

2023  
**Annual Report**  
Centre for Precision Health



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# About the Centre for Precision Health

## Our research

Strives to maximise quality of life through a precision health approach to diagnostic, prognostic, and tailored intervention strategies.

## Our vision

To improve health outcomes through the application of personalised solutions that consider an individual’s unique biology and environment.

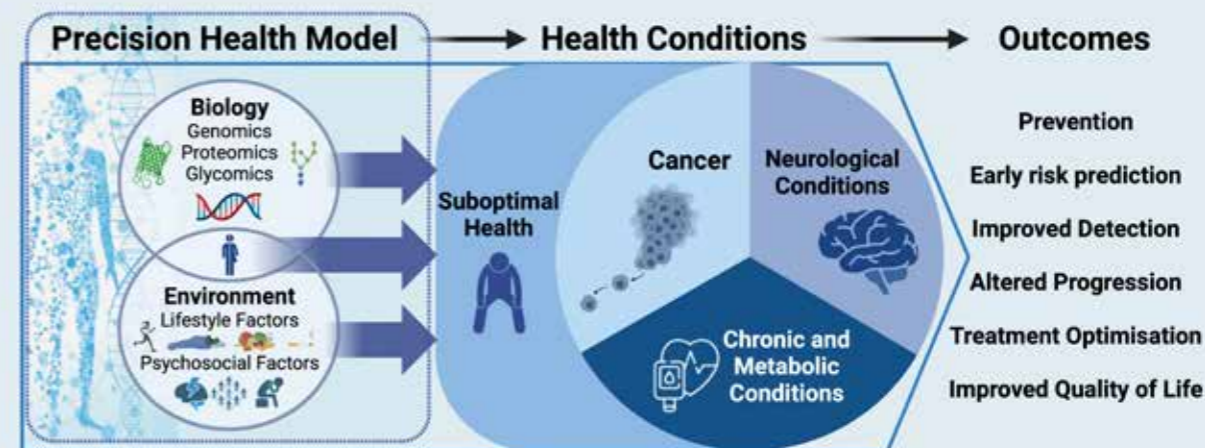
### Our Centre focuses on three strategic programs:

- Cancer – with a focus on diagnostics and liquid biopsy in melanoma and other cancers.
- Neurological conditions – with a focus on genetics of Alzheimer’s disease as well as other neurological conditions.
- Suboptimal Health – with a current focus on chronic and metabolic conditions.

Our world leading research on Suboptimal Health is considered a key preclinical stage in all our priority health areas.

### Benefits of our approach

- Determine the optimal treatment and ongoing care for each individual.
- Identify disease-specific genetic profiles to recognise or predict undiagnosed conditions.
- Guide lifestyle and other modifiable risk factor recommendations.
- Prevent potentially life-threatening side effects from medications and other systemic treatments.
- Provide better population health improvements through evidence-based risk profiling.



## Director's Report

With the first term of the Centre for Precision Health coming to an end in 2023, I found myself looking back over not only 2023 but the full duration of our first 3-year term. In part because this was necessitated for us as we sought a further term of funding for the CPH, but also because I continue to be astounded by the successes and achievements of our research students, academics, and support staff.

As I said in this report in 2022, "Things can only get better", and my word did they ever! The success stories are too many to mention, but 2023 has seen significant grant successes, fellowships, and staff promotions and of course the successful extension of the CPH for a further 4-years!

Whilst we were quietly confident that we had a fair chance of being renewed, one can never take things for granted in research or the university sector, especially when it comes to funding. However, we were not only successful as one of only two ECU Strategic Research Centre's to be renewed in this application round – but we were extended for 4 years rather than the expected three and given a 25% boost in Strategic Research Fund support. I would like to extend my gratitude to the office of the DVCR, Prof Caroline Finch, for the ongoing support provided and the recognition of the sustained excellence in research that the Centre is producing.

Winston Churchill's words could never be truer at this stage of the CPH "...this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning."

In addition to this collective success story, there have been many other successes on no less of important standing – both individual recognitions as well as individual and team grant success.

Promotions in academia are always something to celebrate and we had not one but two notable promotions this year – firstly Dr Travis Cruickshank, who has been an integral driver of the SPIN research program and several significant strategic initiatives, was promoted to Senior Research Fellow. The second promotion, well they don't get much bigger than this – the CPH's Deputy Director and someone I am so proud to have the opportunity to be working closely with – our new Professor of Cancer Research, Professor Elin Gray.

I also want to take these brief words to also recognise three further successful outcomes – the first is one we could not squeeze into last year's annual report due to embargo – this is of course the award of a Fulbright Fellowship to Shane Fernandez, a PhD student in the Neurological Conditions Program. As I write this, he is currently undertaking research with our collaborators at the University of Indiana.

The next successes I wished to draw focus to are the awarding of ECU's only NHMRC Investigator Grant to Dr Emmanuel Adewuyi and the award of a Cancer Research Trust grant to Prof Elin Gray, which will allow her to work on establishing the Western Australia Melanoma Initiative (WAMI) with her colleague Prof Jonas Nilsson. You can read more about these two success stories in the next few pages.

Collectively, we have continued to not only reach but significantly exceed the key performance indicators, including but not limited to continued year on year growth in research income, publications, and the recruitment and graduation of the next generation of research academics. As our CPH alumni grows, we look forward to hearing and sharing their successes as they forge their own careers. Finally, as you read the report, you will see that the CPH has continued to provide strong support to all its members. We extended this in 2023 with two notable new initiatives – one established by our own HDR students, an infographic based research award, and the second, the establishment of the CPH Master's by Research Scholarships.

"We are what we repeatedly do. Excellence, therefore, is not an act, but a habit."

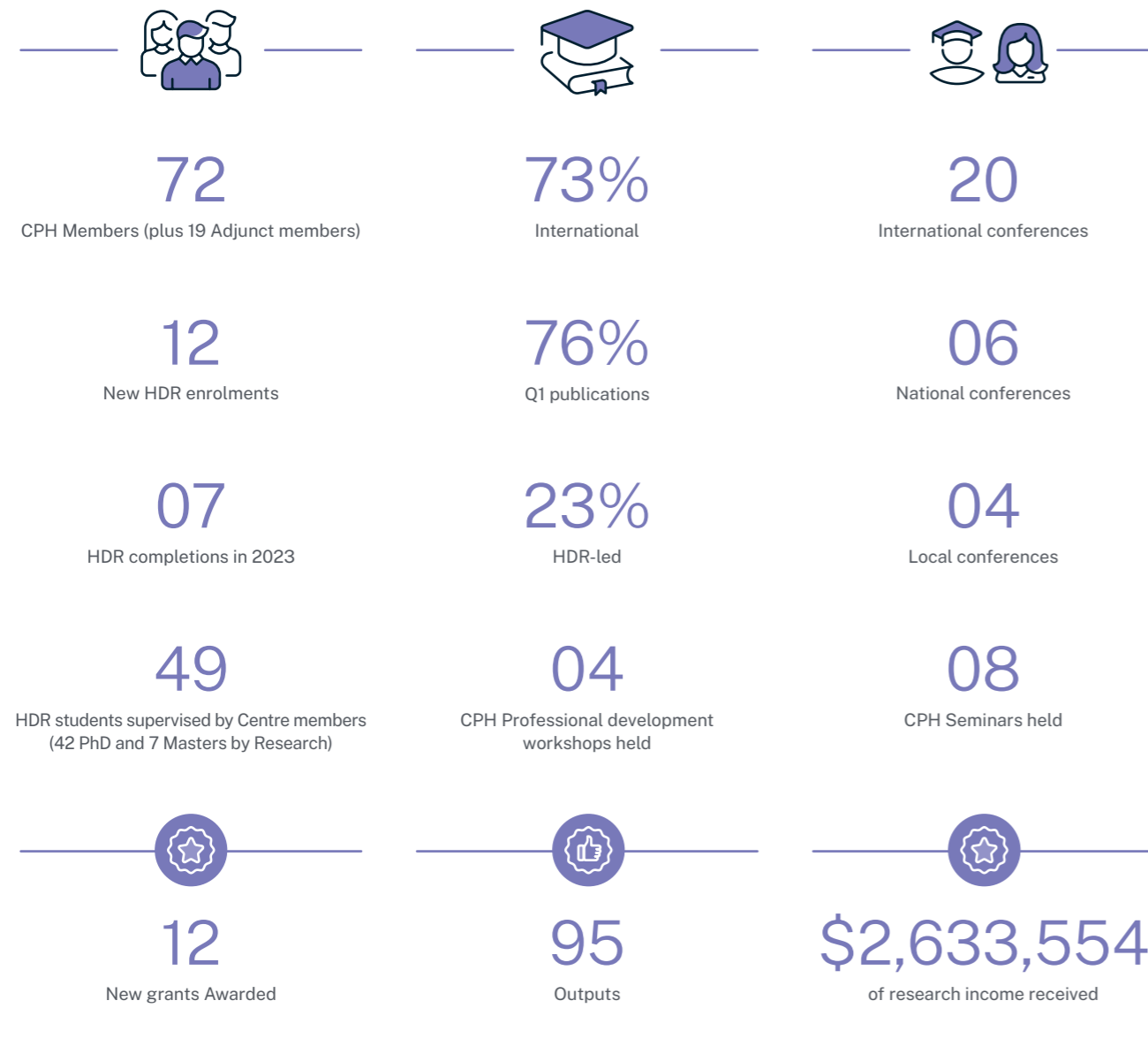
Will Durant

My confidence this time last year that I would be stating all the success of 2023 and being excited about what 2024 will hold is down to each and every member of the Centre. We should all be very proud of what we have achieved, individually and collectively. I for one could not be prouder of what we have all achieved in the last three years and I can't wait to see what the CPH will collectively be able to achieve over the next 4-years.

**Professor Simon Laws**  
Director, Centre for Precision Health



## 2023 at a glance



**1.1 billion**

Global audience reached



**653**

Media mentions in 2023



## Precision Health – a 10 Year Strategic Focus



FHRI Open Day at ECU with from left: Minister Stephen Dawson, Professor Caroline Finch, DVCR, Professor Simon Laws, Director, CPH and Professor Andrew Woodward, Executive Dean, School of Science

Precision health is a key strategic focus area in the WA Health and Medical Research Strategy 2023-2033.

On 31 October 2023 the Future Health Research and Innovation (FHRI) Fund Open Day was held at ECU, attended by Medical Research Minister Stephen Dawson with a focus on the precision health strategic focus area. Professor Simon Laws was the invited Keynote speaker. Dr Pauline Zaenker also provided a presentation based on her prior research grant awarded by the FHRI grant scheme.

"Demand for healthcare services continues to grow around the world. It's clear that we need new ways of thinking. Health and medical research is the catalyst to help us live healthier, more satisfying and productive lives," Minister Dawson said. "A key priority for the Cook Government is to harness the skills of our researchers and attract new talent to our State's growing medical and health research precinct."



## Multimillion dollar grant to bring new cancer cell therapy to WA

CPH cancer researchers, as part of a large Western Australia Melanoma Initiative (WAMI) will implement a new and specialised immune cell therapy for cancer patients in WA, thanks to \$3.5 million in research grants.

2.5 million will come from the Cancer Research Trust (CRT), with a further \$1 million from the Harry Perkins Institute of Medical Research (the Perkins), Wind Over Water Foundation, Spinnaker Health Research Foundation and Cancer Council WA –collectively.

The WAMI is spearheaded by CPH Professor Elin Gray, and Chair of Melanoma Discovery at the Harry Perkins Institute of Medical Research Professor Jonas Nilsson, bringing together clinicians and scientists across WA, with knowledge and expertise required to implement Tumour-infiltrating lymphocytes (TIL) therapy and identify patients who would respond to it.

Professor Elin Gray stated, "With this significant investment we will be able to lead the implementation of TIL and identify who are in more need of this treatment. Our hope is that we will be able to work with other centres around Australia and the world to improve patient outcomes for diagnoses other than melanoma, too."

The funding will be used to establish immunotherapy manufacturing infrastructure in WA, improving on existing immunotherapies being used in other countries. It will also be used to develop a method using biomarkers to identify patients who are less likely to respond to standard treatments. Biomarkers are important to monitor treatment responses and to predict which patients may need new therapies after traditional treatment failure.



Professor Elin Gray and Professor Jonas Nilsson

## NHMRC Investigator grant success

Dr Emmanuel Adewuyi was awarded a prestigious NHMRC Investigator Grant of \$662,000 over 5 years.

These national highly competitive grants provide the highest performing researchers at all career stages with a salary and research support package. His project will study the conditions and diseases commonly found in people living with dementia, known as comorbidities, at a genetic level.

While these comorbidities can cause problems, they may also be the key to creating treatments for the various forms of dementia, including Alzheimer's Disease and frontotemporal, Lewy body, and vascular dementia. All of these forms currently have no curative or disease-modifying treatments, largely because of their poorly understood biological mechanisms.

Dr Adewuyi explains that "Observational data suggests dementia co-occurs with a range of conditions, such as inflammatory, stress-related, and autoimmune disorders. These comorbidities can worsen disease severity and accelerate cognitive decline -but may also be involved in dementia's pathogenesis."

The research programme will use large amounts of genetic data to investigate the shared biological underpinnings between dementia and potential comorbid traits. Understanding these similarities will provide opportunities to develop strategies to prevent the disorder or create new therapies.

"For example, this could result in pharmacological or lifestyle modifications to combat dementia," Dr Adewuyi said. "This research may also allow us to identify key biomarkers to improve diagnosis."

CPH Director Professor Simon Laws said the funding was a testament to Dr Adewuyi's continued excellence in research.

"This project builds on previous CPH breakthroughs in dementia research that Emmanuel has been a part of, such as identifying a link between Alzheimer's and gut disorders" Professor Laws said.

"This fellowship recognises the innovative and impactful research he has been undertaking and will be a foundation for further growth in the strong statistical genetics research that the CPH has established and will continue to be the principal drivers of at ECU."



Dr Adewuyi



## Expanding the genetic link between the brain and the gut

A previous study from the Centre for Precision Health (CPH) discovered a genetic link between gut health and Alzheimer's Disease (AD) but couldn't conclude whether one caused the other. This study breaks new ground by finding that a higher level of education protects against gut disorders.

CPH Director and study supervisor Professor Simon Laws said these findings build upon the centre's previous work to provide further evidence of the strong links between the brain and gut, known as the gut-brain axis. "Gut disorders and Alzheimer's may not only share a common genetic predisposition but may be similarly influenced by genetic variations underpinning educational attainment," Professor Laws said.

This large-scale study examined the genetic information of more than 766,000 individuals, with an emphasis on AD, cognitive traits and gut disorders, including peptic ulcer disease (PUD), gastritis-duodenitis, gastroesophageal reflux disease (GERD), irritable bowel syndrome, diverticulosis and inflammatory bowel disease (IBD). It found higher levels of education and cognitive functioning reduced the risk of gut disorders.

Lead researcher Dr Emmanuel Adewuyi said the findings have significant implications. "The results support education as a possible avenue for reducing the risk of gut disorders by, for example, encouraging higher educational attainment or a possible increase in the length of schooling," he said.

"Hence, policy efforts aimed at increasing educational attainment or cognitive training may contribute to a higher level of intelligence, which could lead to better health outcomes including a reduced risk of gut disorders."

The study further revealed the gut may also influence the brain. GERD showed evidence of causing a decline in cognitive function across a number of cognitive traits assessed in the study, such as intelligence, cognitive performance, educational attainment and educational qualification.

Although this is the first study to report this finding, the results support recent research reporting an increased incidence of dementia and GERD, which Dr Adewuyi said could help with earlier diagnoses and potential treatments.

"GERD may be a risk factor for cognitive impairment, so it's important for health workers to look for signs or symptoms of cognitive dysfunction in patients presenting with the gut disorder," he said.

"This could lead to earlier detection of cognitive decline and therefore earlier interventions aimed at reducing the rate of cognitive decline. More studies are needed to investigate whether treatment for,

cure or remission of GERD can contribute to a reduced risk of cognitive decline."

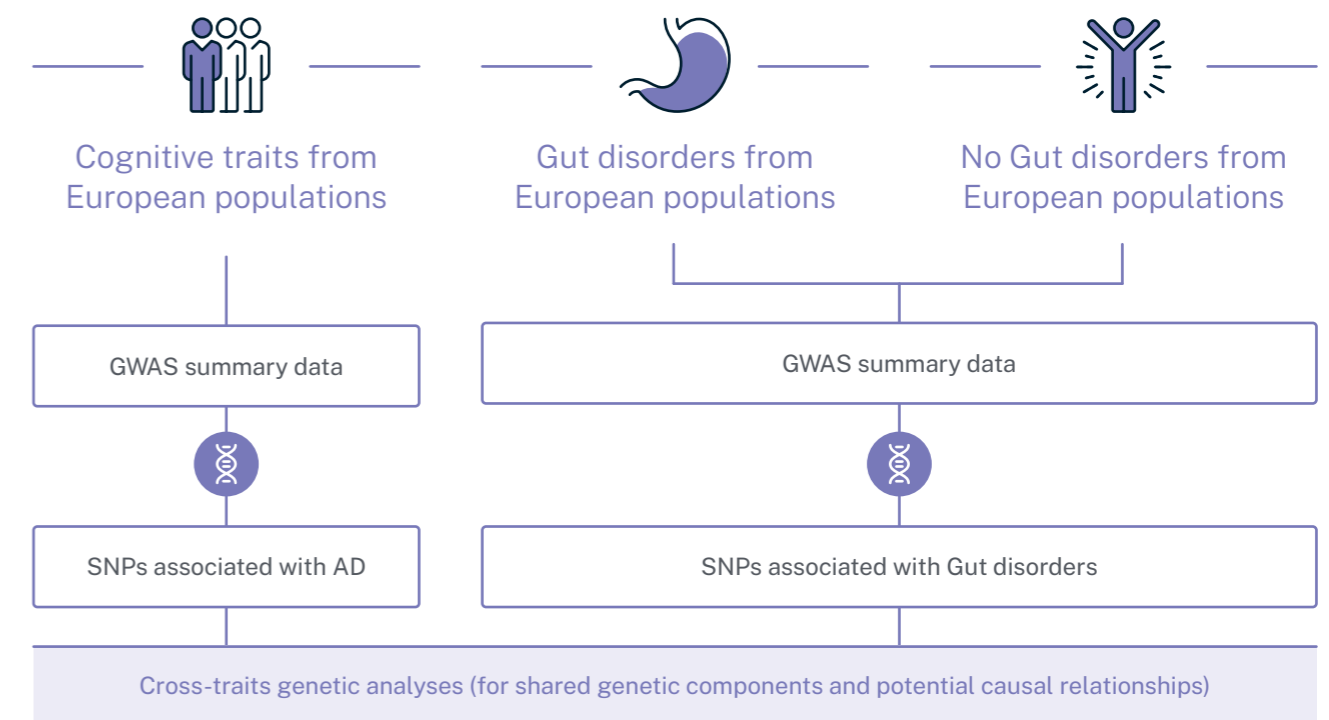
Interestingly, higher levels of education and cognitive function protecting against gut disorders was true of all the disorders examined in the study — but largely with the exception of inflammatory bowel disease. Further analysis reveals different effects of IBD on cognitive traits and AD at different genomic locations, indicating its relationship depend on effects at specific locations across the genome. This new understanding may explain the lack of significant genetic correlation of IBD with cognitive traits and AD, and the inconsistency reported in previous observational studies' Adewuyi said this finding was also important, as it brings a new insight into the relationship of IBD with cognitive traits (and AD), which may shape the direction of future studies. "For example, some risk genes for AD may be protective against IBD, and vice versa," he said.

Landmark research has found a better cognitive function has a strong genetic correlation and a protective causal association with several gut disorders.



Dr Emmanuel Adewuyi

## Shared and causal genetic relationships



Adewuyi, E.O., O'Brien, E.K., Porter, T., Laws, S.M. Relationship of Cognition and Alzheimer's Disease with Gastrointestinal Tract Disorders: A Large-Scale Genetic Overlap and Mendelian Randomisation Analysis *Int. J. Mol. Sci.*

## Developing a blood test for prognosis and monitoring of Uveal melanoma

Uveal melanoma affects roughly 190 Australians per year and can often require several intrusive and risky procedures to diagnose and treat it. For father of four Rhys James (pictured below), this meant his eye muscles were detached and a radioactive disc placed directly onto the tumour for three days. A biopsy during the procedure confirmed the melanoma.

Rhys was diagnosed with uveal (ocular) melanoma, and now he has turned to CPH scientists who have developed a world-first blood test to diagnose the disease earlier. Rhys went for a routine optometrist appointment at the local shops expecting, at worst, to be told he needed glasses. Instead, they discovered a partially detached retina, which a later trip to a specialist revealed was due to the rare form of eye cancer known as ocular or uveal melanoma.

To help the cause, Rhys' wife Kate participated in the gruelling Cape-to-Cape Mountain bike race in Western Australia's Southwest and raised \$8,000 in funding towards uveal melanoma research.

### Safer and easier

The Centre for Precision Health is looking to reduce the risk and invasiveness of diagnosis by developing a blood test to detect and diagnose melanomas far earlier. Professor Elin Gray said early diagnosis was crucial. *"Half of people diagnosed with uveal melanoma will have the cancer spread to other parts of the body – and of those with detectable spread, 92 per cent will die within two years".*

*"Therefore, it is important to determine which patients fall within this 50 per cent for closer clinical follow-up and early treatment to prevent the spread of the cancer."*

*Fortunately, those who sit within this 50 per cent have specific genetic mutations that can be observed, enabling early intervention."*

Professor Gray said a blood test could easily be repeated and would be less intimidating than the current diagnostic procedure. Complications can totally or partially impair vision, and the test can't be repeated if results are deemed inconclusive due to insufficient sample or degradation. Considering the risks, many patients decline the procedure.

This project was also featured on Channel 9 News with Dr Leslie Beasley and an ABC Radio Interview with Dr Aaron Beasley.



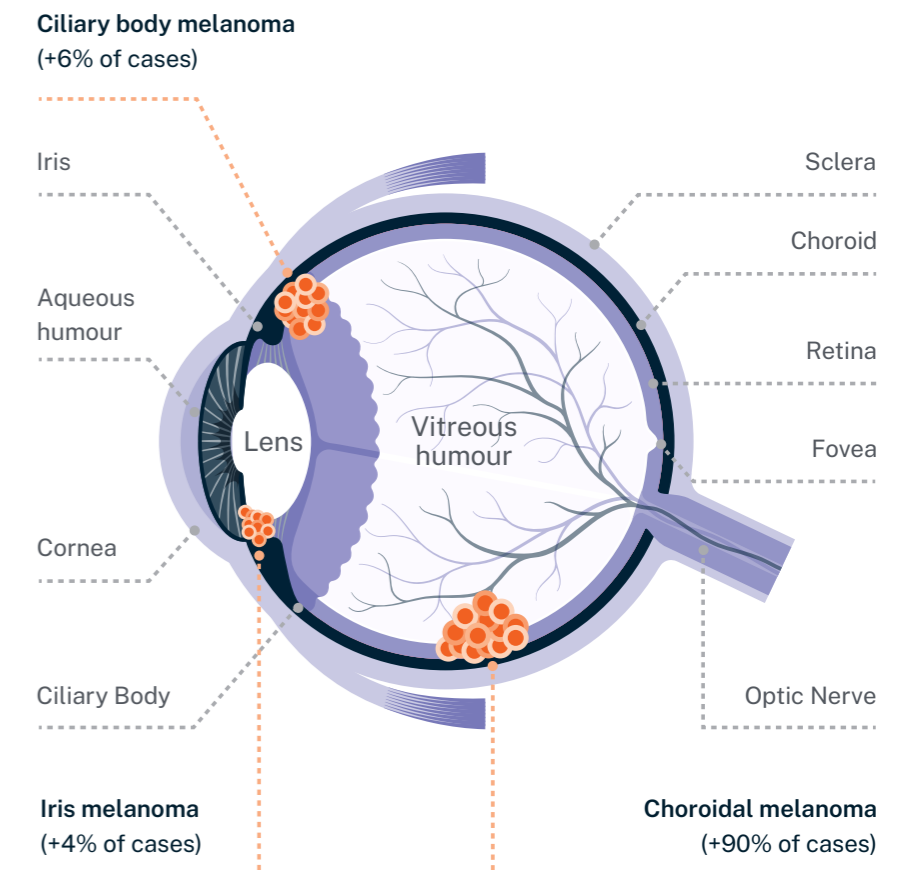
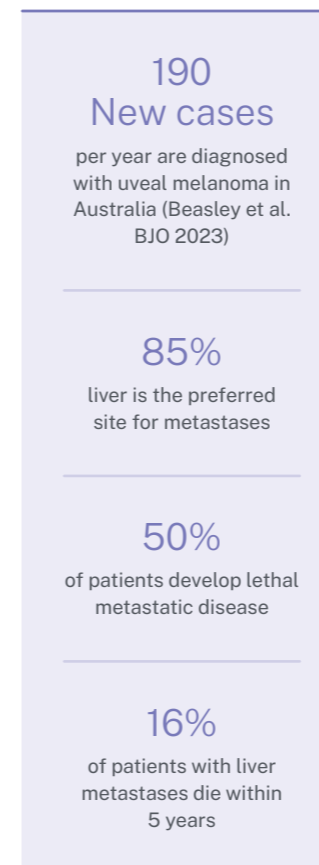
Kate and Rhys with two of their children

Beasley, A.B., de Bruyn, D.P., Calapre, L. et al. Detection of metastases using circulating tumour DNA in uveal melanoma. *J Cancer Res Clin Oncol*

A trip to Specsavers is rarely a life-changing event, but for one Perth family, it was.



Dr Aaron Beasley

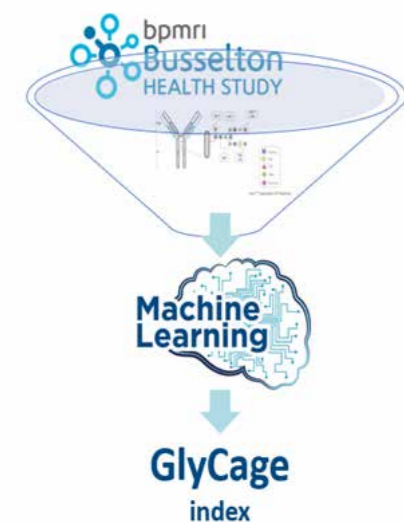


# Tracking Cardiovascular Risk Beyond Calendar Age

Cardiovascular disease refers to a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions.

Cardiovascular diseases take an estimate of more than 18 million lives a year, constituting the leading cause of death globally. The treatment and post-onset rehabilitation and care of cardiovascular diseases constitute a heavy economic burden.

An individual's risk of developing cardiovascular disease depends on the combined effect of multiple risk factors including behavioural factors. It is essential to upscale the primary prevention of CVDs and identify novel biomarkers and tools to facilitate risk assessment and targeted intervention.



## What are IgG N-glycans?

Immunoglobulin G (IgG) N-glycans as an inflammation metric have been reported previously in subclinical atherosclerosis and metabolic disorders, both important risk factors in cardiovascular health.

Glycans participate in key biological processes and the N-glycosylation pattern on blood immunoglobulin G (IgG) has a direct impact on the regulation of inflammation, as the attached glycans can shift the role of IgG in pro- and anti-inflammatory functions.

## The Study

The data from 1465 participants from the Busseton Healthy and Ageing Study (BHAS) was analysed. Information on the IgG N-glycome, medical history of cardiovascular disease, demographic data, anthropometric measurements, and biochemistry tests were included in the final analysis.

Wu, Z., Guo, Z., Zheng, Y., Wang, Y., Zhang, H., Pan, H., Li, Z., Balmer, L., Li, X., Tao, L., Guo, X., & Wang, W. (2 Jan 2023). IgG N-Glycosylation Cardiovascular Age tracks cardiovascular risk beyond calendar age. *Engineering*, 26, 99-107. <https://doi.org/10.1016/j.eng.2022.12.004>

## The Results

Using machine learning algorithms the team developed an IgG N-glycosylation cardiovascular age (GlyCage) index. An excessive GlyCage was found to be significantly associated with higher cardiovascular risk. Compared with calendar age, GlyCage index achieved a significant improvement for predicting cardiovascular risk.

The extent of IgG N-glycosylation is altered in individuals with high CVDs risk and the findings of this study and other CVDs-related studies have demonstrated that altered IgG N-glycosylation leads to an enhancement in the level of pro-inflammatory activity.

The results of this study suggests the practical application of GlyCage index as an important supplement to cardiovascular risk stratification and has great potential to inform clinical decision-making for primary prevention.

The Centre for Precision Health Suboptimal Health program and collaborators published a world-first study to develop a cardiovascular health index (GlyCage) for tracking cardiovascular risk, using IgG N-glycans.



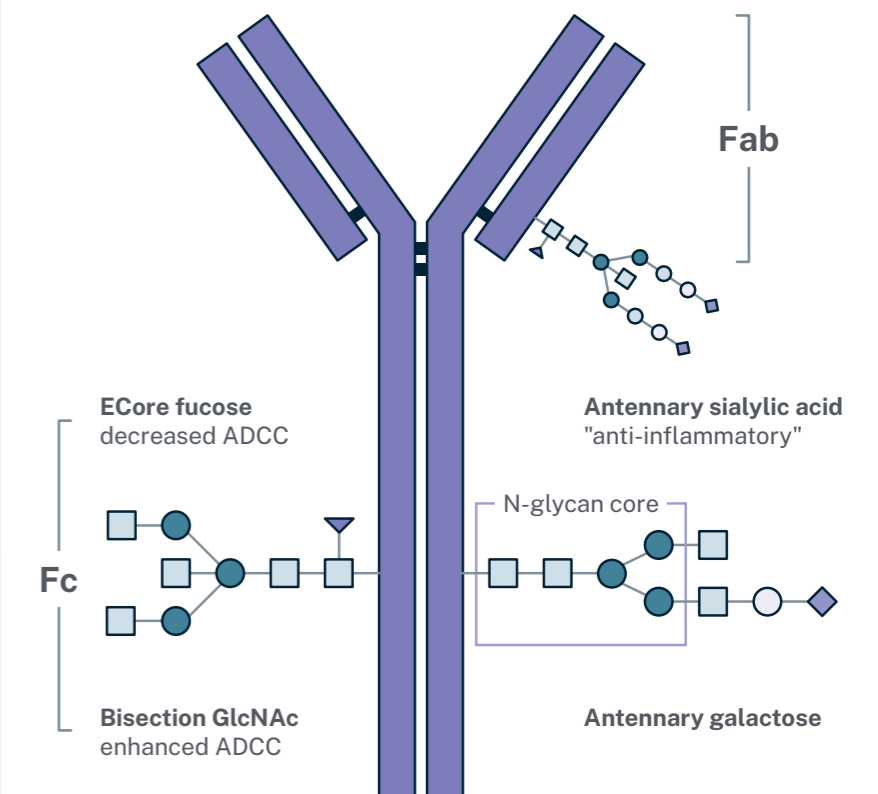
Dr Zhiyuan Wu

**Risk factors in your control**

- ♥ Smoking
- ♥ High blood pressure
- ♥ High cholesterol
- ♥ Diabetes
- ♥ Being overweight
- ♥ Lack of exercise
- ♥ Stress
- ♥ Metabolic syndrome

**Risk factors out of your control**

- ♥ Age
- ♥ Family history
- ♥ Genetic factors







## Engaging the Community

### WA NeuroHub Project

CEOs from more than 15 neurological not-for-profit organisations have united to help improve the health and research landscape for Western Australians living with neurological conditions.

Their valuable insights, shared through workshops, helped shape the content, features and positioning of the WA NeuroHub, a new research project led by the Centre for Precision Health, Perron Institute, and Anthologie. The WA NeuroHub aims to bring important information to one place for people with lived experience of neurological conditions, health professionals, not-for-profit organisations, researchers and industry.

There are more than 600 different neurological disorders, which when combined are in the top five Burden of Disease groups for both fatal and non-fatal disease groups in WA.

Professor Simon Laws said the vast number of different conditions have contributed to many challenges and gaps in providing care and services for people with neurological disorders, however many of these conditions share common symptoms, care needs and treatments.

"The WA NeuroHub project will create an up-to-date service directory which changes in real time to enable patients to find clinicians with reduced waiting periods faster, while a constantly updated research registry is intended to display current projects and studies taking place in WA and offer the opportunity to share information," he said.

Multiple Sclerosis WA (MSWA) and MS Australia have contributed funding to the project, while collaborators include not-for-profit partners Synapse, Stroke Foundation, Huntington's WA, Parkinson's WA, Neurological Council of WA, community support groups The Kings Park Warriors, FND Hope, MS & All Neurological Conditions Perth, and health partners State Head Injury Unit and Neurosciences Unit.



### Developed with the input of key players

The online health and research platform will be designed with input from key stakeholders such as people with lived experience of neurological conditions, health professionals, not-for-profit organisations, researchers and industry.

The first workshops have gained valuable insights from more than 60 carers and people with living with neurological conditions such as Parkinson's disease, Huntington's disease, multiple sclerosis, brain injury, functional neurological disorder, epilepsy, and neuromuscular conditions.

Their top three desires for the platform were information and resources, accessibility and usability, and connection and community.

Dr Travis Cruickshank said CEOs from not-for-profit neurological organisations supported the development of the WA NeuroHub and saw it as a technology to help them optimise their service delivery and support people with a neurological condition.

"It is very unique to see this level of collaboration from all the stakeholders in the neurological community who have been traditionally siloed," he said.

"There is real hope that we can secure the funds to develop this platform if we work together."

Dr Cruickshank said co-designing the workshops will help to ensure that the prospective platform will meet the needs of neurological stakeholders in WA.



Dr Travis Cruickshank

# Community participation



5



Community representatives across all three research streams and regular consumer meetings

Over five educational talks to community groups and community forums

Engagement in Sun awareness community outreach activities

Co-design of (SPIN brain box)

Co-design of an educational resource for people with MS and concussion

Parliamentary Friends of People with Rare and Undiagnosed Diseases

Lab visits by community groups and philanthropists

Participation in community fund raising events: MSA Step-up, MSA Ocean Ride and Melanoma March

## Fostering HDR excellence



49

Total HDRs in 2023

07

Number of HDR Completions in 2023

12

Number of new Enrolments

04

Students have submitted their PhD thesis

### HDR highlights

- PhD completions: Yulu Zheng, Adnan Khattak, Zheng Guo, Afaf Abed, Zhiyuan Wu and Xueqing Wang. Masters by Research Completion by Manjot Singh.
- PhD student Shane Fernandez US-bound after winning prestigious Fulbright Scholarship. He spent six months being hosted by world-leading Alzheimer's researchers at Indiana University's Alzheimer's Disease Research Centre.
- PhD student Désirée Sexauer was awarded a **Melanoma Institute Australia** Postgraduate Research top-up Scholarship.
- PhD student **Andrea Lyon** was awarded a **Spinnaker Foundation The Nicholas Way Fund for Early Career Research** top up grant.
- PhD student **Lidia Medhin** won the Outstanding Presentation Award at the **Thomas Ashworth Conference** in Melbourne.
- PhD student **Fangli Hu** was awarded an International award for her innovative health and travel research.
- **Désirée Sexauer** won the Best Presentation Award at the **2023 ECU HDR symposium**.
- CPH HDR students presented their research at 12 conferences in 2023.



## Attracting and retaining new talent



Dr Mitchell Turner

In the Neurological Conditions program. Mitchell's research focuses on the impact of sleep and chronobiology on human performance.



Dr Leslie Beasley

In the Cancer program. Leslie's research focuses on state-of-the-art research on single cell sequencing and analysis to better understand tumour biology.



Dr Vivian Chua

Was awarded a **VC-Research Fellowship** and will be joining the cancer program in early 2024 to work on the discovery of new treatments for uveal (eye) melanoma.



## Attracting Research Funding

**\$2,633,554**

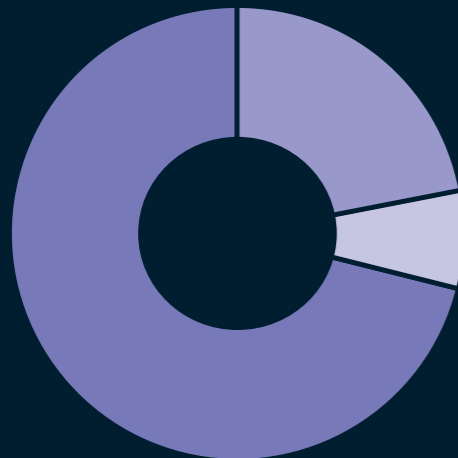
of research income received in 2023 (invoiced amount)

**\$256,845**

in commercial income received

**7.2**

2023 Return on Investment



**71%** Category 3 (including Philanthropy, Industry and International funding)

**22%** Category 1 (including NHMRC and other Australian competitive grants)

**07%** Category 2 (including State Government and other public sector income)

### Active funded research projects

**Cancer Council of WA Fellowship**  
Professor Elin Gray - *Developing blood tests to guide treatment of melanoma*

**Cancer Council of WA Research Project Grant**  
Professor Elin Gray - *Developing a blood test for predicting the response to treatment with immunotherapies in melanoma patients*

**Cancer Council of WA Suzanne Cavanagh Early Career Researcher Grant**  
Dr Leslie Beasley - *Identification of melanoma-specific signature that can predict response to immunotherapies.*

**Cancer Research Trust**  
Professor Elin Gray - *Enabling Advanced Single Cell Cancer Genomics in WA*

**Department of Health WA Future Health Research & Innovation Fund - Biobank Interim Support**  
Professor Elin Gray - *Cancer Blood Biomarkers Study - Biobank*

**Department of Health WA Near Miss Merit Award**  
Dr Tanielle Porter - *The interaction of genetic and lifestyle factors affecting progression in neurodegenerative disorders*

**ECU Early-Mid-Career Researcher Grant**  
Dr Aaron Beasley - *Predicting prognosis using circulating tumour DNA in uveal melanoma*

**ECU Early-Mid-Career Researcher Grant**  
Dr Xingang Li - *Developing a tool to predict the likely occurrence of stroke*

**Florey Institute of Neuroscience and Mental Health**  
Professor Simon Laws - *Genetic contributions to Alzheimer's disease risk and progression in the AIBL cohort*

**Multiple Sclerosis Society of Western Australia (MSWA)**  
Professor Simon Laws - *Develop a systematic profiling of neurological conditions that will facilitate personalised treatment and streamline services*

**National Health and Medical Research Council (NHMRC) Boosting Dementia Research Grant**  
Professor Simon Laws - *E-DADS: Early Detection of Alzheimers Disease Subtypes*

**NHMRC/MRFF - Genomics Health Futures Mission**  
Professor Elin Gray - *Integrated multimodal precision liquid biopsy to enhance Melanoma and NSCLC Treatment (IMPLEMENT)*

**NHMRC/MRFF - Dementia, Ageing and Aged Care Mission**  
Professor Simon Laws - *Blood testing to predict and discriminate dementias*

**NHMRC Ideas Grant**  
Professor Simon Laws - *Imaging, fluid and genetic markers of Alzheimer's disease*

**NHMRC Project Grant**  
Professor Simon Laws - *Genetic and lifestyle susceptibility and resilience factors affecting rates of change in preclinical Alzheimer's Disease*

**National Institutes of Health (NIH) grant**  
Professor Simon Laws - *Alzheimer's dementia and progression in international cohorts*

**Oncomine Clinical Research Grant - ThermoFisher**  
Professor Elin Gray - *TCR repertoire in combination with HLA and TMB as predictor of response to immune checkpoint blockade in melanoma and lung cancer*

**Perron Institute for Neurological and Translational Science**  
Dr Travis Cruickshank - *The effectiveness of a 12-week remote-delivered green-blue light therapy intervention on daytime sleepiness, fatigue, work productivity and quality of life outcomes following traumatic brain injury*

**Perron Institute for Neurological and Translational Science**  
Prof. Simon Laws - *Establishing a Neurological Hub (NeuroHub) Data Registry*

**Shantou University Medical College, China - PhD Program**  
Professor Wei Wang - *Shantou Cooperative Research in Medical Sciences and Health Service Delivery*

**Spinnaker Health Research Foundation: Janine Chalwell Gift Grant**  
Professor Elin Gray - *Multimodal liquid biopsy to predict response to melanoma to Immuno-Oncology*

**Spinnaker Health Research Foundation: Janine Chalwell Innovation Grant**  
Dr Aaron Beasley - *Extracellular vesicles profiling as a signature of response to immunotherapy*

**U.S Department of Defense: Melanoma Research Program Team Science Award**  
Professor Elin Gray - *Multimodal Precision Liquid Biopsy to predict the risk of Melanoma Recurrence*

## 12 new grants awarded in 2023

Category 1 grants <b>\$662,040</b>	<ul style="list-style-type: none"> <li>National Health and Medical Research Council (NHMRC) Investigator Grant Dr Emmanuel Adewuyi (\$662,040)</li> </ul>
Category 2 (including State Government and other public sector income) <b>\$297,356</b>	<ul style="list-style-type: none"> <li>Near Miss Awards: Emerging Leaders Program Dr Emmanuel Adewuyi (\$100,000)</li> <li>Near Miss Awards: Ideas Grants: Dr Pauline Zaenker (\$100,000)</li> <li>Future Health &amp; Innovation Research Fund: WA Cohort Studies Prof. Elin Gray (\$97,356)</li> </ul>
Category 3 (including Philanthropy, Industry and International funding) <b>\$2,125,218</b>	<ul style="list-style-type: none"> <li>MSWA: SPIN Research Program extension SPIN Investigators including CPH members Prof. Simon Laws and Dr. Travis Cruickshank (\$984,039)</li> <li>MSWA: WA NeuroHub extension Prof. Simon Laws and Dr Travis Cruickshank (\$248,875)</li> <li>Cancer Research Trust Grant: WA Melanoma Initiative Prof. Elin Gray (\$667,304)</li> <li>Ian Potter Foundation Grant Prof. Elin Gray (\$140,000)</li> <li>Cancer Council of WA: Suzanne Cavanagh ECR grant Dr Aaron Beasley (\$35,000)</li> <li>Melanoma Institute Australia: Postgrad Top-Up Scholarship Desiree Sexauer (HDR student) - \$30,000</li> <li>Australian Melanoma Research Foundation: Early Career Scientist Grant Dr Pauline Zaenker (\$15,000)</li> <li>Spinnaker Health Research Foundation: Nicholas Way Fund: Andrea Lyon (HDR student) - \$5,000</li> </ul>

## Communicating our Research Findings

**76%**  
Q1 Journals

**23%**  
HDR led

**73%**  
International

## 2023 Publications

Includes CPH members and Adjuncts

(\*Q1, HDR underlined, #International)

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## Communicating our Research Findings beyond publications



~50% increase in X followers



653 media mentions



1.1 billion global audience reach estimate



12 newsletters with 133 subscribers

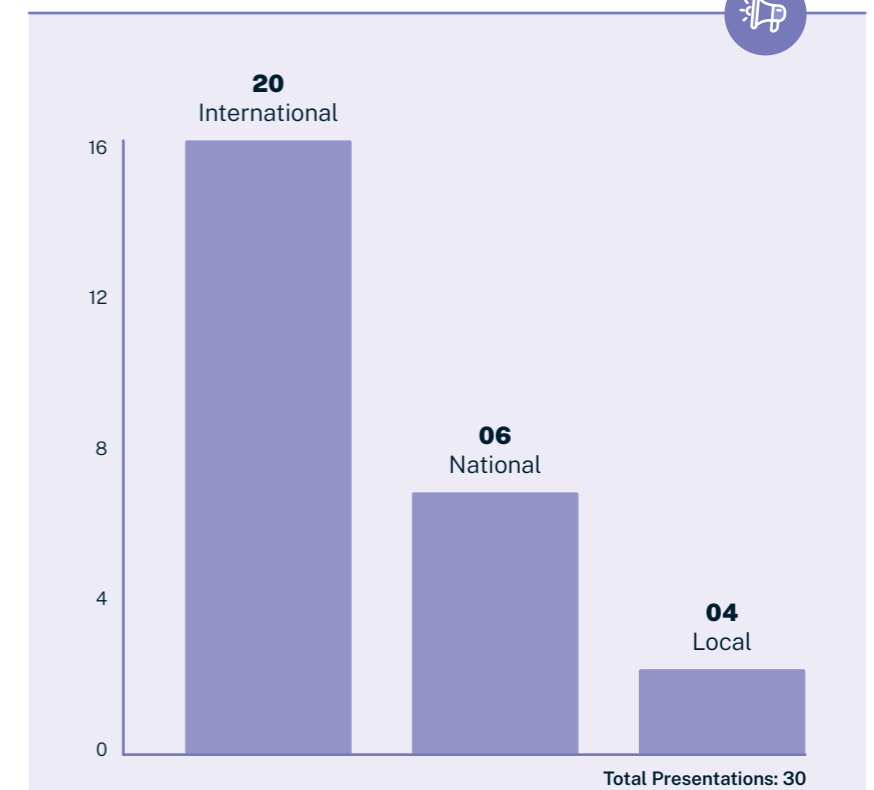


>\$10 million advertising

Centre members featured in 16 ECU media release articles in 2023, with a global audience reach of over 1 billion, including locally, across Australia and internationally in countries such as the United States, India, Switzerland, Turkey, China, Spain, Brazil, Germany and the United Kingdom. This is testament to the increasing recognition of the Centre's work and expertise.

The Centre also has a well developed and active website and X account, which features the Centre's news and events, as well as distributing a monthly newsletter to members and stakeholders.

### Conference presentations



Professor Elin Gray was an invited speaker at three European conferences including the European Society of Medical Oncology (ESMO), which had over 32,000 attendees in 2023.

Professor Wei Wang hosted the China-Europe-Australia Glycomics Symposium in China and was guest editor and Chair of the Engineering Webinar series. 12 conferences in 2023.





## Contributing to Research Culture

The Centre for Precision Health held two Professional Development workshops on goal setting and CV writing as well as two research impact workshops, in conjunction with Research Services.

CPH also hosted 8 seminars in the CPH Seminar Series:

February

CPH Vacation Research Scholarship presentations by scholarship students

March

**Guest: Dr Mikaela Dell'Oro**

UWA Australian Centre for Quantitative Imaging - Artificial intelligence in medical imaging - AIQ Solutions innovative approach in treatment response

**CPH speaker: John Taylor**

Autoantibodies as biomarkers for predicting ICI treatment toxicities

April

**Guest: Dr Tao Wang**

Telethon Kids Institute - Aptamer development for theranostic applications

**CPH speaker: Dr Xingang Li**

Current status and prospects of monoclonal antibody glycosylation

May

**Guest: Associate Professor Yen Ying Lim**

Monash University - Using Digital Technology to Drive Understanding of Brain-Behaviour Relationships in Alzheimer's Disease

**CPH speaker: Shane Fernandez**

Genetic Risk For Accelerated Cognitive Decline: Results From GWAS Analyses



June

**Guest: Clinical Professor Adnan Khattak**

Fiona Stanley Hospital - Personalised cancer vaccine: how Covid ushered in a new era for cancer treatment

**CPH speaker: Dr Aaron Beasley**

Blood-based assay for assessment of tumour mutational burden to predict response to immunotherapy in melanoma

August

**Guest: Dr Liang Wang**

Guangdong Provincial People's Hospital, China - From prokaryotes to eukaryotes: glycogen structural characterization and molecular mechanism exploration.

**CPH speaker: Dr Lan Chen**

Intestinal microbiota alterations in patients with Graves' disease.

September

**Guest: Clinical Professor Benhur Amanuel**

PathWest QEII - Clinical implementation of personalised cancer medicine.

**CPH speaker: Dr Leslie Beasley**

Circulating tumour DNA in patients with advanced ovarian cancer receiving neoadjuvant chemo-immunotherapy.

November

**Guest: Mr Philipp Beranek**

SMHS PhD Student and Research Assistant - The role of sleep behaviour and environment in the sleep of shift workers in extractive industries.

**CPH speaker: Dr Mitchell Turner**

Improved sleep health - a sleep observational study with MSWA Occupational Therapy Department.

## CPH Research Showcase

The Annual Centre for Precision Health Showcase event was held on 5 December 2023 and celebrated CPH achievements for the year as well as highlights of the exciting research happening across the Centre. We were delighted for the event to be sponsored by *Thermo Fisher Scientific* and also to welcome our interstate Keynote speaker, **Professor Helen Rizos** from Macquarie University in Sydney. Prof Rizos provided an inspiring talk about her research on lessons learned from immune checkpoint inhibitors in cancer.

A highlight of the day was the Poster Presentations session held during the morning tea break, where attendees could view the CPH HDR and EMCR research posters and vote on the People's Choice winner. We were also honoured to have **Professor Caroline Finch**, Deputy Vice-Chancellor (Research) attend as our official Judge of the poster prizes. Following the morning break was the EMCR and HDR presentation session. Thank you to our presenters: **Dr Travis Cruickshank**, **Sanjeev Adhikari (HDR)**, **Dr Mitchell Turner**, **Dr Pauline Zaenker**, **Chunbin Zhou (HDR)**, and **Dr Lois Balmer** on their excellent presentations.



Professor Helen Rizos,  
Macquarie University  
Keynote speaker



Research  
poster display



### Showcase Prize winners



#### HDR Student Publication Prize Winners

Joint winners  
Yulong Lan and Dan Wu  
(PhD Candidates)

Presented by Em. Prof.  
John Finlay-Jones (Chair,  
CPH ERAB)



#### Consumer Representative Presentation Prize - Winner

Dr Travis Cruickshank

Awarded by CPH  
Consumer Representative  
and Advocate - Ms Annie  
Cordingley (pictured)



#### Consumer Representative Presentation Prize - Runner Up

Sanjeev Adhikari  
(PhD Candidate)

Awarded by CPH  
Consumer Representative  
and Advocate - Ms Annie  
Cordingley (pictured)



#### Winner HDR Student Poster

Neha Pulyani (pictured)  
(PhD Candidate)

Presented by Prof.  
Caroline Finch ECU DVCR

#### Winner - EMCR Poster

Dr Aaron Beasley



#### People's Choice Poster

Dan Wu  
(PhD Candidate)



#### HDR Student Infographic Prize - 1st Place

Lidia Medhin  
(PhD Candidate)



#### HDR Student Infographic Prize - 2nd Place

Xiaojia Xu  
(PhD Candidate)

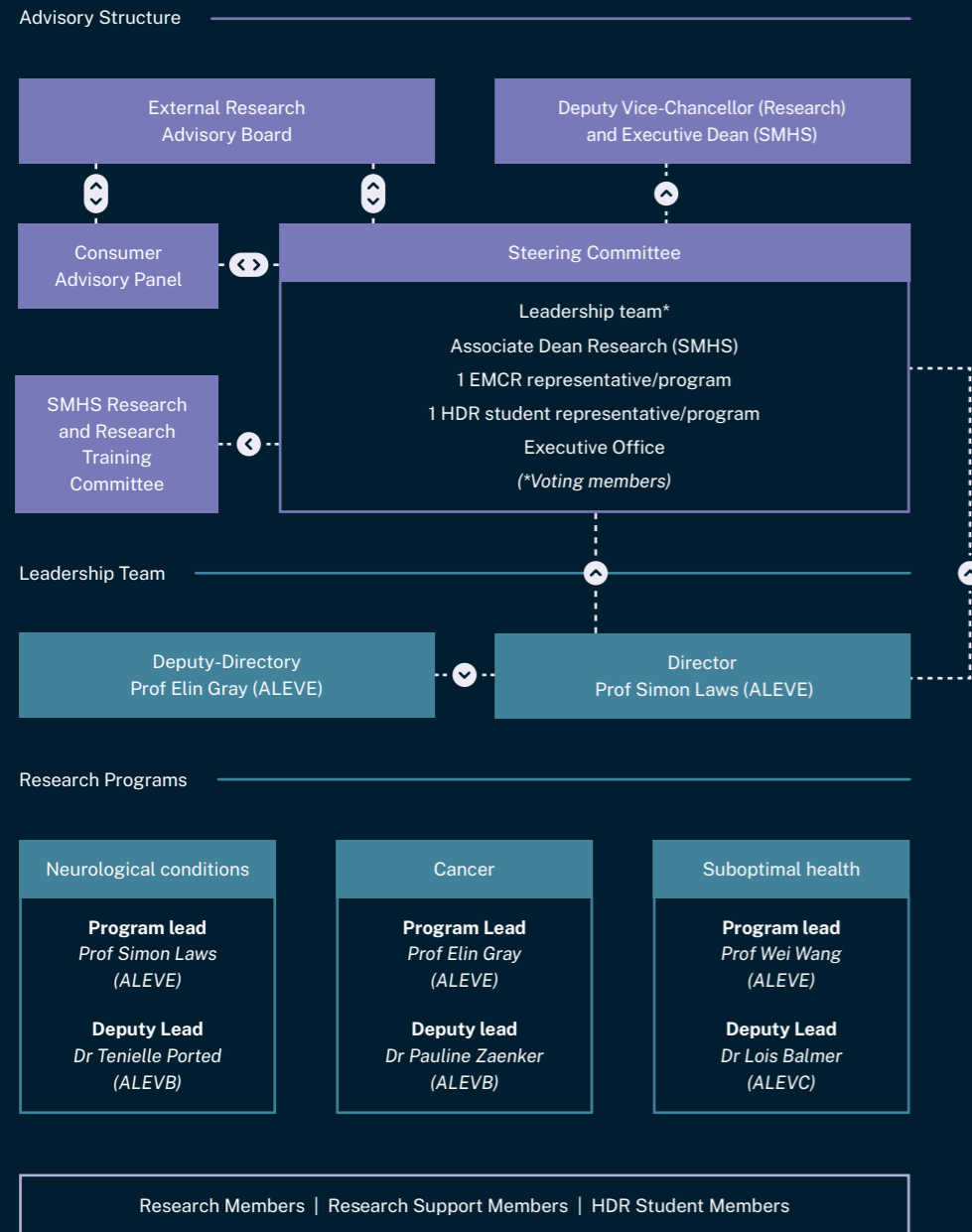


#### HDR Student Infographic Prize - 3rd Place

Désirée Sexauer  
(PhD Candidate)



## Governance Organisational structure



## 2023 CPH Leadership Group



**Professor Simon Laws**  
Professor of Translational Genomics  
Director / Lead, Neurological Conditions



**Professor Elin Gray**  
Professor of Cancer Research  
Deputy Director / Lead, Cancer



**Professor Wei Wang**  
Professor of Public Health  
Lead, Suboptimal Health



**Dr Tenielle Porter**  
Postdoctoral Fellow  
Deputy Lead, Neurological Conditions



**Dr Pauline Zaenker**  
Postdoctoral Fellow  
Deputy Lead, Cancer



**Dr Lois Balmer**  
Senior Lecturer  
Deputy Lead, Suboptimal Health

## 2023 CPH Steering Management Committee



Professor Simon Laws



Professor Elin Gray



Professor Wei Wang



A/Prof Claus Christophersen  
SMHS Assoc. Dean (Research)



Dr Tenielle Porter



Dr Pauline Zaenker



Dr Lois Balmer



Ms Sharon Middleton  
Centre Coordinator



Dr Travis Cruickshank



Dr Aaron Beasley



Dr Ivan Li



Mr Shane Fernandez  
(HDR lead)



Ms Lidia Medhin  
(HDR lead)



Ms Fangli Hu  
(HDR lead)

The Steering Management Committee (SMC) meets on a monthly basis and held 12 meetings in 2023.

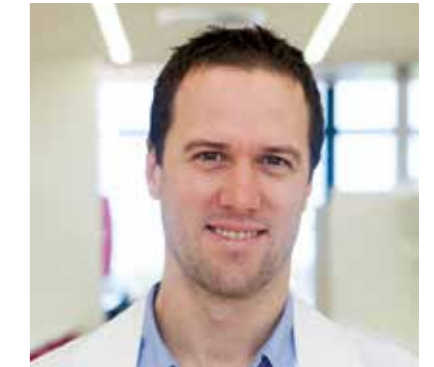
## Centre for Precision Health External Research Advisory Board



Inaugural Chair Professor  
John Finlay-Jones  
Emeritus Professor, SMHS  
and Former ECU DVCR



Dr Carolyn Williams  
Former CEO, Centre for Entrepreneurial  
Research & Innovation (CERI)



Professor Ryan Lister  
Genome Biology and Genetics Program  
Head, UWA/HPMRI



Dr Kelly Ewen-White  
National Sales Manager,  
Thermo Fisher Scientific



Ms Annie Cordingley  
Consumer representative and Member of WA  
Health Consumer Reference Group



Professor Gareth Baynam  
Clinical Genomics Policy Advisor at WA  
Health, Medical Director, Rare Care Centre

The Centre for Precision Health External Research Advisory Board (ERAB) consists of six external members (pictured above) as well as the three Centre Program Leads and Executive Officer. The Board meets quarterly and held four meetings in 2023 with a 70% attendance rate.

The ERAB provided significant advice into the strategic directions of the CPH as well as assistance with shaping the Centre renewal application, 2024-2027 Business Plan and Terms of Reference.

This year the Board have commenced discussions on developing a separate Consumer Advisory Board in the Centre.

The Centre thanks outgoing members Prof. Ryan Lister and Dr Kelly White who have completed their 3-year term. Both members added invaluable insights and contributions to the Board in the Centre's first funded term (2021-2023).

## CPH Members in 2023

### Leadership Group

Name	Level	Position description
Professor Simon Laws	Level E	Director and Research Lead (Neurological conditions)
Professor Elin Gray	Level E	Deputy Director and Research Lead (Cancer)
Professor Wei Wang	Level E	Research Lead (Suboptimal Health and Glycomics)
Dr Lois Balmer	Level C	Deputy Research Lead (Suboptimal)
Dr Tenielle Porter	Level B	Deputy Research Lead (Neurological conditions)
Dr Pauline Zaenker	Level B	Deputy Research Lead (Cancer)

### Research Members

Name	Level	Position description
Dr Andrew Woo	Level B	Research member - EMCR
Dr Eleanor O'Brien	Level B	Research member - EMCR
Dr Emmanuel Adewuyi	Level B	Research member - EMCR
Dr Xingang (Ivan) Li	Level B	Research member - EMCR
Dr Travis Cruickshank	Level B	Research member - EMCR
Dr Aaron Beasley	Level A	Research member - EMCR
Dr Leslie Beasley	Level B	Research member - EMCR
Dr Mitchell Turner	Level B	Research member - EMCR
Dr Shayne Vial	Level B	Affiliate Research Member (Neuro-SPIN)

### Research Support Staff

Name	Level	Position description
Ms Sharon Middleton	Professional staff	Centre Coordinator (CPH)
Ms Manja Laws	Professional staff	Project Coordinator (SPIN)
Ms Milcent Tsvangirayi	Professional staff	Research Assistant (Neuro)
Ms Anna Reid	Professional staff	Research Assistant (Cancer)
Ms Kate Turner	Professional staff	Research Assistant (Neuro-SPIN)
Ms Madeline Griffiths	Professional staff	Research Assistant (Neuro-SPIN)
Ms Rachel Orbuck	Professional staff	Research Assistant (Neuro-SPIN)
Ms Kirsten van Rijn	Professional staff	Research Assistant (Neuro-SPIN)
Ms Lidija Milicic	Professional staff and HDR	RA and PhD student (Neuro-SPIN)
Ms Leah Dempsey	Professional staff and HDR	RA and Masters by Research candidate (Neuro-SPIN)
Ms Luisa Pinnel	Professional staff and HDR	RA and Masters by Research candidate (Cancer)
Ms Rebecca Auzins	Professional staff and HDR	RA and Masters by Research candidate (Cancer)

### HDR Students

Name	Level	Position description
Dr Afaf Abed	HDR	Clinical PhD candidate (completed 2023)
Dr Lydia Warburton	HDR	Clinical PhD candidate
Dr Adnan Khattak	HDR	Clinical PhD candidate (completed 2023)
Dr Aesha Gandhi	HDR	Clinical PhD candidate
Ms Andrea Lyon	HDR	PhD candidate
Mr Aydin Raei Sadigh	HDR	PhD candidate
Ms Bec Auzins	HDR	Masters by Research candidate
Ms Caipan Gong	HDR	PhD candidate
Mr Chunbin Zhou	HDR	PhD candidate
Ms Cuihong Tian	HDR	PhD candidate
Ms Dan Wu	HDR	PhD candidate
Mr Olasunkanmi David Bamidele	HDR	PhD candidate
Ms Desiree Sexauer	HDR	PhD candidate

## HDR Students

Name	Level	Position description
Ms Dong Lin	HDR	PhD candidate
Ms Eleanore Daines	HDR	Masters by Research candidate
Ms Fangli Hu	HDR	PhD candidate (2023 HDR Lead)
Mr Heng Zhang	HDR	PhD candidate
Ms Huiying Pan	HDR	PhD candidate
Ms Jiangyue Yao	HDR	PhD candidate
Ms Jinxia Zhang	HDR	PhD candidate
Ms Lan Chen	HDR	PhD candidate
Ms Leah Dempsey	HDR	Masters by Research candidate
Ms Lidia Medhin	HDR	PhD candidate (2023 HDR Lead)
Ms Lidija Milicic	HDR	PhD candidate
Ms Luisa Pinnel	HDR	Masters by Research candidate
Mr Manjot Singh	HDR	PhD candidate (completed MBR 2023)
Ms Mehrane Mehramiz	HDR	PhD candidate
Ms Monique Garcia	HDR	PhD candidate
Ms Neha Pulyani	HDR	PhD candidate
Mr Qi Yang	HDR	PhD candidate
Mr Ruirui Xu	HDR	PhD candidate
Mr Sam Adams	HDR	Masters by Research candidate
Mr Sanjeev Adhikari	HDR	PhD candidate
Mr Shane Fernandez	HDR	PhD candidate (2023 HDR Lead)
Ms Sharon Chen	HDR	PhD candidate
Mr Shaun Basson	HDR	Masters by Research candidate
Mr Sean (Seungyoul) Oh	HDR	PhD candidate
Ms Tharani Senavirathna	HDR	PhD candidate
Ms Wanqi Wang	HDR	PhD candidate
Ms Weijie Cao	HDR	PhD candidate
Mr Xiaojia Xu	HDR	PhD candidate
Ms Xueqing Wang	HDR	PhD candidate (completed 2023)

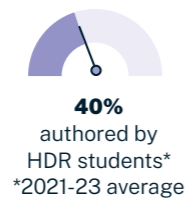
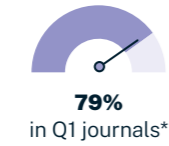
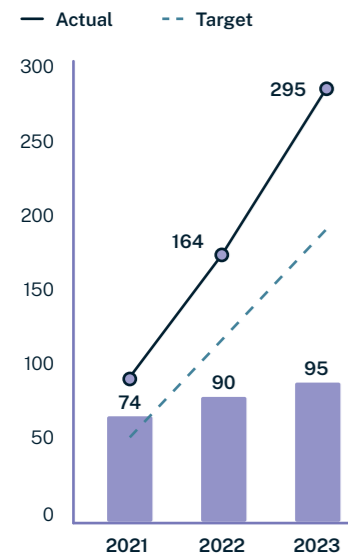
Name	Level	Position description
Mr Yulong Lan	HDR	PhD candidate
Ms Yulu Zheng	HDR	PhD candidate (completed 2023)
Mr Zheng Guo	HDR	PhD candidate (completed 2023)
Mr Zhisheng Chen	HDR	PhD candidate
Ms Zhixian Chen	HDR	PhD candidate
Mr Zhiwei Zhong	HDR	PhD candidate
Mr Zhiyuan Wu	HDR	PhD candidate (completed 2023)

## Adjuncts

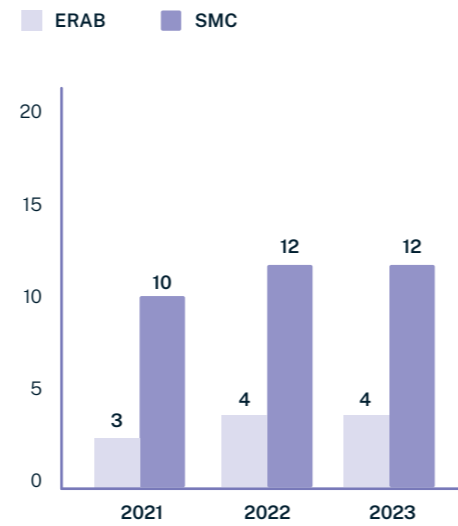
Name	Level	Position description
Clin. Prof. Adnan Khattak	Adjunct	Oncologist & Director, Clinical Trials, Fiona Stanley Hospital
Clin. Prof. Benhur Amanuel	Adjunct	Service Director at PathWest
Hon. Prof. Mel Ziman	Adjunct	Honorary Professor, ECU Melanoma Research
Prof. Xiuhua Guo	Adjunct	Capital Medical University, Beijing, China
Prof. Michael Millward	Adjunct	Foundation Chair of Clinical Cancer Research, UWA
Prof. Youxin Wang	Adjunct	Capital Medical University, Beijing, China
Prof. Victor Villemagne	Adjunct	University of Pittsburgh, USA
A/Prof. Haifeng Hou	Adjunct	Shandong First Medical University, Taian, China
A/Prof. Michelle Lupton	Adjunct	QIMR Berghofer Institute
A/Prof. Belinda Brown	Adjunct	Centre for Healthy Ageing, Murdoch University
A/Prof. Liang Wang	Adjunct	Guangdong Academy of Medical Sciences, China
Dr James Doecke	Adjunct	CSIRO, Queensland
Dr Michael Vacher	Adjunct	CSIRO, WA (embedded at ECU)
Dr Alyce Russell	Adjunct	Australian National Phenome Centre
Dr Jaisalmer de Frutos-Lucas	Adjunct	Universidad Complutense de Madrid, Spain
Dr Enoch Anto	Adjunct	Kwame Nkrumah University of Science and Technology
Dr Eric Adua	Adjunct	University of New South Wales
Dr Weitao Lin	Adjunct	Harry Perkins Research Institute
Dr Siqi Ge	Adjunct	Beijing Neurosurgical Institute, China

## Summary Report – CPH Key Performance Indicators

### Publications



### Governance meetings



## Financial Statement 2023 SRF Income and Expenditure

Income	2023 (\$)
ECUSRIC	400,000

Expenditure	2023 (\$)
Salaries and Oncosts	146,955
Contractor and agency staff costs	3,125
Travel, entertainment and training	10,872
Scholarships & other student expenses	82
HDR grant	5,000
Grant top-up	7,514
Computing	2,837
Equipment, facilities and maintenance	93,466
Other operating expenditure	130,149
<b>Total Expenditure</b>	<b>400,000</b>

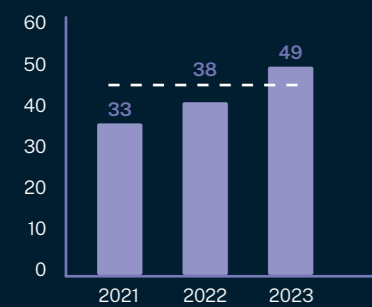
The above-outlined expenses incurred by the Centre for Precision Health align with all previously approved budget areas and the ECUSRIC funding guidelines. Whilst no purchases or expenses were incurred in areas outside of those previously approved, the CPH did reallocate the allocated budget across these approved areas to reflect strategic priorities and opportunities that developed in 2023.

The most notable change within an approved area is that of salaries, which was approximately \$65,000 above the budget allocated. The CPH Steering Management Committee agreed to reprioritise funding from other areas by providing bridging funding in 2023 to the Suboptimal Health research program to allow for the maintaining staffing levels into 2024 and the outcomes of funding applications.

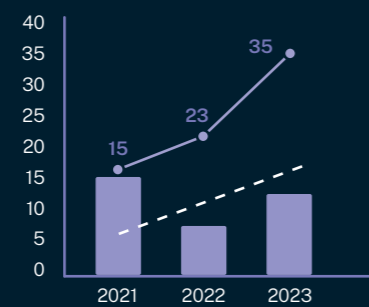
Allocations in all other areas were close to budget, with differences reflecting changes in infrastructure servicing costs as a result of higher-than-expected inflation.

**Prof. Simon Laws**  
Director, Centre for Precision Health

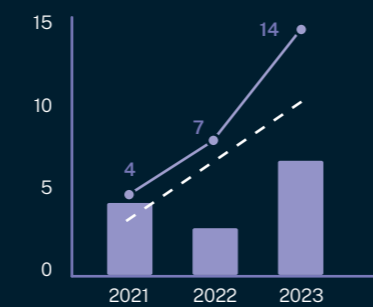
### HDR Students



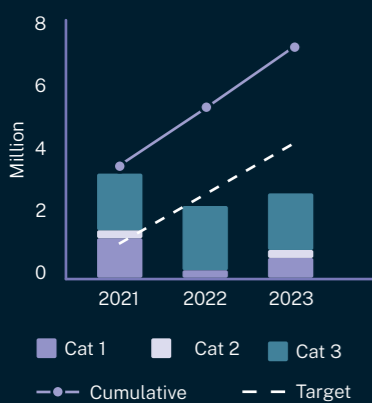
### HDR Enrolments



### HDR Completions



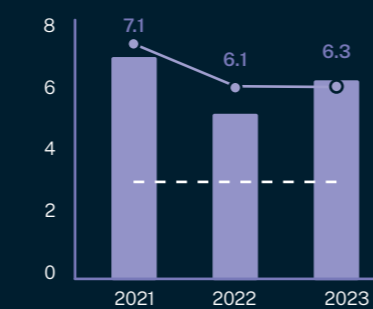
### External Research Income



### Grant Applications



### ROI



**Further Information**

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