

PURPOSE

An investigation is underway to establish the feasibility and a development pathway for a fully mobile radiotherapy facility to improve treatment access for rural and remote Western Australians. This poster reports on the justification for this development and the planned pathway to achieve the goal of providing more accessible treatment for rural and remote patients.

WHY WESTERN AUSTRALIA?

With 33% of Australia's land area (over 2.5 million km², roughly 4 times the size of Texas) and with only 11% of Australia's total population, Western Australia (WA) represents a vast, sparsely-populated region, though one with significant importance for Australia's economy, particularly from mining and agriculture. Rural and remote regions of WA are serviced by a single government health agency, facilitating service governance. Local health researchers are able to leverage strong national partnerships. There is embedded academic and corporate understanding of the challenges of remote healthcare.

REMOTE POPULATIONS IN AUSTRALIA

- Although Australia's population is concentrated in metropolitan areas (see Figure 1), 28% of the population still inhabits areas classified as "rural and remote".
- Co-location of health services with population foci leads to inequity in access. Approximately 18% of the population lives more than 50 km from a tertiary healthcare facility [1].
- As in Figure 1, the distribution of Australian cancer services mirrors population distribution rather than access needs.
- People living in remote areas of Australia are 1.3 times more likely to die from cancer and have a lower 5-year relative survival rate compared to those living in major cities and face considerable psychosocial and economic disadvantage from travelling for treatment [2].
- The increasing proportional population of Aboriginal peoples, 1.9% in metropolitan to 32% in remote and very remote regions, means Aboriginal people are unequally disadvantaged.
- The Western Australian Cancer Plan aims to "empower and inform those affected by cancer and improve access to culturally secure, optimal care that is provided on Country whenever possible." [3]

PROPOSED SOLUTION

- A consortium of partners has been formed to coordinate DESIGN, DEVELOPMENT and DEPLOYMENT of a solution via a defined series of Work Packages as in Figure 2.
- Alternative truck trailer-based configurations will be evaluated in terms of their feasibility, safety, cost, and clinical utility, together with the evaluating methods for service operation and scheduling. A previous model has been developed for the American Carolinas [5]
- A series of docking stations are expected at key regional hubs, providing radiation shielding and complementary services.
- Deployment will be very dependent on available satellite-based data transfer capabilities.
- Costings have been developed and funding sought from a mixture of government and private philanthropy, with a breakdown as shown in Figure 3.

Investigating a Mobile Radiotherapy Solution for Remote Western Australia

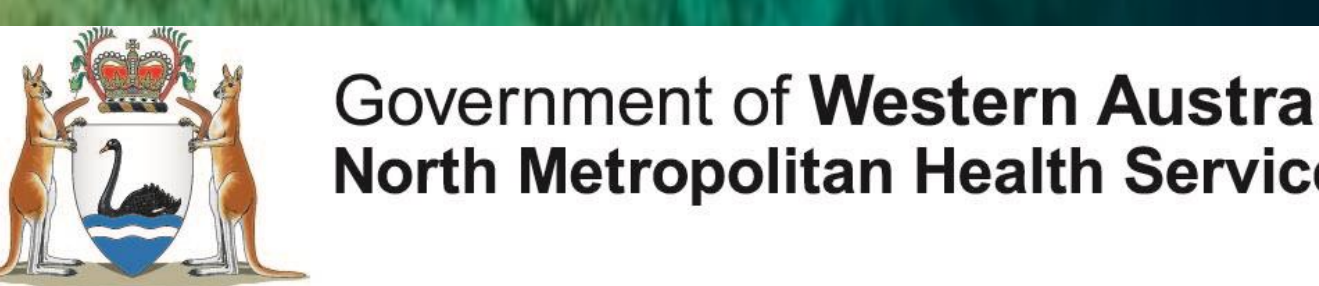
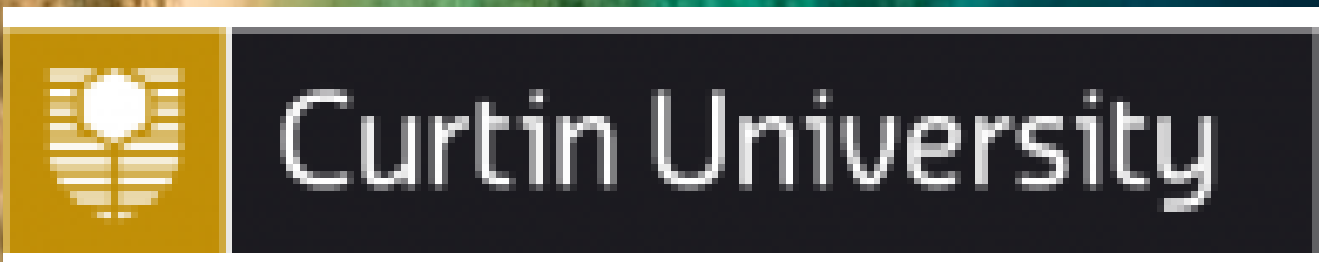
Martin A Ebert^{1,2}; Georgia Halkett³; Brad Boyle⁴; Joanne Dobson⁵; Nathaniel Barry¹; Sandra Thompson²; Nicholas Hardcastle⁶; Jake Kendrick²; Gavin Pikes¹; James Korte⁶; Sandro Porceddu⁶; Joshua Dass¹; Tomas Kron⁶

¹Sir Charles Gairdner Hospital, Western Australia; ²University of Western Australia; ³Curtin University, Western Australia; ⁴Monocorp Law, Western Australia (consumer rep); ⁵Narrogin High School (consumer rep); ⁶Peter MacCallum Cancer Centre, Victoria, Australia

CONCLUSIONS

A clear need exists for a service to provide radiotherapy to rural and remote populations in Western Australia. This project is now underway. It is expected that the development could serve as a model for other remote regions, for deployment to evacuation zones and for deployment in under-resourced countries.

Figure 1. (a) Distribution of population (absolute number) by Australian local government region. (b) % of population in each region who report Aboriginality. (c) Distribution of radiation oncology facilities (number within each indicated region) . (d) Distribution of general cancer services (from [3]) . (e) Distribution of remoteness as classified according to the Modified Monash Model. , including population by region (2021 numbers from [4]).



CONTACT

Dr Martin A Ebert
Sir Charles Gairdner Hospital,
Western Australia
Martin.Ebert@health.wa.gov.au

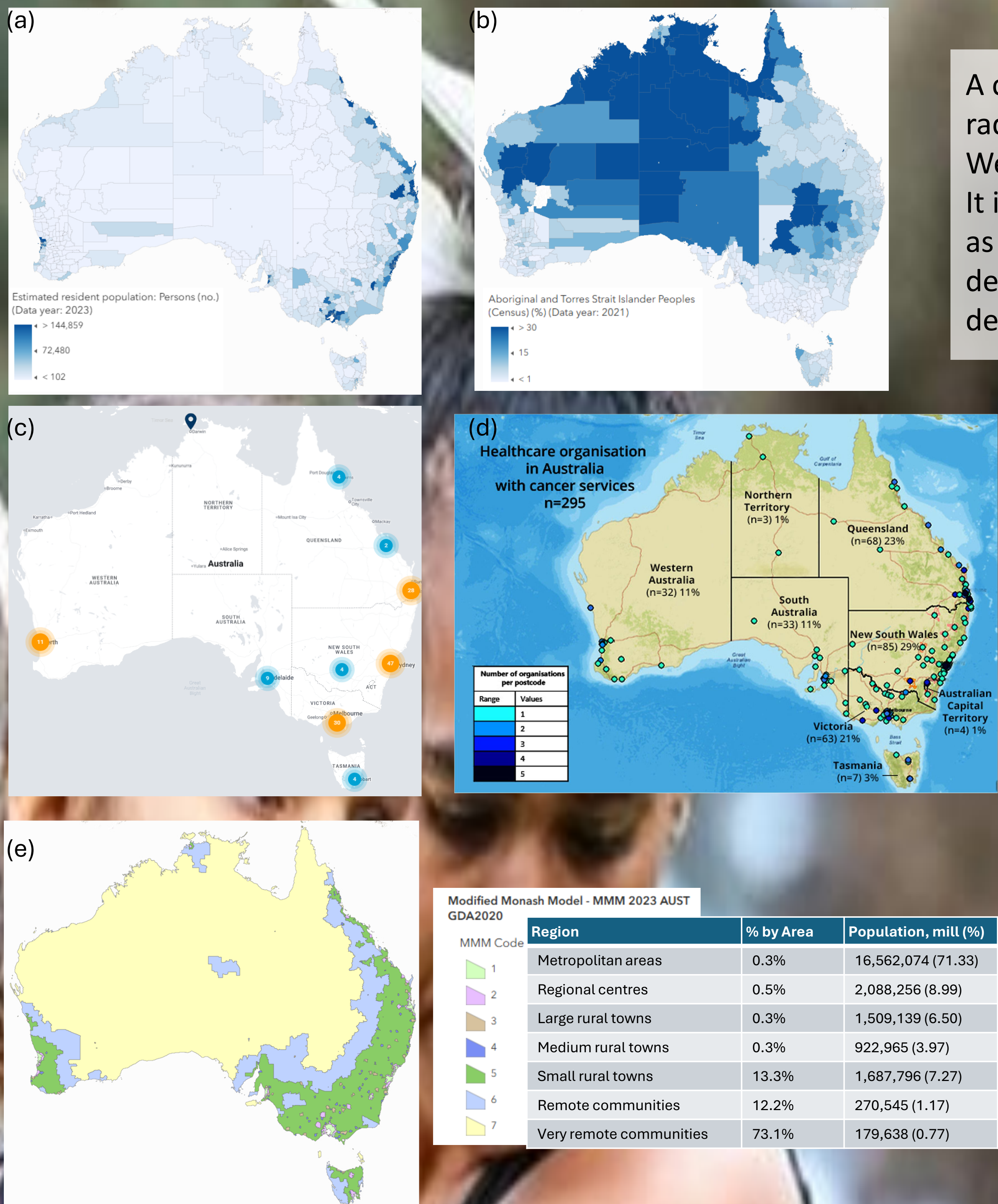
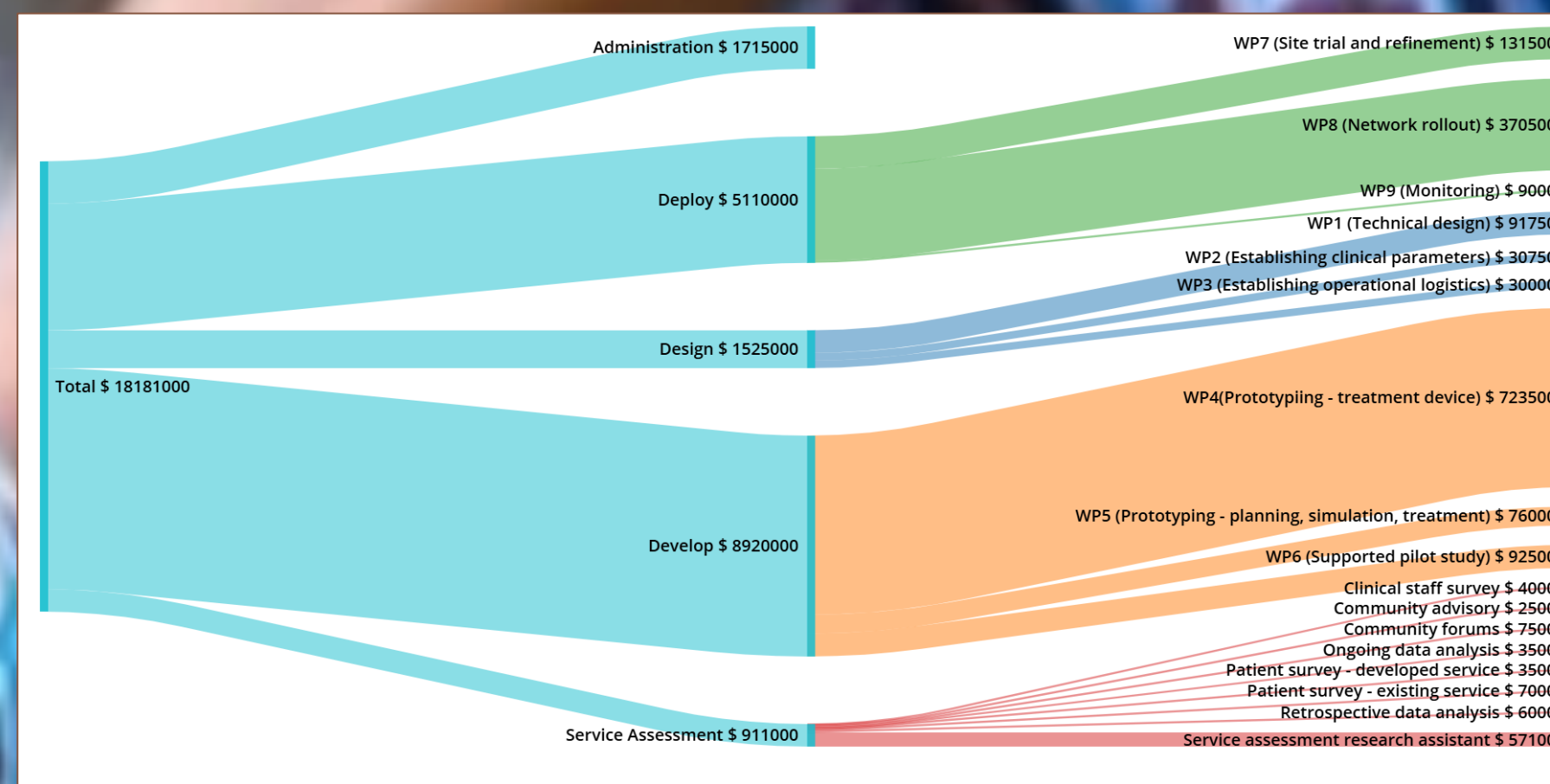


Figure 2. A series of work packages has been developed to address the three primary project phases. Running in parallel to these work packages will be a semi-quantitative cancer needs and outcomes assessment to enable community-informed and evidence-based assessment of service efficacy. Note that there are some inherent dependencies of latter work packages on the outcomes of earlier work packages. As such, the proposed work, timelines and costing would require periodic review throughout the project.

Figure 3. Sankey diagram of project costing and breakdown. Values in AUD (1 AUD ≈ 0.70 USD)



REFERENCES

- Baazeem, M., E. Kruger, and M. Tennant, Geospatial distribution of tertiary hospitals across Australian cities. Australian health review, 2023. 47: p. 379–385
- Australian Cancer Plan, A. Government, Editor. 2023, Cancer Australia: Surry Hills, NSW.
- WA Cancer Plan 2020 - 2025, D.o. Health, Editor. 2020, Government of Western Australia.
- Versace, V.L., T.C. Skinner, L. Bourke, P. Harvey, and T. Barnett, National analysis of the Modified Monash Model, population distribution and a socio-economic index to inform rural health workforce planning. Aust J Rural Health, 2021. 29: p. 801–810.
- Price, A.T., C. Canfield, G.D. Hugo, et al., Techno-Economic Feasibility Analysis of a Fully Mobile Radiation Oncology System Using Monte Carlo Simulation. JCO Glob Oncol, 2022. 8: p. e2100284