**RESEARCH PROPOSAL SUBMISSION FORM**

**BY SUBMITTING THIS FORM, I AGREE TO HAVE MY RESEARCH PROPOSAL ASSESSED BY THE IMSANZ-RN STEERING COMMITTEE FOR ENDORSEMENT, IN ACCORDANCE WITH THE REQUIREMENTS AND CONDITIONS OUTLINED IN THE TERMS OF REFERENCE DOCUMENT. I ALSO CONSENT TO MY NAME AND CONTACT DETAILS BEING PUBLISHED ON THE RESEARCH MEMBERSHIP DIRECTORY OF IMSANZ-RN WEBSITE.**

**STUDY SYNOPSIS (Maximum 1500 words)**

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| **TITLE** | Our story – the On Country journey of remote stroke: Part 1 The Stroke patient journey to Alice Springs Hospital |
| **PRINCIPAL INVESTIGATOR, AFFILIATIONS AND CONTACT DETAILS** | **Dr. Anna Holwell**<br>Department of Medicine – Alice Springs Hospital<br>Associate Clinical Fellow, Department of Medicine, The University of Melbourne |
| **ASSOCIATE INVESTIGATORS AND AFFILIATIONS** | **Dr. Anna Balabanski**<br>VMO Alice Springs Hospital<br>Deputy Director of Neurology & Acting Head of Stroke Alfred Health<br>Adjunct Lecturer Monash University<br>Senior Clinical Research Fellow University of Melbourne<br>**Dr. Angela Dos Santos**<br>University of New South Wales, South Western Sydney Local Health District<br>**Prof. Leonid Churilov**<br>Department of Medicine (Royal Melbourne Hospital), Melbourne Medical School, University of Melbourne<br>**Dominic Italiano**<br>Department of Medicine (Royal Melbourne Hospital), Melbourne Medical School, University of Melbourne<br>**Hannah Johns**<br>Department of Medicine (Royal Melbourne Hospital), Melbourne Medical School, University of Melbourne<br>**Prof Timothy Kleinig**<br>Head of Stroke (Royal Adelaide Hospital) Head of Neurology and Stroke (Lyell McEwan Hospital). Clinical Professor (University of Adelaide)<br>**Prof Steve Davis AO**<br>Co-Chair Australian Stroke Alliance; Director, Melbourne Brain Centre at Royal Melbourne Hospital. Professor of Translational Neuroscience, The University of Melbourne<br>**Prof Geoff Donnan AO**<br>Co-Chair Australian Stroke Alliance; Professor of Neurology, The University of Melbourne<br>**Dr. Dan Adams**<br>Head of Retrieval, Alice Springs Hospital |
| **IS THIS STUDY CURRENTLY A MULTICENTRE STUDY? (I.E. INVOLVEMENT OF MORE THAN ONE HEALTH SERVICES OR JURISDICTION)** | **NO** |

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| **ARE YOU LOOKING FOR OPPORTUNITIES FOR MULTICENTRE COLLABORATION?** | **NO at present – this is a pilot project that can hopefully be expanded in the future** |
| **IF 'YES' TO QUESTION ABOVE, CAN INTERESTED COLLABORATORS CONTACT YOU DIRECTLY?** | **YES** |
| **BACKGROUND** | The Central Australian population comprises two overlapping populations with high stroke rates, limited acute stroke care access and poor stroke outcomes: remote populations and Aboriginal Australians (this term will be used in this document at the request of local community members (1)). Delayed access to healthcare is a significant contributor to health gaps in Central Australia.<br><br>The Central Australian Region (which includes Central Australia and The Barkly) covers 1.5milllion km2: approximately two-thirds of the Northern Territory and extending into north-west South Australia and Western desert regions of WA. The regional population is sparse at 42,000 (Alice Springs 36,000, Tennant Creek 3,500 the remainder more remote). Around 40% of the population identify as Aboriginal. Alice Springs Hospital (ASH) is the major acute hospital. Other health services in the region are Tennant Creek Hospital (TCH) (Rural Generalist run) and around 40 remote health clinics (GP/Remote Area Nurse led). ASH has the only CT scanner and MRI in Central Australia, and is the primary stroke care centre for the region. ASH is part of the South Australian Telestroke service; the closest neurointerventional site is Royal Adelaide Hospital (1500km south). Stroke awareness and education varies significantly across health care workers in Central Australia with significant gaps evident. For example, the term stroke did not appear in the Index of the CARPA Standard Treatment Manual for remote practice until the most recent edition (8th edition), published in 2022(2).<br><br>Stroke is a significant contributor to the health 'gap' in Aboriginal Australians, occurring at higher rates at younger ages, and causing disproportionate early death and disability(3,4). Evidence from the 2009 National Stroke Audit showed significant disparities in stroke burden and stroke care for Aboriginal people(3); Aboriginal patients had more risk factors, were three times more likely to die or be dependent and had a greater prevalence of intracerebral haemorrhage. Stroke incidence is 17% higher in rural/remote areas of Australia, and with this comes twice the likelihood of significant lifelong disability. Only 3% of patients in rural and remote areas of Australia are treated in a stroke unit, compared to 77% of patients in metropolitan areas(5). Early stroke treatments are a key mitigating factor; 'time is brain' for both ischaemic stroke and intracerebral haemorrhage. Reducing onset to treatment times in this population would lessen stroke's devastating impact.<br><br>In Central Australia, the only published clinically adjudicated data on stroke in Aboriginal Australians is CI Balabanski's retrospective hospital-based cohort study of all stroke presentations to ASH between 2011 - 2014(6). In this study, |

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| | age-standardised stroke incidence was threefold greater in Aboriginal compared to non-Aboriginal patients and median onset-age of first-ever stroke (54 years) was 17 years younger in Aboriginal patients. No patients received reperfusion therapy in this period.<br><br>Each link in the stroke rescue chain, from symptom onset to diagnosis and treatment, must be streamlined(7). While significant improvements have been made to in-hospital processes such as door-to-scanner and door-to-needle times, less attention has been given to pre-hospital delays. These delays are amplified in remote Australia – not only due to the tyranny of distance, but also communications infrastructure, health literacy and stroke awareness, inequitable access to healthcare and specialty services, and triaging and prioritisation of potential stroke cases. The hyperacute stages of the stroke journey are determined by community awareness and understanding of stroke. There has been no research into the pre-hospital patient journey in remote Central Australia. |
| **RESEARCH QUESTION/HYPOTHESIS** | The aim of this study is to describe the patient journey for stroke patients in Central Australia. There are no hypotheses associated with this study as the aims are descriptive in nature(8). |
| **PRIMARY OUTCOME/PROCESS MEASURE** | Understanding stroke rescue chain metrics in remote Australian stroke cases will help implement targeted interventions to improve time to brain scanning and therapeutic treatments, enhancing access to specialized stroke services. Our goal is to identify barriers and enablers, including service gaps and community awareness, leading to improved stroke outcomes.<br><br>Key metrics we aim to enhance include:<br><br>1. Increased percentage of acute stroke patients reaching the hospital within re-perfusion therapy timeframes (within 24 hours of symptom onset), resulting in better access to therapies and outcomes.<br>2. Improved accuracy of transfer priorities for suspected stroke patients by retrieval services, ensuring prompt and appropriate care during transfer and better access to hyper-acute therapies.<br><br>An essential part of the study involves raising stroke awareness in remote health clinics, collaborating with CARPA to include stroke recognition in medical manuals. The study aims to implement changes in future editions, enhancing stroke response in remote areas. |
| **SECONDARY OUTCOME/PROCESS MEASURES** | Provide insights to power future quality improvement studies in stroke management in remote regions, including plans for implementing novel technology in acute stroke care, such as prehospital mobile brain imaging technology. |
| **STUDY DESIGN** | |

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| **(IF THE STUDY IS A CLINICAL TRIAL, PLEASE INCLUDE INFORMATION ON SAMPLE SIZE CALCULATION, RANDOMISATION, AND BLINDING)** | This is a retrospective cohort study. The audit will describe the timeline from stroke onset, time of first health care contact, retrieval processes, hospital arrival and time to imaging and definitive treatment (if given). Data regarding in-hospital progress, discharge and outcome will also be collated.<br><br>Stroke admissions will be identified using the International Classification of Diseases (ICD-10-AM: I60, I61, I62.9, I63, I64 – principal diagnosis) from hospital databases during the study period (June 2022-May 2024).<br><br>Value-focused process engineering (VFPE) combined with Value-Focused Thinking (VFT) (9)will be used to understand the stroke patient journey. VFPE is a conceptual modelling tool that provides an understanding of the relationship between individual components of a system or process by linking event-driven process chain methods for building workflows with Value-Focused Thinking (VFT). Workflows will be represented as a chain of activities, active elements which need to be executed as part of the process, and events, passive elements which refer to conditions or situations that trigger activities or result from activities that are connected through logical operators. VFT will provide the framework for identifying and structuring decision-making objectives. By linking the two methods, VFPE methodology will be used to support both the detailed conceptualisation of the remote stroke retrieval workflow and identification of data to be collected. |
| **INCLUSION CRITERIA** | All people aged 18 and over, AND have a stroke diagnosis AND are admitted to the ASH from June 2022- May 2024. The catchment area for ASH is MMR6 and MMR7 - all strokes will occur in a remote or very remote location |
| **EXCLUSION CRITERIA** | People with in-hospital strokes. |
| **EXPECTED NUMBER OF PARTICIPANTS** | 200 |
| **STUDY DURATION** | Retrospective audit – completion date June 2025 |
| **ANALYSIS** | Due to the descriptive nature of this study there is no testable statistical hypothesis or an underlying epidemiological parameter to estimate.<br><br>Statistical analysis: comparisons will be performed, using Student's t-test (continuous variables), Mann-Whitney U-test (non-parametric variables), Fisher's exact test (binary outcomes). Rates will be reported per 100,000 population per year, age-standardised to the World Health Organization population, using the direct method |
| **IMPORTANCE TO GENERAL MEDICINE** | There is a distinct lack of neurologists and stroke specialists in rural and remote Australia. With expansion of Telestroke services stroke metrics may appear to be improving, but there is a real risk of deskilling and disregard of the work that general physicians do in stroke in these regions. |
| **FUNDING** | Successful recipient Stroke Foundation EMCR Seed Grant $80,000 |

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| **HAS CONSIDERATION BEEN GIVEN TO HOW THIS PROJECT MIGHT IMPROVE EQUITY IN INDIGENOUS OR VULNERABLE POPULATIONS? PLEASE PROVIDE EXPLANATION** | Yes – this is one of the main aims of this project.<br>This project addresses underserved communities – two overlapping patient populations.<br>1. Remote populations – Central Australia is comprised exclusively of remote (MMR6) and very remote (MMR 7) regions (2).<br>2. Aboriginal and Torres Strait Islander communities (hereafter respectfully referred to as Aboriginal due to local requests as this represents the majority of the local population(3)) in Central Australia are culturally and linguistically diverse (4). |
| **CURRENT PROGRESS** | Design and protocol development [Complete]<br>Ethics application [Submitted awaiting outcome]<br>Study in progress []<br>Manuscript write-up in progress or under review []<br>Accepted or published []<br>Aborted |
| **IMSANZ-RN OFFICE USE ONLY** | **ENDORSED**<br>**NOT ENDORSED** |

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