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Building health workforce capacity in Northern Australia

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ABSTRACT

The Menzies Ramaciotti Regional and Remote Health Sciences Training Centre (Menzies-Ramaciotti Centre) is located within the Menzies School of Health Research (Menzies) in Darwin, Northern Territory (NT). The Menzies-Ramaciotti Centre is contributing to the development of a local health workforce in the NT, including a strong biomedical workforce. The Centre facilitates health workforce career progression for regional and remote youth, with a focus on career development for Aboriginal and Torres Strait Islander (First Nations) youth. The Centre works in collaboration with a range of industry and education partners, who also have strong workforce development goals and a commitment to serving a vital community need to build pathways into work and study with First Nations peoples. Part of the Centre's focus entails delivery of high-quality training in biomedical sciences, including theoretical and practical skill development in microbiology, laboratory techniques, immunology, public health, data science, allied health, and health research. The Centre uses a non-linear, strengths-based approach to training with a multiplicity of entry and exit points including high school work experience placements, traineeships, vocational placements, as well as undergraduate and postgraduate placements.

Keywords: Aboriginal and Torres Strait Islander health, biomedical, capacity building, First Nations, health sciences, northern Australia, regional, remote.

The need for a dedicated health sciences training centre

The widely dispersed First Nations students of the Northern Territory (NT) have a hunger for Science, Technology, Engineering, the Arts, and Mathematics (STEAM) but have the fewest opportunities. In the NT, almost half of the population live in areas classified as remote or very remote.^{1,2} In remote and very remote areas of the NT, hurdles to education and training can be exacerbated by distance and significant socio-economic disparities. Approximately 57% of NT youth complete high school.³ Low high school completion rates lead to limited numbers of young people entering health and biomedical science pathways, training, and employment opportunities.

As more than one-quarter of the NT population comprises First Nations people,⁴ strategies to address barriers to education and training must have a focus on enabling First Nations participation, engagement, and leadership. In regional, remote, and very remote parts of the NT, communities are reliant on a costly, fly-in fly-out (FIFO) health workforce model⁵ that fails to develop essential capacities within the communities they serve. The Menzies-Ramaciotti Centre aims to simultaneously address this local workforce shortage, provide opportunities to those experiencing the greatest need, and tackle the underrepresentation of First Nations people in the health workforce.

The Menzies-Ramaciotti Centre

The Menzies-Ramaciotti Centre was established in 2020 and is based in Darwin, NT within the Menzies School of Health Research. The Centre logo (Fig. 1), titled 'Turtle on a Journey,' was created by two Australian First Nations people, a former Centre student and now graduate nurse, Zoe Fitzpatrick (Yanyuwa, Garrwa, Wambya and Wanyi woman) and Co-lead of the Centre, Mark Mayo (Mudburra and Mabuig man). The turtle

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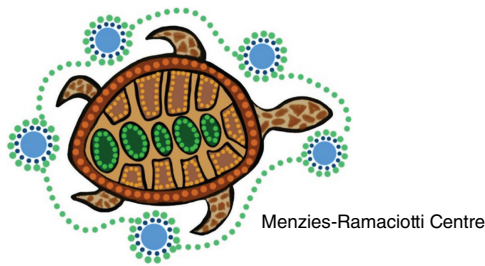
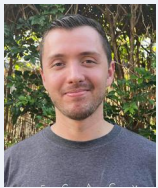


Fig. 1. Menzies-Ramaciotti Centre logo. Titled 'Turtle on a Journey', 2020, by Zoe Fitzpatrick and Mark Mayo.

is depicted on its journey through the sea, representing the journey we all take through life. The lines connecting the circles signify the connections between people, and the way they support and protect the individual on their journey. The Centre is guided by overarching values of equity, reciprocity, self-determination, mutual support, and trust; these values are represented as the shapes on the back of the turtle.

Student in focus



Brandon Turner

Brandon is an Aboriginal man from the Larrakia Nation in the NT with a Bachelor of Science, majoring in Biomedical Science at Charles Darwin University. He commenced with the Centre in 2021, completing a Hot North Vocational placement. He is currently undertaking the Doctor of Medicine at Flinders University while working part-time at Menzies.

The co-leadership model

The Menzies-Ramaciotti Centre has a shared leadership model with four Co-leads, Mark Mayo, Associate Professor Heidi Smith-Vaughan, Dr Robyn Marsh, and Dr Kalinda Griffiths who have worked together to build local health workforce capacity in the NT since the early 1990s. This shared leadership model enables innovative development of the Centre through the Co-leads combined research, teaching and supervisory experience. In this way, youth benefit from decades of mentorship and strategic development of pathways into careers in health that leverages access to networks across health research institutes, the higher education sector, and other partner organisations. Two of the Co-leads began their careers as First Nations laboratory trainees and are now nationally and internationally recognised leaders in their fields of research. This outcome was achieved because of the dedicated mentorship and training they received at Menzies (Fig. 2).

Mr Mark Mayo is a local Darwin man of Aboriginal and Torres Strait Islander (Mabuiag) heritage whose great grandmother Yrambul Nungarai, or Polly Warrumbul, was a Mudburra woman from Wave Hill, NT. Mr Mayo began his



Fig. 2. Program Manager Michael Johnston, Trainee Royce Ramsamy, Laboratory Trainer Kelly McCrory, Co-lead Mark Mayo, Undergraduate Trainee Jayde Hopkins, Co-lead Dr Kalinda Griffiths, and Trainee Porsche Cahill at Menzies.



Fig. 3. Trainee Porsche Cahill and Co-lead Mark Mayo in the laboratory.

career at Menzies in 1992 as a First Nations biomedical laboratory trainee, completed his Bachelor of Science at CDU and now 30 years later is the Associate Deputy Director, Indigenous Leadership and Engagement at Menzies, as well as Senior Researcher and Program Manager for the Melioidosis Program (Fig. 3).

Associate Professor Heidi Smith-Vaughan is an Associate Director at Menzies where she has researched for 32 years. She is a microbiologist passionate about growing the next generation of biomedical scientists, and particularly building capability across the region among those with less opportunity.

Dr Robyn Marsh has a Bachelor of Applied Science (Medical Laboratory Science), Master of Science by Research and PhD in microbiology. Her research program supports foundational laboratory training opportunities for NT youth, with an additional focus on growing local bioinformatic capacity.

Dr Kalinda Griffiths commenced at Menzies in 1997 as a First Nations biomedical laboratory trainee and is now a post-doctoral epidemiologist at the Centre for Big Data Research in Health at the University of New South Wales, holding honorary positions at Menzies School of Health Research and the University of Melbourne. Dr Griffiths' work is focused on Indigenous data governance and the



Fig. 4. Laboratory Trainer Kelly McCrory and Co-lead Dr Kalinda Griffiths working in the laboratory.

measurement of population level health inequities, with a particular interest in cancer care and outcomes (Fig. 4).

Student in focus



Helena Warria

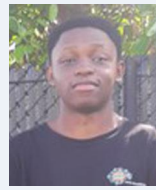
Helena, a Tiwi and Torres Strait Islander woman, is an Edwina Menzies and Ian Albrey training scholarship recipient at the Menzies-Ramaciotti Centre currently undertaking an Undergraduate Certificate in Biomedical Science. Helena moved to Darwin from the Tiwi Islands in January 2022. After developing an interest in medical science, she decided to apply for a position at Menzies to commence her career.

Who we work with

The Menzies-Ramaciotti Centre builds on existing training programs within the NT by partnering with significant stakeholders in health, including Royal Darwin Hospital (RDH), Charles Darwin University (CDU), Indigenous Allied Health Australia (IAHA), and NT schools. These collaborative partners provide the Centre opportunities to engage high school students in regional and remote areas to enable transitions into career pathways that lead to work and study in health and biomedical sciences.

The Menzies-Ramaciotti Centre works across Menzies School of Health Research divisions and programs such as the Biyamarr ma Traineeship Program and HealthLAB, a remote youth engagement and health promotion program led by Associate Professor Heidi Smith-Vaughan. HealthLAB travels throughout regional and remote NT to provide hands-on health education activities and information to school aged youth. Similarly, CDU and IAHA enable First Nations youth transitions from school into work or study in health sciences through targeted support and programs such as IAHA's National Aboriginal and Torres Strait Islander Health Academy and CDU's Bidjipidji School Camp program.

Student in focus



Nyasha Majoni

Nyasha is an 18-year-old Zimbabwean. In 2008 he and his family ventured to Darwin. After completing vocational training in laboratory sciences with the Menzies-Ramaciotti Centre, he commenced working on an ear disease project at Menzies. Nyasha has the long-term goal of studying medicine and working in health.

Training pathways

The Centre aims to provide opportunities to those who experience some of the greatest socio-economic disparities in Australia. It empowers and promotes the social and economic inclusion of those who experience exclusion from mainstream educational and employment opportunities. This includes those living in regional and remote areas, young parents, refugees, new migrants, people who are differently abled, those who are culturally and linguistically diverse, and those who may experience compounding factors at the intersection of race, class, responsibility, gender, sexual orientation, age, and ability. All these factors can impact opportunities.

We provide opportunities by offering entry into training that does not rely on the usual metrics (e.g. tertiary entrance scores) but rather on a hunger to learn, where vocational experiences are tailored to the individual needs of students. Our Centre also offers entry points that align with each individual's interests and prior experiences, so that training builds on existing strengths and enables youth to excel. Each First Nations student is given the opportunity to be paired with a mentor or supervisor who is First Nations themselves, to ensure that training can occur in a safe learning environment, where students' worldviews are reflected in the content and means by which they learn.

Student in focus



Porsche Cahill

Porsche is a First Nations woman who completed a Certificate III in Allied Health Assistance during her schooling through the IAHA NT Aboriginal Health Academy, which included a placement with the Menzies-Ramaciotti Centre. She is currently completing a Certificate III in Laboratory Skills through the Menzies-Ramaciotti Centre and the Biyamarr ma Traineeship Program. Porsche has grown to love working in the lab.

Laboratory training

Creating an industry-ready biomedical and health workforce relies on access to state-of-the-art laboratories. We are active in teaching laboratory skills to local, national, and international students. Our laboratory-based biomedical training

includes, but is not limited to, microbiology, immunology (including cell and tissue work), molecular biology, genomics, metagenomics, microbiomics, and bioinformatics. Students also undertake training in Good Clinical Laboratory Practice and clinical trials.

Our laboratory training program extends from introductory laboratory methods for high school students through to skills development in contemporary industry-relevant technologies including real-time PCR and matrix-assisted laser desorption/ionisation-time of flight (MALDI-TOF). All students participating in our laboratory training program learn fundamental skills that have high transferability across multiple industry contexts. We provide structured workplace learning for students prior to future study or those beginning their studies, enabling students to develop confidence in navigating the laboratory and higher education environments.

Student in focus



Shenea Tipungwuti-Edwards

Shenea is a proud Aboriginal woman from Tiwi and Burarra who grew up on Kunwinjku country in a community called Gunbalanya. She is currently working at Menzies through the Menzies-Ramaciotti Centre and Biyamarr ma Traineeship Program as a laboratory trainee. Throughout her traineeship she hopes to become exposed to different work areas within health research. Medicine has always been a passion for Shenea, and she would like to pursue a career within that path.

Student engagement and future directions

Since the establishment of the Menzies-Ramaciotti Centre in 2020, we have trained 20 work experience students, 27 certificate level trainees, 18 vocational placement students, and 15 undergraduate students have received ongoing support for up to 2.5 years to date. In addition, through our partnership with Menzies HealthLAB we have engaged 3479 regional and remote youth through health promotion activities and science outreach activities.

The next phase of this program is to refine the transferable and adaptive health sciences training model so that it can be implemented across jurisdictions within the nation,

considering local needs and contexts. We are in the process of conducting an evaluation of the Centre's work to date and will identify barriers and enablers to youth completing and progressing through training pathways. The evaluation will develop a set of evidence-based recommendations and processes that can be used at the national level to implement training pathways for regional and remote youth so that our approach can be shared and replicated.

Regional and remote northern Australia suffers from a chronic health workforce shortage and rapid staff turnover. At the same time, the NT has rich, untapped potential in young people who are both underserved and culturally capable to meet the health needs of the region. We welcome potential collaborators and funders to join us on the next stage of our journey to share opportunities in health workforce pathways, which would be impossible to accomplish on our own.

Student in focus



Royce Ramsamy

Royce is an Aboriginal and Torres Strait Islander man from Cairns who applied for a position in the Biyamarr ma Traineeship Program shortly after finishing school in Darwin. He is now completing a Certificate III in Laboratory Skills with the Menzies-Ramaciotti Centre and Biyamarr ma team at Menzies School of Health Research.

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Data availability. Data sharing is not applicable as no new data were generated or analysed during this study.

Conflicts of interest. The authors declare no conflicts of interest.

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Biographies



Michael Johnston is a senior research officer and program manager with the Ramaciotti Regional and Remote Health Sciences Training Centre (Menzies-Ramaciotti Centre), based at Menzies School of Health Research in Darwin, Northern Territory (NT). The Menzies-Ramaciotti Centre is developing a local and Aboriginal and Torres Strait Islander health sciences workforce in the NT.

Following the completion of a combined Bachelor of Arts and Bachelor of Secondary Education and a Master of Human Rights in 2016 and 2019, Michael worked for the University of Sydney, the University of New South Wales, and the Tiwi Islands Regional Council in service of Aboriginal and Torres Strait Islander-led programs. Michael is a non-Indigenous person. Michael brings together his experience as a teacher, education designer, grants and policy officer, as well as a complex systems approach to address structural inequality in educational opportunities in Australia. In his current role, Michael takes an interdisciplinary approach to facilitating educational and career development opportunities with NT youth engaged in science, technology, engineering, the arts, and mathematics (STEAM).



Associate Professor Heidi Smith-Vaughan is Associate Director for Research (HDR and Ethics), Head of HealthLAB, and Co-lead of the Menzies-Ramaciotti Centre. She is an investigator on clinical trials of the efficacy of vaccines and antibiotics for carriage, otitis media and suppurative lung disease in Australia and countries in the region. She also leads government and philanthropy funded outreach and

health education programs. Heidi has a strong record in training and mentoring. She supports scientists in Vietnam, Papua New Guinea and Timor Leste in a range of in-country projects, and has a growing program of training for scientists in disadvantaged regions. In 2014 she co-founded the Menzies HealthLAB with Associate Professor Sue Sayers (deceased). She continues to lead this immersive, interactive community health education initiative which travels around the Northern Territory delivering interactive health promotion with > 13 000 participants to date.

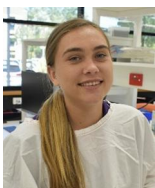


Sophie Bowman-Derrick is a veterinarian. In 2019, she completed the Master of Philosophy (Applied Epidemiology) through the Australian National University, with her thesis focused on antimicrobial resistance. Sophie is currently completing the Doctor of Medicine through Flinders University's NT Medical Program and intends to train as a rural general practitioner. Alongside her

studies, Sophie provides administrative and executive support for the Menzies-Ramaciotti Centre.



Jayde Hopkins is a proud Gurindji and Woolwonga woman from Darwin. She is currently completing her undergraduate degree in Biological Sciences at La Trobe University. She is fascinated by microbiology and genetics and hopes to become an infectious disease researcher. Jayde is currently working at the Menzies-Ramaciotti Centre as a project assistant, artist-in-residence, and peer trainer.



Kelly McCrory first started her journey at Menzies in late 2016 as a work experience student with the Melioidosis team. Her main role in the team is environmental work. The opportunity to get hands on experience in and outside of the lab sparked her interest in pursuing a career in environmental science. Kelly currently works as a Menzies-Ramaciotti Centre peer trainer, develop-

ing and delivering laboratory training. She commenced a Bachelor of Environmental Science degree in 2020 after completing a tertiary enabling program (an alternative pathway into university).



Raelene Collins is a Kuku Yalanji and Garawirtjia woman who grew up in Darwin. She is currently undertaking a Bachelor of Nursing degree at Charles Darwin University. Raelene completed a Certificate III in Laboratory Skills in 2019, currently works as a Menzies-Ramaciotti peer trainer, and develops health promotion resources.



Dr Robyn Marsh is a Senior Research Fellow in the Child Health Division of Menzies School of Health Research, Darwin, Australia where she leads the Paediatric Respiratory Microbiome Program. She is one of the Centre's Co-leads and is an Associate Investigator of the Centre for Research Excellence in Bronchiectasis in Children (<https://www.crelungs.org.au/>). She is

a current Rebecca L Cooper AI and Val Rosenstrauss Fellow and a previous NHMRC Frank Fenner Fellow (2011). Her research focuses on microbiological drivers of chronic airway infections among children, with special interest in chronic suppurative lung diseases, upper airway health and middle ear infections among under-served paediatric populations.



Dr Kalinda Griffiths is a Scientia Senior Lecturer at the Centre for Big Data Research in Health, University of New South Wales. Kalinda's work addresses complex health disparities in populations by using existing administrative data. She holds honorary positions at the University of Melbourne and Menzies and is Deputy Editor of the *Health Promotion Journal of Australia*. Her

research currently addresses issues of quality and the utilisation of Indigenous data with a focus on data governance, measurement and cancer care and outcomes. Kalinda is the recipient of a number of awards. Notably, she was awarded the Northern Territory Young Australian of the Year in 2011 and more recently, the 2019 Lowitja Institute Emerging Researcher Award. She was also a 2019–2021 Science and Technology Australia Superstar of STEM.



Mark Mayo is of Aboriginal and Torres Strait Islander heritage whose great grandmother, Polly Warrumbul, was a Mudpurra woman from Wave Hill. Mark's Torres Strait Islander heritage comes from the descendants of the people of the islands of Mabuiag and Badu in the Torres Strait. Mark is a graduate of Charles Darwin University and is a research scientist with over 30 years' experience.

Mark's interests in Australian First Nations people's health has led him to work on many research projects during his time at the Menzies School of Health Research from malaria, melioidosis, petrol sniffing and childhood ear diseases. Mark's primary research area has been melioidosis, a potentially fatal tropical disease found in Northern Australia. Mark's research into this disease covers many different aspects, from early detection of the disease in hospital and clinical settings, to understanding the environmental niche of the bacteria and the potential exposure risks to people and animals in an endemic region. Mark is adept at identifying the implications of range of developments on Aboriginal people and potential consequences for the land (especially soil). Mark is currently the manager of the Melioidosis Research Program and Associate Deputy Director of Indigenous Leadership and Engagement at the Menzies School of Health Research.