

# IHBI ADVANCES

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Dr Christina Parker

## Researchers at forefront of predicting venous leg ulcer healing and recurrence

Venous leg ulcers are slow to heal and regularly recur following healing, causing a considerable personal and financial burden for patients, carers and the healthcare system. IHBI is at the forefront of research to predict a patient's risk of delayed healing and recurrence.

Leg ulcers affect around one to three per cent of the Australian population, most commonly due to poor circulation.

Chronic leg ulcers are those which occur below the knee and do not heal within a four to six week period, often taking months or years to heal.

The prevalence of leg ulcers increases with age and chronic leg ulcers account for three per cent of total health expenditure in Australia.

Medical treatment aims to improve blood flow and promote healing. The type of treatment depends on whether the wound is caused by problems with veins or arteries.

Venous leg ulcers make up the majority, accounting for 70 per cent of chronic leg ulcers – and between 60 and 70 per cent of those recur after healing. The majority recur within 12 months.

Venous leg ulcers usually result from incompetency of the veins of the legs, often due to damage from deep vein thrombosis or blood clots in the legs, or genetic weakness.

A particular issue with venous leg ulcers is an inability of the veins to return deoxygenated blood from the legs to the heart.

Symptoms include a shallow, asymmetrical wound with varying amounts of ooze and pain, particularly while standing.

IHBI researchers including Dr Christina Parker, Professor Helen Edwards and Dr Kathleen Finlayson are validating new tools for predicting the risk of delayed healing and recurrence within 12 months of a venous leg ulcer healing.

A recent study into recurrence involving more than 150 people used the new tool to classify the patients into low, moderate and high risk categories, with more than half being placed in the moderate category.

A similar study into delayed healing involved 225 people at 10 hospitals and clinics and found 27 per cent were at low risk, 53 per cent at moderate and 20 per cent at high risk.

Dr Parker presented study findings, with a focus on curbing the \$4 billion annual cost of treating chronic wounds, at the CRC Association Collaborate Innovate 2019 Conference and received the top award.

She says the new tool for risk of delayed healing demonstrated 'good discrimination' in determining the patients most likely to not heal in a timely way.

'The risk assessment tools provide clinicians with a resource to identify high-risk patients and guide decisions on tailored interventions, addressing the specific risk factors to decrease the risk of delayed healing and recurrence,' she says.

'The field of wound management presently lacks a validated means to identify those people at the greatest risk. At present, clinicians use their own expert judgement and previous experience in relation to whether they consider a patient's ulcer likely to be slow to heal or recur.'

Recurrence is a significant issue, with 28 per cent of patients experiencing more than 10 episodes of venous leg ulceration in their lifetimes.

Previous studies have found that risk factors for recurrence include the severity of the underlying venous disease, such as a history of deep vein thrombosis. Other factors include level of mobility, the number of previous ulcerations and level of compression being worn.

Venous abnormalities, larger ulcer area and longer ulcer duration have been found to be risk factors for delayed healing in a number of studies, while living alone, low body mass index and decreased mobility have been found to be risk factors for delayed healing in a smaller number of studies.

'For people with a history of multiple venous leg ulcers, the long-term nature of the ulcers and the habitual recurrence leads to uncertainty, disappointment, hopelessness and worry that they may never be free of the condition,' Dr Parker says.

She says ongoing monitoring is essential after healing, with compression therapy recommended for preventing recurrence.

### REAL HEALTH PUBLIC LECTURE: INNOVATIONS IN WOUND HEALING

- Presentations from QUT experts in chronic wounds and treatment, diabetic foot ulcers, leg ulcers and the science of wound healing
- Covering current care, prevention, risk factors, research and future treatment
- Question and answer panel following the presentations

**Date:** Saturday 20 July

**Time:** 10am to noon, followed by refreshments

**Venue:** QUT Kindler Theatre, Room P421, P Block, Gardens Point campus, 2 George Street, Brisbane

**Information:** [www.qut.edu.au/ihbi/wound-lecture](http://www.qut.edu.au/ihbi/wound-lecture)

# Drivers willing to restrict phone distraction, if they can still talk

Mobile phone use has been linked to distracted driving and is a significant contributor to road trauma. Technology exists to reduce distraction, but little research has been done to determine if drivers will use it.



IHBI's Dr Oscar Oviedo-Trespalcios is an expert in promoting safety in transport, including the prevention of human error and misuse of technology.

He is leading a project aiming to reduce the potential adverse effects of distracted driving, with an understanding that road safety policies based on stopping mobile phone use while behind the wheel have shown little success.

'Mobile phone use is so ingrained in our society that completely stopping people from using their phones while

driving is an extremely difficult task,' Dr Oviedo-Trespalcios says. 'Using voluntary apps that restrict some phone functions is emerging as a practical new countermeasure to limit distracted driving.'

Studies show that mobile phone use while driving is a significant contributor to road trauma. Police crash reports in the US estimate that phone distraction contributes to 18 per cent of fatal crashes.

Mobile phone interactions such as texting or dialling increase the odds of crash risk sixfold, with young drivers aged 16 to 29 years at an increased risk compared to those aged 30 to 64 years.

Dr Oviedo-Trespalcios has completed a study involving 712 Australian drivers to analyse their willingness to install and activate a mobile phone app that blocks texting and browsing.

It found 68 per cent were willing to use such an app, as long as it allowed hands-free phone calls, while only 37 per cent were prepared to embrace the technology if calls were blocked.

Younger drivers reported a greater preference for the ability to use music-playing functions while driving. Older drivers were more in favour of automatically detecting when the vehicle was moving.

Most drivers in the study reported using hands-free technology for calls, but 17 per cent admitted to touching their phone for texting, browsing and emailing. Up to 15 per cent

occasionally looked at their phone for more than two seconds and 19 per cent occasionally monitored or read conversations without writing back.

Dr Oviedo-Trespalcios received a research grant from the Royal Automobile Club of Victoria to partially support the research.

The research recognised that the apps showed promise in addressing distracted driving through mobile phone use, but their effectiveness had not been investigated.

'The Do Not Disturb While Driving app, which now comes preinstalled on all iOS mobile phones, disables a variety of phone functions, including texting and browsing, when it is detected that the car is in motion,' Dr Oviedo-Trespalcios says. 'However, the DNDWD application can be deactivated at any time by the driver.'

Dr Oviedo-Trespalcios says rewards are an effective strategy to support acceptance of driving support systems and could include discounts on vehicle insurance and registration; or prizes associated with safe driving behaviour, such as movie tickets or fuel vouchers.

'Many of the incentives could be especially attractive for young drivers.

'Greater involvement of road safety stakeholders such as insurance companies and vehicle manufacturers could be an important step towards supporting the uptake of such technology and promoting the education around the use of applications to reduce mobile phone distracted driving.'

## PARENTS

- Don't panic if your child does not respond immediately. They could be driving.
- Let them know it is OK to wait until reaching their destination before responding.
- Set a good example. Do not message or call when you are driving.

## MANAGERS

- Avoid messaging or calling someone if you know they are driving.
- Tell staff to avoid all phone use when driving and reply when safely at the destination or pulled over.
- Include this in organisational policies and procedures.

## DRIVERS

- Use an app to manage notifications or activate the Do Not Disturb or Driver Mode functions on mobiles.
- Pull over to safely read messages or wait until you have reached the destination.

## FRIENDS

- If you think a friend could be driving, do not put them in danger.
- Save messages for later or, if urgent, call instead of texting.

Adjunct Professor Anne Chang



# Collaboration aims to better understand serious lung disease

Primary ciliary dyskinesia (PCD) is incurable, progressive and serious, affecting many organs – particularly the lungs. Diagnosing PCD is complex and little is known about the risks and benefits of antibiotics used in treatment.

IHBI is part of a collaboration involving health researchers from five Australian states and territories, health services and Indigenous community leaders.

Adjunct Professor Anne Chang is leading the research, using a Medical Research Future Fund grant to better understand present treatments, patient quality of life, genetics, cost effectiveness and possible antimicrobial resistance.

The research will be the first Australian randomised control trial on PCD and has the potential to spur other clinical trials and result in the establishment of a trials network.

## PRIMARY CILIARY DYSKINESIA (PCD):

A genetic disorder causing defects in the action of cilia, which resemble microscopic hairs, lining the respiratory tract, fallopian tube and flagellum of sperm cells.

## ROLE OF THE CILIA:

Beating synchronously in the respiratory tract, moving mucus towards the throat. Normally beating seven to 22 times per second. Impairment can result in poor mucus clearance, with subsequent upper and lower respiratory infection.

## PCD SYMPTOMS:

- Inability to clear mucus from the lungs
- Susceptibility to chronic recurrent respiratory infections, including sinusitis, bronchitis and pneumonia
- Diagnosis is often missed early in life despite characteristic signs and symptoms

## GENETICS:

PCD is genetically inherited. Structures that make up the cilia are missing or dysfunctional and thus cell structures lack the ability to move.

Professor Chang says the research aims primarily to determine if people with PCD who regularly use one of two common therapeutics have fewer instances of sudden worsening of symptoms, called respiratory exacerbation.

'Acute exacerbations have a major negative health impact on people with underlying lung diseases,' she says. 'They are associated with psychological stress, impaired quality of life, lung function decline and substantial healthcare costs.'

People with PCD are unable to clear mucus from their lungs and are susceptible to chronic recurrent respiratory infections, including sinusitis, bronchitis and pneumonia.

About 50 per cent of children and almost all older adults with PCD have bronchiectasis, a disease in which there is permanent enlargement of parts of the airways of the lung. Infection in the areas contributes to ongoing inflammation.

'Management of patients is presently not based on high-level evidence,' Professor Chang says, 'because research findings are mostly derived from small observational studies with a limited follow-up period.'

She says the research will investigate both the potential harm and the benefits from regular use of the two therapeutics.

Long-term use of antibiotics has the potential to lead to antimicrobial resistance, with implications for the wider community.

PCD has an estimated incidence of one in 10 000 to 20 000 people, but there is no published data about prevalence in Australia.

An Indigenous Reference Group in Darwin highlighted the need for more clinical research on respiratory illness, given such diseases are common in their community.

The group, along with the PCD Foundation and Australian Lung Foundation, is part of the collaboration's community engagement strategy, with consultation during the study's design phase, plans to provide feedback, incorporate findings into clinical practice and employ an Indigenous health practitioner.

Professor Chang brings to the collaboration experience as a paediatric respiratory physician and expertise in multi-centre studies and Indigenous health.

She will work closely with infectious disease experts from Griffith University, PCD experts from the Royal Children's Hospital in Melbourne and Concord Repatriation General Hospital in Sydney, biostatisticians and geneticists from the University of Queensland and health economists from the Northern Territory's Department of Health.

QUT strength includes the expertise of Professor Emma Duncan and Distinguished Professor Matt Brown in whole exome sequencing of rare diseases and novel gene identification, and Dr Paul Leo's expertise in bioinformatics, clinical sequencing, genetics and immunology. They use state-of-the-art facilities at IHBI's Australian Translational Genomics Centre.



Dr Natalie Bradford

# Better care and support a major aim of child cancer study

Children with brain tumours and their families face unparalleled difficulties. Yet little research has been conducted into their needs, especially after their treatment, or the healthcare and support services that exist.

Dr Natalie Bradford is part of an IHBI collaboration that aims to improve outcomes— including their quality of life—for children with brain tumours.

‘Not only is the threat of premature death a possibility,’ she says, ‘the children and families affected by brain tumours must also face the potential long-term management of difficult symptoms including seizures, cognitive deficits, behavioural changes, pain and fatigue.’

Dr Bradford says not all brain tumours are malignant. In those that are, there is a five-year survival rate of about 65 per cent among child patients. In both malignant and non-malignant tumours, almost all will have an irreversibly negative impact on the life of a child and their family.

The research aims include identifying the unmet needs of children with brain tumours and their families, determining when interventions are required and how to deliver them, and investigating the costs.

Researchers will interview patients from the Queensland Children’s Hospital, their families, healthcare teams, service managers and policy makers to determine the unmet needs, gaps in present care and costs.

Present care will be scrutinised for safety, effectiveness, family focus, timeliness, efficiency and equity.

An important consideration will be equity, specifically related to children from rural and remote parts of Queensland. About 60 per cent of young people with brain tumours live outside of metropolitan Brisbane, often in areas with limited services.

Dr Bradford is part of the new Centre for Child and Adolescent Brain Cancer Research, the only such specialist facility in Australia to focus specifically on outcomes for children and adolescents with brain cancer.

Her research will involve IHBI Distinguished Professor Patsy Yates, an internationally acclaimed expert in palliative care and cancer nursing, qualitative data analysis expert Dr Stuart Ekberg, health economist Dr David Brain and Children’s Health Queensland neuro oncologist Dr Timothy Hassall.

IHBI’s Research Methods Group will be leveraged for the research project’s design and statistical support. Being based at the Centre for Children’s Health Research, adjacent to the

Queensland Children’s Hospital, will enable collaboration and provide access to clinicians and patients.

Underpinning the research is recognition that nurses have a significant role in supporting children with brain tumours and their families.

They are pivotal in assessing and managing symptoms, providing education and helping families to navigate the health system, Dr Bradford says.

‘After the acuteness of cancer treatment has receded, nurses are also well placed to provide survivorship and palliative care. They can assist in articulating patient and family goals, promoting communication, referral between care services and facilitating continuity of care.’

Dr Bradford says international research has traditionally focused on neurological, behavioural and biological factors, rather than psychological, social and economic impacts.

‘Many children have a long time to live with the consequences of cancer and cancer treatment. Where a child does not survive, families will continue to carry the burden of a child’s death for the rest of their lives.’

‘Balancing the needs of an acutely unwell child with the competing demands of family life is a tension not well understood and availability of support services are limited. These aspects of survivorship comprise a considerable healthcare need, yet are often neglected in the present healthcare system.’

## CENTRE FOR CHILD AND ADOLESCENT BRAIN CANCER RESEARCH

Committed to changing the devastating reality of childhood brain cancer, with researchers from world-leading institutions working together to advance treatment options and improve survivorship.

Involves QUT, QIMR Berghofer Medical Research Institute, the University of Queensland, Children’s Health Queensland and the Children’s Hospital Foundation.

### Projects from IHBI, with lead researchers:

- Professor Greig de Zubicaray: Risk factors for speech and language impairment and long-term outcomes in survivors of childhood primary posterior fossa tumours
- Professor Stewart Trost: Effects of therapeutic exercise in survivors of childhood posterior fossa brain tumours
- Dr Natalie Bradford: Addressing survivorship and palliative care needs in children and adolescents with brain cancer

# Focus on common quality of life issues among cancer survivors

Cancer incidence is on the rise, but so is the number of cancer survivors. IHBI Professor Ray Chan’s joint QUT and Princess Alexandra Hospital appointment ensures he is well placed to overcome quality of life issues that cancer survivors often face.



Professor Ray Chan

With advances in treatment, survival rates among people with cancer have improved in recent years. Cancer deaths are reducing by one per cent each year.

However, Professor Chan says cancer survivors experience a wide range of psychological, physical and quality of life issues related to diagnosis, treatment and aligned conditions such as fatigue, pain, sexuality problems and financial problems.

‘In many countries, the acute cancer care system is not the ideal setting to meet the long-term needs of cancer survivors with multiple chronic conditions and other psychosocial problems,’ he says.

Clinicians juggle the needs of patients and making efficient use of resources to ensure both high-quality care and a well-functioning, sustainable health system, he says.

Barriers to optimising quality of life include lack of coordination between clinical care specialists, such as oncologists and cancer nurses, and primary care providers (PCP) such as GPs, practice nurses and community nurses.

‘A number of barriers to shared care have been reported, including insufficient or delayed communication, a lack of familiarity among PCPs with highly specialised cancer treatments and associated complications, and a specialist’s uncertainty about the potential role of the PCP in follow-up care.’

Professor Chan says a successful partnership between clinical care specialists and PCPs is likely to lead to improved patient outcomes, increased patient convenience, reduced costs, reduced burden on specialists and greater continuity of care.

Specialist cancer nurses are best placed to facilitate effective and timely care coordination and communication, he says, acting as the conduit at key patient treatment times, such as their return home from hospital.

Professor Chan is establishing a randomised controlled trial at Brisbane’s Princess Alexandra Hospital, involving specialists, general practitioners and post-treatment breast cancer patients using a nurse-coordinated care model.

QUT Giving Day, a 30-hour fundraising event to increase support for key QUT programs, research projects and groups, has provided additional funding to enhance Professor Chan’s program of research.

The funding will enable a co-design project involving GPs, their practice managers, practice nurses and patients in identifying innovative strategies to improve cancer survivorship in the primary care setting.

## QUT GIVING DAY

- \$785,846 raised for QUT to help disadvantaged students, save the environment, find solutions to major health problems and social issues
- 2013 donors, with 1172 first-time donors to QUT, mostly from Australia but also from the US and Asia
- \$119,091 was raised from 562 people for IHBI projects
- 85 donors gave \$29 923 to fight head and neck cancers, including a \$20 000 gift from the late Jake Simpson, whose partner Carly and young son Noah were advocates for Giving Day
- 123 donors gave \$40 901 to support prostate cancer research, including a \$33 000 gift from JJ Richards & Sons/In Vitro Technologies
- 123 donors gave \$15 760 for IHBI Innovation Ideas Grants to fund pilot studies and other research for which alternative financial support may not be readily available





# Shedding light on threat of Zika transmission in Australia

The presence of the dengue mosquito in northern Queensland makes parts of Australia vulnerable to emerging viruses, including Zika. IHBI researchers have been working to understand the threat.

IHBI's Dr Francesca Frentiu has been investigating two mosquito species to determine their ability to transmit Zika. Research involved the dengue mosquito, sourced from Innisfail in north Queensland, and the Asian Tiger mosquito, collected on Hammond Island in the Torres Strait.

Dr Frentiu collaborated with researchers from the QIMR Berghofer Medical Research Institute, using a biosecurity insectary that was able to replicate the environment where the two species could thrive, similar to what is experienced around Cairns.

A strain of Zika was tested from the Asian lineage that caused microcephaly during an epidemic in Brazil in 2016. Microcephaly is a medical condition in which the brain does not develop properly, resulting in a smaller than normal head.

Dr Frentiu says the two species were fed a mixture of Zika and blood. 'At three, seven and 14 days after the mosquitoes were infected with Zika, we tested their saliva to see if they could pass on the virus through a bite,' she says.

Results showed that the dengue mosquito poses the greatest danger of spreading Zika in Australia.

'We found 50 to 60 per cent of the dengue mosquitoes could effectively transmit the virus 14 days after becoming infected, compared to 10 per cent of the Asian Tiger mosquitoes,' Dr Frentiu says.

'Discovery of Zika in the ovaries of the dengue mosquitoes showed another potential route of infection transmission through mosquito populations.

'This has also been observed recently in mosquitoes collected in Brazil. Eggs were collected, hatched and the larvae tested – and Zika was found in the larvae.

'It is possible that if infected larvae were able to reach maturity still infected with Zika, they could then pass the virus to humans. This is an area where further research is needed.'

Epidemics of Zika have occurred on Yap Island, a part of the Federated States of Micronesia, French Polynesia, islands in the south and southwest Pacific, and more recently in Latin America.

While 80 per cent of Zika infections remain asymptomatic or cause a mild febrile illness, showing symptoms of a fever, recent epidemics have had more severe disease manifestations, such as microcephaly and central nervous system malformations in new-born children, and Guillain-Barré syndrome in adults.

Guillain-Barré syndrome is an autoimmune condition in which the body's own immune defence system attacks a person's nerves. As a result, the nerve insulation and sometimes even the inner covered part of the nerve are damaged and signals are delayed or otherwise changed.

Zika virus may be passed from a woman to her unborn baby, potentially causing serious consequences for the baby, particularly microcephaly. Symptoms of congenital Zika virus syndrome—such as seizures, irritability, swallowing problems, hearing and sight abnormalities—can be present at birth or appear later in infancy.

## ZIKA:

A virus that is closely related to dengue. It is spread by mosquitoes.

It typically takes three to 12 days for symptoms to appear.

About one in five people who catch Zika virus is likely to feel sick. If they do, the disease is generally not severe and lasts only a few days. Symptoms may be similar to those caused by the flu and can include:

- fever
- skin rash
- pain in the joints
- muscle pain
- a headache, especially with pain behind the eyes
- conjunctivitis (red eyes)
- weakness or lack of energy

## The study:

<https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0007281>



Researchers are not just experts in specific scientific disciplines such as genetics, chemistry or nanotechnology. They have to translate their research from an experiment in the lab—or a good idea from the clinic—to a therapeutic, medical device or service that improves the lives of patients, their carers and clinicians.

Researchers need to build teams around them, through collaboration with industry, clinicians and patients. They also need to have the support of institutes such as IHBI, with specialist facilities, equipment and support staff.

**Professor Ray Chan** has joint QUT and Princess Alexandra Hospital appointments that enable him to see cancer survivorship both scientifically and clinically.

He partners with specialists such as oncologists, primary care providers such as GPs and researchers in the Queensland Collaborative for Cancer Survivorship, aiming to improve health outcomes for cancer survivors.

Similarly, **Adjunct Professor Anne Chang** juggles roles as an IHBI researcher in paediatric respiratory medicine and Head of Child Health at Menzies School of Health Research, investigating treatment and diagnosis of paediatric cough.

She works with infectious disease experts, clinicians and Indigenous community leaders to better understand treatments, patient quality of life, genetics and cost effectiveness.

**Dr Natalie Bradford** leads one of three IHBI collaborations in the new Centre for Child and Adolescent Brain Cancer Research, bringing together researchers to advance treatment options, improve survivorship, and ultimately, overcome child brain cancer.

Her team has experts in palliative care and cancer nursing, data analysis, health economics and neuro oncology, and uses facilities and capabilities at IHBI and the Centre for Children's Health Research.

**Dr Francesca Frentiu** is working with two mosquito species to determine their ability to transmit Zika in Australia.

IHBI provides support in study design and experts in different aspects of infectious disease, while a collaboration with QIMR Berghofer enables use of an insectary to replicate the environment where the two species live.

**Dr Oscar Oviedo-Trespalcacios** is part of IHBI's Centre for Accident Research and Road Safety – Queensland, with a focus on impacting international transport through partnerships with researchers, industry, government and community organisations.

He uses the connections and brings insights from studies—some involving more than 700 people—to prevent human error and misuse of technology, including mobile phone use while driving.

**Dr Christina Parker** collaborates with peers from IHBI and with clinicians to understand venous leg ulcers, their healing and recurrence. Studies involving more than 150 people ensure health care is based on sound evidence, is easy to replicate in hospitals and clinics, and focuses on patient wellbeing.

Please join us for our **Real Health Public Lecture** at QUT's Gardens Point campus on Saturday 20 July, detailing chronic wound treatment, prevention, risk factors and Dr Parker's research and potential future impact.

**Professor Lyn Griffiths**  
Executive Director, IHBI

## EXECUTIVE DIRECTOR'S REPORT

## FIND OUT MORE: support IHBI



### Yes, I would like to support IHBI's health research

If you would like to help us make the possibility of better health a reality, please fill out the form and send it with your donation to:

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Brisbane QLD 4001 Australia

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A secure electronic donation service is also available. Please visit [www.qut.edu.au/giving/ihbi](http://www.qut.edu.au/giving/ihbi) to contribute.

Please send me information on how I can include IHBI in my will.