



Nutrition & Health Innovation Research Institute

2023 Annual Report

Our purpose is to discover and share real-world solutions to improve health and quality of life.



One vision

Healthy people
Healthy communities

One mission

Reduce chronic disease by
developing, translating and
implementing nutrition and health
innovation research

Our research themes



Discovery and excellence



Technology and innovation



Real-world impact



A sustainable future





2023 at a Glance

112

Total Members

45

HDR Students

1 in 10

NHIRI Publications are in the top 1% journals by citespace

>\$6M

Total Grants Awarded**

1 in 2

NHIRI Publications are in the top 10% journals by citespace

4.3

10 year research FWCI

2.5K

Total Media mentions*

>4B

Potential media reach

133

Publications

108

Q1 Publications

* Relevant Advertising Value \$37.6M

** Includes grants starting in 2024. Grants submitted >\$26M



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Director's Report

The driving force behind our success at The Nutrition & Health Innovation Research Institute (NHIRI) is our mission to contribute to the creation of a healthier world for current and future generations.

In the pursuit of scholarly excellence, our focus is on nurturing high-performing leaders through high level mentorship. We measure success through the quality and impact of publications, citation rates, the cultivation of academic discourse, and the translation of research findings in the community.

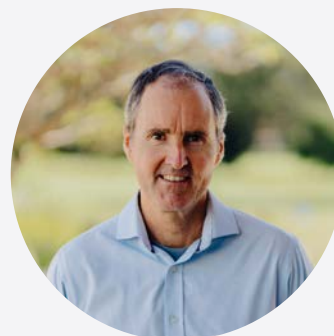
Our team at NHIRI underwent significant growth in 2023, with four new early-career post-doctoral researchers joining, resulting in a team of 22 core researchers. We have had considerable success in securing new grants and fellowships in 2023, including two National Health & Medical Research Council Ideas grants, two Heart Foundation fellowships, two Future Health Research & Innovation Fund - Innovation fellowships, a Raine Priming grant, and a Cancer Council of WA fellowship.

The Institute is committed to translating research into real-world impact, particularly in clinical, commercial, and policy settings. We work alongside our collaborators in other institutions, government, and industry to achieve this impact.

A shining example is NHIRI's involvement in shaping the 2026 Post-Fall Multidisciplinary Management Guidelines for WA Health Care Settings. This is groundbreaking, as nutrition has not been addressed in similar guidelines previously.

Lastly, the Institute demonstrates its dedication to preventive health initiatives through the adoption of innovative technologies. Our work using AI technology to detect prospective chronic diseases, is garnering international interest. We are steadily progressing the evidence needed to widely implement and commercialise this potentially lifesaving technology. Additionally, in the realm of 3D printed and freeze-dried food, we have made great headway to forging successful partnerships, collaborations and the funding needed to implement strategies to improve the eating experience of those limited to texture-modified foods.

The Institute's focus is not only to advance scholarly pursuits but also to make meaningful impacts on clinical and healthcare practices for preventive health on a broader scale.



Professor Jonathan Hodgson
Director



A/Prof Josh Lewis
Research Program Lead



Highlights of 2023

3D Food Printing and Nutrition Literacy Regional Tour 2023

NHIRI partnered with The Polly Farmer Foundation to take the 3D food printing lab on the road to school students in the Pilbara region.

The 3D Food Printing and Nutrition Literacy Regional Tour 2023 initiative provided a rich innovative experience, using engaging presentations, hands-on demonstrations, and food tasting sessions around novel 3D food printing technology and freeze-drying technology. The initiative introduced a wide range of topics in food and nutrition literacy, and promoted healthy and sustainable eating among school students of 6 regional schools in Newman and Hedland.



Favourite moments from the sessions were:

"It was so interesting to see the food being printed"

"The educational aspects to the session, the value of the nutritional benefits of various foods and getting students to think about ways to help Global Warming"

"Watching the 3D printer create the food"

"The students really enjoyed being able to touch and look at the 3D printed food close up"





Highlights of 2023

Cooking tips to prevent injury from falls

ECU's nutrition research is world-leading — and a recent workshop has shown how people can introduce what we've learned into their cooking at home. Researchers are constantly growing their understanding of how nutrition affects various aspects of our lives, however it is just as important people have the know-how required to put these learnings into practice.

ECU's Nutrition & Health Innovation Research Institute held a unique workshop to teach the community what to eat to improve muscle, bone and vascular health — and how to prepare the meals.

Recent ECU research has shown the role nutrition can have on bone fracture risk, blood vessel health and heart health.

NHIRI partnered with not-for-profit Injury Matters' Stay on Your Feet program, which was launching its 'Improve Your Health campaign' which aims to promote key messages such as eating nutritious food in order to stay strong and active to prevent falls.

Members of the community aged over 60 learned to cook meals such as beetroot pancakes, grilled fish tacos with kale slaw, and "chocolatey cruciferous ice-cream".

While attendees enjoyed the meals, Dr Marc Sim, Dr Lauren Blekkenhorst, Dr Tas Masih and PhD candidate Montana Dupuy then explained the nutritional benefits before the guests took home a cookbook with a dozen healthy recipes.

Organised by NHIRI Strategic Initiatives and Operations Manager Cheryl Croce and supported by laboratory technician Kim Luu, participants said they benefited greatly from the workshop.

Positive feedback ranged from learning new recipes, to understanding how diet can improve health.

"I was surprised at how nice certain vegies are to taste when used in recipes we tried today, which will be tried at home," one attendee said.

Another participant remarked how she could now better address her elevated cholesterol. "I realise by making a small change in my diet I can improve it," she said.

"I am challenged to find new and interesting ways to eat a wider variety of vegetables, but the camaraderie of the day was excellent, with everyone working together to make interesting, tasty food.

"I loved the broccoli ice-cream!"

Dr Sim said it was important health research was accompanied by practical messaging people could implement.

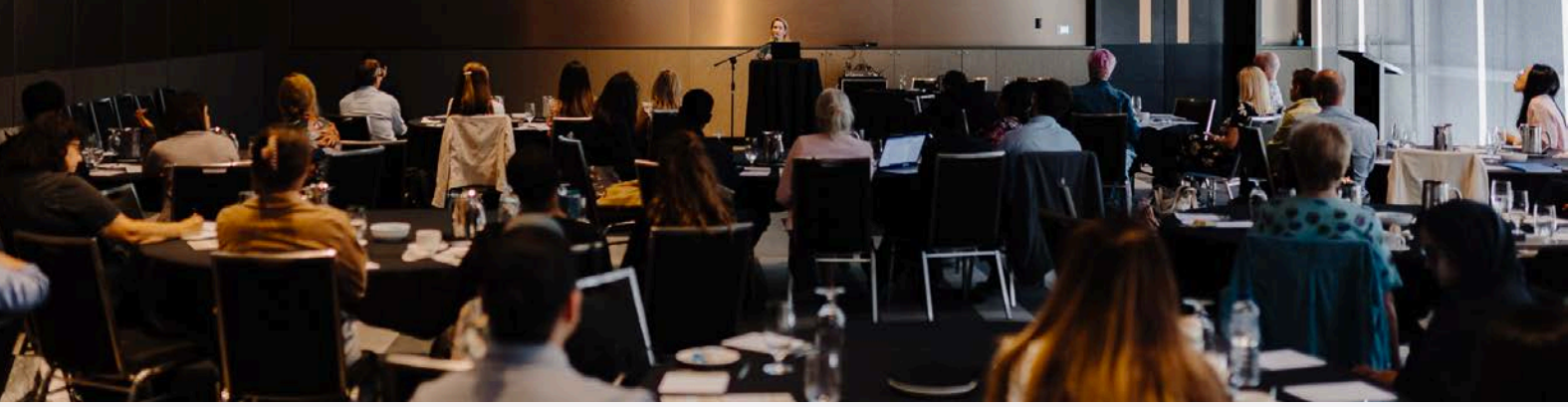
"NHIRI has developed evidence around specific foods for muscle, bone and vascular health, and it's important to translate this for people," he said.

"It's one thing to tell them what to eat, it's another to tell them why they need to eat these foods and how to prepare them."

He said it was important people knew about advancements in our understanding of nutrition, particularly as we age.

"Traditionally, muscle and bone benefits from diet have been all about calcium and vitamin D, but there's more to nutrition than that," he said.

"Eating well doesn't have to be difficult: it can be simple, quick and tasty while also allowing us to age in a healthy way."



Highlights of 2023

NHIRI/NSA Symposium: Supporting healthy ageing; future challenges and opportunities

NHIRI hosted its third Research Symposium at Joondalup Country Club on November 17th, delving into the theme of "Supporting Healthy Ageing: Future Challenges and Opportunities." Co-hosted with The Nutrition Society of Australia (NSA), the event featured Professor Barbara Mullan as the keynote speaker. Her presentation, "Using Behaviour Change Techniques to Improve Patient Outcomes," illuminated innovative approaches in health psychology.

NHIRI and NSA members, alongside collaborators from various career stages, seized the opportunity to share cutting-edge research, network, and engage in lively discussions. The diverse program included 15 presentations across six sessions, culminating in a Panel discussion facilitated by Professor Jonathan Hodgson. Tackling the topic "Building a Successful Research Pathway: Top Tips for Students and Early and Mid-Career Researchers," the panel provided invaluable insights for navigating the dynamic landscape of research careers.

The symposium not only showcased the forefront of research but also fostered a collaborative atmosphere, emphasizing NHIRI's commitment to advancing knowledge and building connections. The event left a resonating impact, paving the way for future breakthroughs in the realms of health and nutrition.

Montana Dupuy

2023 Judge's Choice - Winner

"Vitamin K1 intake is associated with lower risk for all-cause and cardiovascular disease mortality in community-dwelling older Australian women"



Zaid Ilyas

2023 People's Choice

"AACLiteNet: A Lightweight Model for Detection of Fine-Grained Abdominal Aortic Calcification"



Caroline Hill

2023 Judge's Choice - Runner-up

"What's the best way to cook our cruciferous vegetables to optimize their health-promoting compounds?"



NSA
THE NUTRITION SOCIETY OF AUSTRALIA (INC.)

Core Goal
Increase and communicate scientific value and relevance of nutrition science to the Australian community

Benefits of Membership

- Provides an extended, direct network of contacts (national and international) to assist researchers and students
- Support for young investigators through scholarships, travel awards and workshops
- Networking with other nutritionists at the Annual Scientific Meetings and Regional Group Meetings
- Offers a forum for discussion in nutritional science
- Access to NSA research awards
- Join the Register of Nutritionists, a system involving continuing professional development

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From L-R; Zaid Ilyas, Prof. Jonathan Hodgson, Montana Dupuy, Dr Anthony James (NSA), Caroline Hill, A/Prof. Josh Lewis, Dr Catherine Bondonno (NSA)



Collaborating with our stakeholders

In 2023, NHIRI members continued to initiate and be involved in highly productive collaborations. These partnerships include a wide range of engagement and collaboration activity with industry, government, research bodies, and other stakeholders.

NHIRI's Impact: Contributing to National and International guidelines

Dr Marc Sim, an esteemed authority on diet and falls, was invited to spearhead a specialised nutrition section for the WA Falls Management Special Interest Group, at the Department of Health's Older Person Health Network. Marc's work involves contributing to the development of the **2026 Post-Fall Multidisciplinary Management Guidelines for WA Health Care Settings**. This endeavour is particularly noteworthy as nutrition has not previously been included in similar guidelines.

A/Prof Josh Lewis contributed to the **International Federation of Musculoskeletal Research Societies Education in Musculoskeletal Research Global Action Plan**.

Dr Cassandra Smith served on the Healthy Bones Australia National Round Table to develop an expert statement on the prescription of **exercise for osteoporosis for Physiotherapists and Exercise Physiologists**.

Dr Alex Strahan, Chief Medical Officer for the West Coast Eagles, and NHIRI's Dr Myles Murphy were invited by St John of God Health Care Group to present on the latest **Sports-Related Concussion guidelines** released by the British Journal of Sports Medicine to over 70 of WAs GPs and representatives from the Department of Local Government, Sport and Cultural Industries as well as SportsWest and the Western Australian Football Commission. Dr Murphy is an Associate Editor of the British Journal of Sports Medicine.

2023 Western Australia Branch Dinner of the Australian Physiotherapy Association (APA)

Dr Myles Murphy delivered a keynote address for the 2023 Western Australia Branch Dinner of the Australian Physiotherapy Association (APA) whose topic was injury prevention through the lifespan. Fellow presentations included an update on current advocacy efforts by APA President Mr Scott Willis and an address on the lived experience of injury and injury prevention by Perth Umpiring Legend and Australian Football League Life Member, Dean Margetts.



From L-R; Ms Helen Rogan (WA Branch Manager), Mr Dean Margetts (AFL Hall of Fame Umpire Inductee), Mr Scott Willis (APA President), Dr Myles Murphy, Ms Amber Davey (WA APA Branch Chairperson)

Sports Medicine Australia's state Sports Medicine symposium

Dr Myles Murphy chaired Sports Medicine Australia's state Sports Medicine symposium on the 22nd of April at the ECU city offices. This state symposium featured speakers from around Australia and the world, discussing gender biases within sports medicine research. These biases remain a dominant issue and have significant real-world consequences, ranging from sub-optimal patient care to shaping societal narratives around the fragility of female athletes. This symposium challenged cognitive bias and provided practical suggestions for change. The speakers included Clinical Pain Neuroscientist, Associate Professor Tasha Stanton from University of South Australia, Human Performance and Sports Scientist Professor Sophia Nimphius from ECU, researcher and physiotherapist Dr Mervyn Travers from Curtin University, Advanced Scope Physiotherapist Cobie Starcevich, Sports Physician and ex-Olympian Dr Rachel Harris, and Editor-in-Chief of JOSPT and Senior Research Fellow at the University of British Columbia, Dr Clare Ardern.



From L-R; Dr Alex Strahan, Brad Gunson, Stephen Murray and Dr Myles Murphy

European Calcified Tissue Society

The European Calcified Tissue Society (ECTS) is the major organisation in Europe for researchers and clinicians working in the musculoskeletal field. ECTS represents more than 600 members, including basic researchers, clinicians, students and health allied professionals working in the musculoskeletal field. It has a network of over 30 national and international societies. The 2023 ECTS Annual Congress was held in Liverpool, United Kingdom.

Associate Professor Josh Lewis was the Invited International Plenary and presented on "Impact of bone-modifying agents on vascular calcification".

Dr Marc Sim presented "Dietary Vitamin K1 intake is associated with lower long-term injurious fall and fracture risk: The Perth Longitudinal Study of Ageing Women". Dr Sim also presented, "Association between automated abdominal aortic calcification 24 scoring obtained from lateral spine images with long-term fracture risk: the Perth Longitudinal Study of Ageing Women".

Dr Cassandra Smith presented "Extent of Abdominal Aortic Calcification is Associated with Increased Risk of Rapid Weight Loss over 5 years: the Perth Longitudinal Study of Ageing Women."



NSA Perth Group / NHIRI Research Seminar

The Nutrition Society of Australia (NSA) Perth group and NHIRI co-hosted Professor Mario Siervo, Professor of Human Nutrition and Physiology at Curtin University, who presented "Dietary nitrate and brain health. Too much ado about nothing or a possible solution to dementia prevention? ".



Parliamentary friends of Medical Research

On Monday 27 March, a team of researchers from School of Medical Health Sciences and School of Nursing and Midwifery, including NHIRI's Associate Professor Josh Lewis, presented to Dr Katrina Stratton MLA (Nedlands) on the remarkable research conducted at ECU. Katrina leads an initiative called Parliamentary friends of Medical Research. The team did an excellent job of advocating for ECU's work.



From L-R: A/Prof Claus Christophersen, Prof Lisa Whitehead, A/Prof Elin Gray, Prof Beth Armstrong, Prof Jacques Oosthuizen, Dr Stephen Bright, A/Prof Josh Lewis and Dr Katrina Stratton



NHIRI 2023 Sports Medicine Series Masterclasses

The Nutrition and Health Innovation Research Institute hosted three Sports Medicine workshops in 2023.

In April, Dr Myles Murphy hosted A/Prof Joanne Kemp from the La Trobe Sport and Exercise Medicine Research Centre for a clinical masterclass in Perth focussing on hip pain in young and middle-aged people. A/Prof Kemp is an NMHRC emerging leadership fellow at La Trobe University, Director of the La Trobe University Clinical Trials Platform and Editor for the British Journal of Sports Medicine.



Dr Brady Green and Dr Myles Murphy presented "Mastering the Calf and Achilles: From Prevention to Performance" at the second Masterclass in September. This masterclass covered the assessment of the calf and Achilles complex in both healthy and injured athletes as well as how to prevent injury, rehabilitate the injured athlete and optimise calf and Achilles performance.

In December, the Nutrition & Health Innovation Research Institute (NHIRI) hosted A/Prof Tania Pizzari from the School of Allied Health, Human Services and Sport at La Trobe University for a clinical masterclass in Perth focussing on shoulder injuries.

Knowledge Dissemination

In 2023, NHIRI created impact by sharing groundbreaking research findings with audiences near and far, from local communities to international stages. These efforts not only spotlighted NHIRI's expertise but also served to advance knowledge in healthcare and research. By connecting with diverse groups including community organisations, healthcare professionals, research institutions, and industry leaders, NHIRI sparked valuable conversations, gained fresh perspectives, and transformed research into real-world solutions. Through this dynamic exchange of ideas, NHIRI aimed to improve healthcare outcomes and enhance the well-being of both local and global communities.

In 2023, NHIRI contributed the following oral presentations:

- Australian Institute of Food Science & Technology: New Product Development Workshop - Insights & Opportunities. *Dr Liezhou Zhong*
- Busselton Health Study Showcase, Invited presentation. *A/Prof Josh Lewis*
- Yancheep Two Rocks Probus Club, entitled "Musculoskeletal health and lifestyle factors: nutrition and exercise". Invited presentation. *Dr Cassandra Smith*
- Science on the Swan presentation, entitled "Creatinine to cystatin C ratio: a novel biomarker of sarcopenia measures and falls risk in community-dwelling older women?". *Dr Marc Sim*
- Science on the Swan presentation, entitled "Habitual Dietary Nitrate Intake and Cognition in the Australian Imaging, Biomarkers and Lifestyle Study of Ageing: A Prospective Cohort Study". *Dr Catherine Bondonno*
- Science on the Swan poster presentation, entitled "Automated Abdominal Aortic Calcification Scoring and Long-term Falls and Fracture Risk: The Perth Longitudinal Study of Ageing Women". *Dr Abadi Gebre*
- Science on the Swan presentation, entitled "The Pregnancy Lifestyle and Activity Nutrition App: Journey to Embedding E-health into Routine Clinical Practice". *A/Prof Rae-Chi Huang*
- Science on the Swan presentation, entitled "Connecting Regional Cancer Patients to Evidence-based Care: A Partnership Approach to Co-design and Implement an Exercise and Nutrition Referral Pathway for Patients". *Dr Annie De Leo*
- Newcastle University, entitled "Preventing fall and fractures in older populations" Newcastle, UK. International Invited presentation. *Dr Marc Sim*
- Cancer Council WA, entitled "Exercise Oncology - If you build it, will they come? Exploring how to integrate exercise into routine oncology care". Invited presentation. *Dr Mary Kennedy*
- Clinical Oncology Society of Australia (COSA) Annual Scientific Meeting, entitled "Oncology healthcare professionals' awareness and practice regarding the COSA position statement on exercise in cancer care: Understanding reach and barriers". Poster presentation. *Dr Jack Dalla Via*
- Exercise and Sport Science Australia WA State Symposium, entitled "Current evidence and practical considerations for exercise prescription in cancer survivors". Invited presentation. *Dr Jack Dalla Via and Chris Andrew (PhD student)*
- Probus Club of Dianella, entitled "Novel exercise approaches, and exercise for cancer survivors". Invited Presentation. *Dr Jack Dalla Via*
- Royal Australian College of Physicians specialist society ANZBMS webinar, entitled "Abdominal aortic calcification and cardiovascular disease risk". *A/Prof Josh Lewis*
- Probus Club of Dianella, entitled, "Unlocking a heart-healthy diet: the power of vegetables". Invited Presentation. *Dr Lauren Blekkenhorst*
- RPH research foundation symposium 2023, entitled "Nitrate and human health – villain or superhero?". Invited Presentation. *Dr Catherine Bondonno*
- ECU EMCRN Symposium 2023, entitled "Osteoporosis Is Associated With Increased Risk For Cardiovascular Disease Mortality In Community Dwelling Older Women: The Perth Longitudinal Study Of Ageing Women". *Dr Cassandra Smith*
- National Conference of Allied Health 2023, entitled "Printing an Appetite for Life". Invited Presentation. *Dr Liezhou Zhong*
- MSWA, entitled "Printing an Appetite for Life" Workshop. *Dr Liezhou Zhong*



Associate Professor Rae-Chi Huang



Nutrition Society of Australia Celebrating Women in Science from L-R; NHIRI's A/Prof Therese O'Sullivan, A/Prof Allison Hodge, Prof Bing Wang, Prof Welma Stonehouse

- American Society for Bone and Mineral Research 2023 Annual meeting, Osteoporosis - Epidemiology session Co-chair. *A/Prof Josh Lewis*
 - American Society for Bone and Mineral Research - International Federation for Musculoskeletal Research Societies. AI and musculoskeletal health discussion lead. *A/Prof Josh Lewis*
 - Breastfeeding Conferences, Clinical Applications in Lactation Care, entitled 'Antenatal expression of colostrum'. Invited presentation. *A/Prof Therese O'Sullivan*
 - ECU Athena Swan, focus groups for academic women in STEMM disciplines. Invited participant. *A/Prof Therese O'Sullivan*
 - Women's Health Research Translation Network co-production workshop with maternity care consumers/advocates and researchers (through Australian Health Research Alliance (AHRA), February 2023). Invited participant. *A/Prof Therese O'Sullivan*
 - ANZ Falls prevention and World Falls Congress Joint Conference, entitled "Machine Learning abdominal aortic calcification and falls and fracture risk". *Dr Abadi Gebre*
 - Western Australia Cardiovascular Alliance Heart-and-Vessel Research showcase, entitled "High sensitivity cardiac troponin and fall-related hospitalisation risk". *Dr Abadi Gebre*
 - Cottesloe Ladies Probus Club, entitled "Raising awareness of CVD in women". Invited presentation. *Dr Cassandra Smith*
 - Injury Matters, entitled "Exercise for sarcopenia". *Dr Cassandra Smith*
 - MASCC (Multinational Association of Supportive Care in Cancer) conference, entitled "Using CAC scores from radiation planning scans to identify cancer survivors at high risk of cardiac events: Preliminary data from a feasibility study". *Dr Jack Dalla Via*
 - MASCC (Multinational Association of Supportive Care in Cancer) conference, entitled "Exercise and diet support in Australian breast and prostate cancer survivors: A focus group study". *Dr Jack Dalla Via*
 - AIFST23, The Science of Food Security & Sustainability. entitled "Nutrition Trends". *Dr Liezhou Zhong*
 - SJOG Health care Research Week, "Ethical Considerations of Comparative Effectiveness Trials". Panel member. *Dr Myles Murphy*
 - Nutrition Society of Australia Annual Scientific Meeting 2023, entitled "Dietary Vitamin K1 intake is associated with lower long-term falls and fracture-related hospitalization risk: the Perth Longitudinal Study of Ageing Women". *Dr Marc Sim*
 - American Society for Bone and Mineral Research, Clinical Case Workshop on Hypoparathyroidism Management, Contributor. *Dr Cassandra Smith*
 - NHMRC EL2 La Trobe University Lecture, Contributor. *Dr Myles Murphy*
 - Toodyay Probus Club, "Novel exercise approaches, and exercise for cancer survivors". *Dr Jack Dalla Via*
 - Injury Matters, "Sarcopenia – Screening, treating & preventing: a focus on exercise' as part of a professional development workshop titled 'Preventing falls in older adults: a focus on diet and screening sarcopenia training". *Dr Jack Dalla Via*
 - Navigating Postdoctoral Journey as a Promising Researcher. *Dr Abadi Gebre*
 - PhD scholarship opportunities in Asia-Pacific region. *Dr Abadi Gebre*
 - International Federation of Musculoskeletal Research Societies (IFMRS) education roundtable facilitator. *A/Prof Josh Lewis*
 - Nutrition Society of Australia conference Invited presentation, "Helping new mums to be better breastfeeders – before their babies are even born". *A/Prof Therese O'Sullivan*
- Other**
- Food Hydrocolloids, Reviewer, *Dr Liezhou Zhong*
 - Journal of Orthopaedic & Sports Physical Therapy, Special Edition Editor. *Dr Myles Murphy*
 - Training Institute for Dissemination and Implementation Research in Health (TIDIRH Australia), Selected participant: 2023. *Dr Annie De Leo*
 - The BMJ, invited editorial. *Dr Abadi Gebre, Dr Marc Sim and Professor Carl Schultz*
 - Medical Journal of Australia, Reviewer. *A/Prof Josh Lewis*
 - Calcified Tissue International, Reviewer. *A/Prof Josh Lewis*
 - Bone, Reviewer. *A/Prof Josh Lewis*
 - Osteoporosis International, Reviewer. *A/Prof Josh Lewis*
 - Nutrition Metabolism and Cardiovascular Diseases, Reviewer. *A/Prof Josh Lewis*



Consumer and Community Involvement

A 3 Year Partnership: CCI Program

Research Priority Mapping Workshop

In January 2023, the Institute formally commenced a 3-year partnership with the CCI Program with the aim to embed consumer and community involvement across the entire program of work at NHIRI. A Research Priority Mapping Workshop was held as this was one of the first of the major activities for the program. The purpose of the Workshop was to directly collect future research projects and initiatives as informed by the wider community and prioritised within a lived experience lens.



Healthy Bones and Joints School Holidays Workshops

In the July school holidays, NHIRI members Dr Julie Boston and Britt Hanson held focus groups with high school students and parents, to collect data for the development of a game for the Bones and Joint Health Project.

The Bone and Joint Health Project of Western Australia is a collaboration between ECU, its funding partner Arthritis and Osteoporosis WA Foundation (AOWA) and Singular Health Group (SHG), to design, implement and evaluate pedagogically-sound, curriculum-aligned, digitally immersive educational resources to improve bone and joint health awareness and initiatives amongst youth. This partnership provides a valuable opportunity to improve awareness and knowledge of bone and joint health in order to reduce the risk of developing health conditions, such as osteoporosis, osteopenia and arthritis; a long-term goal of this project.

RESEARCH HIGHLIGHT

Using video games to get teens off the couch to build better bones and joints



Dr Julie Boston, Director, Partnerships and Engagement, School of Education and Professor Amanda Devine, Associate Dean, School of Medical and Health Sciences.

Osteoporosis may be associated with old age, but our lifestyles when we are young can play a big part in preventing the disease later in life – and video games could prove a surprising tool in getting teens to be more active.

Though they are often seen as being detrimental to healthy lifestyles in kids, video games may be a crucial element in teaching teens how to keep their bones and joints healthy and avoid developing osteoporosis later in life. Almost 1 million Australians have the condition, which sees a person's bones become fragile, leading to an increased risk of breaks and having a significant impact on quality of life and health in general.

Edith Cowan University's (ECU) Simulation and Immersive Digital Technology Group are partnering with the Arthritis and Osteoporosis WA Foundation and Singular Health Group on the Bone and Joint Health Project of Western Australia to try to prevent the disease from developing. A collaboration between ECU's Nutrition and Health Innovation Research Institute and School of Education, the project will see the research team develop a video game for teenagers to teach them to look after their bones and joints at a crucial point in their lives.

Professor Amanda Devine said there was a misconception about who osteoporosis affects – and how it can be prevented. "A lot of people look at it as only affecting older populations, but our lifestyles in our younger years can play a big part in our bone and joint health later in life," she said.

"There are many things kids can do to reduce the likelihood of osteoporosis when they're older, so, it's really important we teach them how to look after their bones and joints and understand how their skeletal system works – what we call 'bone literacy'."

Arthritis and Osteoporosis WA executive director Ric Forlano said the foundation always worked towards reducing the disabling effects of bone and joint conditions. "Unfortunately, they are often considered trivial and often not taken seriously by the community," he said.

"Whilst there may be no cure for many of the conditions that come under the umbrella of bone and joint disease, we can strive to maintain quality of life, through education. "We know that very little is taught in the school curriculum and by educating at an early age we can try and reduce the risk factors as we age.

"By partnering with ECU, their expertise gives us added leverage in getting the message across."

Using video games for good

A major element of improving bone and health is increased physical activity – meaning a video game would appear to be a counterproductive method encouraging kids to move more. However, Dr Julie Boston said kids' easy access to devices such as smartphones, tablets and computers can be used to promote healthier living.

This article is republished from the [ECU Newsroom](#). Read the original article [here](#).

Other recent ECU projects have used digital platforms such as games and apps to educate kids on how to recognise meningococcal symptoms, or how to respond to peer pressure regarding drug and alcohol use. "Video games are increasingly appealing as a way of teaching important health messages to teens, as they are engaging and immersive: learning occurs through gameplay," Dr Boston said.

"A well-designed bone and joint digital game could allow for meaningful learning and entertainment, engaging students in a virtual world where they can gain experience and skills which can help shape their behaviours and ultimately improve their health." To make the game as effective as possible, the research team is asking for feedback from school principals, educators, sports coaches and other relevant parties.

Building better bones

Although factors such as genetics and other medical conditions can play a part in osteoporosis developing, many measures can be taken to help ward off the disease. "It's common for younger people to have the misconception that bones are inert, and not living tissue," Professor Devine said.

"And many older students don't understand that once the skeleton is fully developed, usually around the mid-20s, bone mass can decline unless we maintain a healthy lifestyle.

"Gameplay will teach these concepts to ensure sustainable health behaviours for our growing kids."

To establish the best foundation for good bone and joint health late in life, young people are urged to:

- Participate in weight bearing exercise
- Have a diet rich in calcium and vitamin D
- Maintain a physically active lifestyle
- Avoid smoking
- Reduce alcohol and caffeine intake
- Take part in balance training

Those looking to be involved can visit the [project homepage](#).




Credit: Sergey Nivens/shutterstock.com

Abdominal Aortic Calcium Scoring (AAC) Information Sheets

NHIRI's Disorders of Mineralisation group embarked on a year-long consumer engagement initiative throughout 2023, culminating in the development of informative Abdominal Aortic Calcium (AAC) Scoring information sheets. These sheets were purposely crafted to bolster awareness and comprehension among consumers following DEXA or Osteoporosis scanning, empowering them to understand their AAC score and adopt effective lifestyle management strategies.

Tailored for individuals who may be unfamiliar with AAC, as well as to aid general practitioners (GPs), these resources serve as invaluable tools in bridging the gap between medical diagnosis and patient understanding. Drawing on the expertise of various specialists, including radiologists, rheumatologists, and cardiologists, feedback was sought and incorporated to ensure the efficacy and relevance of these materials within the medical community.

By fostering collaboration between consumers and healthcare professionals, NHIRI's initiative underscores the importance of informed decision-making and proactive health management. These information sheets not only empower individuals to take charge of their health but also facilitate smoother communication between patients and their healthcare providers, ultimately enhancing the quality of patient care.




ABDOMINAL AORTIC CALCIUM TEST

Frequently Asked Questions


Below are some FAQs about advanced blood vessel disease and other lifestyle related questions. When we refer to 'advanced blood vessel disease' this is from your abdominal aortic calcification scan.

- What does no, moderate and extensive blood vessel disease of the aorta look like?**

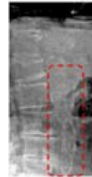
No AAC



Moderate AAC



Extensive AAC



To the left represents an example of what low, moderate, and extensive blood vessel disease may look like in lateral spine images. Within the red dashed border is the section of calcification of the abdominal aorta.
- How does the grading system work for the assessment of blood vessel disease into the categories of no, moderate and extensive disease?**

At current, the most common method for the assessment of calcification in the abdominal aorta is by a trained image interpreter. The aorta is assessed at the lower part of the spine, called the lumbar region, here the aorta is assessed corresponding to the 4 vertebral segments of the lumbar spine, this is termed L1 to L4. Each vertebral section is given a score out of 6, with a score out of 3 given for the anterior portion (the side away from the spine) and posterior portion (the side closest to the spine) of the aorta. A score of 0 would be no calcification present, with a score of 3 the highest calcification present. Each vertebral segment is then added up to a score out of 24, the higher the score, the greater amount of calcification present. The 3 groups used (above) are established groupings used throughout the literature. No or low calcification is a score of 0-1, moderate is a score of 2-5 and extensive being a score of 6+ out of 24.
- How can the advanced blood vessel disease that I have be reversed?**

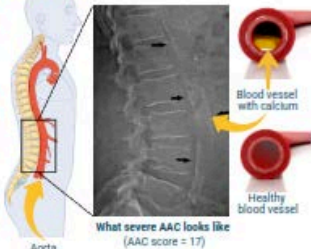
We don't know if advanced blood vessel disease can be reversed. However, we do know the progression can be slowed or stopped by having a healthy diet and lifestyle as well as appropriate treatment of your risk factors such as high blood pressure or hypertension.
- What if I have advanced blood vessel disease present and I decide not to change anything?**

That is your choice. The test shows that there is advanced blood vessel disease present, and in other groups of people this has been associated with substantially increased risk of future heart attack and stroke. Most strokes or heart attacks are the first symptom of cardiovascular disease, with 2 in 5 not surviving the first event, so you may not get another chance to change your diet and lifestyle. Changing your diet and lifestyle can help. For example, getting at least 5 serves of vegetables and 2 serves of fruit combined with a healthy and balanced diet and moderate physical activity can reduce your risk of heart attack and stroke.

ABDOMINAL AORTIC CALCIUM SCORING

WHAT IS AN ABDOMINAL AORTIC CALCIUM (AAC) TEST?

- It's done on a very low radiation bone density scan, of the abdominal aorta, one of the first blood vessels where calcium is seen.
- Healthy blood vessels should not have any calcium (one marker of blood vessel health).
- The more white spots (calcium) the greater the extent of blood vessel disease.
- It can inform your risk of having disease in other blood vessels (e.g. heart) as well as heart attack and stroke.



Blood vessel with calcium

Healthy blood vessel

What severe AAC looks like (AAC score = 17)

YOUR AAC SCORE

You will get a score between 0 (none) and 24 that shows extent of calcium:

Low

0-1

Moderate

2-5

Severe

6-24

Research shows

The more calcium in your aorta, the higher your risk of cardiovascular events such as heart attack & stroke

HOW TO MANAGE YOUR BLOOD VESSEL HEALTH

You CAN improve your blood vessel health to lower your risk of cardiovascular events. Your AAC score can help you and your healthcare team decide how best to do this

Get a heart health check

Eat a well balanced diet

Be active

Manage your blood pressure

Maintain a healthy weight

Be smoke-free

Reduce alcohol

Manage your cholesterol

Manage your blood sugar

Reduce stress & improve sleep

QR CODE
Links to FAQs

Information provided for educational purposes only. Please talk to your healthcare professional about your specific health needs.

JOSPT Community Engagement Infographics

Dr Myles Murphy hosted a community engagement activity on recovery pathways for the Journal of Orthopaedic & Sports Physical Therapy, with lead author Jo Belton. The activity resulted in two infographics being designed and published to help patients with achilles tendon pain. Jo Belton is an internationally renowned patient advocate.

5 THINGS TO LOOK FOR WHEN SEEING A HEALTH PROFESSIONAL FOR ACHILLES TENDON PAIN

HOW TO SELF-MANAGE ACHILLES TENDON PAIN AND WHEN TO SEE A HEALTH PROFESSIONAL

You feel heard

The person takes time to see how you move, which may include call cones or hopping. They've ruled out other diagnoses.

You feel confident

Exercises like call cones reduce Achilles tendon pain and symptoms, and should form part of a tailored program to help you return to your usual activities.

You create a plan together

Exercises like call cones reduce Achilles tendon pain and symptoms, and should form part of a tailored program to help you return to your usual activities.

5 ways to manage Achilles tendon pain on your own:

- Call rates**
Call rates build up your strength and capacity to tolerate the amount of exercise you want to do!
- Keep moving**
Resting too much can aggravate your tendon MORE than staying active. Reduce your training volume enough to reduce symptoms and ensure you don't feel worse the next day.
- Plan ahead**
Avoid consecutive days of impact exercises like running or jumping when your tendon is sore.
- Monitor morning stiffness and symptoms**
Low and stable symptoms are okay. A spike in stiffness, tightness or pain means you're probably overdoing it. You don't need rest - on the day after you train go back to tips 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and see how you feel.
- Be patient**
There is no quick fix, so beware of hyped-up claims that are not based on evidence.

5 THINGS TO BE CAUTIOUS OF

Pain medications can make it harder to know whether your pain is worsening (or not) with your current activities and rehabilitation program.

Stretching

Your body is very good at healing on its own. Your Achilles tendon has a sort of 'self-healing' mechanism that is activated by becoming thicker - well done Achilles!

When to see a health professional for Achilles tendon pain?

If the pain gets worse during activities, look at the 5 things to look for in the infographic.

Who should I see to manage my Achilles tendon pain?

- Sports medicine, clinicians and physical therapists are the best people to see for Achilles tendon pain and they will help keep you moving.
- Be wary of people pushing back their own agenda.
- See 5 Things to Look for When Seeing a Health Professional for Achilles Tendon Pain!





Committees & Groups

During 2023, NHIRI staff were extensively involved as members in a diverse range of international, national and local groups and committees. This underscores NHIRI's commitment to collaboration, knowledge sharing and making meaningful contributions to the global, national and local health landscape.

International

- Member, American College of Sports Medicine, Moving Through Cancer Task Force
- Member, American College of Sports Medicine, Exercise is Medicine Education Committee
- Member, American Heart Association, Council on Epidemiology and Prevention (EPI); Council for Kidney in Cardiovascular Disease (KCVI) and council for Epidemiology and Prevention; Council on Lifestyle and Cardiometabolic Health
- Member, American Society for Nutrition
- Member, American Society for Bone and Mineral Research
- Member, American Society for Bone and Mineral Research, Program advisory group
- Member, American Society for Bone and Mineral Research, Early Stage Investigator Clinical Subcommittee
- Member, Australasian Epidemiological Association
- Member, British Journal of Sports Medicine Equity, Diversity Inclusion Committee
- Cluster Leader, Early Life Origins of Health Consortium, Cardio-metabolic group
- Member, International Atherosclerosis Society
- Co-chair, International Federation for Musculoskeletal Research Societies, Future Global Leaders Committee
- Member, International Network for Child and Family Centred Care
- Member, International Society of Behavior, Nutrition, and Physical Activity, Scale-up and Implementation Special Interest Group
- Member, International Society for Nutritional Psychiatry Research
- Member, Medical Image Computing and Computer Assisted Intervention Society
- Member, Origins Scientific Committee
- Life member, Pakistan Engineering Council (Member of Washington Accord)
- Member, Pregnancy and Childhood Epigenetics (P.A.C.E.) Consortium
- Member, Society for Implementation Research Collaboration
- Member, World Public Health Nutrition Association
- Consultant, Bristol Bears Rugby Club

National

- Member, Australasian Society for Behavioural Health and Medicine
- Member, Australian Academy of Science, National Committee of Nutrition
- Member, Australian Academy of Science, Early- and Mid-Career Researchers
- Member, Australian Atherosclerosis Society
- Member, Australian Breastfeeding Association
- Member, Australian Cardiovascular Alliance
- Member, Australian College of Midwives
- Member, Australian College of Physiotherapists
- Member, Australian Institute of Food Science and Technology
- Member, Australian and New Zealand Alliance for Cardiovascular Trials
- Council member, Australian and New Zealand Bone and Mineral Society
- Member, Australian and New Zealand Bone and Mineral Society, working group, MSAC funding of DXA based lateral spine imaging/vertebral fracture identification
- Member, Australian and New Zealand Bone and Mineral Society, clinical subcommittee
- Member, Australian and New Zealand Bone and Mineral Society, Early to Mid-Career Research Committee
- Co-chair, Australia and New Zealand Bone and Mineral Society, Early Career Investigator Committee
- Member, Australian and New Zealand Bone and Mineral Society, Early Career Investigator Committee, Working Group
- Member, Australia and New Zealand Bone and Mineral Society, Early Career Investigator Committee, Career development subcommittee
- Member, Australian and New Zealand Bone and Mineral Society, Research committee
- Member, Australian and New Zealand Obesity Society
- Member, Australia and New Zealand Society for Sarcopenia and Frailty Research, Sarcopenia Diagnosis and Management Taskforce
- Member, Australia and New Zealand Society for Sarcopenia and Frailty Research, ANZSSFR Education Task Force
- Member, Australia and New Zealand Society for Sarcopenia and Frailty Research, Early and Mid-career Researchers Committee
- Western Australian representative, Australia and New Zealand Society for Sarcopenia and Frailty Research Council

National cont.

- Member, Australia and New Zealand Society for Sarcopenia and Frailty Research, Organising committee for the virtual webinar 'Unveiling the Triad: Exploring the Intersection of Frailty, Sarcopenia, and Osteoporosis'
- Member, Australian Nurses Federation
- Trustee, Australian Nutrition Trust Fund
- Editor, Australian Pattern Recognition Society
- Member, Australian Physiological Society
- Member, Australian Physiotherapy Association
- Member, Australian Society for Medical Research
- Member, Dietitians Australia
- Member, Dietitians Australia, Dietitian and Nutritionist Regulation Council
- Member, Endocrine Society of Australia
- Member, Exercise and Sport Science Australia
- Member, Exercise and Sport Science Australia Publications Committee
- Member, Health Services Research Association of Australia & New Zealand
- Member, High Blood Pressure Research Council of Australia
- Member, Nutrition Society of Australia
- Member, Nutrition Society of Australia, Equity, Diversity and Inclusion Working Group
- Member, Nutrition Australia
- Member, Physical Activity Alliance, Physical Activity Assessment, Prescription, and Referral Work Group
- Member, Public Health Association of Australia
- Member, Sports Medicine Australia, Education Advisory Committee
- Member, Sports Physiotherapy Australia
- Member, Raine Management Committee, Raine Genetic Subcommittee
- Member, Unity of First People in Australia, Clinical Reference Group



State

- Member, Exercise & Sports Science Australia, WA State Chapter Committee
- Member, Exercise & Sports Science Australia, WA State Chapter, Lead of Professional Development
- Principal Investigator, Perth Longitudinal Study of Ageing Women
- Consultant, Fremantle Football Club
- Chair, Nutrition Society of Australia, Perth Regional Group
- Member, Nutrition Society of Australia, Perth Regional Group
- Consultant, Perth Wildcats
- Director, Western Australian Cardiovascular Researchers Alliance
- Advisor, Western Australian Cardiovascular Researchers Alliance, ECR Committee
- Member, Western Australian Cardiovascular Researchers Alliance, ECR Committee
- Chair, Sports Medicine Australia, Western Australia Branch
- Member, Western Australian Bone Research Collaboration
- Consultant, WA Ballet
- Consultant, WA Concussion Network
- Consultant, WA Department of Sport and Recreation



Research Highlights

WA Government turns to ECU for food security parliamentary report

Edith Cowan University's (ECU) extensive research and expertise in food security issues has formed the basis for a new report tabled in State parliament.

The Joint Standing Committee on the Commissioner for Children and Young People's [Hungry for Change](#) report aims to address food insecurity among children affected by poverty, with Member for Albany, Rebecca Stephens MLA entering it into the Western Australian Legislative Assembly.

Food security refers to people's ability to access food they need to keep healthy, which can be compromised by factors such as physical distance, affordability, social constraints or other factors. ECU has been on the forefront of [addressing the issue](#) in WA.

Its [Food Community](#) project began as a pilot program in the South West, where its success saw it then scaled up across the rest of the State, with ongoing work to support regional communities. ECU's researchers are currently visiting regional communities to seek feedback on how food security can be improved, and to share how other countries address the problem with [Food Action Groups](#).

NHIRI's [Professor Amanda Devine](#), [Dr Stephanie Godrich](#) and PhD candidate [Ros Sambell](#) presented to two panels to support ECU's submissions to the report, which saw their work feature prominently and often singled out for praise.

Among ECU's recommendations to be incorporated in the report include human rights approaches incorporated across government policies, improved food supply and distribution in regional and remote WA, and Food Action Groups initiated in regional areas.

Other recommendations included a review of regulations and standards to strengthen and guide healthier food provision in the Early Years Education and Care Sector to support child growth and development, as well as establishing school meals.

"ECU's work being cited throughout this report shows the influence and impact our research is having with government, and in the community," Professor Devine said.

"We have had ongoing discussions with Ms Stephens and she has requested we keep her informed with further information about our projects, and the next steps we can take."



You “aorta” look beyond muscle and bone for falls and fracture risk: New AI algorithm identifies high risk older women

A new automated machine-learning algorithm has been developed by researchers at Edith Cowan University’s Nutrition & Health Innovation Research Centre (NHIRI). The algorithm accurately assesses abdominal aortic calcification (AAC) during routine bone density testing. AAC is a recognised measure of advanced vascular disease.

The new detection method significantly shortens the timeframe to screen for AAC. Compared with the five to six minutes it would take an experienced reader to obtain an AAC score from one image, the new algorithm takes less than a minute to predict AAC scores for hundreds of images

“We know that moderate to extensive AAC, seen in one in two of these older women, is associated with falls and fractures. Determining whether these relationships remain comparable after automation is a critical step to enhance the clinical utility of lateral spine images taken during bone density testing.”

A study headed by NHIRI’s Post Doctoral Research Fellow [Dr Jack Dalla Via](#) was recently published in the *Journal of Bone and Mineral Research*. It found women with moderate to extensive AAC, derived through the algorithm, had an increased risk of fall-related hospitalisation and clinical fractures, compared to those with low AAC. The study is the first of its kind, revealing that automatically assessed AAC can identify older woman at an increased risk of falls and fractures. Dr Dalla Via said that an automated algorithm would allow AAC to be instantaneously and seamlessly assessed and reported in clinical practice whenever a lateral spine image is captured.

“Importantly, our algorithm has good levels of agreement with AAC that was manually assessed by trained experts.”

“Bone density scans involve a very low radiation dose and are routinely used for osteoporosis screening, performed most commonly in older women.

Therefore, the ability of this machine-learning approach to provide novel non-muscle, non-bone information on falls and fracture risk at the time of bone density testing would be extremely valuable.” “Beyond falls and fractures, we have shown AAC to be a strong predictor of cardiovascular events, late-life dementia and mortality. This is important in the context of opportunistic health screening for other health outcomes,” he added.

Dr Dalla Via said that the potential mechanisms underlying the observed relationship between AAC and falls, and fracture-risk are as yet unknown. However, it could relate to shared underlying mechanisms such as chronic low-grade inflammation, shared risk factors such as smoking, or impaired blood flow, which could contribute to increasing fracture risk. Vascular disease could also contribute to increased falls propensity, and subsequent fractures.

The next step is to verify the performance of the algorithm in independent cohorts, particularly in routine clinical bone densitometry services.

Senior author [Associate Professor Joshua Lewis](#) said he is now keen to see the benefits of this breakthrough research being made available more widely, “There has already been interest shown by both national and international companies keen to commercialise this product.”

This work was supported by the Heart Foundation, Western Australian Future Health Research and Innovation Fund, as well as the National Health and Medical Research Council.

The study was a result of collaboration between ECU, the University of WA, INSERM, University of Minnesota, University of Manitoba, Marcus Institute for Aging Research, and Hebrew SeniorLife Harvard Medical School.



Longer training sessions less likely to cause injury to military recruits

New Edith Cowan University (ECU) research has revealed that up to one in four military recruits would seek medical assistance for injury in one training period. Led by NHIRI's Post Doctoral Research Fellow [Dr Myles Murphy](#), the project centered on both the occurrence and type of musculoskeletal injuries sustained by military recruits world-wide, with data from a number of countries including Australia, the USA, UK and Canada. The research found military recruits were at higher risk of injury than those of other tactical operations, such as law enforcement, and were prevalent across all countries that undertook military recruitments. The findings also show the injuries sustained by the recruits could have life-long implications to the function and quality of life of those injured.

"What we found is that recruit injuries accounted for a substantial amount of time-loss from basic training which can result in medical discharge from the services," Dr Murphy said.

"This can then result in less recruits graduating from military training which in turn would impact the number of qualified servicemen and women available to serve in the forces."

The research reported that injuries sustained by the military recruits impose a financial burden on military organisations and compensation systems, with previous research showing that over a seven-year period, the United States air-force had spent over US\$43.7 million in recruit injuries sustained during basic training.

"The scale and magnitude of the financial and health burden globally is compounded when considering other countries and military recruits from other sections of the armed forces," Dr Murphy explained.

The duration of the recruit training was identified as being associated with the recruit injury incidence rate, with Dr Murphy saying the results demonstrated that longer recruit training programmes appeared to be associated with a lower injury incidence rate.

[Credit: ECU Newsroom](#)

"This appears reasonable when considering longer programmes will be better able to spread physical training over the duration of the training programme, as opposed to needing all physical activity to be completed in a short window. A longer training programme and reducing large increases in training volume may be protective and, recruits may be less likely to become acutely overloaded and suffer an injury.

"However, these results must be interpreted with caution, given many other factors contribute to the injury incident rate that were unable to control for within our analysis."

Dr Murphy also confirmed previous research findings, that female recruits were a higher risk of injury. While more male recruits were injured than females overall, a higher proportion of females sustained injuries when accounting for the number of females included in the studies.

"Additionally, other international research has also established that a high body mass index (BMI) was a predictor for injury in general military populations, along with lower entry fitness standards," he said.

Dr Murphy said that the study results provided insights into training protocols that could potentially provide less injuries, and that the study could be used to inform decisions on changes to existing military training programmes.

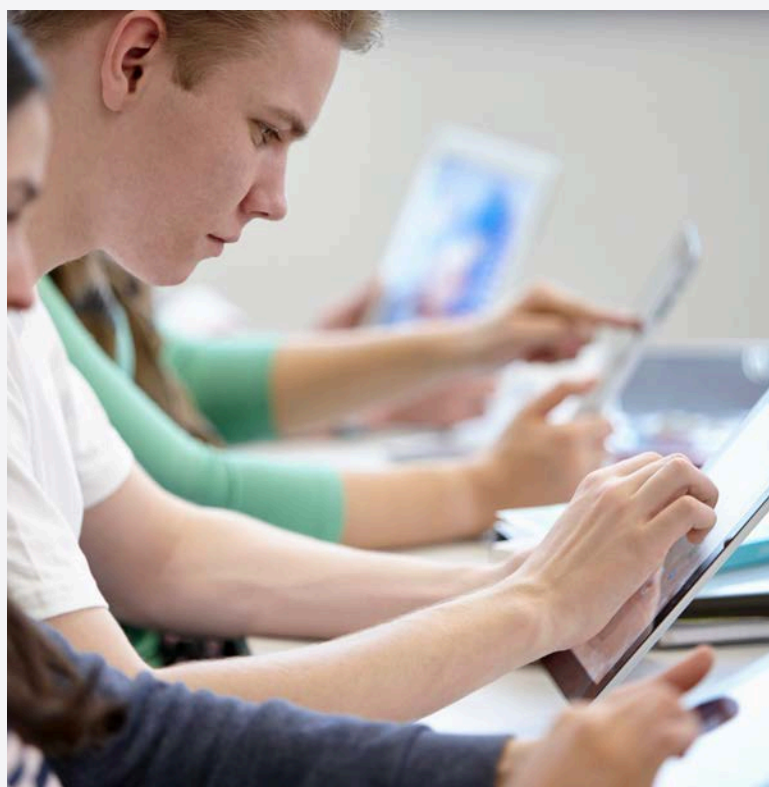
Dr Murphy has recommended that all militaries should consider recording injuries in a standardised way that allow for clear comparisons between countries. Further, introducing evidence-based injury prevention programmes may reduce injury incidence rates to protect recruits and retain servicemen and women in the forces.



Unlocking Healthy Bones: The Game-Changing Quest to Beat Osteoporosis

Contrary to the stereotypical image of video games as the enemy of healthy living, researchers at Edith Cowan University (ECU) are embarking on a revolutionary journey to harness the power of gaming in promoting bone and joint health among teenagers. The Bone and Joint Health Project of Western Australia, a collaborative effort between ECU's Simulation and Immersive Digital Technology Group, the Arthritis and Osteoporosis WA Foundation, and the Singular Health Group, aims to combat osteoporosis, a condition affecting nearly a million Australians. In a unique twist, the project, backed by ECU's Nutrition & Health Innovation Research Institute and School of Education, will see the development of a video game tailored for teenagers. The Nutrition & Health Innovation Research Institute's Professor Amanda Devine emphasizes the misconception surrounding osteoporosis, stating that our younger years significantly impact bone and joint health later in life. The game seeks to impart 'bone literacy,' guiding teens on actions to reduce the risk of osteoporosis through interactive and engaging gameplay. Arthritis and Osteoporosis WA Executive Director Ric Forlano underscores the project's mission to educate at an early age, aiming to diminish the risk factors associated with bone and joint conditions. With ECU's expertise, the collaboration aims to raise awareness and promote healthier living. Addressing concerns about sedentary lifestyles, Dr Julie Boston highlights the potential of video games as a powerful tool for delivering health messages to teens. Drawing inspiration from previous successful projects, the team believes that a well-designed digital game can intertwine entertainment with meaningful learning, shaping behaviors and ultimately improving health.

To ensure the game's effectiveness, the research team is reaching out to school principals, educators, sports coaches, and relevant stakeholders for valuable feedback. As the virtual quest to build better bones unfolds, Professor Devine encourages young people to embrace weight-bearing exercise, adopt a calcium and vitamin D-rich diet, stay physically active, avoid smoking, moderate alcohol and caffeine intake, and engage in balance training for a solid foundation of good bone and joint health in later years. The game promises not just entertainment but a key to a healthier, more resilient future for the younger generation.





Nitrate: healthy heart or cancer risk? Meet nutrition's Jekyll and Hyde

Despite our understanding of nutrition expanding remarkably in recent times, few aspects of our diet continue to confuse and divide the experts like nitrate. For a long time, nitrate has been viewed warily, with previous research showing it could potentially be linked to causing cancer.

However, subsequent research has revealed dietary nitrate also has various cardiovascular health benefits, which could help reduce the risk of related conditions such as heart disease, dementia and diabetes.

So, how can one dietary compound have such contrasting potential risks and benefits?

Edith Cowan University's (ECU) Nutrition & Health Innovation Research Institute hopes to find out how and why nitrate such contrasting potential risks and benefits.

All about the source

Dr Catherine Bondonno led a review of nitrate research and says the key may lie in where it comes from.

"We get nitrate from three major dietary sources: meat, water and vegetables," she said.

"Nitrate's reputation as a health threat stems from 1970, when two studies showed it can form N-nitrosamines, which are highly carcinogenic in laboratory animals.

"However, no human studies have confirmed its potential dangers, and our clinical and observational studies support nitrate preventing cardiovascular disease, if it's sourced from vegetables.

"So the review looked to unpack all of that, identify new ways forward and ways that we can solve this puzzle, because it's really time to address it: it's been 50 years."

Urgency required

Despite recent research indicating the source of nitrate may affect its health benefits and risks, current dietary guidelines relating to nitrate have been in place since the 1970s and don't differentiate between nitrate from meat, vegetables and water.

Dr Bondonno said while the 1970s animal studies reported a small incidence of malignant tumours, there was evidence not all nitrates deserve to be "tarded with the same brush".

"For instance, unlike meat and water-derived nitrate, nitrate-rich vegetables contain high levels of vitamin C

and/or polyphenols that may inhibit formation of those harmful N-nitrosamines associated with cancer," she said.

Dr Bondonno said it was vital more research was conducted so guidelines could be updated.

"The public are unlikely to listen to messages to increase intake of nitrate-rich vegetables, if they are concerned about a link between nitrate intake and cancer."

However, she stressed while official guidelines hadn't changed, the apparent benefits of nitrate had seen many people potentially put themselves at risk.

"We need to be sure nitrate-rich vegetables don't actually have an increased risk of cancer if we consume a higher amount," she said.

"High dosage nitrate supplements are already used to improve physical performance in sport, while vegetable nitrate extracts are being added to cured meat products with a "clean label" claim, purporting to be better for you. "So we really need to get this right."

What do we eat, then?

Given its divided experts in the field, Dr Bondonno said it's understandable people may be confused as to whether nitrate is good or bad for them.

"They're probably thinking, 'If I can't have a salad, what CAN I have?'," she said.

Despite the debate, she said current evidence suggests people should aim to get their nitrate from vegetables — but there was no need to go overboard.

"Dark green, leafy vegetables and beetroot are good sources, our research shows one cup of raw, or half a cup cooked per day is enough to have the benefits on cardiovascular health," she said.

"We know processed meat isn't good for us and we should limit our intake, but whether it's the nitrate in them that is causing the problem or something else, we don't know.

"It just further emphasises the need to investigate dietary nitrate to clarify the message for people.

"The potential cancer link was raised 50 years ago; now it's time to conduct an in-depth analysis to distinguish fact from fiction."

Slowing down in your old age? It may be a dementia warning sign

It's generally accepted we will lose muscle strength and slow down as we age, making it more difficult to perform simple tasks such as getting up, walking and sitting down.

But new Edith Cowan University (ECU) [research](#) indicates this could also be a signal for another sinister health concern of ageing: late-life dementia.

To investigate the relationship between muscle function and dementia, the research teams from ECU's Nutrition & Health Innovation Research Institute and Centre for Precision Health used data from the Perth Longitudinal Study of Ageing in Women to examine more than 1000 women with an average age of 75. In collaboration with the University of Western Australia, the team measured the women's grip strength and the time it took for them to rise from a chair, walk three metres, turn around and sit back down – known as a timed-up-and-go (TUG), test.

These tests were repeated after five years to monitor any loss of performance.

Over the next 15 years, almost 17 per cent of women involved in the study were found to have had a dementia event, categorised as a dementia-related hospitalisation or death.

The team found lower grip strength and slower TUG were significant risk factors for presenting with dementia, independent of genetic risk and lifestyle factors such as smoking, alcohol intake and physical activity levels.

Relationship established

The women with the weakest grip strength were found to be more than twice as likely to have a late-life dementia event than the strongest individuals.

A similar relationship emerged between TUG performance and dementia, with the slowest in their TUG test more than twice as likely to experience dementia than the quickest.

When researchers looked at the changes in grip strength and TUG test results after five years, a decrease in performance was also linked with greater dementia risk.

Those who had experienced the biggest decline in grip strength and TUG speed were approximately 2 and 2.5 times more likely, respectively, to have had a dementia event, compared to those in the group who recorded the smallest decline in performance.

An early warning

Senior researcher [Dr Marc Sim](#) said grip strength, which can be easily measured using a handheld device known as a dynamometer, may be a measure of brain health due to the overlapping nature of cognitive and motor decline.



Women with the biggest drop in TUG performance were found to be over four times more likely to have a dementia-related death than the fastest.

“Possibly due to a range of underlying similarities, grip strength may also present as a surrogate measure of cardiovascular disease, inflammation and frailty, which are known risk factors for dementia,” Dr Sim said. Dr Sim said the findings from the study could help health professionals to identify dementia risk in patients earlier.

“Both grip strength and TUG tests aren't commonly performed in clinical practice, but both are inexpensive and simple screening tools,” he said.

“Incorporating muscle function tests as part of dementia screening could be useful to identify high-risk individuals, who might then benefit from primary prevention programs aimed at preventing the onset of the condition such as a healthy diet and a physically active lifestyle.

“The exciting findings were that decline in these measures was associated with substantially higher risk, suggesting that if we can halt this decline, we may be able to prevent late-life dementias. However, further research is needed in this area.”

Centre for Precision Health Director [Professor Simon Laws](#) said there has been encouraging progress in identifying early warning signs of dementia.

“We are now starting to see a number of [simple yet indicative screening assessments](#) that could be combined with other biological and clinical measures to provide a holistic risk-profile for individuals presenting to their GP with, for example, memory concerns,” he said.



2023 NHRI Fellowships

A/Prof Josh Lewis



Developing & evaluating a novel tool for primary prevention of clinical cardiovascular disease, Heart Foundation, NHF - Future Leader Fellowships, 2020 - 2023, \$1,166,638

Awarded 2023: Improving screening, understanding, prevention and treatment of abdominal aortic calcification, Heart Foundation, NHF - Future Leader Fellowships, 2024 - 2027, \$792,623

Dr Lauren Blekkenhorst



Stronger evidence for the cardiovascular health benefits of specific vegetables and their bioactive compounds, Heart Foundation, NHF - Postdoctoral Fellowships, 2020 - 2026, \$60,000.

Vegetable types and their bioactives: Growing the evidence for cardiovascular benefits, National Health and Medical Research Council, Investigator grants, 2020 - 2026, \$1,028,346.

Dr Liezhou Zhong



Emerging technologies and approaches to enhance health for people on texture modified diets, Department of Health WA, WA Near-miss Awards: Emerging Leaders Program, 2023 - 2025, \$393,090.

3D food printing to enhance eating experiences and health for people on texture modified diets, Department of Health WA, Future Health Research & Innovation Fund - Innovation Fellowship, 2023 - 2024, \$49,838.

Dr Marc Sim



Career Advancement Fellowship 2020, Royal Perth Hospital Medical Research Foundation, Career Advancement Fellowship, 2021 - 2024, \$145,865.

Preventing falls in older Australians: an appetite for change, Department of Health WA, WA Near-miss Awards: Emerging Leaders Program, 2022 - 2025, \$390,444.

Dr Catherine Bondonno



Career Advancement Fellowship 2020, Royal Perth Hospital Medical Research Foundation, Career Advancement Fellowship, 2022 - 2024, \$166,622.

Nitrate: the Dr. Jekyll and Mr. Hyde of human health?, Department of Health WA, WA Near-miss Awards: Emerging Leaders Program, 2023 - 2024, \$100,000.

A/Prof Rae-Chi Huang



Early Life Prevention of Childhood Obesity and Lifelong Non-Communicable Diseases, Department of Health WA, WA Near-miss Awards: Emerging Leaders Program, 2022 - 2023, \$74,000.

Dr Annie De Leo



Exploring the gap in supportive cancer care in rural and remote WA
Department of Health WA, Future Health Research and Innovation Fund - Implementation Science Fellowship, 2022 - 2025, \$731,18

Dr Mary Kennedy



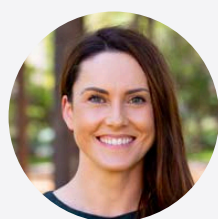
Awarded 2023: Standardising Clinical Oncology Pathways for Exercise (SCOPE), Cancer Council of WA Inc, Postdoctoral Fellowship, 2024 - 2026, \$520,785

Dr Benjamin Parmenter



Post Doctoral Fellow – Novel Dietary Bioactives (flavonoid), Queen's University Belfast, Grant, 2023 - 2024, \$150,345

Dr Cassandra Smith



Vice Chancellors Research Fellowship

Awarded 2023: Better identification, understanding and prevention of advanced blood vessel disease in women, Heart Foundation, NHF - Postdoctoral Fellowships, 2024 - 2025, \$151,200

Dr Zulqarnain Gilani



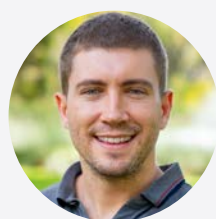
Explainable AI Frameworks for Automatic Detection and Localisation of Abdominal Aortic Calcification, Raine Medical Research Foundation, Raine Priming Grants, 2023 - 2024, \$255,913.

Dr Nicola Bondonno



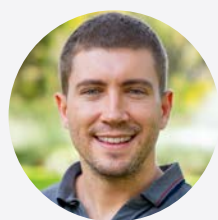
Variations in flavonoid metabolism as an explanation for inter-individual differences in physiological responses to flavonoid-rich foods, National Health and Medical Research Council, Early Career Fellowship, 2019 - 2026, \$551,169.

Dr Myles Murphy



Improving quality of life in people with lower limb osteoarthritis, Department of Health WA, WA Near-miss Awards: Emerging Leaders Program, 2023 - 2024, \$100,000.

Dr Myles Murphy



Awarded 2023: Harnessing 'brainpower' to reduce the burden of hip-related pain, Raine Medical Research Foundation, Raine Priming Grants, 2024 - 2025, \$238,852

Awarded 2023: Harnessing 'brainpower': using portable, electrical brain stimulation to enhance injury recovery and physical performance via neuroplasticity., Department of Health WA, Future Health Research & Innovation Fund - Innovation Fellowship, 2024 - 2025, \$119,489



ECU's 'Emerging Leaders' win State Government health research funding

Three Edith Cowan University Nutrition & Health Innovation Research Institute health researchers have won hundreds of thousands of dollars as part of the WA Near-Miss Awards: Emerging Leaders program (WANMA).

The WANMA is an innovative program aiming to support emerging WA researchers who narrowly missed out on highly sought-after National Health and Medical Research Council (NHMRC) grants.

NHIRI's Dr Liezhou Zhong, Dr Myles Murphy and Dr Catherine Bondonno will use the funding to continue their respective research projects which all aim to improve people's health and lives.

Dr Zhong was one of just four WA researchers awarded a 2-to-3-year Emerging Leaders Fellowship.

He will receive \$261,000 to continue his work at ECU's Nutrition & Health Innovation Research Institute (NHIRI) researching innovative ways for people to eat nutritious food.

Be it fussy school children or aged care residents with chewing and swallowing problems, many people struggle to consume the food they need.

Dr Zhong uses innovative technology such as 3D food printing to create food which is nutritious, but also easier to consume and/or more visually appealing.

"This fellowship can definitely speed up my research program in advancing 3D food printing to improve health and wellbeing in many vulnerable communities," he said.



"It can help these people enjoy every bite, every day and feel loved and supported, and also help their caregivers in preparing texture modified foods for their loved ones. "I hope my work can make real changes in people's life in WA and beyond."



The remaining duo of researchers both received one-year Emerging Leaders Grants worth \$100,000.

Dr Murphy is investigating how to improve the quality of life for people with lower limb osteoarthritis.

Specifically, he will explore how mechanisms in the brain behave unusually in osteoarthritis and reduce muscle strength, which can make pain and symptoms worse.

"My WANMA will allow me to explore how these maladaptive processes in the brain are driving the development of hip osteoarthritis," he said.

"Once we know which elements of the brain are responsible for inhibiting strength and capacity of the muscles, we can work on innovative new ways to treat the brain and improve the quality of life for people with osteoarthritis."

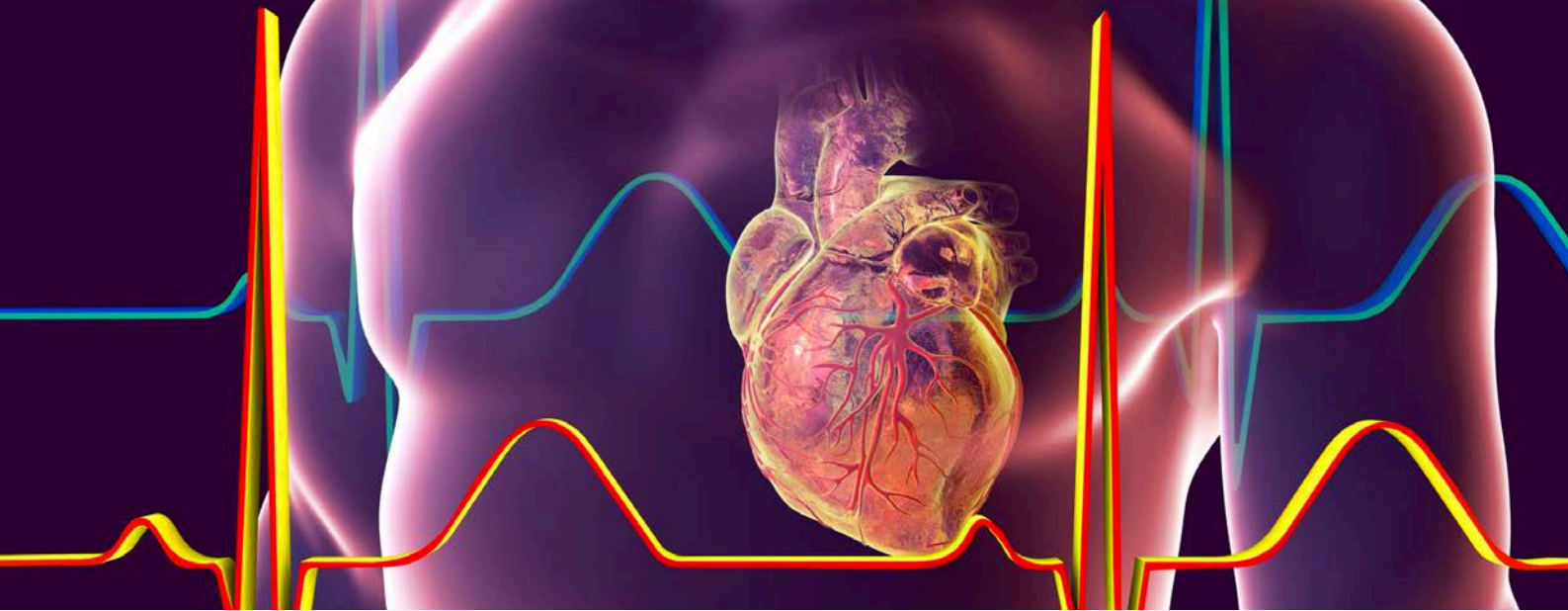
NHIRI's Epidemiology Lead, Dr Bondonno's project is titled 'Nitrate: The Dr Jekyll and Mr Hyde of human health?' and explores how nitrate could improve health or be linked to cancer, depending on what source it comes from.

"The major sources of nitrate are vegetables, meat, and drinking water," she said.

"My research will determine in what contexts nitrate causes harm and when it is beneficial.

"This will provide the necessary evidence for developing and promoting new dietary guidelines for health."





Major funding announcement for ECU to lead global cardiovascular disease research team

Edith Cowan University (ECU) researchers will lead a global team researching how to better prevent a novel aspect of cardiovascular disease, after winning \$1.2 million in funding from the National Health and Medical Research Council.

The three-year Medical Research Future Fund – Cardiovascular Health Mission grant will allow the team to further research abdominal aortic calcification (AAC), which is a build-up of calcium in the body’s largest artery and a reliable marker for cardiovascular disease risk. The project is a collaboration between ECU’s Nutrition & Health Innovation Research Institute, Heart Foundation, University of Queensland, University of WA, Flinders University and collaborators in the US, UK and Canada. It will use a newly developed artificial intelligence algorithm which will learn to automatically detect and measure AAC based on lateral spine images taken from bone density machines used for screening of osteoporosis.

Lead investigator Associate Professor Joshua Lewis, said the team will then use these AAC results in large studies with detailed genetic and lifestyle information, and explore how and why cardiovascular disease occurs. “Our multidisciplinary team will use data from more than 100,000 people and more than 125,000 images,” Professor Lewis said.

“This will provide robust estimates of the prevalence and clinical importance of AAC in middle-aged to older adults with and without chronic metabolic diseases.”

Other ECU researchers on the project are Dr Cassandra Smith, Dr Zulqarnain Gilani, Dr Nicola Bondonno and Dr Marc Sim.

Professor Lewis said the project is expected to enable a “paradigm shift” in what’s understood about how and why cardiovascular disease progresses. “Ultimately, this will lead to better approaches to target modifiable lifestyle factors, genes and chronic diseases causing cardiovascular hospitalisations and deaths in older people, to create new and better ways to prevent and treat the disease.”



Clockwise from top: A/Prof Josh Lewis, Dr Cassandra Smith, Dr Nicola Bondonno, Dr Zulqarnain Gilani and Dr Marc Sim



Funding to reduce stress for new parents – and benefit the whole family

Researchers from Edith Cowan University's Nutrition & Health Innovation Research Institute (NHIRI) are launching the Happy Parenting Program to support parents during the critical period when their babies are between 4 and 12 months old. Despite this being a challenging time for parents due to teething, sleep issues, rapid growth, and other factors, there is often a lack of scheduled child health nurse visits during this period. The research, funded by Channel 7 Telethon Trust, aims to investigate effective ways of supporting parents and their infants. The program explores different approaches, including the Respectful Approach, which emphasizes developing a cooperative relationship between parents and infants, resulting in reduced parental stress levels and increased confidence in as little as six weeks. Preliminary data indicates that the Respectful Approach particularly addresses stressful meal times. Instead of pressuring children to finish their plates or using food as a reward, the program encourages parents to trust and observe their infant's cues during mealtimes. The goal is to foster healthy eating behaviors and reduce stress for both parents and infants. The research also emphasizes the impact of stressful environments on children's development, stating that a chronically high-stress environment without a supportive caregiver relationship can have detrimental effects on learning, behavior, and health throughout their lives. With \$118,000 in funding from Channel 7 Telethon Trust, the researchers plan to recruit families with babies up to six months old for weekly parenting workshops.



Lead Researcher, Associate Professor Therese O'Sullivan

The study will focus on children's health, considering the influence of family socioeconomic backgrounds on household stress. The ultimate goal is to determine whether the intervention can improve children's stress levels, behavior, and development, with a particular interest in assessing its impact on children from disadvantaged families. The Happy Parenting Program intends to provide valuable insights into early parenting's role in reducing childhood disease risks, such as obesity and anxiety, through stress reduction and relationship building. Interested parents can find more information on the [Happy Parenting Program homepage](#).



Dr Catherine Bondonno

New ideas on the boil are the future of health research and innovation

Research on Immunotherapy and Melanoma and facilitating early identification of osteoporosis are among the winning ideas granted funding for further development by the 2023 WA Near-miss Awards (WANMA).

Four of Edith Cowan University's (ECU) early- and mid-career researchers were awarded national grants of \$100,000 to accelerate the success of their innovative research ideas.

The awards may be comically named but winners are seen as serious contenders in the future of health research and innovation. The grants provide real recognition for researchers who only narrowly missed out on a highly sought-after National Health and Medical Research Council (NHMRC) Ideas grant.

Dr Catherine Bondonno from ECU's Nutrition & Health Innovation Research Institute was awarded for research on: Pardon the vegetables: how nitrate source determines health impact, which aims to understand the role of dietary nitrate in human health.

The WANMA Ideas Grants 2022-23 program awarded 12-month grants of \$100,000 to 23 early- and mid-career researchers from a total funding pool of \$2.3 million provided to the WA health and medical research sector.

The program is funded by the State Government's Future Health Research and Innovation (FHRI) Fund. Minister for Medical Research Hon. Stephen Dawson said WA was already home to some of world's leading researchers and innovators and over the next decade we will see some amazing advances in home-grown research and innovation. "Congratulations to the funding recipients announced – the champions of health and medical research and innovation for the future."



ECU researcher's work exploring stroke survivors' diet wins women's health award and funding

Research investigating how fruit and vegetables can benefit women after suffering a stroke has seen NHIRI's [Dr Simone Radavelli-Bagatini](#) win a highly sought-after Australian Health Research Alliance (AHRA) award.

Each year, the AHRA Women's Health Research, Translation and Impact Network's EMCR Awards distributes funding to early and mid-career female researchers who work across women's health research. Dr Radavelli-Bagatini was named a 2023 EMCR Award winner due to her project aiming to understand the barriers and motivators for women post-stroke to consuming fruit and vegetables to improve their physical and mental wellbeing.

Dr Radavelli-Bagatini's project will not only consider the viewpoints from women who have had a stroke, but also their carers – a group who are also at a high risk of experiencing stroke.

"Older Australian women and their women carers are more likely to have a stroke, with three in four carers being women," she said.

"Whilst the exact causes for this remain unclear, it may be partly related to an unhealthy diet and increased stress.

"We know stress affects women biologically and psychologically differently to men, with women being twice as likely to suffer anxiety and 2.5 times more likely to suffer depression than men at the same age." Despite increasing fruit and vegetable intake being a cornerstone of a healthy diet and essential for physical and mental wellbeing, less than 5 per cent of Australian adults eat the recommended intake.

Dr Radavelli-Bagatini said eating fruit and vegetable may be even lower in stroke survivors due to dysphagia, a difficulty with swallowing affecting up to 80 per cent of stroke patients in the acute phase, who therefore require texture modified diets.



Dr Simone Radavelli-Bagatini

"Our aim is to understand what will encourage and discourage increasing fruit and vegetable consumption in post-stroke women, be it access to food, availability, price or psychosocial and physical factors," she said. "In addition, we will also evaluate whether women post stroke will accept novel approaches to increasing fruit and vegetable intake, such as [3D-printed food](#) using freeze-dried powders."

ECU Associate Dean of Public Health [Professor Amanda Devine](#) said this is exciting new research that will make a difference to many people post stroke – including carers.

"Working with the consumers of our research from the get-go and truly understanding their needs ensures our research is getting to the heart of the problem," Professor Devine said.

"Using the latest food technology ensures foods provided are nutrient dense, supply key nutrients to support wellbeing and a part of the solution."



Dr Mary Kennedy

Cancer Council WA Postdoctoral Research Fellowship awarded to ECU's Dr Mary Kennedy

NHIRI's researcher [Dr Mary Kennedy](#) has been awarded \$225,000 over the next three years in a bid to make sure every cancer patient in WA receives a referral for exercise from their cancer care team during treatment. Dr Kennedy, who was awarded Cancer Council WA's 2023 Postdoctoral Fellowship, said exercise is important for people with cancer, yet fewer than 13 percent of patients are getting a referral.

"Research has shown the multiple ways exercise works as an important medicine for people with cancer, increasing survival, helping to alleviate negative side effects of treatment, and improve quality of life," Dr Kennedy said.

"This Fellowship will look at how people are currently referred to exercise oncology services, design a new process to increase referrals, then evaluate the results. "This is not a people issue; this is a system issue. To embed genuine, long-term change, we need to invest as much time and effort into developing robust implementation strategies, as we do in gathering evidence and conducting research to demonstrate the effectiveness of a program."

Dr Kennedy was invited to join the multi-disciplinary international Moving Through Cancer (MTC) Task Force in January 2021.

The Task Force is an initiative of the American College of Sports Medicine and has been assembled to achieve the bold goal of making exercise standard practice in oncology by 2029.

"This funding from the Cancer Council will also assist my work co-funded by the Future Health Research

Innovation Fund through the Implementation Science Fellowships 2021 program, which aims to integrate exercise into cancer care in the South West region of Western Australia".

Today, Dr Kennedy is closely aligned with GenesisCare. Together their work has focused on ensuring patients with cancer have access to exercise through integrated exercise programs.

"People living with cancer benefit from exercising during treatment in many ways and our research with Edith Cowan University has demonstrated that radiotherapy patients value being connected with high-quality exercise consultations as part of their routine care," GenesisCare Radiation Oncologist Dr Yvonne Zissiadis said.

"We look forward to continuing our work with Dr Kennedy and the ECU team to support the case for exercise therapy to be embedded as standard practice in cancer care."

Cancer Council WA Cancer Prevention and Research Director, Melissa Ledger, congratulated Dr Kennedy.

"Our Research Fellowships support outstanding cancer researchers to undertake research that can reduce the risk of cancer and the impact of cancer," Ms Ledger said.

"We are committed to achieving the best outcomes for cancer patients and their families, so it's important for us to support research such as Dr Kennedy's, which will bridge the gap between research and practice in exercise oncology."



Dr Myles Murphy

ECU researcher receives grant to revolutionise hip osteoarthritis treatment

NHIRI's postdoctoral research fellow [Dr Myles Murphy](#) has been awarded a \$238,852 grant from the Raine Medical Research Foundation for a project entitled: Harnessing 'brainpower' to reduce the burden of hip osteoarthritis.

Dr Murphy is aiming to determine whether eight weeks of electrical brain stimulation, called transcranial direct current stimulation (tDCS) to the brain's motor cortex during exercise rehabilitation could decrease pain and increase muscle strength in people with hip osteoarthritis (OA). The study will make use of the largest exercise trials in hip OA to date.

"This research has the potential to revolutionise OA management in clinical practice and increase physical activity," said Dr Murphy.

"If tDCS is an effective intervention, it has the potential to improve the quality of life for people living with hip OA and reduce treatment costs associated with pharmacological and surgical interventions.

Furthermore, the intervention from this study could be easily reproduced in other conditions with a substantial healthcare burden, such as back pain or rotator cuff injury."

The research will be supported by [Professor Janet Taylor](#), [Professor Jonathan Hodgson](#), both from ECU, Associate Professor Joanne Kemp from La Trobe University, and Adjunct Professor Paola Chivers from the University of Notre Dame Australia.

Dr Murphy said funding from the Raine Foundation has supported world-class research that has directly impacted our understanding of medicine and substantially improved patient care.

"The grant allows me to continue developing my research into harnessing brainpower to improve our outcomes with exercise and physiotherapy for chronic musculoskeletal diseases such as OA. With this funding, I have the means to perform a methodologically robust randomised controlled clinical trial to assess the benefits of electrical stimulation in improving the recognised benefits of exercise rehabilitation," Dr Murphy said.

The Raine Foundation has a 60-year history supporting health and medical research in Western Australia, offering support to a full spectrum of topics without being limited to one specific area of disease.

The Raine Foundation was established by London-born real estate mogul Mary Raine in 1957, following the death of her husband Arnold Raine. To date, the fund has contributed more than \$50 million to medical research.



ECU researchers awarded prestigious grant to tackle national health challenges

NHRI Senior Research Fellow [Dr Catherine Bondonno](#) has been awarded more than \$679,000 under the Ideas Grant to unravel the long-standing debate surrounding nitrate, a compound found in meat, water, and vegetables, and its impact on human health.

For over 50 years, regulations and concerns about cancer risks associated with nitrate consumption have shadowed its potential benefits, particularly from vegetables. The controversy stems from the conversion of nitrate to nitrite, which can lead to the formation of carcinogenic N-nitrosamines.

“Conducting six human studies, we will dissect the nitrate-cancer link and its broader health implications. This research will explore whether the dietary source of nitrate – be it from meat, water, or vegetables – alters its effects on the human body. This research also aims to investigate the potential protective role of nitrate in conditions such as cardiovascular disease, cognitive decline, dementia, and diabetes,” said Dr Bondonno.

“The current scientific and public health consensus for nitrate is that it is a potentially toxic/carcinogenic contaminant in meat, water, and vegetables. We believe that this view is incorrect: it is not supported by available evidence, but definitive studies have yet to be performed.

“This cohesive series of projects will challenge the current perspective. Results will change legislation, regulations, public health messaging, farm practices and community perceptions of nitrate-rich vegetables. They will inform the acceptable daily intake of nitrate, which currently does not differentiate between sources.

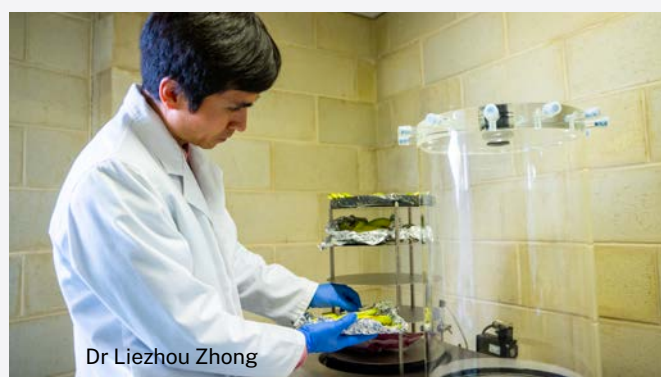
“Ultimately this will remove a barrier to increased intake of nitrate-rich vegetables and lead to higher nitrate intakes, resulting in improved cardiovascular, cognitive, and diabetic outcomes and a reduction in the current near \$12 billion economic burden of these diseases to Australia,” Dr Bondonno said.

NHRI Postdoctoral Research Fellow [Dr Liezhou Zhong](#) has also been awarded more than \$719,000 to continue his extensive research into the adoption of state-of-the-art 3D printed foods, which will be rolled out in aged care facilities for elderly residents who have chewing and swallowing difficulties (dysphagia).

“We will work closely with our industry partner, Brightwater Care Group, to implement the technologies and the developed food products at aged care facilities, Dr Zhong said.

“This project can provide fundamental evidence on the feasibility of 3D food printing in improving food intake and eating experience in aged care residents, therefore, reducing preventable malnutrition in the residents. We have built a multidisciplinary team that brings together world-renowned researchers in aged care, nutrition, food science and technology, speech pathology, dietetics, agriculture, public health, and implementation science.” Dr Zhong said that the NHMRC funding would enable him to enhance the capacity of 3D food printing further and create more nutritious, ready-to-print and consume texture modified foods, particularly fruit and vegetable-based options.

“The outcomes will provide translatable evidence regarding the health potentials of the developed technology and food products. Therefore, it will undoubtedly support my research to develop and implement approaches to improving the nutrition and health of many people on texture modified foods, beyond residential aged care, such as people with multiple sclerosis, dementia and other neurodegenerative disorders, stroke and cancer survivors, and children with autism.”



Dr Liezhou Zhong



ECU Associate Professor getting to the heart of healthy ageing

NHIRI Associate Professor Josh Lewis has been awarded a 2023 Heart Foundation Future Leader Fellowship supporting the best and brightest in cardiovascular research.

The prestigious Heart Foundation Fellowship will allow Associate Professor Lewis and his team to further research into abdominal aortic calcification (AAC), which is a build-up of calcium in the body's largest artery and is a marker for cardiovascular disease risk.

"My research program has developed an artificial intelligence algorithm that automatically detects and measures a marker of advanced blood vessel disease (calcification) in the abdominal aorta on images taken from bone density machines used for screening of osteoporosis," he said.

"We are using the results from this algorithm in large epidemiological studies to understand for the first time why and how abdominal aortic calcification (AAC) develops and progresses often before disease is seen in the heart.

"We are also undertaking groundbreaking trials providing these results with educational resources to people and their healthcare teams to motivate heart-healthy, risk-reducing behaviours and improve risk factor control," Associate Professor Lewis said.

His most recent Medical Research Future Funded Cardiovascular health mission research Investigating genetic and lifestyle determinants of abdominal aortic calcification, and their relationship with cardiovascular disease, is a collaboration between ECU's Nutrition & Health Innovation Research Institute, Heart Foundation, University of Queensland, University of WA, Flinders University and collaborators in the US, UK and Canada.

"This work can reveal not just who is at risk of future heart attacks and strokes but also why and how such diseases develop and progress. This knowledge, used effectively, can be used to alter the course of cardiovascular disease and save lives," he said.

"Collectively, this program of work will develop this scalable test that could transform our ability to monitor and change the trajectory of advanced blood vessel disease, saving lives and reducing healthcare costs in the process."

The fellowship will see \$692,000 over four years towards the research program at ECU's Nutrition & Health Innovation Research Institute.

Nationwide, the Heart Foundation has awarded \$13.9 million to support 73 new, groundbreaking research projects that will leverage Australia's scientific expertise to save more lives from cardiovascular disease.

Heart Foundation CEO David Lloyd said that the generosity of donors during the past 12 months had ensured the organisation could continue to help support vital cardiovascular research.

"These 73 innovative projects build on the Heart Foundation's strong legacy of supporting cardiovascular research since 1959," he said.

"The Heart Foundation supports research right across the spectrum: from work in fundamental biology that aims to discover the basic mechanisms of disease, to clinical research, to work in health services and public health – and it's pleasing to see that spread continues with this year's funding outcomes.:

More than four million Australians are living with a cardiovascular disease and nearly 44,000 deaths are attributed to one, with coronary heart disease continuing to be the leading single cause of disease and death in Australia – accounting for more than 17,300 deaths each year.



More than half a million dollars for ECU medical innovation

The State Government has announced \$1.4 million will be awarded to WA's leading medical and health innovators through its Innovation Fellowships program.

More than half a million dollars of that funding will be used directly for Edith Cowan University (ECU)-led health and medical research projects.

"This significant recognition of ECU's medical and health research is yet another terrific example of the progressive nature of our work," Deputy Vice-Chancellor (Research) [Professor Caroline Finch](#) said.

"Research involving the use of AI, electric brain stimulation, 3D printing and the use of lithium for mental health treatment is being supported.

"These are truly innovative, out-of-the-box initiatives that show ECU is continually at the forefront of health innovation."

This program provides Fellowships to talented Western Australians to enable them to develop innovative early-stage processes, products and services in medical and health innovation.

Funded by the Future Health Research and Innovation Fund (FHIRI) which provides a secure source of funding to drive health and medical research, innovation and commercialisation.

NHIRI research to receive funding:

- [Dr Myles Murphy](#) has received a \$119,489 grant for his work harnessing 'brainpower': using portable, electrical brain stimulation to enhance injury recovery and physical performance via neuroplasticity.
- [Dr Liezhou Zhong](#) has received a \$115,348 grant for his ongoing research that develops 3D printed food to enhance eating experiences and health for people on texture modified diets, like the elderly in nursing homes around the country.

"We are immensely proud of the multidisciplinary research being done in the health and medical fields here at ECU," Professor Finch said.

"Our researchers and innovators are addressing the problems that arise from unmet health and medical needs, and we simply cannot wait to see the benefits that arise from these projects, a future of better health diagnosis and treatment."



Funding futures in new clinical health innovations

Edith Cowan University (ECU) has been selected as the host university to lead innovative research into strategic and health priorities, including a cultural perspective in brain injury rehabilitation and using nutrition as a powerful tool to modulate the immune system.

Future Health Research and Innovation (FHRI) Fund will support two exciting new research projects with PhD students from ECU.

The support comes through the Clinician Researcher Training (CRT) Program, which is designed to build the clinician researcher workforce by providing scholarships for clinicians to undertake a clinically focussed, higher degree by research (HDR) at a WA university.

One of the CRT scholarship recipients will look at how culture can inform brain injury rehabilitation services. ECU PhD research student Meaghan McAllister explains how her research will be undertaken in collaboration with St John of God Midland Public Hospital where she is employed as a Senior Speech Pathologist.

“I am aiming to centre on First Nations peoples’ perspectives to achieve systemic change in the planning and delivery of rehabilitation and support after stroke and traumatic brain injury,” said Meaghan. “Allied health clinicians and Aboriginal people with brain injury have made recommendations to enhance accessibility and culturally secure models of rehabilitation, however implementation is slow. Privileging Aboriginal voices, the project aims to accelerate change and practice in rehabilitation by identifying barriers and facilitators to implementing systemic changes.”

Meaghan’s supervisors are [Professor Beth Armstrong](#) (ECU), [Professor Dan McAullay](#) (Kurongkurl Katitjin, ECU), and Ms Linda Cresdee and Dr Dave Parsons of St John of God Midland Hospital.

The FHRI Fund support will also enable ECU PhD student Evania Marlow to research immunomodulation of the gastrointestinal tract through nutrition at Ramsay Health Care (Joondalup).

Evania’s supervisors, Professor Amanda Devine (ECU), Associate Professor Claus Christophersen and Associate Professor Ajay Sharma (Gastroenterologist), explain the purpose of this study is to elucidate the link between optimal nutrition, and the gastrointestinal based immune system in paediatric Crohn’s Disease, targeting specific nutrients.

“Ultimately, my research will provide more evidence around nutrition therapy and how targeted nutrition would lead to a reduction in the incidence of Crohn’s Disease through early detection of nutrition depletion and followed by supplementation.” said Evania. “This would subsequently reduce the overall costs to the health care system, potentially enabling faster and more frequent remission in Crohn’s Disease.”



NHIRI Awards Highlights

ECU leader announced as 2023 WA Scientist of the Year finalist

Edith Cowan University's [Professor Amanda Devine](#) has been announced as a finalist for the 2023 WA Scientist of the Year for her extensive work in health and nutrition.

It is the most prestigious honour bestowed at the annual Premier's Science Awards, which are administered by the Department of Jobs, Tourism, Science and Innovation and aim to recognise and celebrate the outstanding scientific research and engagement taking place in Western Australia. Professor Devine is one of five finalists, with the winner to be announced in September. Currently Associate Dean of Public Health and OHS, and Professor of Public Health Nutrition at ECU's Nutrition & Health Innovation Research Institute, Professor Devine has spent more than 30 years aiming to improve people's health and wellbeing across their entire lifespan through her teaching and varied research.

This has included overseeing projects aiming to influence policy and practice to ensure children at early learning centres are receiving the food they need to thrive and co-creating video games to engage school-aged children to make healthy food choices.

Professor Devine is working with dietitians to test plant-based diets in treating gestational diabetes and inflammatory bowel disease and is working to rescue imperfect fruit and veg to transform it into nutrient-dense, 3D printed meals to support older people who require texture-modified diets. She is also involved in a large-scale project aiming to improve food security for Western Australians in regional and remote areas.

"I work towards being a knowledge broker for nutrition science, so research findings can be implemented to have real world impact on people's health," Professor Devine said.

"I am also committed to mentoring and training the next generation of public health leaders, bringing likeminded people together to innovate collaboratively and change broader systems in order to benefit community."

"It's an honour to be named as a finalist in such as prestigious award."



Recognising NHIRI excellence

Each year Edith Cowan University (ECU) recognises and rewards ECU staff who have achieved outstanding outcomes, socially, professionally and academically.

The Vice-Chancellor's Staff Excellence Awards are a celebration of those who go above and beyond to demonstrate ECU's core values of Integrity, Respect, Rational Inquiry, Personal Excellence and Courage in all aspects of their work.

The NHIRI 2023 Vice-Chancellor's Staff Excellence Award winners:

Outstanding Research Mentor

Associate Professor Josh Lewis
School of Medical and Health Sciences



Outstanding Research Communication

Dr Liezhou Zhong
School of Medical and Health Sciences

Tall Poppy teaching others to stand tall

Edith Cowan University (ECU) medical and health researcher Dr Marc Sim has been selected as one of the outstanding early career researchers to receive a Western Australia 2023 Young Tall Poppy Science Award.

Senior Research Fellow at ECU's Nutrition & Health Innovation Research Institute (NHIRI), Dr Sim has been recognised for his scientific achievements, engagement with the community and leadership. The prestigious annual Young Tall Poppy Science Awards were created in 1998 by the Australian Institute of Policy & Science (AIPS) to recognise and celebrate Australian intellectual and scientific excellence and to encourage younger Australians to follow in the footsteps of our outstanding achievers. Dr Sim was awarded for his research that aims to communicate and educate the public on the importance of nutrition for falls prevention. His research program examines the role of diet, physical activity and its impact on disease progression, more specifically muscle function and bone structure, which are major risk factors for falls and fractures in older populations. He explains that 1 in 3 older Australians living in the community experience a fall each year, with resulting fractures often compromising independence and quality of life.

"While no pharmaceutical interventions can preserve muscle function and thus prevent falls, emerging evidence indicate an important role for nutrition that requires urgent investigation," said Dr Sim.

"I have demonstrated the importance of diet by identifying specific foods such as green leafy and cruciferous vegetables that enhance musculoskeletal health and lower falls risk.

"I am now exploring how nitrate and vitamin K1 from these vegetables optimise muscle function and bone structure."

Power of nutrition at any age

Dr Sim explains his research involves community education talks and workshops delivered across Perth, including retirement villages and junior sporting organisations. The aim of this is to promote food literacy and communicate the importance of diet for muscle and bone health. In collaboration with Stay on your Feet (WA), he has also developed a cooking workshop aimed at providing community members with the skills and knowledge to prepare meals to support musculoskeletal and cardiovascular health.



Dr Marc Sim

Giving back

The Awards engage the winning 'Tall Poppies' in activities to promote interest in science among school students and teachers, as well as an understanding and appreciation of science in the broader community.

It has made significant achievements towards building a more publicly engaged scientific leadership in Australia.

Dr Sim is supported by Fellowships from the Future Health Research and Innovation Fund (WA) and the Royal Perth Hospital Research Foundation.

NHIRI Awards Highlights

Promotions

Dr Cassandra Smith - Promotion to Lecturer (Level B)

A/Prof Leesa Costello - Promotion to Associate Professor (Level D)

Awards

Dr Cassandra Smith, winner of **2023 Vice-Chancellor's Research Fellowship**. This Scheme recruits exceptional early to mid-career researchers into ECU's key areas of research activity and/or strategic priority.

Dr Cassandra Smith was awarded the **Victoria University Medal for Academic Excellence in Research Training**. Victoria University awards this medal each year, on the basis of excellence in thesis quality and outstanding reports from examiners. It is awarded in order to recognise high-achieving students who demonstrate the University's commitment to excellence, and display the attributes of a future generation of academic leaders.

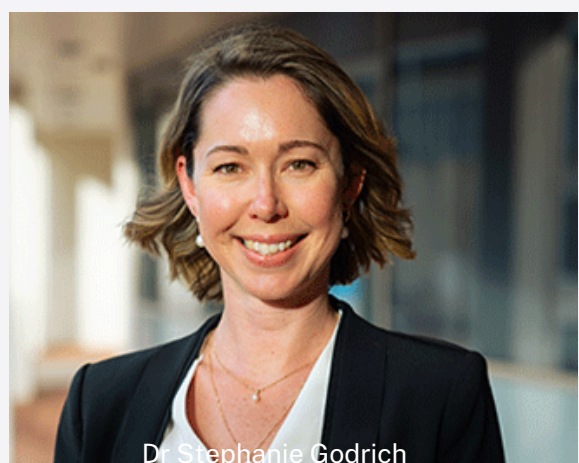
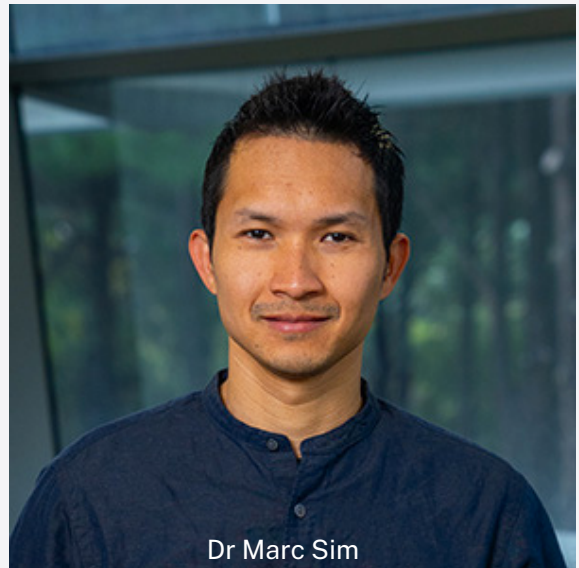
Dr Cassandra Smith was a highly ranked new investigator (top 10 abstract) and received the **2023 ECTS New Investigator Seminar Nestle' Clinical Award** at the European Calcified Tissue Society (ECTS) & Bone Research Society (BRS) congress.

Dr Marc Sim received the **2023 European Calcified Tissue Society, Allied Health Award**: "Dietary Vitamin K1 intake is associated with lower long-term injurious fall and fracture risk: The Perth Longitudinal Study of Ageing Women". Dr Marc Sim also received the **2023 ECTS New Investigator Best Clinical Poster Award**.

Dr Marc Sim was the selected applicant, **2023 American Society for Bone and Mineral Research (ASBMR) Leadership Education for Advancement (LEAD) program**.

Dr Zulqarnain Gilani, was awarded the **DAAD AINet fellowship**, which is awarded twice a year, by DAAD Germany, to a group of outstanding international early career researchers in the field of artificial intelligence.

NHIRI member Dr Stephanie Godrich was awarded the **Universities Australia Award for Teaching Excellence**. Stephanie received the award for a highly industry-engaged learning environment that incorporates authentic assessments to effectively engage regional health science students.



A/Prof Josh Lewis received the **WA Cardiovascular Research Alliance EMCR Research Leadership Award & Researcher of the Year Award** at the recent Western Australian Cardiovascular Research Alliance Awards dinner.

The event was supported by the Heart Foundation and MC'd by ECU's Dr Lauren Blekkenhorst and was attended by David Lloyd CEO of the Heart Foundation and the Honourable Tjorn Sibma Deputy Leader of the Liberal Party in the Legislative Council; Shadow Minister for Justice; Defence Industry; Metronet; Citizenship and Multicultural Affairs

Dr Benjamin Parmenter was awarded the **2023 WACRA Heart-to-Vessel Showcase Award Runner up (Early-Middle Career Researcher)**.

Dr Abadi Gebre was awarded the **2023 WACRA Heart-to-Vessel Showcase Award Runner up (Student Researcher)**.

Dr Simone Radavelli-Bagatini and Dr Benjamin Parmenter were awarded the **Australian Nutritional Trust Fund Travelling Fellowship Award**.

Dr Ros Sambell received the **Australian Health Promotion Association 2023 Excellence in Leadership Health Promotion Award**.

NHIRI member Ruth Wallace, was awarded **Senior Fellow of Advanced Higher Education**. AHE is a UK based professional association that promotes excellence in higher education. The application is a substantial piece of work and the requirements are stringent.

A/Prof Therese O'Sullivan was awarded the **2023 Nutrition Society of Australia Mid-Career Researcher Award** at the 2023 Nutrition Society of Australia Annual Scientific Meeting in Auckland, New Zealand.

Dr Benjamin Parmenter received the **Early Career Publication Award** at the 2023 Royal Perth Hospital Research Foundation Symposium.

NHIRI's 'Fuel Your Body and Mind' workshop was a finalist for the Outstanding Achievement in **Empowering WA to Prevent Injury or Support Recovery** award at the **Injury Matters Injury Prevention and Safety Promotion Awards 2023**.



Dr Benjamin Parmenter with Professor Livia Hool (Director - Chair, WACRA) and David Lloyd (CEO, Heart Foundation) and Dr Lauren Blekkenhorst (WACRA).



Dr Abadi Gebre with Professor Livia Hool (Director - Chair, WACRA) and David Lloyd (CEO, Heart Foundation) and Dr Lauren Blekkenhorst (WACRA).



A/Prof Josh Lewis with Professor Livia Hool (Director - Chair, WACRA) and David Lloyd (CEO, Heart Foundation).



Student Awards

HDR Student Completions

NHIRI is thrilled to announce the exceptional achievement of two of our students who achieved their PhD's with the highest grade and a further five completions.

Abadi Gebre - Doctor of Philosophy

(unconditionally passed without further corrections - the highest grade)

Thesis title: Cardiovascular Disease, Musculoskeletal Health and Falls: Exploring the Nexus.

NHIRI Supervisors: A/Prof Joshua Lewis, Dr Marc Sim, Prof Jonathan Hodgson, Dr Catherine Bondonno

Reindolf Anokye - Doctor of Philosophy

(unconditionally passed without further corrections - the highest grade)

Thesis title: Exploring the psychological and behavioural responses to cardiovascular screening interventions.

Supervisors: A/Prof Josh Lewis, Dr Lauren Blekkenhorst, Prof Jonathan Hodgson.

Callum McCaskie - Doctor of Philosophy

Thesis Title: An examination of kinanthropometric and physical injury risk factors in elite Australian Football

NHIRI Supervisor: Dr Marc Sim

Eugene Paewai - Master of Medical and Health Science by Research

Thesis Title: Compliance of pre-packaged food products imported from Asian countries, and sold in Western Australia, with the Australian and New Zealand Food Standards Code

NHIRI Supervisor: Prof Amanda Devine

Gemma Maisey - Doctor of Philosophy

Thesis Title: Mining for Sleep Data: An investigation into the sleep of fly-in fly-out shift workers in the mining industry and potential solutions

NHIRI Supervisors: Prof Amanda Devine

Ros Sambell - Doctor of Philosophy

Thesis Title: Food provision in long day care requires a multilevel approach to optimise health and developmental outcomes for young children

NHIRI Supervisors: Prof Amanda Devine, A/Prof Leesa Costello

Tina Yan - Doctor of Philosophy

Thesis Title: Does Fibre-fix provided to people with irritable bowel syndrome who are consuming a low FODMAP diet improve their gut health, gut microbiome, sleep and mental health?

NHIRI Supervisor: Prof Amanda Devine

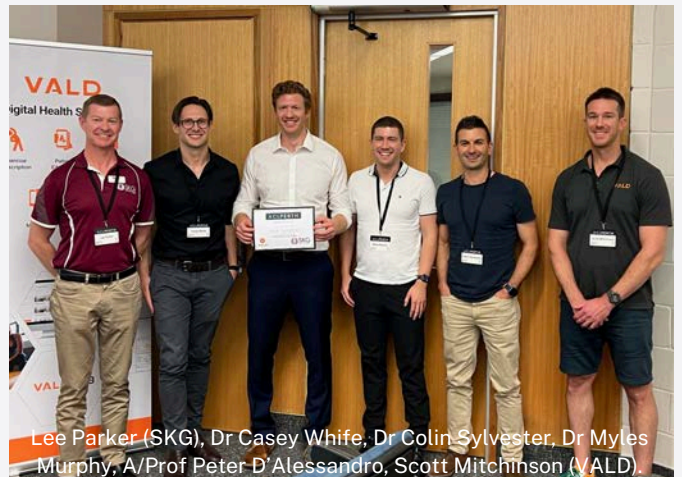
Awards

Chris Andrew has been a successful applicant for the **Rural and Regional & Enterprise Scholarship**. This scholarship will assist Chris for the duration of his PhD.

Vanessa Sutton was awarded the **Early Career Research Award, ASICS Best Paper - Sports Injury Prevention** (\$2k cash prize) at the Sports Medicine Australia Conference for her project "Joining Forces: Police recruit physical capability at entry is impacted by previous injury-related disability."

Dr Colin Sylvester won the competitive **Perth ACL Student Research Grant** (worth \$5k) to support his Masters research. The award was co-sponsored by SKG Radiology and VALD performance.

Molly Coventry won the \$2k **WA Sports Medicine Australia Research Foundation - WA Gender Equity in Research Grant** for her proposed project "Understanding the mind-body connection - the relationship between motor cortex drive and pain response to strength and fitness in female athletes: A cross-sectional cohort study"



Lee Parker (SKG), Dr Casey White, Dr Colin Sylvester, Dr Myles Murphy, A/Prof Peter D'Alessandro, Scott Mitchinson (VALD)



From L-R, Vanessa Sutton, Maddison Kirk, Dr Rachael McMillan, and Free Coulston

Internationally recognised scholarship awarded to ECU early career researcher

Edith Cowan University (ECU) PhD student Dr Carlos Toro-Huamanchumo (MD) has been announced as one of the six recipients of the prestigious Forrest Research Foundation Scholarships which recognise the best early career researchers from around the world.

The Foundation was established in 2014 by Dr Andrew Forrest and Dr Nicola Forrest to drive research and innovation capacity in Western Australia by awarding Forrest Scholarships to outstanding young intellects from around the world to conduct research at one of Western Australia's five universities.

Dr Toro-Huamanchumo will investigate the link between vascular calcification, specifically in the abdominal aorta with cognitive function and dementia. Over 55 million people suffer dementia worldwide, with almost two thirds of these people living in low-and middle-income countries. Despite the devastating consequences of dementias globally, very little is known as to why and how dementias develop and progress.

Dr Toro-Huamanchumo's project will follow on from a landmark ECU paper in the [Lancet Regional Health Western Pacific in 2022](#) that showed that the one in two older women with moderate to extensive abdominal aortic calcification had twice the risk of being hospitalized for late-life dementia and four times the risk of dying from late life dementias, independent of genetics and risk factors.

Dr Toro-Huamanchumo's project will seek to confirm this link between the state-of-the-art ECU-led machine learning abdominal aortic calcification algorithm with brain imaging, cognitive function and dementia risk in large international and national datasets.

Importantly, the work will not only identify the link between these conditions but will also use advanced genetic research methodologies to determine whether these links are likely to be causal and what preventative measures or treatments may be most effective.

Peruvian-born Dr Toro-Huamanchumo is supervised by Dr Marc Sim, Associate Professor Josh Lewis, Professor Blossom Stephan, Chair of Dementia and Professor Mario Siervo from Curtin University.

"I am thrilled and deeply grateful to have been awarded the prestigious Forrest Research Foundation scholarship to pursue my PhD," said Dr Toro-Huamanchumo said.

"This marks a significant milestone in my research career, providing a unique opportunity to advance and extend my work. I am committed to making a meaningful contribution to public health, not only in Australia but also internationally, with the additional hope of positively impacting Latin American populations, including my home country, Peru."

Dr Sim said Dr Toro-Huamanchumo's project centers around the application of a machine learning algorithm



Dr Carlos Toro- Huamanchumo

developed at ECU to detect a novel biomarker of subclinical vascular disease.

"This work holds immense clinical potential as we can assess abdominal aortic calcification on an additional image taken by widely available bone density machines that are currently used to detect osteoporosis in over 600,000 older people in Australia. If we can also use these machines to screen for abdominal aortic calcification and subsequent cardiovascular and dementia risk at the same time as osteoporosis screening that would be a game-changer. Carlos's work will be pivotal to assessing this and for future large clinical trials.

"Our team would like to sincerely thank the Forrest Research Foundation for supporting this important research and providing Carlos such a fantastic opportunity to be a part of the Forrest Hall community of future global research leaders."

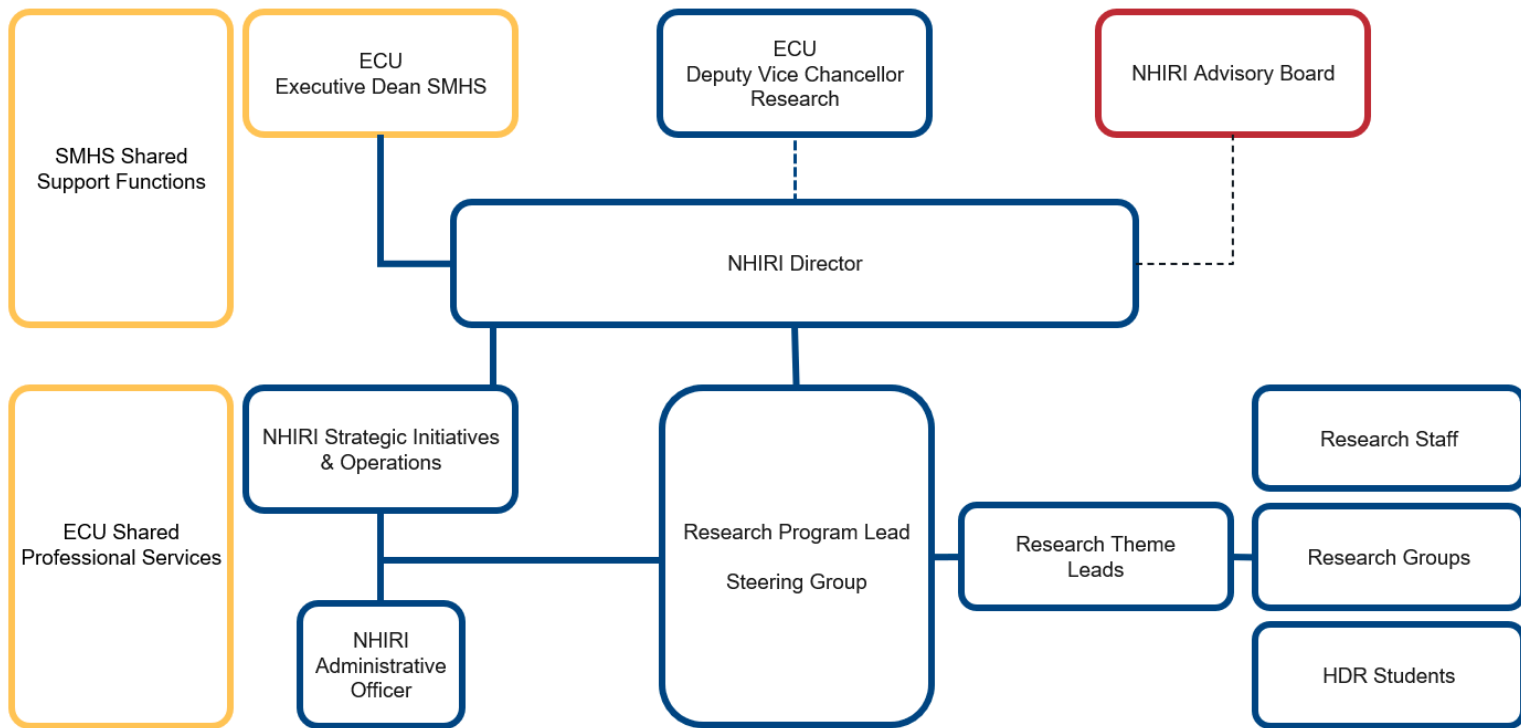
Director of the Forrest Research Foundation Professor James Arvanitakis said that the quality of the 2024 Forrest scholars reflected the incredibly competitive nature of the program, as well as its growing global reputation.

"The Forrest Research Foundation is increasingly identified as a home of excellence, creativity and ground-breaking research," Professor Arvanitakis said. "We continue to attract the best emerging researchers from around the world and connect them to centres of excellence within our universities. Building on our growing alumni, our new scholars will continue to ensure the research undertaken positively impacts the lives of Western Australians."

Dr Toro-Huamanchumo's research is supported by a Medical Research Future Fund Cardiovascular Health mission grant and a Heart Foundation Future Leader Fellowship for Associate Professor Lewis.

NHIRI Governance

NHIRI Organisational Structure





NHIRI in the media

ECU's media monitoring service recorded **2,497 media mentions for 2023**, with a **potential audience reach of 4.5 billion**.

Media included:

Dietary nitrate work led by Dr Catherine Bondonno with Dr Liezhou Zhong, Dr Nicola Bondonno, Professor Jonathan Hodgson, Anjana Rajendra (PhD candidate) and Pratik Pokharel (PhD candidate). Dietary nitrate has confounded researchers for a long time, with a long-held belief it is carcinogenic contrasting with more recent work revealing its benefits.

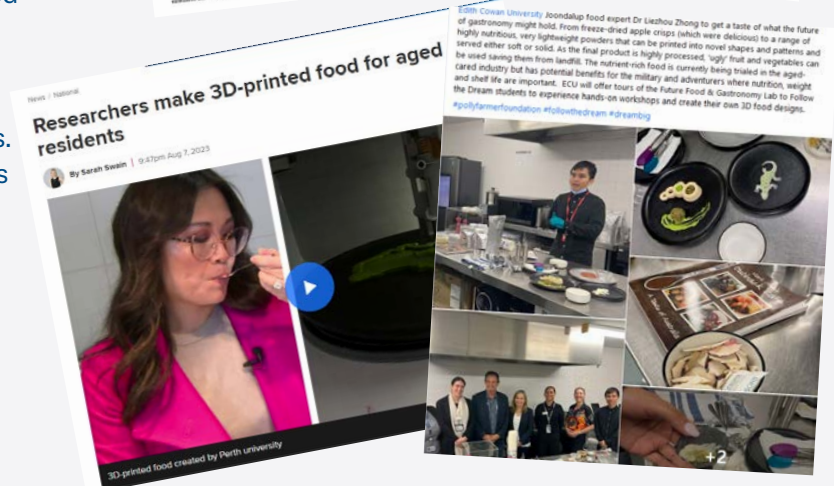
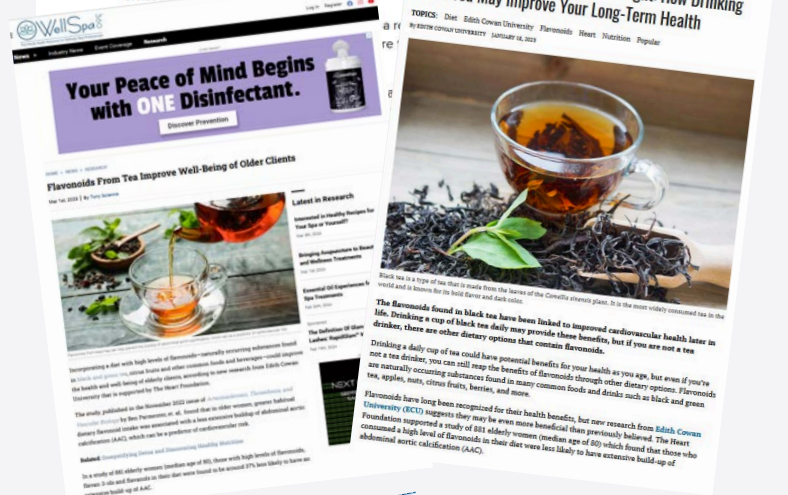
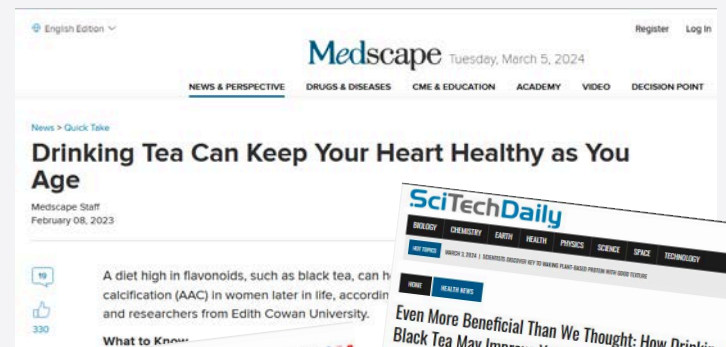
Nitrate: healthy heart or cancer risk? Meet nutrition's Jekyll and Hyde revealed the answer may be in the source of the nitrate, and was.

This media campaign was published 150 times globally, and reach a potential audience in excess of 180 million people worth an estimated \$1.67 million in advertising spend.

Research led by PhD candidate Ben Parmenter, with input from Professor Jonathan Hodgson, Associate Professor Josh Lewis, Dr Catherine Bondonno and Dr Nicola Bondonno built upon ECU's growing body of work examining the benefits of flavonoids, revealing they could help protect against abdominal aortic calcification and its many associated health risks.

The campaign, **Put the kettle on! How black tea (and other favourites) may help your health later in life** had significant success with more than 700 media mentions across the globe, reaching an potential 871,848,518 people, worth an estimated \$8.065 million.

Dr Liezhou Zhong's ongoing research in 3D Food Printing remained a topic of interest across various media platforms, with Channel 9 News featured a segment focussing on texture modified foods tailored for aged care residents. Additionally, organisations have visited NHIRI's Gastronomy lab and subsequently highlighted their experience on their respective social media channels.



An exceptional collaboration harnessing the expertise of academics from the School of Medical and Health Sciences and School of Science, the media campaign '**AI to predict your health later in life — all at the press of a button**' highlighted groundbreaking research. This work built upon previous ECU research, which established how common bone density scans can be used to detect abdominal aortic calcification, an identifier of cardiovascular risk later in life.

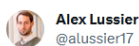
The team then identified how artificial intelligence could make this process far more efficient. Instead of relying on highly trained expert scan image reader spending 5-15 minutes to analyse a single scan, the software developed by ECU could analyse roughly 60,000 images a day.

The campaign garnered substantial coverage domestically and internationally, reaching a potential audience of almost 143 million people, worth an estimated \$1,320,803 in advertising spend. Associate Professor Josh Lewis adeptly handled media responsibilities, effectively representing the collective efforts of Professor David Suter, Professor Jonathan Hodgson, Dr Zulqarnain Gilani, Dr Marc Sim and Adjunct Professor Richard Prince.

Dr Myles Murphy spoke with ABC radio about treating bursitis.

NHIRI member Dr Ruth Wallace & Dr Amelia Ruscoe wrote an article for Every Child magazine, about the growing need for health literacy in Early Childhood Education Centres to set children and their families up for a positive future.

Associate Professor Rae-Chi was part of a study in [Lancet Child and Adolescent Health](#) which investigates the considerable impact that childhood adversity can have on child and adolescent health. Massachusetts General Hospital issued a press release with the research findings.



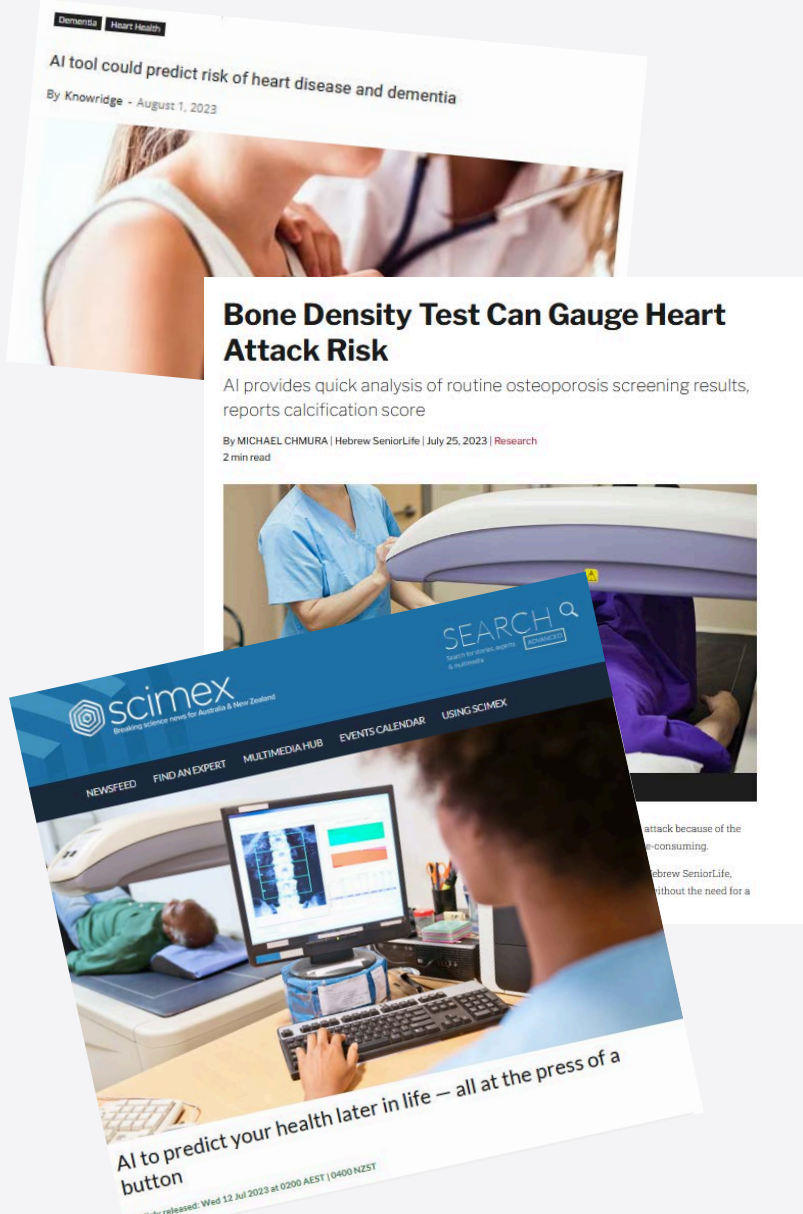
Alex Lussier
@alussier17

New paper alert! Our recent study in @LancetChildAdol investigates the relationship between the timing of childhood adversity and epigenetic profiles across development. Check out our paper and thread below!
thelancet.com/journals/lanch...

Alex Lussier @alussier17 · 12h

Childhood adversity can have a considerable impact on child and adolescent health. Our new study published in @LancetChildAdol sheds light on the #epigenetic mechanisms linked to #childhoodAdversity across #childhood and #adolescence. Let's dive in! 📖 (1/15)

[Show this thread](#)



Health literacy in ECEC for a healthy future

Holistic development and learning starts with healthy bodies and minds. In this article, the authors of the Little Aussie Bugs book series, Dr Ruth Wallace and Dr Amelia Ruscoe, write about the growing need for health literacy in ECEC to set children and their families up for a positive future.

The World Health Organisation (WHO) tells us that health literacy has an important influence on health (2017). Teaching health literacy promotes good health throughout life and reduces health inequalities. Health literacy has often been assessed among adults (Gibson et al., 2022), but the WHO has called for a fresh focus on health literacy for children, particularly in the early years (Jikan, 2019).

What is health literacy?

Health literacy is someone's ability to access health services and understand information about health. The reorientation where people live, work and play can significantly influence health literacy and how they engage with health services and systems (AHPAC, 2022; Sorokowski, 2020, p. 5294).

Health literacy in early childhood

We know that birth to five years is when optimal growth, developmental and learning are most important for children. Children who start to learn about being healthy in early childhood lay strong foundations for education, employment and health throughout their lives (Center on the Developing Child, 2022). ECEC services are the perfect place for children to start learning health literacy skills (Khan, 2019), which can reduce any disadvantage they may face that can inhibit their growth and development (Blair & Hayes, 2014).



Providing young children with health information builds their interest in health and wellbeing, and encourages them to understand and use this information. There is a growing need for age-appropriate, culturally relevant and socially supported health literacy resources for young children (Sorokowski, 2020). The WHO (2017, p. 26) describes very young children as 'potentially vulnerable'. This means that as a group, they can be more engaged and productive as learners and healthier if they develop good health literacy skills. The Early Years Learning Framework (EYLF) wants children to have a strong sense of their own wellbeing (Learning Outcomes 1) (ACECQ, 2022), and Article 6 of the United Nations Convention on the Rights of the Child (UNCRC) states that 'Children have the right to live a full and healthy life'. To this end, as very young children start to develop their own opinions and form their own understanding of the world around them, they also become aware of their own health and wellbeing (Broder et al., 2020).

Our researchers contribute to Medical Forum magazine, Western Australia's monthly publication for general practitioners and medical specialists, key government people, hospital trainees and corporate subscribers.

CLINICAL UPDATE

Contribution of dietary flavonoids to pulmonary health

By Dr Benjamin Parmenter PhD, and Dr Nicola Bondonno PhD

Chronic obstructive pulmonary disease (COPD) is among the world's leading causes of mortality. Identifying strategies to prevent and control COPD onset and progression is an ongoing public health priority.

Flavonoids, bioactive compounds found in plant-based foods and beverages such as fruits, vegetables, tea, cocoa, red wine, and berries, have been linked with pulmonary-protective benefits.

The pulmonary system and COPD

While the respiratory tract is primarily responsible for the exchange of oxygen and carbon dioxide between the external environment and the blood stream, it also performs important barrier and immune system functions.

Throughout life, the human lung is exposed to pollutants and infectious organisms in the ambient air, making it vulnerable to injury and disease. Gradually, over time, exposure to noxious substances, such as tobacco smoke and air pollution, causes lung tissue destruction, inflammation and narrowing of the airways, leading to COPD. One in 20 Australians aged 45 and over have COPD and those with COPD have a higher risk of other chronic diseases, such as cardiovascular disease and cancer.

Flavonoids: dietary occurrence

In addition to vitamins, minerals and macronutrients, the human diet contains a wide variety of other compounds, including flavonoids. At least several hundred flavonoids are found in the foods we eat.

Sources of flavonoids are quite diverse ranging from nuts, seeds, wholegrains and legumes to fruits, herbs, and vegetables, and also include oils, tea, wine, and beer.

Based on chemical structure, flavonoids can be classified into six major subclasses including flavanols, flavones, flavanones,



Key messages

- Flavonoids are bioactive compounds found in foods and beverages such as tea, cocoa, red wine, nuts and berries.
- Flavonoids have demonstrated anti-inflammatory and antioxidant properties as well as pulmonary protective benefits.
- Emerging research links flavonoid consumption to a lower risk of COPD.

Isoflavones, flavan-3-ols, anthocyanins. Isoflavones are typically found in soy products. Flavonones are mostly found in citrus fruits and anthocyanins in berries and red wine and green tea. Dark chocolate apples are high in flavan-3-ols. Flavonols are more ubiquitous and are found in many different plant-based foods.

The ability of flavonoids to modulate pulmonary health is dependent on their absorption, subsequent interaction with biological processes involved in pulmonary pathophysiology. Flavonoids, rather than in-vitro models, are found in many different plant-based foods. Flavonoids in pulmonary disease

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3D food printing to nourish vulnerable Australians

By Dr Liezhou Zhong & Amanda Orchard, ECU

Poor nutrition contributes to more deaths globally than any other factor including smoking and inadequate physical activity. It is estimated to be responsible for 7% of Australia's disease burden.

Despite the perception that it is "an issue of the past" in Australia, malnutrition is disproportionately common in various vulnerable groups such as people who have difficulties chewing (e.g., tooth loss, dry mouth, gum disease) who

Key messages

- Poor nutrition contributes to more deaths globally than smoking.
- Texture-modified foods often have lacked nutritional value and aesthetic appeal.
- 3D printing of foods offers a solution.

scopos", making people feel "left out". Poor food visual quality leads to lower intake, physical

CLINICAL UPDATE



into aesthetically pleasing dishes. 3D food printing can fabricate food objects layer by layer, from the bottom to the top, to achieve designed shapes.

3D food printing is a new frontier in the food industry and has been referred to as a "magic bullet" to enable rapid prototyping, customised nutrition (based on food preferences, health conditions, specific dietary requirements, and social context).

Extrusion-based 3D food printers are the most common as they allow operation at a low cost using compatible materials. These materials should be loaded into a nozzle and then be pushed or extruded through the nozzle. Common materials include chocolate, fats, and oil. Other materials include fruits, vegetables, and proteins. Hummus, spreads, and soups are also possible. Thus, modified foods are ideal for based 3D food printing. Another advantage of 3D printing is its freedom

Read on Page 49

Unlocking a heart-healthy diet: the power of vegetables

By Dr Lauren Blekkenhorst and Dr Simone Radavelli-Bagatini, Edith Cowan University

Cardiovascular disease (CVD) is the leading cause of death in Australia, with one person dying of CVD every 13 minutes. Those surviving a heart attack or stroke usually face long-term disabilities.

CVD risk factors are well-established and include an unhealthy diet, sedentary lifestyle, obesity, smoking and excessive alcohol consumption. A diet lacking in vegetables, fruits, whole grains and legumes while high in saturated fats, added sugars, and salt, can increase the risk of CVD.

Emerging evidence also shows that prolonged exposure to physiological stress increases the risk of CVD. Additionally, CVD itself, is a risk factor for mental health

Key messages

- Cardiovascular disease (CVD) is the number one cause of death.
- Poor diet is one of the leading risk factors for CVD.
- Vegetables are key to a heart-healthy diet.

conditions, such as depression and anxiety, and vice-versa. Much more needs to be done to improve these lifestyle risk factors to reduce CVD burden.

Herby eating

Life Imp: pro

The National Heart Foundation of Australia recommends plant foods to make up the most of an individual's diet including lots of vegetables, fruit, wholegrains, and legumes (chickpeas, beans, and lentils). Fish and seafood can be included with smaller servings of other animal-based products, such as milk, cheese, yoghurt, eggs, poultry, and lean meat.

This heart-healthy dietary pattern is high in fibre, vitamins, minerals and other protective plant chemicals, and low in saturated fat, added sugars and salt. These are all recommendations that will improve several CVD risk factors including



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medical FORUM
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Happy parenting - prevention cure
Assoc/Prof Therese O'Sullivan - June 19, 2023

For our website as well as other www.clinp

QUEST COLUMN 3 MIN READ



A strong parent-child relationship from infancy can help set up children for long-term success, says ECU's Assoc/Prof Therese O'Sullivan.

Many parenting interventions emphasise skills training after problems develop, as opposed to establishing a strong parent-child relationship from early on. For young children, growing up with a good relationship with their parents may help prevent long-term health issues.

An important part of healthy child development is learning how to cope with mild stressful events, which trigger physiological effects. When young children experience stress in the context of supportive relationships with their parents, these effects are cushioned and return to normal levels relatively quickly. The result is the development of healthy stress response systems.

However, if a young child is living in a chronically high stress environment without a safe and dependable relationship with their caregiver, the result can be very different. Healthy development can be affected, resulting in detrimental influences on learning, behaviour, well-being.

Getting to the heart of falls risk - CVD and musculoskeletal health

By Mr Abadi Gebre, Edith Cowan University

Around 33% of Australians aged 65 years and over fall each year, with one in five experiencing injuries such as fractures, eight days spent in hospital.

Falls can also cause psychological trauma, with a loss of confidence, resulting in self-imposed mobility restrictions and loss of functional independence to perform daily activities. This poses a significant challenge, highlighting an urgent need to address the growing burden of falls, particularly considering the ageing population.

Uncovering novel fall risk factors that allow for more effective and tailored prevention strategies. While transient events often associated with cardiovascular disease (CVD) such as hypertension, syncope and dizziness are among factors, atherosclerotic CVD is an underappreciated potential risk factor.

To address existing knowledge gaps, we conducted five studies. The majority using data from the Perth Longitudinal Study of Ageing in Women.

Structural measures of subclinical CVD: injurious falls

The primary cause of CVD is atherosclerosis, which begins early in life and progresses, for decades before cardiovascular symptoms appear. Atherosclerosis leads to structural and functional abnormalities in major arteries including abdominal aorta and carotid arteries, typical of subclinical CVD. Measures of subclinical CVD (eg, abdominal aortic calcification, associated with decline in muscle strength) - an independent fall risk factor - have been linked to injurious falls in older women.

We demonstrated for the first time that AAC, a marker of generalised atherosclerosis seen in more than 70% of older women, was linked to a 39% higher risk of injurious fall-related hospitalisation over 3.5 years. This is important because



routine osteoporosis screening undertaken for fracture risk reduction can also detect AAC and fall risk.

We also showed that AAC was related to a higher risk of fractures at multiple skeletal sites. The presence of fatty build-up in any of the carotid arteries, was also associated with a 44% higher risk of injurious falls in older women.

These two studies indicate the potential of subclinical atherosclerosis to provide a warning signal not only for CVD, but also for fall risk.

Subclinical CVD biomarkers: injurious falls

High-sensitivity cardiac troponin (hs-cTn) is a lower-cost and

shown to have a greater impact than one session alone. Focusing on the positive benefits of treatment and lifestyle changes has also been shown to lead to the greatest impact with patients.

Author competing interests: nil

References available on request. Author competing interests: the author was involved in the research described.

CLINICAL UPDATE

Key messages

- Falls are the primary cause of injury-related hospitalisations, leading to a substantial loss of functional independence in daily routines.
- Older women with CVD are previously unrecognized high fall risk population.
- Subclinical CVD may serve as a 'amber light' signalling a future risk of injurious falls, offering an opportunity for implementing early fall prevention interventions.

readily available marker of myocardial injury related to fatal and non-fatal CVD events. There were limited studies reporting an association between subclinical CVD biomarkers and falls, however we lacked evidence whether hs-cTn was linked to injurious falls.

For the first time, we demonstrated elevated subclinical related hospitalisation.

This suggests hs-cTn may serve not only as a biomarker for CVD, but also for injurious falls.

Clinical CVD: injurious falls

Although some cross-sectional studies reported the association between self-reported CVD and falls, there was limited evidence on whether CVD was related to injurious falls.

We found prevalent clinical CVD was associated with a 20% greater risk of fall-related hospitalisation, with a 53% higher risk of injurious falls. This indicates individuals with CVD are an under-recognized high fall risk population, warranting the need for consideration of cardiovascular health during fall assessment.

Our studies are not without limitations. Due to the observational nature of the studies, a causal relationship cannot be claimed. The studies were based on older individuals with CVD that they may have a higher fall risk and could benefit from undertaking fall screening. Currently limited clinical guidelines exist on the best approaches for fall prevention in individuals with CVD. However, there is a consensus on the need for tailored fall prevention strategies.

Recommendations include a comprehensive exercise program including aerobic, resistance, and challenging quieting smoking and adopting a diet rich in vegetables and fruits to help improve cardiovascular health and reduce fall risk.



New Core Members

We would like to welcome our new Core Members who joined us in 2023.



Dr Benjamin Parmenter

"My research program is pioneering understanding of the molecular, clinical and nutritional impacts of flavonoids in chronic disease prevention, with a focus on cardio-pulmonary disease"

"My research seeks to understand why and how cardiovascular disease increases the risk of falls and fracture with the ultimate goal of developing better ways to prevent this happening"



Dr Abadi Gebre



Dr Ros Sambell

"My research focusses on improving the food environment in childcare for better health & developmental outcomes in the first 2,000 days of life"

"As a qualitative methodologist, my research portfolio is punctuated by diverse public health topics, including those which reflect nutrition and health promotion agendas in the early childhood education and care sector."



Associate Professor Leesa Costello



NHIRI Advisory Board

We would like to thank our Advisory Board members who volunteer their time. Their skills and experience are invaluable and help support NHIRI in achieving its purpose and strategic performance.

Dr Gina Trapp
Head, Food and Nutrition,
Telethon Kids Institute



Dr Joe Kosterich
GP, Health Industry Consultant

Professor Robin Daly
Chair of Exercise and Aging,
Institute for Physical Activity and
Nutrition (IPAN), School of Exercise and
Nutrition Sciences, Deakin University



Professor Jason Wu
Program Head, Nutrition Science,
Food Policy, The George Institute for
Global Health

Professor Kadambot H.M Siddique
Chair and Director,
The UWA Institute of Agriculture,
The University of Western Australia



Angela Boothroyd
Community Member
Representative

Professor Kevin Croft
Senior Honorary Research Fellow
School of Biomedical Science,
The University of Western Australia



Professor Phillip Dolan
Adjunct Professor, La Trobe University

Professor Moira Clay
Moira Clay Consulting



Professor Peter Thompson
Cardiologist and Co-Director, The Heart
and Vascular Research Institute, Sir
Charles Gairdner Hospital

Pippa Grant,
Head of Health Programs, HBF Health



Rohan Prince
Director of Horticulture,
Department of Primary Industries
and Regional Development



Professor Carl Schultz
Consultant cardiologist, Royal Perth
Hospital and Associate Dean: Research,
Medical School, The University of
Western Australia

Core Team



**Prof
Jonathan Hodgson**



**A/Prof
Josh Lewis**



**Prof
Amanda Devine**



**Prof
David Suter**



**A/Prof
Therese O'Sullivan**



**A/Prof
Rae-Chi Huang**



**A/Prof
Leesa Costello**



**Dr
Catherine Bondonno**



**Dr
Marc Sim**



**Dr
Lauren Blekkenhorst**



**Dr
Nicola Bondonno**



**Dr
Liezhou Zhong**



**Dr
Zulqarnain Gilani**



**Dr
Mary Kennedy**



**Dr
Jack Dalla Via**



**Dr
Annie De Leo**



**Dr
Myles Murphy**



**Dr
Simone Radavelli-Bagatini**



**Dr
Cassandra Smith**



**Dr
Benjamin Parmenter**



**Dr
Abadi Gebre**



**Dr
Ros Sambell**



**Cheryl Croce
Strategic Initiatives &
Operations Manager**



**Bianca Lovi
Research Institute Officer**



Externally funded research projects active in 2023

Research Team	Project Title	Funding Scheme
Sim, M.	A novel machine-learning approach to reduce falls in older community-dwelling Australians	Department of Health WA, WA Near-miss Awards: Ideas
Newton, R., Christophersen, C.T., Galvao, D. A., Taaffe, D.R., Broadhurst, D.I., Hart, N. H., Devine, A., Spry, N.A.	An exploratory study to determine if exercise can impact the gut microbiota composition of men receiving androgen suppression therapy for prostate cancer	Prostate Cancer Foundation of Australia, Grant
Raynor, A., Scott, S., Costello, L.	An investigation into how physical activity can enrich the lives of older adults during the transition process from independent living to residential aged care	Fresh Fields Aged Care Pty Ltd, Scholarships to Support Industry Engagement PhD Projects
Christophersen, C.T., Grosse, C., Devine, A.	Application of a plant based diet in active Ulcerative Colitis (UC)	St John of God Health Care, Scholarships to support Industry Engagement PhD Projects
Lewis, J., Suter, D., Schousboe, J., Cootes, T., Prince, R., Harvey, N., Kiel, D., Islam, S.M.S	Automated methods for evaluating structural vascular disease	National Health and Medical Research Council, Ideas grants
Suter, D., Mehizadeh, M., Hiew, J., Vignarajan, J., Wood, F., Hamilton, E., Ritter, J., Goodred, C., Manning, L., McLeod, G., Hendrie, D., Gupta, A., Islam, S.M.S., O'Hanlon, S.-M., Gibson, D., Saha, S., Berghuber, A., Masek, M., Abu-Khalaf, J.M., Abela, B.	Better and faster than the human eye: artificial intelligence and computational radiomics for foot x-rays in patients with diabetes-related foot infections	Department of Health WA, Research Translation Projects
Barblett, L., Zarb, D., Costello, L.	Co-designing Playful Health-Arts	Healthway (WA Health Promotion Foundation), Healthy Communities Grant
Sim, M.G.B., Abbiss, C., Ciccone, N.A., Newton, R., Edwards, D., Cruickshank, T., Stanley, M.J., Boxall, K., Van Der Groen, O., Devine, A., Laws, S.	Develop a systematic profiling of neurological conditions that will facilitate personalised treatment and streamline service delivery	Multiple Sclerosis Society of Western Australia, MS WA - Research funding for social and applied research
Abu-Khalaf, J.M., Suter, D., Shitov, D.	Developing a Framework for Speech Recognition and understanding in digital learning contexts	Science and Industry Endowment Fund, SIEF - Ross Metcalf Stem Business Fellowship
Hodgson, J., Lewis, J., Devine, A., Schousboe, J., Woodman, R., Jackson, B., Dimmock, J.	Developing a novel approach to improve diet and lifestyle	National Health and Medical Research Council, MRFF Preventive and Public Health

Research Team	Project Title	Funding Scheme
Coole, M., Suter, D., Evans, D., Abu-Khalaf, J.	Development of a Risk Based Framework for Governance of Autonomous Weapons System	Department of Jobs, Tourism, Science and Innovation, Defence Science Research Higher Degree Student Grant
Gilani, S.Z., Carter, O., Markovic, C., von Mollendorf, D., Lloyd, A., Howard, Z., Hong, J.	Dynamic two-way communication using gestures for human-machine teaming	Department of Jobs, Tourism, Science and Innovation, Defence Science Collaborative Research Grants
Kennedy, M., Kirkegaard, A., Tuffaha, H., Ball, L.	Effective Exercise Implementation for the Future: Value assessment for sustainable translation of exercise oncology interventions	University of Queensland, 2023 BEL Connect Grant
Mills, B., Roberts, P., Ayre, K., Wallace, R., Costello, L., Rayfield, T.	Emotional Literacy Mindfulness Academy Research program evaluation	ELMA EDUCATION PTY LTD, Grant
Moses, E., Blangero, J., Brennecke, S., Beilin, L., Hui, J., Melton, P., Huang, R-C	Epigenetic Biomarker Discovery for Cardiovascular Disease Risk Stratification of Women Following Preeclampsia	National Health and Medical Research Council, Ideas grants
Byrne, M., Partington, G., Anderson, K., Shaw, T., Miller, M., Lester, L., Gower, G., Cross, D., Devine, A.	Evaluation of Foodbank WAs School Breakfast and Food Nutrition Program (01/2015FBWA)	Foodbank, Grant
Godrich, S., Devine, A.	Food Action Groups Project – Peel Region	Department of Primary Industries and Regional Development, Grant
Godrich, S., Humphreys, E., Zivkovic, S., Stoneham, M., Devine, A., Bernhagen, M.	Food Community: A systemic approach to support healthy food availability, access and use across regional Western Australia	Healthway (WA Health Promotion Foundation), Health Promotion Project Grant
Bondonno, C., Hodgson, J., Dimmock, J., Lewis, J., Schousboe, J., Whitehead, L., Sim, M.G-B, Dalla Via, J., Bondonno, N., Bucks, R., Sim, M., Schultz, C., Kennedy, M., Laws, S., Woodman, R.	Getting to the heart of healthy aging: a behaviour change program to promote dietary pattern changes	National Health and Medical Research Council, MRFF - Dementia, Ageing and Aged Care Mission
O'Sullivan, T., Webb, K., Richardson, A., Calogero, N., Sim, M., McDonald, E.	Happy Kids Through Connected Parenting	Channel 7 Telethon Trust, Grant
Giglia, R., Cooper, M., Binns, C., O'Sullivan, T., Silva, D., Moorhead, A.	Helping new mums to be better breastfeeders - before their babies are even born	Department of Health WA, Near Miss Merit Awards

Research Team	Project Title	Funding Scheme
O'Sullivan, T., Moorhead, A., Binns, C., Silva, D., Demirci, J.R., Cooper, M., Giglia, R.	Helping new mums to be better breastfeeders - before their babies are even born	Stan Perron Charitable Trust, New Child Health Research Grant
Devine, A., Marlowe, E.	Immunomodulation of the GIT through nutrition	Department of Health WA, Clinician Researcher Training Scholarship
Murphy, M., Lewis, J., McCaskie, C., Hart, N., Mosler, A.	Improving the health and performance of Western Australian Police Force recruits by developing an injury and physical performance surveillance system and quantifying the financial burden of injury	WA Police, Grant
Abbiss, C. Christophersen, C.T., Abbiss, H.J., Devine, A.	Influence of Enzyme Rich Malt Extract on gut health symptoms of irritable bowel syndrome and endurance exercise performance	Ateria Health Australia Pty Ltd, Grant
Lewis, J., Lim, W., Hodgson, J., Suter, D., Schousboe, J., Legendijk, A., Blekkenhorst, L., Bondonno, N., Gilani, S., Harvey, N., Kemp, J., Bondonno, C., Duncan, E., Smith, C., Hung, J., Sim, M., Schultz, C., Raina, P., Woodman, R.	Investigating genetic and lifestyle determinants of abdominal aortic calcification, and their relationship with cardiovascular disease	National Health and Medical Research Council, MRFF - Cardiovascular Health Mission
Devine, A., Marino, M., Lewis, J., Prince, R., Miller, M., Boston, J., Tay, G., Forlano, R., Hill, J.	Investing in your bones: supporting lifelong health and performance	Arthritis Foundation of WA, Grant
Huang, R-C.	Lifecycle – Early Life Stressors and LifeCycle Health	National Health and Medical Research Council, European Union Collaborative Research Grants
Sambell, R., Prideaux, S., Devine, A., Goodwin, S.	Local Eats	Healthway (WA Health Promotion Foundation), Healthy Communities Grant
Bloomfield, L.E., Westphal, D., Barwood, D.M., Miller, M.R., Boston, J., Howell, D., Andrew, L.J., Devine, A., Masek, M.	Meningococcal Infection, Awareness Prevention and Protection (Mlapp) – Improving and evaluating adolescent access to meningococcal education through the use of an app	Lotterywest, Grant
O'Sullivan, T., Jansen, E., Pulker, C., Pahlsson Morelius, A., Sim, M.	Mindful mouthfuls: Developing healthy eating behaviours from infancy	Royal Perth Hospital Medical Research Foundation, Springboard Grants
Bondonno, C.	Nitrate: the Dr. Jekyll and Mr. Hyde of human health?	Department of Health WA, WA Near-miss Awards: Ideas

Research Team	Project Title	Funding Scheme
Bondonno, C.	Pardon the vegetables: how nitrate source determines health impact	Department of Health WA, WA Near-miss Awards: Ideas
Bondonno, C., Christophersen, C., Hodgson, J., Bondonno, N., Schultz, C., Croft, K., Woodman, R.	Pardon the vegetables: how nitrate source determines health impact	Royal Perth Hospital Medical Research Foundation, Springboard Grants
Gowrea, A.M., Godrich, S., Sambell, R., Andrew, L.J., Devine, A., Masek, M., Trent, A.M.	Pathway to healthy food environments: a guide for local governments in Western Australia	Healthway (WA Health Promotion Foundation), Healthway - Grant
Lewis, J.	Perth Longitudinal Study of Ageing Women	Department of Health WA, Future Health Research and Innovation Fund - Biobank Interim Support Program 2021
Gilani, S., Lewis, J., Suter, D., Zhang, E., Rosenhahn, B., Abu-Khalaf, J.	Predicting falls in the elderly: A novel machine learning approach	Edith Cowan University, Australia-Germany JRC Scheme (UA-DAAD)
Murphy, M., Cochrane-Wilkie, J., Hart, N., Chivers, P., Allen, G., Sutton, V.	Predicting operational skill proficiency of para-military recruits using baseline physical performance data	Department of Jobs, Tourism, Science and Innovation, Defence Science Research Higher Degree Student Grant
Murphy, M., Nimphius, S.	Preventing injury and improving performance in National Basketball League (NBL) players	Perth Wildcats, Scholarships to support Industry Engagement PhD Project
Bellinge, J., Hillis, G., Schultz, C., Hodgson, J.	Prevention of Aortic Stenosis progression Phylloquinone Ossification Reduction Trial (PASSPORT)	Heart Foundation, NHF - Vanguard Grants
Murphy, M., Allen, G., Mosler, A.	Risk and protective factors for injury and occupational performance success in law enforcement recruits: a systematic review and meta-analysis	WA Police, Grant
Suter, D.	Tensor and Hypergraph Methods in Fitting Visual Data	Australian Research Council, Grant - Discovery Projects
Latino, C. Christophersen, C.T. Mehta, S., Gianatti, E., Devine, A., Lo, J.S.H.	The Effect of Dietary Resistant Starch on Maternal Glycaemia and the Gut Microbiome in Gestational Diabetes	Spinnaker Health Research Foundation, Edith Cowan University Spinnaker Explorers Grant
Devine, A.	The effectiveness of culturally competent resources in the WA Culturally and Linguistically Diverse (CALD) parent communities, to inform health behaviours	Nutrition Australia, Scholarships to support Industry Engagement PhD Projects

Research Team	Project Title	Funding Scheme
Murphy, M., Rio, E., D'Allesandro, P., Whife, C.	The efficacy of Transcranial direct current stimulation during rehabilitation following Anterior Cruciate Ligament (ACL) reconstruction on functional outcomes and return to play timelines. A double-blind randomised controlled trial (The TACL study)	Orthopaedic Research Foundation of WA, Grant
Cruickshank, T., Ciccone, N.A., Blacker, D., Stanley, M.J., Turner, M., Van Der Groen, O.L., Learmonth, Y., Bartlett, D.M., Devine, A., Laws, S., Lo, J.S.H.	The feasibility and therapeutic utility of a 12-week telehealth delivered environmental enrichment program for young stroke survivors experiencing cognitive impairment	Perron Institute for Neurological and Translational Science, Neurotrauma Research Program
Doleman, G., Duffield, C., De Leo, A., Bloxome, D.	The impact of the COVID-19 health pandemic on junior doctors and nurses' workloads - sub project of G1001207	Sir Charles Gairdner Hospital, Grant
Zhong, L.	Three-dimensional fruit and vegetable-based texture modified food printing in Australian residential aged care: A proof-of-concept study	Department of Health WA, WA Near-miss Awards: Ideas
Nimphius, S., Kendall, K., Cikoratic, T., Hart, N., Murphy, M.	Understanding bone health in AFL and AFLW athletes	West Coast Eagles Football Club, PhD Scholarship
Radavelli-Bagatini, S.	Understanding the barriers and motivators for consumption of fruit and vegetables in women post-stroke: a focus groups from patients and carers perspective	Australian Health Research Alliance, Women's Health Research Translation Network Early and Mid-Career Researcher Award
Kennedy, M.	Value-based assessment and cost-effectiveness analysis of two models of exercise oncology implementation	Exercise & Sports Science Australia, ESSA Research Grants 2023
Galvao, D.A., Hayne, D., Newton, R., Joseph, D., Tang, C., Taaffe, D.R., Chambers, S., Devine, A., Lopez Da Cruz, P., Spry, N.A.	Weight loss for overweight and obese prostate cancer patients: a randomised trial of a clinic-based versus telehealth delivered exercise and nutrition intervention	Cancer Council of WA Inc, Prostate Cancer Research Initiative
Murphy, M., Mosler, A., Chivers, P., Sutton, V.	Western Australia Police Force Recruit Injury Rates, Physical Performance Capacity and Completion Rates	WA Police, Grant
Cattani, M., Farr-Wharton, B., Oosthuizen, J., M, Sim, M.G-B., Doherty, S., Selleck, R., Devine, A., Bhullar, N., Bentley, T., Coall, D.,	What is the role of the safety Regulator in suicides?	Department of Mines, Industry Regulation and Safety, Grant



2023 Publications



NHIRI has year-on-year increased the volume of quality research recognised nationally and internationally for excellence.

108 Q1 Publications 	66 Publications with NHIRI Core or HDR First or Last author 	81 Publications with International Co-Author 	33 Publications with HDR Co-Author 
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No.	Article	Q1	Impact Factor
1	Andrew, L., Barwood, D., Boston, J., Masek, M., Bloomfield, L., & Devine, A. (2023). Serious games for health promotion in adolescents – a systematic scoping review. <i>Education and Information Technologies</i> , 28(5), 5519-5550. https://doi.org/10.1007/s10639-022-11414-9 .	*	5.500
2	Andrew, L., Robinson, K., Dare, J., & Costello, L. (2023). Nursing students doing gender: Implications for higher education and the nursing profession. <i>Nursing Inquiry</i> , 30, e12516. https://doi.org/10.1111/nin.12516	*	2.300
3	Anokye, R., Jackson, B., Dimmock, J., Dickson, J. M., Blekkenhorst, L. C., Hodgson, J. M., Lewis, J. R., & Stanley, M. (2023). Psychological distress and quality of life in asymptomatic adults following provision of imaging results for prevention of cardiovascular disease events: a scoping review. <i>Eur J Cardiovasc Nurs</i> , 22(1), 13-22. https://doi.org/10.1093/eurjcn/zvac047	*	2.900
4	Anokye, R., Jackson, B., Dimmock, J., Dickson, J. M., Kennedy, M. A., Schultz, C. J., Blekkenhorst, L. C., Hodgson, J. M., Stanley, M., & Lewis, J. R. (2023). Impact of vascular screening interventions on perceived threat, efficacy beliefs and behavioural intentions: a systematic narrative review. <i>Health Promotion International</i> , 38(3). https://doi.org/10.1093/heapro/daad040 .	*	2.700
5	Attwell, C., McKay, A., Sim, M., Dugan, C., Nicholas, J., Hopper, L., & Peeling, P. (2023). Timing is everything, but does it really matter? Impact of 8-weeks morning versus evening iron supplementation in ballet and contemporary dancers. <i>European Journal of Sport Science</i> , 1-18. https://doi.org/10.1080/17461391.2023.2224285 .	*	3.200
6	Baguley, B. J., Dalla Via, J., Fraser, S. F., Daly, R. M., & Kiss, N. (2023). Effectiveness of combined nutrition and exercise interventions on body weight, lean mass, and fat mass in adults diagnosed with cancer: a systematic review and meta-analysis. <i>Nutr Rev</i> , 81(6), 625-646. https://doi.org/10.1093/nutrit/nuac079	*	6.100
7	Balfour, D., Melton, P. E., McVeigh, J. A., Huang, R. C., Eastwood, P. R., Wanstall, S., Reynolds, A. C., & Cohen-Woods, S. (2023). Childhood sleep health and epigenetic age acceleration in late adolescence: Cross-sectional and longitudinal analyses. <i>Acta Paediatr</i> . https://doi.org/10.1111/apa.16719 .	*	3.800
8	Bauer, C., Sim, M., Prince, R. L., Zhu, K., Lim, E. M., Byrnes, E., Pavlos, N., Lim, W. H., Wong, G., Lewis, J. R., & Levinger, I. (2023). Circulating lipocalin-2 and features of metabolic syndrome in community-dwelling older women: A cross-sectional study [Article]. <i>Bone</i> , 176, Article 116861. https://doi.org/10.1016/j.bone.2023.116861	*	4.100
9	Bills, K., Costello, L., & Cattani, M. (2023). Major aviation accident investigation methodologies used by ITSA members. <i>Safety Science</i> , 168, 106315. https://doi.org/https://doi.org/10.1016/j.ssci.2023.106315	*	6.100
10	Bills, K., Costello, L., & Cattani, M. (2023). Barry Turner: The Under-Acknowledged Safety Pioneer [Review]. <i>Safety</i> , 9(4), Article 68. https://doi.org/10.3390/safety9040068		1.900
11	Bondonno, C. P., Zhong, L., Bondonno, N. P., Sim, M., Blekkenhorst, L. C., Liu, A., Rajendra, A., Pokharel, P., Erichsen, D. W., Neubauer, O., Croft, K. D., & Hodgson, J. M. (2023). Nitrate: The Dr. Jekyll and Mr. Hyde of human health? <i>Trends in Food Science & Technology</i> , 135, 57-73. https://doi.org/https://doi.org/10.1016/j.tifs.2023.03.014	*	15.300

12	Bondonno, N. P., Liu, Y. L., Zheng, Y., Ivey, K., Willett, W. C., Stampfer, M. J., Rimm, E. B., & Cassidy, A. (2023). Change in habitual intakes of flavonoid-rich foods and mortality in US males and females. <i>BMC Med</i> , 21(1), 181. https://doi.org/10.1186/s12916-023-02873-z .	*	9.300
13	Cadman, T., Elhakeem, A., Vinther, J. L., Avraam, D., Carrasco, P., Calas, L., Cardo, M., Charles, M. A., Corpeleijn, E., Crozier, S., de Castro, M., Estarlich, M., Fernandes, A., Fossatti, S., Gruszfeld, D., Gurlich, K., Grote, V., Haakma, S., Harris, J. R., Heude, B., Huang, R. C., Ibarluzea, J., Inskip, H., Jaddoe, V., Koletzko, B., Luque, V., Manios, Y., Moirano, G., Moschonis, G., Nader, J., Nieuwenhuijsen, M., Andersen, A. N., McEachen, R., de Moira, A. P., Popovic, M., Roumeliotaki, T., Salika, T., Marina, L. S., Santos, S., Serbert, S., Tzorovili, E., Vafeiadi, M., Verduci, E., Vrijheid, M., Vrijkotte, T. G. M., Welten, M., Wright, J., Yang, T. C., Zugna, D., & Lawlor, D. (2023). Associations of Maternal Educational Level, Proximity to Greenspace During Pregnancy, and Gestational Diabetes With Body Mass Index From Infancy to Early Adulthood: A Proof-of-Concept Federated Analysis in 18 Birth Cohorts. <i>Am J Epidemiol</i> . https://doi.org/10.1093/aje/kwad206	*	5.000
14	Castañeda, J., Gil-Lespinard, M., Almanza-Aguilera, E., Llahá, F., Gómez, J.-H., Bondonno, N., Tjønneland, A., Overvad, K., Katzke, V., Schulze, M. B., Masala, G., Agnoli, C., Santucci de Magistris, M., Tumino, R., Sacerdote, C., Skeie, G., Brustad, M., Lasheras, C., Molina-Montes, E., Chirlaque, M.-D., Barricarte, A., Sonestedt, E., da Silva, M., Johansson, I., Hultdin, J., May, A. M., Forouhi, N. G., Heath, A. K., Freisling, H., Weiderpass, E., Scalbert, A., & Zamora-Ros, R. (2023). Association between classes and subclasses of polyphenol intake and 5-year body weight changes in the EPIC-PANACEA study. <i>Obesity</i> , 31(4), 1146-1158. https://doi.org/https://doi.org/10.1002/oby.23689	*	6.900
15	Choo, J. M., Murphy, K. J., Wade, A. T., Wang, Y., Bracci, E. L., Davis, C. R., Dyer, K. A., Woodman, R. J., Hodgson, J. M., & Rogers, G. B. (2023). Interactions between Mediterranean Diet Supplemented with Dairy Foods and the Gut Microbiota Influence Cardiovascular Health in an Australian Population. <i>Nutrients</i> , 15(16). https://doi.org/10.3390/nu15163645	*	5.900
16	Choudhary, P., Monasso, G. S., Karhunen, V., Ronkainen, J., Mancano, G., Howe, C. G., Niu, Z., Zeng, X., Guan, W., Dou, J., Feinberg, J. I., Mordaunt, C., Pesce, G., Baiz, N., Alfano, R., Martens, D. S., Wang, C., Isaevska, E., Keikkala, E., Mustaniemi, S., Thio, C. H. L., Fraszczyk, E., Tobi, E. W., Starling, A. P., Cosin-Tomas, M., Urquiza, J., Röder, S., Hoang, T. T., Page, C., Jima, D. D., House, J. S., Maguire, R. L., Ott, R., Pawlow, X., Sirignano, L., Zillich, L., Malmberg, A., Rauschert, S., Melton, P., Gong, T., Karlsson, R., Fore, R., Perng, W., Laubach, Z. M., Czamara, D., Sharp, G., Breton, C. V., Schisterman, E., Yeung, E., Mumford, S. L., Fallin, M. D., LaSalle, J. M., Schmidt, R. J., Bakulski, K. M., Annesi-Maesano, I., Heude, B., Nawrot, T. S., Plusquin, M., Ghantous, A., Herceg, Z., Nisticò, L., Vafeiadi, M., Kogevinas, M., Vääräsmäki, M., Kajantie, E., Snieder, H., Corpeleijn, E., Steegers-Theunissen, R. P. M., Yang, I. V., Dabelea, D., Fossati, S., Zenclussen, A. C., Herberth, G., Magnus, M., Håberg, S. E., London, S. J., Munthe-Kaas, M. C., Murphy, S. K., Hoyo, C., Ziegler, A. G., Hummel, S., Witt, S. H., Streit, F., Frank, J., Räikkönen, K., Lahti, J., Huang, R. C., Almqvist, C., Hivert, M. F., Jaddoe, V. W. V., Järvelin, M. R., Kantomaa, M., Felix, J. F., & Sebert, S. (2023). Maternal educational attainment in pregnancy and epigenome-wide DNA methylation changes in the offspring from birth until adolescence. <i>Mol Psychiatry</i> . https://doi.org/10.1038/s41380-023-02331-5	*	11.000
17	Chuah, W., Tennakoon, R., Hoseinnezhad, R., Suter, D., & Hadiashar, A. B. (2023). An Information-Theoretic Method to Automatic Shortcut Avoidance and Domain Generalization for Dense Prediction Tasks [Article]. <i>IEEE Transactions on Pattern Analysis and Machine Intelligence</i> , 1-18. https://doi.org/10.1109/TPAMI.2023.3268640 .	*	23.600
18	Clark, J. S., Dyer, K. A., Davis, C. R., Shivappa, N., Hébert, J. R., Woodman, R., Hodgson, J. M., & Murphy, K. J. (2023). Adherence to a Mediterranean Diet for 6 Months Improves the Dietary Inflammatory Index in a Western Population: Results from the MedLey Study. <i>Nutrients</i> , 15(2). https://doi.org/10.3390/nu15020366	*	5.900
19	Coventry, M., Timler, A., Mosler, A. B., Russell, K., Travers, M., Mitchell, L. OAM., & Murphy, M. C. (2023). "I lied a little bit." A qualitative study exploring the perspectives of elite Australian athletes on self-reported data. <i>Physical Therapy in Sport</i> , 60, 91-97. https://doi.org/https://doi.org/10.1016/j.ptsp.2023.01.009	*	2.400
20	Cox, D. N., Campbell, K. J., Cobiac, L., Gardner, C., Hancock, L., Hendrie, G. A., Kelaart, A., Lausen, M., Poelman, A. A., Sambell, R., Tikellis, K. M., & Wiggins, B. (2023). Working together to increase Australian children's liking of vegetables: a position statement by the Vegetable Intake Strategic Alliance (VISA). <i>Public health nutrition</i> , 1-5. Advance online publication. https://doi.org/10.1017/S1368980023001398		3.200
21	Coyle, D. H., Sanavio, L., Barrett, E., Huang, L., Law, K. K., Nanayakkara, P., Hodgson, J. M., O'Connell, M., Meggitt, B., Tsai, C., Pettigrew, S., & Wu, J. H. Y. (2023). A Cross-Sectional Evaluation of the Food Environment at an Australian University Campus. <i>Nutrients</i> , 15(7). https://doi.org/10.3390/nu15071623 .	*	5.900
22	Cuffe, C., Giglia, R., Cooper, M. N., Hill, J., Silva, D., Moorhead, A. M., Verhasselt, V., Lewis, J. R., Ireson, D., Demirci, J. R., Cotte, T., Webb, K., Patey, F., & O'Sullivan, T. A. (2023). Study Protocol for a Stepped-Wedge Cluster (Nested) Randomized Controlled Trial of Antenatal Colostrum Expression (ACE) Instruction in First-Time Mothers: The ACE Study. <i>J Hum Lact</i> , 8903344231215074. https://doi.org/10.1177/08903344231215074		2.600
23	Dalla Via, J., Gebre, A. K., Smith, C., Gilani, Z., Suter, D., Sharif, N., Szulc, P., Schousboe, J. T., Kiel, D. P., Zhu, K., Leslie, W. D., Prince, R. L., Lewis, J. R., & Sim, M. (2023). Machine-learning assessed abdominal aortic calcification is associated with long-term fall and fracture risk in community-dwelling older Australian women. <i>J Bone Miner Res</i> . https://doi.org/10.1002/jbmr.4921	*	6.200

24	Dalla Via, J., Stewart, N., Kennedy, M. A., Cehic, D. A., Purnell, P., Toohey, J., Morton, J., Ramchand, S. K., Lewis, J. R., & Zissiadis, Y. (2023). Protocol: Can coronary artery calcium score identified on thoracic planning CT scans be used and actioned to identify cancer survivors at high risk of cardiac events: A feasibility study in cancer survivors undergoing radiotherapy in Australia [Article]. <i>BMJ Open</i> , 13(7), Article e072376. https://doi.org/10.1136/bmjopen-2023-072376	*	2.900
25	de Crom, T. O. E., Blekkenhorst, L., Vernooij, M. W., Ikram, M. K., Voortman, T., & Ikram, M. A. (2023). Dietary nitrate intake in relation to the risk of dementia and imaging markers of vascular brain health: a population-based study [Article]. <i>American Journal of Clinical Nutrition</i> , 118(2), 352-359. https://doi.org/10.1016/j.ajcnut.2023.05.027	*	7.100
26	De Leo, A., Bloxsome, D., & Bayes, S. (2023). Approaches to clinical guideline development in healthcare: a scoping review and document analysis. <i>BMC Health Services Research</i> , 23(1), 37. https://doi.org/10.1186/s12913-022-08975-3	*	2.800
27	Demirci, J. R., Glasser, M., Bogen, D. L., Sereika, S. M., Ren, D., Ray, K., Bodnar, L. M., O'Sullivan, T. A., & Himes, K. (2023). Effect of antenatal milk expression education on lactation outcomes in birthing people with pre-pregnancy body mass index ≥ 25 : protocol for a randomized, controlled trial. <i>Int Breastfeed J</i> , 18(1), 16. https://doi.org/10.1186/s13006-023-00552-6 .	*	3.500
28	Dent, E., Hanlon, P., Sim, M., Jylhävä, J., Liu, Z., Vetrano, D. L., Stolz, E., Pérez-Zepeda, M. U., Crabtree, D., Nicholson, C., Job, J., Ambagtsheer, R. C., Ward, P. R., Shi, S. M., Huynh, Q., & Hoogendijk, E. O. (2023). Recent developments in frailty identification, management, risk factors and prevention: A narrative review of leading journals in geriatrics and gerontology. <i>Ageing Res Rev</i> , 91, 102082. https://doi.org/10.1016/j.arr.2023.102082	*	13.100
29	Doleman, G., De Leo, A., & Bloxsome, D. (2023). The impact of pandemics on healthcare providers' workloads: A scoping review. <i>Journal of Advanced Nursing</i> , 79, 4434-4454. https://doi.org/10.1111/jan.15690	*	3.800
30	Dupuy, M., Radavelli-Bagatini, S., Zhong, L., Dalla Via, J., Zhu, K., Blekkenhorst, L. C., Bondonno, N. P., Linneberg, A., Bellinge, J. W., Schultz, C., Courtney, W., Prince, R. L., Hodgson, J. M., Lewis, J. R., & Sim, M. (2023). Vitamin K1 intake is associated with lower risk for all-cause and cardiovascular disease mortality in community-dwelling older Australian women. <i>Nutrition, metabolism, and cardiovascular diseases : NMCD</i> , S0939-4753(23)00501-X. Advance online publication. https://doi.org/10.1016/j.numecd.2023.12.007	*	3.900
31	Fayyazifar, N., Dwivedi, G., Suter, D., Ahderom, S., Maiorana, A., Clarkin, O., Balamane, S., Saha, N., King, B., Green, MS., Golian, M., Chow, B. J. (2023). A Novel Convolutional Neural Network Structure For Differential Diagnosis Of Wide Qrs Complex Tachycardia. <i>Biomedical Signal Processing and Control</i> , 81(article in press), article number 104506. https://doi.org/10.1016/j.bspc.2022.104506 .	*	5.100
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Contact us

Email: nhiri@ecu.edu.au

Telephone: (+61 8) 6304 6781