to mid-May, and used a unique sampling approach to confirm that SARS-CoV-2 had infected only a tiny proportion of Sydneysiders. Estimated SARS-CoV-2 seroprevalence was below 1%, indicating that community transmission was low during the first COVID-19 epidemic wave in Sydney.

The team tested 5,339 blood samples for SARS-CoV-2-specific antibodies collected as part of routine visits unrelated to COVID-19 from three populations: blood donors, women undergoing routine antenatal screening, and other people undergoing diagnostic pathology testing. The three populations surveyed provided very similar results, increasing confidence in the generalisability of the findings to the broader community.

The findings show the success of measures taken early in the pandemic in NSW to control the virus’ spread and the importance of people being vigilant and continuing to come forward for testing, given that the vast majority of the population remains vulnerable to infection. While the results from this study confirm a strong response from NSW Health early in the pandemic, they also highlight the urgency of achieving high vaccine coverage.

The study methodology provided a model for expansion to the second nationwide study conducted between June and August 2020 and will be used in the future to track population immunity following vaccination.

## Boosting the public health response to COVID-19 in NSW

During 2020, the Kirby Institute was proud to send a team of researchers and project staff to NSW Health to join the fight against COVID-19.

Dr Louise Causer, Dr Laila Khawar, Mr Jonathan King, Mr Nicolas Legrand, Ms Erin Ogilvie, Dr Prital Patel, Dr Nick Rose, Ms Mallory Trent and Dr Manisha Yapa joined with NSW Health public health teams to increase the operational and research capacity of NSW Health.

Professor Anthony Kelleher, said that these types of partnerships are essential to Australia’s response to COVID-19.

“We needed to rapidly increase our understanding of COVID-19. Knowledge of this virus, how it moves through communities and what prevents its spread forms the basis of the tools we use to combat it,” he said.

“The Kirby Institute has a long history of research partnership with NSW Health. Our existing networks, relationships and surveillance systems helped support both the extraordinary day-to-day operations and essential new research on COVID-19.”

## How Kirby Institute ‘INSIGHT’ from HIV is facilitating a rapid COVID-19 response

In 2020, the Kirby Institute co-led and collaborated on a number of major international COVID-19 treatment trials, by utilising an existing clinical trials network established for HIV treatment trials.

The unprecedented pace of development for these trials, shortening a process that usually takes years to a matter of months, reflects years of preparation by network leaders.

INSIGHT (the International Network of Strategic Initiatives in Global HIV Trials) was established over 20 years ago in response to the HIV pandemic, and has since conducted pivotal trials in HIV and other viral infections including influenza.

“INSIGHT was conceived by colleagues at five universities along with the U.S. National Institutes of Health. Among those leaders were the Kirby Institute’s Professor David Cooper (who passed away in March 2018) and Professor Sean Emery (now the Senior Vice Dean Research at UNSW Medicine), so Australian leadership in these global clinical trials goes right back to the beginning,” said Associate Professor Mark Polizzotto, who led the Kirby Institute’s Therapeutic Vaccine and Research Program.

“The strength of INSIGHT is its global reach. This allows us to rapidly answer critical questions about treatments for COVID-19, ensuring we can offer the trial to patients wherever there is an outbreak. Evaluating treatments in a diverse range of populations, including those who are not normally represented in clinical trials, ensures the trial treatments are applicable to all those who need them.

“For infectious diseases like HIV, influenza and now COVID-19, there are regional variations in both the disease itself, and the health systems in which it’s treated. A gold-standard ‘successful treatment’ needs to be effective across a range of settings,” said A/Prof Polizzotto.

“The true strength of INSIGHT is its diversity. It brings together study sites in low, middle, and high-income countries, and resources them effectively to find a treatment that will save lives.”

The Kirby Institute’s Therapeutic Vaccine and Research Program continues to lead work with sites across multiple countries including some of those with the greatest burden of infection such as India and Argentina, to address the most relevant ongoing therapeutic questions.



Healthcare workers at trial site in Capetown, South Africa. Note, this photo was taken prior to COVID-19 restrictions.



“Being able to communicate complex scientific and health issues simply to the community is important to empower people during challenging times.”

**Professor Raina MacIntyre**  
Program Head, Biosecurity Program

### Understanding long COVID

Early in the pandemic, many of our clinical academics established cohort studies at sites across Sydney’s hospitals to understand the pathogenesis and natural history of COVID-19. One of these, the ADAPT study at St Vincent’s Hospital headed up by Professor Gail Matthews led to the first description of ‘long COVID’ in Australia and is one of the most comprehensive long COVID studies in the world. These same cohorts are now being used to investigate the causes behind the long COVID syndrome and to potentially design therapeutic interventions.

### Global collaboration to identify strategies for people living with COVID-19 and HIV

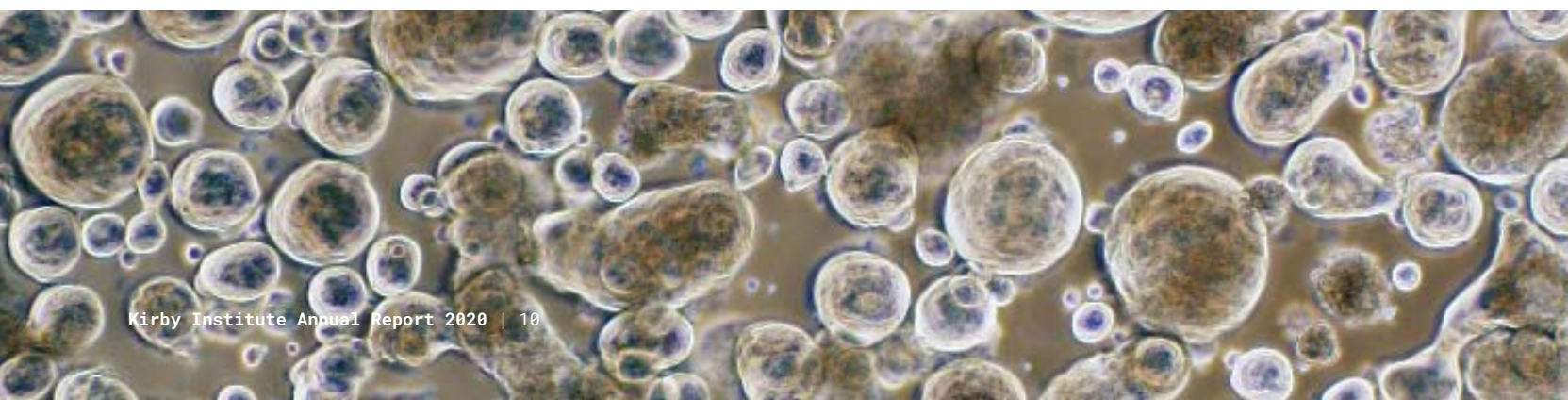
Globally, there are 37.9 million people living with HIV, and most people with HIV live in resource-constrained settings, where health systems were stretched well before COVID-19. During 2020, the Kirby Institute’s Dr Emmanuelle Papot coordinated a multi-country study – called COHIVE: Coronavirus Outcomes in HIV Evaluation in Resource Limited Settings – to determine risk factors for COVID-19 among people living with HIV, and to collect crucial information to inform strategies for clinical care in low- and middle-income countries.

### Keeping the public informed

During 2020, a large number of Kirby Institute researchers shared their expertise and research with the public through the media and were involved in a range of high-level government and scientific committees focusing on the epidemic.

Professor Raina MacIntyre was named by the Australian Science Media Centre as the most prominent expert in news articles involving COVID-19, whilst the Kirby Institute was the fourth most prominent institute. Prof MacIntyre was also invited to write a number of commentaries during the pandemic, including in *The Lancet* and *BMJ Global Health*.

**Right:** Associate Professor Stuart Turville working inside Kirby Institute’s PC3 containment lab. **Cell image:** The SARS-CoV-2 B.1.351/Beta lineage, entering cells, 2-3 days post culture, 20x microscope objective.



## Aboriginal and Torres Strait Islander health

Across the full spectrum of research disciplines at the Kirby Institute, our researchers work alongside Aboriginal and Torres Strait Islander community-controlled health organisations and government agencies that service Aboriginal communities to identify, develop and evaluate culturally appropriate interventions to prevent and treat infectious disease.



The road to Papunya, Northern Territory. © Steve Bell



### COVID-19 testing program improves access in remote communities

For Aboriginal and Torres Strait Islander Australians living in rural and remote areas, the nearest laboratory able to conduct a COVID-19 test can be hundreds of kilometres away, meaning significant delays in receiving a test result.

To help address this, researchers at the Kirby Institute worked closely with Flinders University International Centre for Point of Care Testing, state health departments and laboratories, Aboriginal Community Controlled Health Services, Government Health Services and industry to develop an urgent solution.

They leveraged an existing program that utilises a sophisticated device called the 'GeneXpert' which delivers on-the-spot test results within 45 minutes.

Prior to the COVID-19 pandemic, the technology was already in use in rural and remote Aboriginal and Torres Strait Islander communities to test for a range of sexually transmissible infections, thanks to the same collaborative efforts. When the pandemic hit, the program was able to be quickly scaled up and expanded to test for COVID-19.

In the case of a positive result, public health action can occur immediately, ensuring timely treatment and minimising risk to others in the community.

The COVID-19 testing program was rapidly rolled out to more than 85 health centres, which are acting as testing hubs for 150 remote communities across Australia. Furthermore, negative test results help prevent costly aero-evacuations of symptomatic individuals while waiting on test results.

"This program has really optimised health care in rural and remote communities, especially during the pandemic," said the Kirby Institute's Dr Belinda Hengel, who was the lead author in *The Lancet Infectious Diseases* paper that described the program framework. "The great thing about it is that local nurses and Aboriginal health practitioners can collect and process the test in the clinic themselves. The fact that this program is decentralised means greater access to these critical tests in a timely manner for people in these communities."

Australia's swift response in identifying a potential gap in access to COVID-19 testing, and addressing it with the point-of-care testing program, as one part of a comprehensive Aboriginal and Torres Strait Islander community-led response has meant that a COVID-19 outbreak in remote Aboriginal and Torres Strait Islander communities has to date been avoided.

### Mathematical modelling to prevent COVID-19 in remote communities

Early in the pandemic, an Emergency Response Plan was coordinated by the national Aboriginal and Torres Strait Islander Advisory Group on COVID-19. Kirby Institute researchers, led by Associate Professor David Regan and Dr Ben Hui used a mathematical model of COVID-19 transmission in remote Aboriginal communities, to inform the design of the Plan, and evaluate its strategies for responding to COVID-19 outbreaks in remote communities.

### Improving influenza vaccination access

Professor Raina MacIntyre co-authored a report on influenza vaccination for Aboriginal and Torres Strait Islander adults for the NHMRC's Evidence-Policy/Practice Gap initiative. The initiative identifies and reports on the gaps between best available research evidence, and current policy and practice in Australia. The report found that influenza vaccine coverage among Aboriginal and Torres Strait Islander adults (18–49 years) is inadequate at 30 per cent, and points to national leadership, identification and targeting of the under-vaccinated, and health information systems as areas requiring improvement.

### Robert Monaghan

#### Aboriginal and Torres Strait Islander Research Manager

In 2020 as part of the Kirby Institute's commitment to developing and enhancing Aboriginal and Torres Strait Islander ownership and leadership of research and within the workplace, Robert Monaghan was appointed to the position of Aboriginal and Torres Strait Islander Health Research Manager.

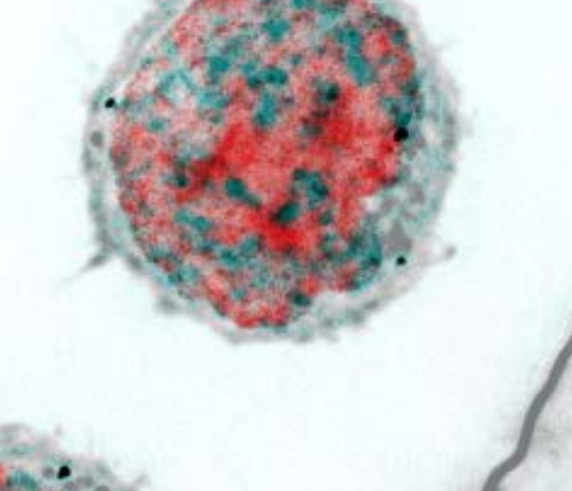
Mr Monaghan is a descendant of the Bundjalung Nation on his mother's side - his family and extended family are from the North Coast alongside the Clarence River at Baryulgil – while there is a long and rich history of descendants from Ireland on his father's side. He has 25 years' experience working within the Aboriginal community-controlled health sector with national, state and local governments, and has worked as a Project Officer with the Kirby Institute's Surveillance, Evaluation and Research Program since 2014.

"The creation of this role is a critical step in the right direction for the Kirby Institute in its commitment to Aboriginal and Torres Strait Islander leadership and engagement across the full spectrum of research."

#### Mr Robert Monaghan

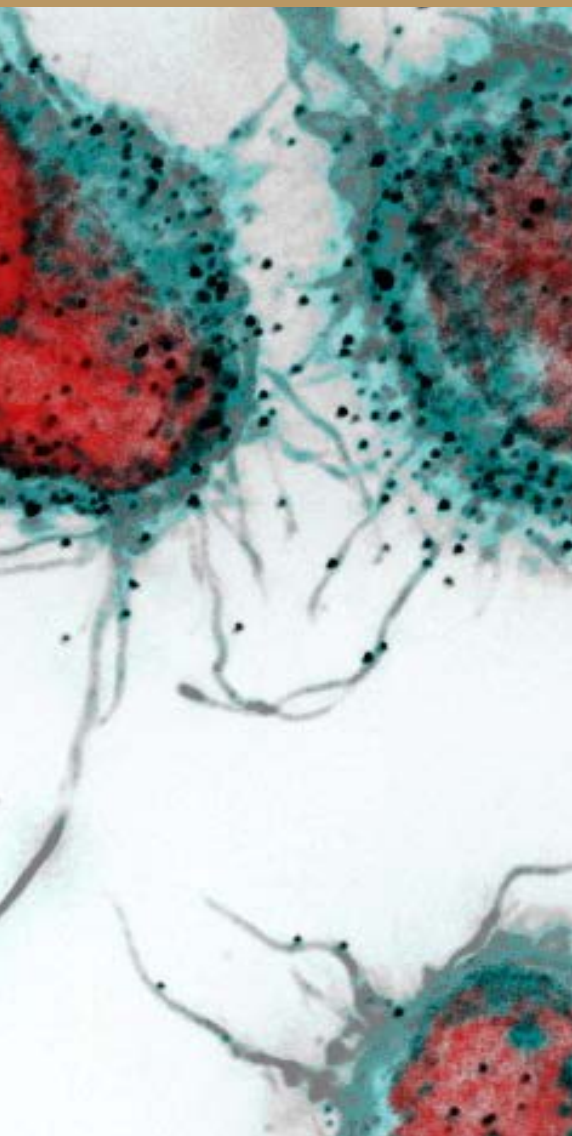
Aboriginal and Torres Strait Islander Research Manager





## HIV

We have made major contributions to the health and lives of people impacted by HIV. We work to prevent HIV transmission and to improve health outcomes for people living with HIV, in Australia and globally.



### Making the case for widespread access to HIV treatment

In 2020, Australia expanded access to HIV treatment and care for people living in Australia on temporary visas (and therefore ineligible for Medicare) by subsidising the cost of treatment by the Australian Government from 2021.

The announcement was the culmination of a long and persistent advocacy campaign spanning over 20 years by community organisations National Association of People with HIV Australia (NAPWHA) and the Australian Federation of AIDS Organisations (AFAO) and supported by research from the Kirby Institute. Associate Professor Kathy Petoumenos and Dr Richard Gray estimated the number of Medicare-ineligible people living with HIV in Australia, and the annual cost of subsidised treatment, providing the evidence base to support the long-standing advocacy campaign.

Based on mathematical modelling, it is estimated that expanding access to treatment for all HIV-positive temporary residents in Australia will significantly reduce HIV transmission between sexual partners, at little additional cost. “If people are unable to access HIV treatment, the risk of HIV transmission increases,” explained A/Prof Petoumenos. “Our model found that the health and economic benefits of expanding access to treatment for this relatively small, but vulnerable group of people far outweigh the cost of subsidising treatment.”

Overseas students, workers, and other people on temporary visas currently access treatment from pharmaceutical companies on a compassionate basis, which the researchers say is neither ideal nor sustainable.

“Equitable access to HIV treatments is critical not only for the health of the individual, but for Australia’s overall ability to achieve our National HIV Strategy targets,” said A/Prof Petoumenos. “The decision to subsidise these treatments also substantiates our endorsement of global goals to provide universal access to antiretroviral therapy for all people with HIV.”

The Kirby Institute’s Director, Professor Anthony Kelleher, says that this policy decision is an example of the impact that collaborative research has on people’s lives. “Importantly, this fantastic outcome demonstrates what can be achieved through cross-sector collaboration, where sustained advocacy from people with lived experience, supported by community, is complemented by robust evidence,” he said.

Left: HIV cells. Kirby Institute – Stuart Turville.



Dr Mohamed Hammoud was awarded the Kirby Institute’s Postgraduate Student Prize for 2020 for his paper titled “Emerging practices and the potential to change HIV epidemiological trends: Pre-exposure prophylaxis as biomedical HIV prevention among gay and bisexual men who participate in chemsex”. The Prize is an annual award given to the most significant first author paper by a Kirby Institute student, published in the previous calendar year in a peer-reviewed journal in the area of infectious diseases.

### Mapping HIV transmission in NSW with genetic analysis

To increase our understanding of the impact of HIV sub-types on HIV transmission in NSW, a team of researchers from the Kirby Institute undertook molecular genetic analysis of routinely collected HIV data. This type of analysis is called ‘molecular epidemiology’ and is able to characterise how viral subtypes move through populations, providing critical information to inform prevention strategies.

The research found that despite recent declines in HIV among gay and bisexual men, most of Australia’s transmission still occurs among this group, but the patterns of transmission vary across a range of demographics, adding crucial detail that was not obtainable from the routinely collected NSW public health data on new HIV cases. It was undertaken as part of a large NSW HIV Prevention Partnership Project which includes researchers, clinicians, the public health sector, and the HIV positive community.

“Molecular epidemiology helps us identify changes in transmission, providing us with insights that we can’t get from clinical data alone,” said Dr Francesca Di Giallonardo. “This information can reveal the missing puzzle pieces in transmission pathways, which is crucial because the more we understand about transmission, the better our HIV prevention strategies will be.” The results from this work helped to inform the NSW HIV Strategy 2021–2025.

### How are gay and bisexual men responding to COVID-19?

The Kirby Institute’s Flux study monitors the sexual and other risk behaviours of hundreds of gay and bisexual men (GBM) in Australia via repeated surveys. In March 2020, Dr Mohamed Hammoud and Associate Professor Garrett Prestage, who led the study, recognised the unique opportunity for the Flux study to monitor the impact of COVID-19 among GBM and adapted the study.

The findings have provided powerful insight into how Australian GBM have responded as a community to the pandemic. Initially, major declines in sexual contacts were observed, corresponding with declines in the use of PrEP, the HIV prevention medication. Many men were avoiding sex to help reduce the risk of COVID-19 transmission, but there were also increases in anxiety and depression.

Study findings informed the development of key HIV policies such as the NSW HIV Strategy 2021–2025 and are assisting with quarterly HIV reporting in NSW; an essential component of monitoring the effectiveness and impact of HIV prevention and testing initiatives.



## Viral hepatitis

Hepatitis impacts some of the world's most vulnerable communities, but globally, life-saving preventions and treatments are not widely accessed. We work to ensure equitable access to hepatitis B and C prevention, treatment, and care.

## Acute and recently acquired hepatitis C trials

Globally, 3–4 million new hepatitis C virus infections are estimated to occur annually. People who inject drugs and HIV-positive men who have sex with men are two groups at highest risk of transmitting and acquiring hepatitis C infection. Two Kirby Institute studies show that treating people early in infection with curative direct-acting antiviral (DAA) therapy delivers high cure rates and limits the potential of transmission of the virus to others.

The REACT study was a large international study funded by the National Institutes of Health (NIH), which compared the efficacy and safety of DAA therapy over six or 12 weeks in people with recent hepatitis C infection, and included some participants who also had HIV, to determine whether DAA treatment cure rates were impacted by coinfection. Early on, the study showed that 12 weeks of treatment was much more effective, showing a 91 per cent cure rate (compared with an 81 per cent cure rate with six weeks of treatment), and that HIV coinfection did not impact on the likelihood of cure.

The TARGET3D study tested the efficacy of different types of DAA medication for people with recent hepatitis C infection over four, six and eight-week timeframes in Australia, New Zealand and the United Kingdom. The two completed cohorts of eight and six weeks have shown over 90 per cent cure rates.

Both studies have shown that early treatment of hepatitis C infection is safe and effective, and reinfection rates are low, making the case for broad access to treatment including in recent infection.

## 25 years of measuring the health of marginalised communities who inject drugs

In 2020, the Kirby Institute marked 25 years of implementing the Australian Needle Syringe Program Survey (ANSPS), our internationally recognised surveillance system for monitoring HIV, hepatitis C and sexual and drug use behaviours among people who inject drugs.

The 2020 report analysed data from 57,000 respondents who had participated since 1995, and measured trends over the past 25 years. Over this time, HIV prevalence remained remarkably low (less than 3%) among people who inject drugs. Although hepatitis C prevalence had been historically high, a significant decline was observed in recent years thanks to a range of targeted measures, supported by the federal government, to prevent, test, treat and measure hepatitis C among people who inject drugs.

People who use drugs access sterile injecting equipment through Needle Syringe Programs (NSP). More than 4,000 NSPs

are located throughout Australia, offering people who use drugs access to advice, information and referrals alongside sterile needles and syringes.

“Access to sterile injecting equipment and drug use advice has been pivotal to Australia maintaining low and stable HIV prevalence among people who inject drugs, and it has played a major role in our recent hepatitis C reductions, with more than half of survey respondents showing no evidence of infection in recent years,” said Dr Jenny Iversen, who has coordinated the study and authored the ANSPS National Data Report for more than a decade.

“Support from the Commonwealth, state and territory health departments and the community, as well as the annual efforts of on the ground Needle Syringe Program staff and clients is the key to why the NSP survey produces such high quality and useful data.”

Australia is set to become one of the first countries in the world to eliminate hepatitis C, and researchers, policy-makers and community leaders agree that it has done so by putting affected populations at the heart of the hepatitis C response.

“The data we have in Australia thanks to the NSP Survey highlights the benefits of investing in robust sentinel surveillance to monitor trends in drug use, sexual and injecting risk behaviour, treatment uptake and prevalence of blood borne viral infections among people who inject drugs,” said Professor Lisa Maher, who leads the survey. “This is absolutely the gold standard when it comes to bio-behavioural surveillance systems to examine and monitor the health of people who inject drugs.”

“When we conduct bio-behavioural surveillance, we don’t only learn about the prevalence of blood borne viruses among people who inject drugs, we learn about the behaviours that may increase risk, and we also learn about prevention strategies developed within these populations, and are able to use these data to optimise interventions and maximise health outcomes.”

**Dr Jenny Iversen**  
Senior Research Fellow, Viral Hepatitis Epidemiology and Prevention Program



## Sexually transmissible infections and HPV

Sexually transmissible infections like chlamydia, gonorrhoea and syphilis are common infections that can lead to serious complications – and in the case of human papillomavirus (HPV), cancer – if left untreated. We search for new strategies to prevent their spread.

### Using the latest medical advancements to drive down HPV and STIs in Papua New Guinea

Papua New Guinea (PNG) has among the highest burden of cervical cancer globally, but like many other low- and middle-income countries, lacks large-scale HPV vaccination and cervical screening programs.

A team of researchers led by Professor Andrew Vallely from the Kirby Institute and the PNG Institute of Medical Research (PNGIMR) have been working with the PNG Obstetrics and Gynaecology Society, national and provincial health authorities, local clinicians, and academic partners in PNG and Australia for more than a decade on new strategies for cervical screening and treatment in this setting.

This group recently designed and tested a new ‘self-collect test and treat’ screening strategy involving more than 5,000 women in PNG. This approach comprises self-collection of a vaginal swab, which is tested for HPV and if positive followed by curative treatment of the cervix using a new highly portable, battery operated device. The entire process is conducted during a single clinic visit with collection, testing and treatment all carried out at point-of-care and taking only a few hours to complete.

“This strategy represents a revolution in cervical screening in high-burden settings – it was highly effective in detecting and treating cervical pre-cancer, and importantly, was highly acceptable for women and health workers in a setting where stigma around sexual health can be a real challenge,” says Prof Vallely.

In late 2020, the World Health Organization announced a global cervical cancer elimination strategy, which set targets of 90% of girls being fully vaccinated with the HPV vaccine by age 15; 70% of women screened with a high-precision HPV test by age 35, and again by age 45; and 90% of women with cervical pre-cancer or cancer appropriately managed with treatment.

“This technology has the potential to help low- and middle-income countries like PNG to achieve the screening and treatment targets, which will have an enormous impact on reducing cervical cancer rates from preventable and treatable HPV,” says Prof Vallely.



### Point-of-care STI testing and treatment to improve birth outcomes

Women in PNG and many other low-resource countries worldwide face an unacceptably high burden of adverse birth outcomes, including preterm birth and low birth weight. Curable, sexually transmitted and genital infections, such as chlamydia, gonorrhoea, trichomonas and bacterial vaginosis, are major factors, but most infections go untreated because they do not cause symptoms and because affordable, easy to use and accurate screening tests are not available.

Prof Vallely and Professor William Pomat, Director of the PNGIMR are jointly leading a world-first clinical trial in PNG to increase STI testing and treatment – the WANTAIM Trial.

“Point-of-care testing has been a huge development in the delivery of healthcare in high-burden resource-limited settings,” says Prof Pomat.

“Through our long-standing partnership with the Kirby Institute, we have been able to gain important insights and achieve beneficial health outcomes for our communities. If we can demonstrate that antenatal point-of-care STI testing and treatment prevents preterm birth and other adverse outcomes, our study could improve the health of mothers and their newborns in high-burden, low-income settings worldwide.”

The study started in 2017, is being carried out among 4,600 women and their newborns in 10 sites in the country, and is expected to report findings in early 2022.

### Does PrEP use affect STI rates among gay and bisexual men?

With HIV pre-exposure prophylaxis (PrEP) being available in Australia through the Pharmaceutical Benefits Scheme since 2018, there have been some concerns that other sexually transmissible infections (STIs) may increase. PrEP is protective against HIV, but does not protect against other STIs.

To determine the trends in STIs before and after PrEP, Kirby Institute researchers analysed clinical data of 2,400 gay and bisexual men in NSW, comparing STI rates before and after they commenced PrEP.

The study found that while STI rates were already relatively high among gay and bisexual men prior to commencing PrEP, there was no increase in STI test positivity after PrEP. These findings highlight the importance of continued efforts to control STIs among gay and bisexual men.

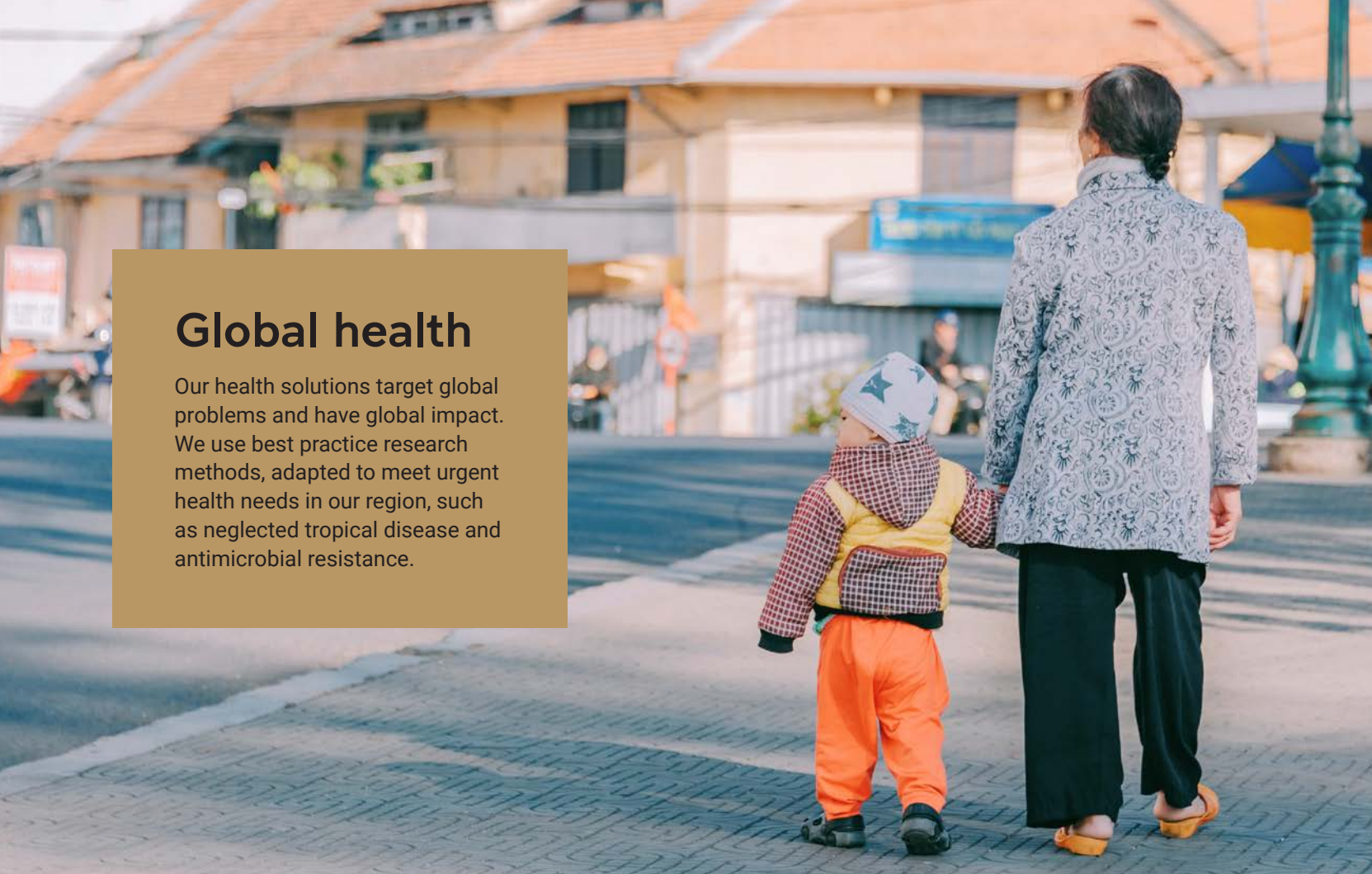
### Progress with elimination of genital warts in Australia

Australia is tracking well to eliminate genital warts, which are caused by HPV, with substantial declines observed in recent years. Thanks to Australia’s highly successful HPV vaccination program, there is real potential to achieve elimination of genital warts; but a definition of what constitutes elimination in Australia has been elusive.

In 2020, Kirby Institute researchers conducted a modified Delphi study among experts to define genital warts control and elimination thresholds in the Australian context. Consensus was reached that with at least 80 per cent HPV vaccination coverage, genital warts will be eliminated as a public health problem in Australia by 2060. This was the first study in the world to define genital warts elimination at a national level.

The framework developed through this study could be used to define genital warts elimination in other settings, with targets particularly valuable for surveillance and vaccination program impact evaluation.

Left: [CIN 1/HPV on ThinPrep](#). Ed Uthman/Flickr. (CC BY 2.0)



## Global health

Our health solutions target global problems and have global impact. We use best practice research methods, adapted to meet urgent health needs in our region, such as neglected tropical disease and antimicrobial resistance.

### Antimicrobial resistance and COVID-19 in Indonesia: research expands amid pandemic threat

An international team of researchers, led by the Kirby Institute's Professor Virginia Wiseman, expanded their ongoing antimicrobial resistance (AMR) study investigating antibiotic use in community pharmacies and drug stores in Indonesia to explore the impact of the COVID-19 pandemic on these drug retail outlets.

The Protecting Indonesia from the Threat of Antimicrobial Resistance (PINTAR) study was launched in 2018 and the first phase of the study revealed widespread inappropriate use of antibiotics amongst private drug sellers in Indonesia; a key risk for AMR. When the pandemic emerged, the researchers were concerned that these new circumstances could further exacerbate inappropriate use and dispensing of antibiotics and therefore accelerate the threat of AMR.

"Private drug sellers, such as community pharmacies and drug stores, are a convenient, affordable and accessible source of antibiotics for many Indonesians," explained Prof Wiseman. "The first phase of the study confirmed that these sellers frequently supply antibiotics without prescription and without appropriate

advice, which could facilitate the development and spread of antibiotic resistance. COVID-19 is a new health threat that emerged rapidly, and we are concerned that it could further accelerate problems of unnecessary self-medication and spark irrational use and hoarding of antimicrobial drugs such as antivirals, antimalarials and antibiotics."

The PINTAR team, including Professor Tri Wibawa from Universitas Gadjah Mada and Professor Ari Probandari from Universitas Sebelas Maret, has now launched a sub-study to explore the understanding of COVID-19 among community pharmacies and drugs sellers.

"This study will provide vital evidence on the types of advice given and medicines dispensed by community pharmacies and drug stores to suspected COVID-19 patients," said Prof Wiseman. "The evidence we gain will inform the design of interventions and policies to improve the quality of care offered by private drug sellers during the current COVID-19 outbreak and any future pandemics."

### Combatting HIV drug resistance in Papua New Guinea

Papua New Guinea (PNG) has the highest burden of HIV in the Pacific region. While education, testing and treatment initiatives have improved in recent years, a rise in drug resistance in the region has proven particularly problematic for those currently on or about to commence HIV treatment.

A new project that commenced in 2020 is set to bolster HIV viral load testing at the point of care, and surveillance capacity relating to HIV drug resistance in PNG. An initiative of the Government of Papua New Guinea, this project is co-led by researchers at the Kirby Institute and the PNG Institute of Medical Research in partnership with the National Department of Health, WHO, UNAIDS, the Central Pathology Health Laboratory and the Provincial Health Authorities in Western Highlands Province and the National Capital District.

Recent data from PNG has shown high rates of HIV drug resistance, highlighting the need for ongoing routine viral load testing to determine the amount of virus present in the body. Through this project, routine surveillance of HIV resistance will be introduced and expanded to include children and pregnant women with HIV.

### Progressing research on neglected tropical diseases

For over a decade, the Kirby Institute has been expanding its work on Neglected Tropical Diseases (NTDs), in close partnership with local collaborators.

NTDs include a range of infectious conditions, and impact on more than one billion people worldwide, mainly in low-income countries. They affect the poorest and most vulnerable in society and perpetuate the cycle of poverty.

During 2020, Kirby Institute researchers and their partners in Australia and overseas have been able to maintain momentum on NTD research during the pandemic. Thanks to the strength of our collaborative networks, we continued to conduct innovative research to improve strategies to control and eliminate NTDs, which remain serious health challenges, alongside COVID-19. These included a clinical trial and impact assessment related to mass drug administration (MDA) for control of intestinal worms (or soil-transmitted helminths) in Vietnam and Timor-Leste; trachoma surveys using clinical, serological and molecular diagnosis in the Solomon Islands; and large-scale MDA for scabies control in Fiji.

### Estimates and projections of COVID-19 in the Western Pacific

Limited resources, both within the health system, and in data collection, place countries in the Western Pacific region at greater risk of COVID-19 epidemics.

To help address this, the WHO Western Pacific Regional Office (WPRO) funded and coordinated a team of Kirby Institute researchers to provide mathematical modelling support to the Philippines and Malaysia. The researchers produced estimates of SARS-CoV-2 infections, the potential number of people who will need hospitalisation and intensive care, and the number of deaths due to COVID-19.

This work builds the capacity of in-country data collection and will map the trajectory of COVID-19 and the impact of interventions and health system scale-up, which is essential for governments to develop appropriate public health and economic policies in response.



**Associate Professor Susana Vaz Nery** leads the Kirby Institute's Neglected Tropical Diseases Research Group. Established in 2020, the Group works collaboratively across a range of NTDs of concern in the Asia-Pacific region, conducting epidemiological, social science and health economics research to control and eliminate these preventable diseases.

## Our collaborations



We collaborate actively with over 950 organisations in more than 50 countries across 6 continents.

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



## Strength through partnerships

Despite the challenges presented by the COVID-19 pandemic in 2020, the Kirby Institute sustained and enhanced, our national and global collaborations. We worked with a diverse range of partners, including at-risk communities, governments, health care professionals, other research organisations and industry, in Australia and abroad. This resulted in better-informed research and more effective solutions.

In Australia, our work was made possible by 604 collaborations across the country.

# Most significant publications

One way of demonstrating the impact of our work is through publishing our findings in peer reviewed journals. In 2020, Kirby Institute researchers published 626 articles in academic journals\*.

The following highlights are just a small sample of our 2020 publications.

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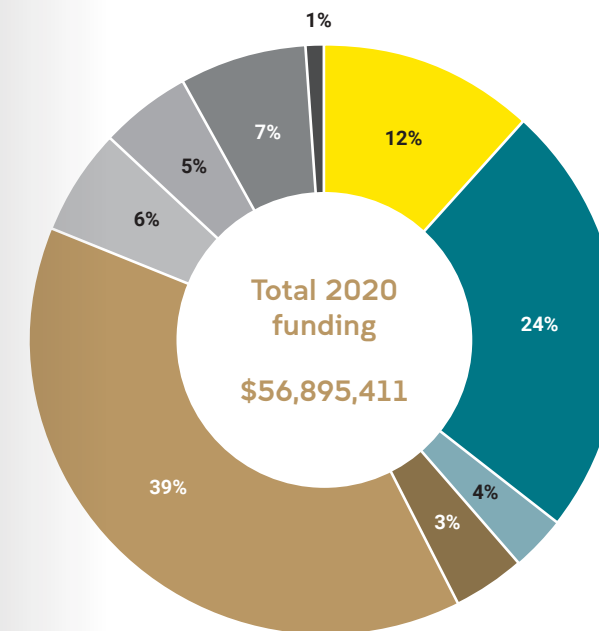
Dr Anupriya Aggarwal, Dr Alberto Ospina Stella and Associate Professor Stuart Turville working inside Kirby Institute's PC3 containment lab.  
Kirby Institute/UNSW – Richard Freeman.



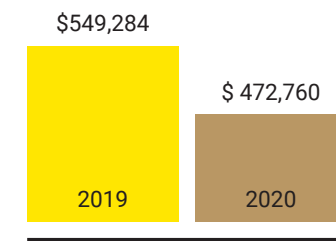
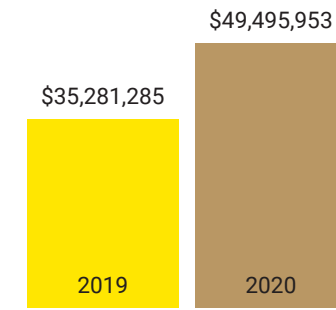
\*BORIS, UNSW

# Funding

		AUD\$
<b>UNSW Sydney</b>		<b>6,926,698</b>
<b>National Health and Medical Research Council (NHMRC)</b>		
Clinical Trials and Cohort Studies Grants		454,054
Centres of Clinical Research Excellence		2,128,725
Development Grants		18,692
European Union Collaborative Research Grants		50,000
Fellowships		2,232,564
Ideas Grants		184,981
Investigator Grants		1,723,518
Partnership Grants		1,256,143
Program Grants		2,315,872
Project Grants		3,139,390
Postgraduate Scholarships		26,560
		<b>13,530,499</b>
<b>Medical Research Future Fund (MRFF)</b>		
Emerging Priorities and Consumer Driven Research		175,153
Coronavirus Research Response		1,467,259
		<b>1,642,412</b>
<b>Australian Research Council (ARC)</b>		
Discovery Projects		82,953
Industrial Transformation Research Hubs		2,056,222
		<b>2,139,174</b>
<b>Australian Governments</b>		
Federal Department of Health		15,305,341
NSW Ministry of Health		1,165,979
Other Government Departments		5,681,863
		<b>22,153,183</b>
<b>National Institutes of Health (NIH), USA</b>		
		<b>3,346,269</b>
<b>Other Grants and Contracts</b>		
Australian		877,472
International		1,854,935
		<b>2,732,407</b>
<b>Pharmaceutical Industry</b>		
		<b>3,952,009</b>
<b>Philanthropic Funding</b>		
		<b>472,760</b>
<b>Total</b>		<b>56,895,411</b>



- UNSW Sydney
- NHMRC
- MRFF
- ARC
- Australian Governments
- NIH
- Other Grants and Contracts
- Pharmaceutical Industry
- Philanthropic Funding



Kirby Institute researchers had an extremely strong year in 2020, with external grant income rising by over \$14 million (40%) compared to 2019. This included significant funding from MRFF.



Associate Professor Stuart Turville and Dr Alberto Ospina Stella preparing to enter Kirby Institute's PC3 containment lab. © Kirby Institute/UNSW – Richard Freeman.



**Left to right:** David Gonski (UNSW Sydney Chancellor), Michael Kirby (Patron of the Kirby Institute), Chuck Feeney, Fred Hilmer (Former Vice Chancellor UNSW Sydney), Charles Curran (Chair St Vincent's Curran Foundation) at the Kirby Institute's 25th anniversary celebrations in 2008.

## \$10 million pledge laid the groundwork for our lead role in COVID-19 research

In 2020, Chuck Feeney celebrated giving away his entire fortune to philanthropic causes. Back in 2011, Chuck Feeney pledged \$10 million to the Kirby Institute, when we were a much smaller institute than what we are today. He was impressed by the people who worked here, and he wanted to invest in 'good researchers'. At that time, no one had heard of COVID-19, but The Atlantic Philanthropies saw the potential to build a research hub at UNSW Sydney that could help tackle any new pandemic that may emerge. Almost 10 years later, the importance of this generous donation could not be greater.

Our Patron, the Hon. Michael Kirby, said that in donating his entire fortune within his lifetime Chuck Feeney's legacy should serve as a sharp reminder for the importance of radical kindness as the world faces COVID-19.

"Chuck Feeney has shown the way for Australians. His contribution was immense. It's now time for others to follow."

## You can make a difference

Thank you to our wonderful community of supporters for your generous philanthropic support throughout the year. It is with your ongoing commitment that we are able to scale up our work on COVID-19, and continue to work with vulnerable communities around the world to prevent new infectious outbreaks, improve access to healthcare in communities impacted by infection, and train the next generation of front-line doctors to improve diagnosis of infectious diseases.

As we continue to work towards developing new therapies, preventative vaccines and better solutions for those who are currently affected by infectious diseases and those who are most at risk, we gratefully receive your support to enable our vision to become reality.

It is through the help of our supporters that the Kirby Institute is able to carry forward cutting-edge research that is improving health outcomes in Australia and around the world. Your support will ensure that the Kirby Institute can continue to alleviate global health challenges and focus on breaking new ground in the response to epidemics.



School children with their stool collection packs for the CoDe-STH trial, comparing the impact of a school versus a community deworming program in the Dak Lak province, Vietnam. © Dinh Ng Nguyen. This photo was taken prior to COVID-19 restrictions.

To find out more and to make a donation, visit [kirby.unsw.edu.au/donate](https://kirby.unsw.edu.au/donate) or call +61 (2) 9385 0900





“You can find Kirby’s solutions to infectious diseases at every critical intervention point – from testing, diagnosis, treatment, and prevention, through to education.”

**Professor Anthony Kelleher**  
Director

Dr Maryam Alavi (right) is speaking to a community worker in Rafsanjan, Iran, where a community-led and community-integrated program for hepatitis C elimination is being conducted. This photo was taken prior to COVID-19 restrictions.  
📷 Conor Ashleigh

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