HIV: THE EPIDEMIC
30 YEARS ON

NEW WAR ON AN OLD ENEMY – FIGHTING BACK AGAINST DRUG-RESISTANT TB
It is a great pleasure to bring you this first edition of IMPACT for 2010. It is an understatement to say that 2009 was a challenging year for the world. Like all organisations we did not escape the effects of the global financial crisis and faced substantial hurdles on a number of fronts. It is a great testament to the skill and tenacity of the Burnet staff and board that we have emerged from 2009 stronger than ever.

We enter 2010 with our new $100 million building almost finished; ahead of schedule and on budget. We have just completed a record year for field and laboratory research performance in terms of the number and quality of peer reviewed publications we have generated. And we have continued to grow our international public health activities by a remarkable 50 per cent over the preceding year. The Institute now has 410 staff, offices in eight countries outside of Australia and an annual operating budget of almost $50 million. Simply stated, we have emerged as a strong independent, not-for-profit medical research and public health organisation.

In 2009, we also launched our new logo designed to encapsulate our mission, ‘to address the major health challenges of disadvantaged, marginalised and resource-poor groups in Australia and overseas’. An emphasis on disease prevention and the unique merging of discovery-orientated laboratory and field research with surveillance and public health activities defines our approach to addressing health problems.

Our work in understanding, diagnosing, preventing and developing therapies to major global pathogens such as HIV, hepatitis C, malaria and tuberculosis remains the mainstay of the Institute and 2009 saw major activities and successes in each of these areas. As well as the pathogens themselves, we continue to focus on the immune system that responds to foreign invaders and to cancers. This understanding provides exciting new avenues to develop novel therapies and the next generation of public health tools, most particularly, more effective and affordable vaccines. In addition, we continue to develop our research and public health activities that focus on broader health issues of mothers and their babies, of adolescents in this country and abroad and increasingly, on indigenous Australians.

We look forward to 2010 with a solid platform to continue to fight many of the major health concerns of Australians and the world’s most needy populations. But we simply cannot do it alone. As we have just seen so dramatically with the humanitarian crisis that followed the catastrophic earthquake in Haiti, the world faces enormous health challenges on so many fronts, and it is the poor who always bear the brunt. This year, more than ever, we will rely on our supporters to help our teams of committed clinicians, scientists, public health experts and general staff to drive us forward in our quest for a healthy life for all.

Professor Brendan Crabb, Director and CEO
One Man Epic fundraises for Burnet

On the first of March Tom Smitheringale set off from Canada to trek 800km across frozen arctic seas, dragging a 160kg sled, in his quest to be the first Australian to reach the North Pole, solo and unsupported. It is an epic battle by one man against blizzards, polar bears and broken ice over 70 days.

During his time in the British military services, Tom witnessed the devastating effects of The ‘Big Three’: HIV, TB and malaria on poor communities in Africa – and vowed to one day find a way to make a difference. He has chosen the Burnet Institute as his charity partner because of our outstanding research and public health programs many of which are focused in these areas. You can help Tom’s fundraising for Burnet by sponsoring his expedition at www.onemanepic.com. Tom will post his progress on the site throughout his amazing quest.

Sir Gustav Nossal delivers 2009 Burnet Oration

On 28 October 2009, one of Australia’s most celebrated medical scientists and humanitarians, Sir Gustav Nossal AC, delivered the Burnet Oration – ‘Recent advances in global public health’. The BMW Edge was at full capacity, and attendees enjoyed the opportunity to meet Sir Gustav after the lecture at a cocktail function.

An eventful end to the year

The Burnet Institute is the proud charity partner of a number of fundraising events. In late 2009, staff promoted the Institute in Queensland, Western Australia and Victoria at the Anaconda Adventure Race series, run by Rapid Ascent.

In November, Rapid Ascent ran the Rainforest Ride in the Great Otway National Park at Apollo Bay. One thousand cyclists enjoyed the spectacular scenery, participating in either the 140km, 70km or 23km ride. We would like to thank all the participants and the people that sponsored them. All money raised supports Burnet’s work with The ‘Big Three’: HIV, TB and malaria.

The Australasian World Music Expo, featuring indigenous artists from the Pacific Region, exposed Burnet to a new audience. A highlight of the partnership was the Papua New Guinea’s (PNG) Moab Stringband performing for staff after a tour of the laboratories. The group was particularly interested in our work with malaria, a disease that is prevalent in PNG and has affected many of their families and communities.

Fenner Lecture

Professor Mark Hogarth, Deputy Director of the Burnet Institute and Head of the Centre for Immunology, was the recipient of the 2009 Fenner Award. The Fenner Lecture is delivered by, and pays tribute to, a Burnet Institute staff member who has made a significant contribution to the Institute’s vision and mission in the areas of medical research and public health.
Almost 30 years since the first eight cases of acute immunodeficiency syndrome (AIDS) were reported in the United States, 65 million people have been infected with HIV and around 32 million people have died of AIDS-related illnesses. In 2007, 33 million people around the world were living with HIV; half were women and 95 per cent were in developing countries. Of the estimated 2.7 million new HIV infections in 2007, some 270,000 occurred in children. AIDS-related illnesses are the leading cause of death in Sub-Saharan Africa, and the fourth leading cause of death globally.

Despite these grim statistics, there have been important achievements. Countries such as Australia, New Zealand, Thailand, and Cambodia quickly took action to promote safer sexual and drug-injecting behaviours and to ensure the safety of blood transfusions. Community organisations were mobilised to access the often marginalised people who were most vulnerable to infection. The prevalence (the proportion of people infected) of HIV among 21 year old men in Thailand decreased from four per cent in 1992 to less than one per cent in 2001 through the promotion of 100 per cent condom use by female sex workers. Similar trends were observed in Cambodia and Brazil.

In Sub-Saharan Africa, there were some notable achievements. In Uganda, HIV prevalence among urban pregnant women decreased from 30 per cent in 1992 to eight per cent ten years later through a government-supported campaign that promoted postponing first sexual intercourse, particularly among teenage girls, reducing the number of sexual partners, and using condoms during casual sex. In a number of other African countries, including Zimbabwe, Zambia, Rwanda, and Ethiopia, HIV prevalence among pregnant
Human immunodeficiency virus – since the early 1980s much has been achieved in the fight against HIV and AIDS but we still face many hurdles. Head of Burnet Institute’s Centre for International Health, Professor Mike Toole, reflects on the achievements and challenges of this major global health problem.

women has declined over the past five years.

Despite these successes, in some southern African countries, such as South Africa, Swaziland, and Lesotho, more than one in four adults is infected with the virus. Meanwhile, an HIV epidemic emerged in Russia, Ukraine, and other eastern European and Central Asian countries fuelled initially by injecting drug use. Closer to Australia, HIV prevalence has reached around 1.5 per cent in Papua New Guinea and more than two per cent in Papua and West Papua provinces of Indonesia.

HIV prevention continues to rely on a small number of interventions – condom promotion, clean needles and syringes, safe blood supplies, and the prevention of parent-to-child transmission. If used correctly and combined with water-based lubricant, latex condoms are highly effective in preventing infection by HIV and other sexually transmitted infections (STIs) during sexual intercourse. Needle and syringe exchange is the cornerstone of an approach known as harm reduction and has been proven to be highly effective.

Trials of biomedical interventions have yielded disappointing results. Of the 30 completed clinical trials with HIV as an end-point, four have proven significant effectiveness. Three of these were male circumcision trials in Africa, which showed that a circumcised man was 57 per cent less likely to be infected with HIV than an uncircumcised man. Consequently, a number of African countries are rolling out mass circumcision programs; for example, the Government of Botswana is scaling up services to enable 80 per cent of men to be circumcised by 2014.

While it is known that individuals infected with another STI are at higher risk of HIV infection, population-based trials of STI treatments have demonstrated no significant impact on HIV infection rates in all but one of eight clinical trials. The exception was in Mwanza, Tanzania, where the incidence of HIV infection was atypically low. While STI treatment is beneficial in and of itself, it may not contribute very much to HIV prevention at a population level.

None of the 11 trials of vaginal microbicides has demonstrated significant protection by these products. Four trials of potential HIV vaccines have been completed; three were negative and one showed a protective effect of 26 per cent. Although the results of the latter trial, conducted in Thailand, show only a modest benefit, they may offer insights for future research.

The greatest achievement during the past decade has been scaling up antiretroviral treatment (ART). Although the first antiretroviral drug, zidovudine, became available in 1987, it was not until 1995 that a new class of drugs led to what is called highly active antiretroviral therapy, or HAART. These new drugs were expensive and initially only available to people in developed countries or the wealthy in developing countries.

Over the past six years the cost of HAART has declined dramatically and low income countries have had access to greater resources to purchase drugs. The number of people receiving HAART in developing countries has increased ten-fold since 2002, reaching an estimated 3 million by 2007.

In 2007, only 33 per cent of HIV-positive pregnant women in low and middle income countries received antiretroviral drugs; in Asia only 22 per cent received ART. On a positive note, in eastern and southern Africa, the figure increased from 11 per cent in 2004 to 43 per cent in 2007.

There remain many challenges in the global response to HIV and AIDS. In 2009, there were calls to provide universal access to HAART as a prevention strategy because HAART reduces the amount of virus in the body to levels that render a person non-infectious. However, there are enormous practical obstacles to this approach and it does not solve the problem that people are highly infectious when they are newly-infected, which is a time when
Laboratory Research

The Burnet Institute’s HIV laboratory-based research is spread across more than 10 different laboratories in our Centres for Virology and Immunology. Focused in five broad areas, research includes: developing a greater understanding of how the virus infects cells and causes disease including progression to AIDS, the development of rapid diagnostic tests, the development of HIV vaccines and microbicides, investigating new drugs and drug targets, and reducing the side effects of existing antiretroviral treatment.

Anderson/Crowe Laboratory (Diagnostics and Basic Research)

Development of a prototype finger prick rapid point-of-care test to measure CD4 count levels in HIV positive patients to determine immune status and appropriateness for commencing antiretroviral therapy. Currently in clinical trial this test will have significant benefit for people living with HIV in many resource-poor countries.

Cherry Laboratory (HIV Neuropathy and Toxicity)

Research into the side effects (such as nerve damage) associated with HIV infection and some of the medications used to treat HIV. Once understood, our aim is then to target appropriate prevention and treatment strategies.

Churchill/Wesselingh Laboratory (HIV Neuropathogenesis)

HIV dementia is thought to be due to the indirect effects of HIV in the brain. This research area aims to understand the mechanisms of HIV infection in the brain and the development of HIV-associated dementia. HIV-infected astrocytes in the brain have been shown to play an important role in HIV-associated dementia and with this knowledge new treatments for dementia can be developed targeting these cells.

Crowe/Jaworowski Laboratory (HIV Pathogenesis)

Research to understand how HIV infection causes defective functioning of immune cells and the effectiveness of therapy in restoring cell function. In addition, we seek to understand how HIV hides within reservoirs in cells and organs to allow specifically targeted treatment to eradicate HIV from the body. Lastly we are investigating why there is premature ageing of the immune system and a higher risk of cardiovascular disease in HIV-infected patients.

Crowe Laboratory (Clinical Research; WHO Regional Reference Laboratory for HIV Resistance)

This NATA accredited laboratory provides HIV viral load testing and HIV genotype testing for The Alfred hospital, clinics across Australia and international clinical trials. CRL also manages the Victorian HIV Tissue Blood and Tissue Storage Bank consortium, providing a valuable source of HIV-infected material for research purposes. CRL also undertakes evaluation of low-cost HIV monitoring tests for resource-poor countries.

Drummer/Poumbourios Laboratory (Viral Fusion)

Researching and understanding the mechanisms associated with virus and cell attachment and how HIV enters and infects cells is critical in developing new therapies targeting this important step in the virus life cycle.

Gorry Laboratory (HIV Molecular Pathogenesis)

Understanding how HIV replicates in and destroys immune cells and how disease progresses within the body is essential in finding ways to halt the replication of the virus. In addition, understanding various genetic factors will also provide knowledge as to why some people progress to AIDS faster than others.
substitution services, need to be massively expanded to achieve total coverage. This is urgent in countries like Russia with its estimated 3 to 4 million injecting drug users, but also in neighbouring countries such as Indonesia, Vietnam, Thailand, and Burma (Myanmar).

More attention is needed to increase coverage of programs to prevent the transmission of HIV from parent to child. In addition, these programs need to take a more comprehensive approach, including preventing new HIV infections in pregnant and lactating women and their sexual partners and providing effective counselling on infant feeding. Moreover, the integration of sexual and reproductive health, HIV prevention, and maternal and newborn care will lead to a much broader impact on women’s and children’s health than HIV prevention alone.

Further efforts are needed to ensure that the more than 6 million people worldwide who need HAART have access to the drugs. Scaling up and maintaining lifelong treatment requires strengthening the health systems through which services are delivered. New diagnostic aids are needed to further reduce costs and increase access to treatment services. Low-cost point-of-care tests to measure CD4 counts and viral loads are under development and showing great promise.

Finally, there remains the need for intensified research on how HIV infects the body’s cells and how that leads to the eventual destruction of the body’s immune system. This critical basic research is needed as a platform to develop safe and effective biomedical prevention interventions, diagnostic tools, and therapeutic agents.

**Lewin Laboratory (HIV Immunopathogenesis)**

This area of research focuses on how the body’s immune system recovers from HIV infection, where HIV hides in patients who are on treatment with antiretrovirals, and how HIV interacts with unique infection-fighting cells called dendritic cells. Improved understanding of HIV reservoirs will assist in a more targeted approach to treatment.

**Mak Laboratory (HIV Assembly)**

By defining and understanding the process of HIV formation and disassembly post infection, we can identify vulnerable parts of the virus for the development of effective treatment and prevention strategies such as new drugs and vaccines.

**Tachedjian Laboratory (Molecular Interactions)**

Understanding how HIV interacts with host cells is essential in developing new treatments and prevention strategies. One approach to HIV prevention is the development of microbicides. Burnet is working collaboratively with biotech company Stapharma to develop a microbicide gel known as VivaGel®. This unique product is active in blocking HIV and herpes simplex virus in laboratory tests and has been proven to be safe in phase one clinical trials.

**INTERNATIONAL HEALTH**

Burnet’s Centre for International Health is a recognised leader in HIV prevention, treatment and care approaches that respond to the characteristics of the epidemic in unique and complex settings across South and East Asia, the Pacific and on the African continent.

The Centre contributes to the development of national policies and plans based on evidence, responding to countries’ practical capacities, strengthening and supporting civil society organisations, including those which work with marginalised and vulnerable groups.

We work with young people most at risk of HIV transmission, involving them in the design and management of prevention programs, and responding to the challenges of basing responses on evidence, while respecting national and localised cultures. As a result, we work with sex workers as well as their clients, and with men who have male-to-male sex, regardless of their sexual or social identities; with drug users and with police and prison officials, helping to reduce HIV transmission and to ensure that drug users gain access to appropriate treatment. We work to engage religious groups in prevention and treatment with populations at high risk.

The Centre also promotes greater engagement of men in reproductive, maternal and child health services in order to reduce the risk of parents and children becoming infected with HIV.

**POPULATION HEALTH**

Burnet’s Centre for Population Health aims to reduce HIV transmission in the Australian population by undertaking research involving groups most at risk of HIV infection. Working with a range of at-risk population groups including men who have sex with men, people who inject drugs, and people from culturally and linguistically diverse backgrounds, our research informs new strategies to prevent HIV infection and to identify people already infected with HIV early in their illness to improve their health outcomes.

The Centre also develops and manages innovative HIV surveillance systems on behalf of the Victorian Government’s Department of Human Services.
NEW WAR ON AN OLD ENEMY

– FIGHTING BACK AGAINST DRUG-RESISTANT TB

It was supposed to be a disease of the past. But tuberculosis continues to exact a huge toll, driven by poverty, poor health services and the HIV epidemic. Globally, almost 10 million cases are estimated to occur annually and two million people, mostly in developing countries, die from the disease.

The emergence and spread of multidrug-resistant TB, or MDR-TB as it is known, has made many of the affordable drugs useless. MDR-TB is present in all countries where testing is available, and at alarmingly high levels in several highly populated countries including South Africa, Papua New Guinea (PNG), India, Bangladesh and even Russia.

MDR-TB is treatable with old and often toxic drugs that were previously discarded for TB treatment. Although treatment is long and difficult, up to 70 per cent of patients can be cured. The problem is that very few patients in developing countries have access to this treatment. As a result most die, and we are now seeing the emergence of extremely drug-resistant TB – XDR-TB, a strain resistant to most of the available drugs. Patients infected with XDR-TB have very limited treatment options.

The spread of drug-resistant TB poses a future threat to our own health system. According to Professor John Reeder, Head of the Burnet Institute's Centre for Population Health, it is imperative that we find not just a drug or vaccine to treat and to prevent the disease, but also better tools for early diagnosis to help recognise and contain it. “Scientists tend to look at new exotic diseases but some of the old enemies, like TB, are coming back at us,” he says. “We are now starting to build programs in this area at Burnet to take up the fight.”

There is progress. Dr Helen Cox, a Senior Research Fellow in the Centre for Population Health, has used DNA fingerprinting technology to track down how the disease is transmitted both within hospitals and communities. Dr Cox, who is
collaborating with ‘Médecins Sans Frontières’ in Khayelitsha, a township in South Africa, has already established, for example, that treating patients at home rather than in specialist hospitals results in more cases being diagnosed and can lead to better outcomes for patients. The project has taken lessons from the roll-out of antiretroviral treatment for HIV, providing diagnosis and treatment close to where people live and empowering patients to understand their disease and take responsibility for completing their treatment. Key elements of the project include training for primary health care staff, counselling, education and support to patients and their families, along with implementing infection control measures in clinical settings, patient’s homes, and the community.

The pilot project in Khayelitsha is being carefully monitored and evaluated with a view to developing a model of care that can be applicable elsewhere. Currently less than five percent of patients suffering from drug-resistant TB have access to appropriate care and treatment. “We aim to use this project to catalyse the expansion of access to good care in many other settings, where people are just dying at the moment”, says Dr Cox.

If the epidemic is to be contained we need to stop the further spread of disease through better diagnosis and better infection control, particularly in health care facilities. “Establishing that transmission can occur within clinics that are not properly ventilated has had a profound effect on how the disease should be treated worldwide,” Professor Reeder says.

TB also remains a problem in many countries in our region. Ms Eman Aleksic, a research assistant working in the Centre for Virology’s Clinical Research Laboratory is helping to unravel why the small Pacific Island nation of Kiribati has such a high rate of tuberculosis. Her work aims to document which TB strains are causing disease in Kiribati and where these strains may have come from.

In comparison to HIV, TB has been a neglected health priority. In PNG, TB remains at alarming levels and drug-resistant TB is suspected to be emerging in many provinces. The Burnet Institute is looking at how we can help build the most appropriate health systems to deal with this emerging problem in PNG.

WE NEED TO TAKE TB SERIOUSLY AND AT BURNET WE ARE REFLECTING THAT BY PUTTING IT HIGH ON OUR AGENDA, HALF THE PLANET IS AT RISK OF THIS DISEASE AND THAT IS A CONSERVATIVE ESTIMATE.”

Professor John Reeder, Head, Centre for Population Health

Patient information leaflet on infection control in the home.
A first for Burnet – a partnership approach to deliver antiretroviral treatment

The Centre for International Health recently received USD$850,000 from the Three Diseases Fund for a project to increase antiretroviral treatment (ART), care and support services in Burma (Myanmar) for people living with HIV. This project marks the first time that a Burnet Institute country program has undertaken direct implementation of ART. The funding success was the result of local Burmese staff designing an innovative project responding to the dire situation facing people living with HIV. In Burma (Myanmar) only 13 per cent of HIV-positive people who need treatment have access to ART.

The project will be jointly implemented by the Burnet Institute and three local partner organisations. The Phaung Daw Oo Monastic Education High School (PDO) has been responding to HIV since 2003 and has expanded into school, clinic and home-based care programs with technical and financial support from the Burnet Institute. PDO is the leading organisation advocating HIV-related issues among Buddhist leaders in Mandalay.

Another of the partners, the Myanmar Red Cross Society has developed extensive experience in the provision of care and support services for people living with HIV and their family members through the support of Burnet, UNAIDS and the Department of Health in Thaton. Wachet Jivitadana Sangha Hospital, with technical and financial support from Burnet, has been working with hospital-based HIV-related activities providing voluntary and confidential counselling and testing, confirmation and quality control of HIV testing in the hospital, outpatient medical treatment and ongoing home-based care services to people living with HIV.

The project aims to treat 165 new patients through building the capacity of local non-government organisations to provide comprehensive HIV care with the view to scale up ART treatment access across Burma (Myanmar).

PROJECT NAME: A Partnership Approach to Expansion of Comprehensive HIV Care, Support and Treatment
FUNDING BODY: The Three Diseases Fund
LENGTH OF PROJECT: Two years

In Burma (Myanmar) only 13 per cent of HIV-positive people who need treatment have access to antiretroviral therapy.”

Bequests – your achievements live on in ours

A bequest is the act of leaving a gift in your Will. Leaving a bequest to the Burnet Institute can help to fund our ongoing research and public health programs worldwide. So your achievements in life can help Burnet create a healthier world in the future.

A bequest to the Institute can take many forms: any part or percentage of your estate; a specific amount of money; assets such as shares, property, works of art, jewellery, or an investment in perpetuity. The choice is yours.

Many Burnet supporters have already declared their bequest, and we would encourage you to consider a bequest to the Institute if you haven’t already done so. Letting us know, in complete confidence, gives us the opportunity to thank you, and discuss specific terms of the bequest’s application, if you wish.

Of course, when you are making or revising your Will we simply hope there may be a consideration of the Institute’s work when all else, including your family, is accommodated.

For more information or a confidential discussion please contact Ian Haigh, our Community Development Manager on (03) 9282 2299 or write to him at the Burnet Institute, GPO Box 2284, Melbourne VIC 3001.
Staff Spotlight

Lachlan Gray
NHRMC Postdoctoral Fellow,
Churchill/Wesselingh Laboratory,
Centre for Virology

I joined Burnet in 2003 as a Melbourne University Honours Student in the Gorry Laboratory (HIV Molecular Pathogenesis). Following my Honours year I was offered a one-year research assistant position in the same lab. I commenced my PhD studies in the Gorry lab in 2005, and after four years, I accepted a senior research assistant position in the Churchill Laboratory in 2009. The two labs are separate, but collaborate very closely which is a real benefit to advancing your own work.

I recently submitted my thesis for examination and it has now been passed – it actually has a short title compared to most – Viral determinants of HIV-1 neurotropism and neurovirulence. I have always had an interest in viruses, inspired by the media and movies (yes it was Outbreak) so I did an undergraduate science degree and then specialised in virology for my Honours project. I chose to do my Honours project at Burnet because it has a PC3 laboratory allowing me to work with live viruses. Eighty per cent of my work has always been ‘wet-lab’ based, which is another way of describing hands-on work with cells, reagents and chemicals as opposed to ‘dry-lab’ based which is more data crunching and public health related work.

Working at Burnet is great because it gives you the opportunity to discuss your research with colleagues, and get their take on interpreting data or alternative avenues of research. In my work I feel that I am at the cutting edge of discovering novel reagents and chemicals for a variety of organisations. The aim of the Pacific Office is to bring together the skills and expertise available in all sections of the Institute into a coherent program that contributes to improved health outcomes for the Pacific Island people. In a relatively short time, we have mobilised significant funding to support an approach of developing health policies and programs informed by research in a range of areas including HIV and STI prevention, treatment and support, and drug and alcohol-related harm. We are about to embark on research in two countries with key vulnerable populations, namely prisoners, sex workers and men who have sex with men. The research will help to focus the HIV responses in the two countries.

Talking Heads

Dr Tamara Kwarteng,
Pacific Regional Representative,
Burnet Institute

I am a Principal Research Fellow at the Centre for International Health and have been at the Burnet Institute for 17 years, joining CIH in 1992. Since 2003 I have been based in Fiji, initially as the Team Leader for the Australian and New Zealand government-funded Pacific Regional HIV/AIDS Program (PRHP). This program catalysed and strengthened regional and national HIV responses in 14 Pacific Island Countries. I began my new role as Burnet’s Pacific Regional Representative in February 2009, charged with establishing the newest of the Institute’s overseas offices.

The Burnet Institute has been active in the Pacific region since the mid 1990s, mostly through specific technical inputs for a variety of organisations. The aim of the Pacific Office is to bring together the skills and expertise available in all sections of the Institute into a coherent program that contributes to improved health outcomes for the Pacific Island people. In a relatively short time, we have mobilised significant funding to support an approach of developing health policies and programs informed by research in a range of areas including HIV and STI prevention, treatment and support, and drug and alcohol-related harm. We are about to embark on research in two countries with key vulnerable populations, namely prisoners, sex workers and men who have sex with men. The research will help to focus the HIV responses in the two countries.

Student Focus

Judy Gold

Centre you work in: Centre for Population Health

Supervisors: My main supervisor is Associate Professor Margaret Hellard who heads the Centre; I also have two co-supervisors, Dr Jane Hocking and Dr Louise Keogh from the Key Centre for Women’s Health in Society at the University of Melbourne.

Currently studying: PhD student, enrolled through the Department of Epidemiology and Preventive Medicine at Monash University. My thesis is on sexual health promotion to young people.

Previous degrees: I completed a Bachelor of Biomedical Sciences degree at Monash University in 2003. In 2005 I came to Burnet to complete my Honours year and have been here on and off ever since!

What is your average day? Lots of work on the computer; preparing and reviewing documents for projects, data analysis, collecting and reading journal articles, creating presentations, and meetings with project supervisors and collaborators. Occasionally I get to go out and chat to young people in the “real world” – that’s the best bit of the job, but it doesn’t happen very often.
A new low-cost test which detects drug resistance within HIV-infected patients receiving anti-HIV therapy, has been developed by Dr Anna Hearps, the Senior Scientist working within the World Health Organization Regional HIV Drug Resistance Laboratory at the Burnet Institute. HIV can rapidly evolve to become resistant to one or more anti-HIV drugs and patients need to be tested for drug resistance before they start therapy and throughout treatment to ensure their treatment remains effective. Whilst commercial versions of this test are commonly used in Australia, their high cost prohibits their use within resource-constrained countries. Burnet scientists have adapted the test so that it can be used with blood dried onto filter paper, instead of the traditional fresh blood samples, allowing low-cost HIV monitoring assays. The availability of these low-cost tests and the ability to use them with dried blood spots ensures HIV infected patients living in both resource-rich and resource-poor countries receive the most effective anti-HIV therapy with minimal side effects.

Burnet helps Lao and Indian doctors become local experts

Professor Suzanne Crowe, Head of the Centre for Virology, is an infectious diseases physician and scientist, who has used her clinical skills to design and coordinate more than fifty HIV training programs for doctors living in the Asia and Pacific regions. Forty one of these programs have been run in urban and rural India, and others in resource-constrained countries throughout the region including Indonesia, Fiji and Malaysia.

In July 2009, Professor Crowe organised an HIV training program in Lao PDR with assistance from Professor Mike Toole, Head of Burnet’s Centre for International Health, Dr Niramont Chanlivong, Country Manager of Burnet’s Lao program in Vientiane and Dr Saykham from the Setthathirath Hospital in Vientiane. Dr Saykham initiated and runs the HIV service at the hospital. Although certain towns such as Savannakhet, a border town near Thailand, and Vientiane have recognised a growing HIV epidemic, particularly amongst drug users, the prevalence of HIV in Lao PDR still remains low.

The training program was presented by three Australian clinicians; Professor Crowe, Associate Professor Anne Mijch and Professor John Mills, along with Dr Saykham and included a mixture of lectures, case presentations and group discussions. Overall 29 doctors received training. Twenty-four were doctors working in Vientiane; five were from other provinces including Luang Prabang, Bookeo, Luang Namtha and Savannakhet.

These programs are designed to teach local doctors how to safely prescribe antiretroviral (anti-HIV) drugs through lectures, interactive sessions and ward rounds so that they can provide evidence-based, safe care of patients and in some cases become the local experts.
Marrow dendritic cell and they are currently unravelling how these cells and other bone marrow dendritic cells respond to virus infection.

The bone marrow can be invaded by pathogens such as HIV which have the potential to disrupt hematopoiesis. To date little is known about the role of dendritic cells in this process. Dendritic cells are the gatekeepers of our immune system. They can see foreign invaders such as viruses and when they recognise this danger they produce anti-viral soluble factors, including factors called Type I interferons, and their cell surfaces undergo changes, like the raising of flags, to inform other immune cells that danger is present. A domino effect is then in place, newly-warned immune cells produce virus-toxic soluble factors, culminating in elimination of the pathogen.

The work of the O’Keeffe Laboratory (Viral Resistance) lends insight into the roles of dendritic cell activation during virus infection in the bone marrow. In particular how in some cases bone marrow dendritic cell activation may actually lead to impaired hematopoiesis potentially leading to anemia.

In mid 2009, Dr Meredith O’Keeffe joined Burnet to establish the Laboratory for Viral Resistance. She brings with her ten years of dendritic cell research experience gained in Australia and overseas.

In this new laboratory scientists are working at understanding specialised cells of the immune system, present in bone marrow, called dendritic cells. Bone marrow is the source of stem cells which in the process of hematopoiesis, produce every blood cell type in the body. Many cancer patients treated with radiation or harsh chemicals to remove their own defective blood cells, rely upon rare stem cells from donor bone marrow to remake their blood cell system.

Dr O’Keeffe and her staff have discovered a novel anti-viral bone marrow dendritic cell and they are currently unravelling how these cells and other bone marrow dendritic cells respond to virus infection.

In many ways, cancer cells are very similar to healthy cells making it difficult for the immune system to detect; however, some proteins are expressed by cancer cells at vastly higher levels than by healthy cells. The approach taken by our laboratory involves taking these proteins, such as Mucin 1, and joining it to a sugar called mannan naturally found in yeast. This modification means that the immune system now sees cells expressing the Mucin 1 protein as an infection and generates anti-tumour immunity. Previous work involving Burnet’s Professors Ian McKenzie and Vasso Apostolopoulos have yielded first and second generation vaccines that have been tested in clinical trials, with an immune cell-based vaccine being approved for clinical trials in the USA (Primabiomed Ltd).

Currently the laboratory is working toward improvements to the Mucin 1 vaccine to prevent relapse of adenocarcinomas, such as breast cancer, through modification of the Mucin 1 protein and the yeast-derived sugar. The vaccine is also being assessed for its potential for use in haematological malignancies including multiple myeloma.

Pre-clinical studies in mice have been successful leading to testing on human immune cells. Successful validation of these vaccines with human cells in the test tube will pave the way to further clinical trials and translation of the research from bench-side to bedside.
The world prison population is around 10 million and growing, with an estimated 30 million people moving through prison systems each year. Prisoners experience extreme and intractable marginalisation, and rates of infectious and chronic disease, mental illness and drug-related harm at a much higher rate than other members of the community. Despite this, relatively little is known about the health of justice-involved populations around the world, and the evidence base for developing health interventions for this group remains weak.

In recognition of this, Dr Stuart Kinner from Burnet’s Centre for Population Health has joined forces with Professor Catherine Gallagher from George Mason University in Virginia, USA, to establish a Justice Health Field within the international Cochrane Collaboration. The Cochrane Collaboration is widely recognised as the world leader in the systematic review of knowledge about healthcare interventions. The new Justice Health Field will generate gold-standard, policy-relevant knowledge to inform healthcare delivery in justice settings internationally.

Following three exploratory meetings in Florida (USA), Oslo (Norway) and Singapore, Dr Kinner and Professor Gallagher have applied to establish the new Field, and a formal announcement will be made in early 2010. Professor Gallagher has already attracted funding for the Field from the US Agency for Healthcare Research and Quality (AHRQ), and in-kind support is being provided by the not-for-profit Lloyd Society.

Along with PhD student Ms Kate van Dooren, Dr Kinner and Professor Gallagher have already embarked on a systematic review of health interventions for ex-prisoners – the first review ever to be co-registered with the Cochrane Public Health Review Group and the Campbell Crime and Justice Group. Among the studies to be included in the review is Dr Kinner’s Passports to Advantage study – the world’s largest randomised controlled trial of a health intervention for ex-prisoners.

If you would like more information about this project please contact Dr Stuart Kinner at kinner@burnet.edu.au or call 61 3 8506 2368.

PROJECT NAME: Justice Health Field – Cochrane Collaboration
FUNDING BODY: US Agency for Healthcare Research and Quality
LENGTH OF PROJECT: Ongoing

Burnet’s Swine Flu expertise assists Pacific Region

Our Centre for Population Health (CPH) and Centre for International Health (CIH) are collaborating on a review of the current Pacific Regional Influenza Pandemic Preparedness Project (PRIPPP), to prepare Pacific Island Countries and Territories for a second wave of the swine flu pandemic. Burnet was chosen to manage the project due to our experience in influenza pandemic preparedness and response and our current involvement in swine flu research.

The review of PRIPPP is the result of a recommendation made at the Eighth Pacific Island Health Ministers’ Meeting held in Madang, Papua New Guinea in July last year.

Although the swine flu pandemic was relatively mild in the Pacific it had wide-reaching effects. These included: placing stress on the ability of health services to function during the initial containment efforts; challenges in maintaining essential services due to high levels of absenteeism; and economic consequences as a result of a reduction in tourism.

Burnet Institute Epidemiologists Dr Isabel Bergeri (CPH) and Dr Tony Stewart (CIH) will make recommendations whether to maintain or revise current responses to swine and avian influenza outbreaks and identify the main priorities for regional agencies to support Pacific Countries to strengthen their preparedness for swine flu in the future.

PROJECT NAME: PRIPPP Influenza A (H1N1) 2009 Rapid Evaluation
FUNDING BODY: AusAID and NZAID and other partners
LENGTH OF PROJECT: Three months

Dr Isabel Begeri (left) with a health worker specialising in emergency response in Tuvalu.

The laboratory manager of Tuvalu’s hospital examining swine flu specimens.
In October 2009, Burnet Ambassador Deanna Blegg visited Papua New Guinea (PNG) to see the HIV prevention program Tingim Laip at work. Deanna is an HIV-positive mother of two, elite adventure-racing athlete and motivational speaker. Her visit was co-ordinated to ‘reinvigorate’ our generous Tingim Laip volunteers by meeting Deanna and hearing her inspiring story of living a healthy life as an HIV-positive person.

Tingim Laip – ‘think about your life’ in local language – is a comprehensive community-based HIV prevention and care strategy operating in 34 sites across 11 provinces. The project promotes tailored behaviour change interventions and referral to services, focusing on the most vulnerable populations in high-risk settings throughout the country where HIV transmission is known or likely to be high.

Deanna visited the Western Highlands, Morobe and Port Moresby meeting Tingim Laip staff members, volunteers and networks of people living with HIV. Her honesty and willingness to share her experiences and feelings was extremely powerful. Her achievements and positive outlook on life stunned many of her audiences, with participants openly admitting that they did not realise people living with HIV could compete at the elite level in sports, appear so healthy, live for so long and even have children.

The hospitality shown to Deanna by sites and communities was outstanding and caused many to question why attitudes of stigma and discrimination toward people living with HIV still remain. Newspaper coverage resulted in several local organisations calling Tingim Laip offices for more information and the opportunity to meet with Deanna. Hotel staff and people in the street approached Deanna during her stay, saying they had seen her in the paper and wanted to know more about her story.

Of her visit Deanna said, “I’d heard that the travelling was tiring and I was prepared for it. What I was not prepared for was firstly, the overwhelming response to my visit, and secondly, the success, commitment and strength of the Tingam Laip Project”.

Tingim Laip is Burnet’s largest project in PNG, applying the full spectrum of HIV prevention and community development expertise across the Institute in new and effective ways.

**PROJECT NAME:** Tingim Laip (think about your life)
**FUNDING BODY:** AusAID
**PROJECT LENGTH:** 3-5 years

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**Community HIV Prevention project China (Tibet)**

Rural communities in the Tibet Autonomous Region (Tibet) comprise some of the poorest and most disadvantaged in the Region; levels of health, education, nutrition, food production and opportunities for income generation are substantially lower than in many neighbouring countries.

Little opportunity exists for rural communities to contribute to decisions that affect their own physical and economic development. Women, children and the elderly particularly, often find themselves disadvantaged in terms of their health needs because they are rarely given the opportunity to contribute their voice to strategies which aim to improve their health and wellbeing.

In 2009, Burnet instigated a new approach to community health in Tibet; inviting rural communities to work together to identify their own health needs, and to develop their own plans to address these.

Nearly 2,000 women and men of all ages came together to discuss and contribute their ideas towards a range of activities which are being supported by Burnet, such as; travelling theatre productions to promote health messages, training of community members to deliver education to their own communities, development of Tibet’s first, completely pictorial health education materials and development and production of an interactive multimedia package for use by community groups, schools and health workers.

The approach represents the first time many of the participants have ever contributed to the development or delivery of health activities in their community. This is especially powerful for women and the elderly, who participated in the community meetings in large numbers.

**PROJECT NAME:** Duilong Dechen Community HIV Prevention Project
**FUNDING BODY:** Canada Fund
**LENGTH OF PROJECT:** 18 months

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**Centre for International Health**

Burnet Ambassador’s field trip to Papua New Guinea

Deanna Blegg with local people at Minj Market, Western Highlands.
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Sunday 21 March 2010

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The Burnet Institute has offices in Africa, South East Asia, the Pacific region and China (Tibet).
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