

Building Australia's national transfusion data infrastructure: the National Transfusion Dataset (NTD) project

Tina van Tonder¹, Christine Akers², Christopher Berry², Linley Bielby³, Karina Brady¹, Kirsten Caithness¹, Shelley Cox⁴, James Daly³, Lucy Fox^{1,5}, Karthik Mandapaka¹, Zoe McQuilten^{1,3}, Susan Morgan², Stephen Opat^{6,7}, Andrew Pearce⁸, David Pilcher⁹, David Roxby¹⁰, Romi Sinha¹¹, Andrew Spencer^{2,12}, Neil Waters¹, Cameron Wellard¹, Erica Wood^{1,6}

¹ Transfusion Research Unit, School of Public Health and Preventive Medicine, Monash University; ²The Alfred Hospital; ³Australian Red Cross Lifeblood; ⁴Ambulance Victoria; ⁵Peter MacCallum Cancer Centre; ⁶Monash Health; ⁷School of Clinical Sciences, Monash Health, Monash University; ⁸South Australian Ambulance Service; ⁹Australian and New Zealand Intensive Care Society Adult Patient Database; ¹⁰Flinders University; ¹¹SA Health; ¹²School of Translational Medicine, Monash University

Introduction

Adequate supplies of safe blood are a critical but costly component of our health infrastructure. In 2022-2023, over 1 million fresh blood components (RBC, platelets, fresh frozen plasma, cryoprecipitate, and cryo-depleted plasma) were issued to Australian hospitals and other healthcare providers e.g. ambulance and retrieval services (1).

In Australia, there is no national database to track how and why blood products are used, the numbers and characteristics of patients transfused, their clinical outcomes following transfusions, or the total costs to the community. This is largely due to the absence of a supporting data infrastructure.

Aim

To establish an integrated national dataset on blood product use, from donation to transfusion to clinical outcomes. The NTD will incorporate data from multiple datasets (Figure 1) to enhance data coverage, quality, and accessibility, enabling research that improves transfusion practices, patient outcomes, and informs national policy.

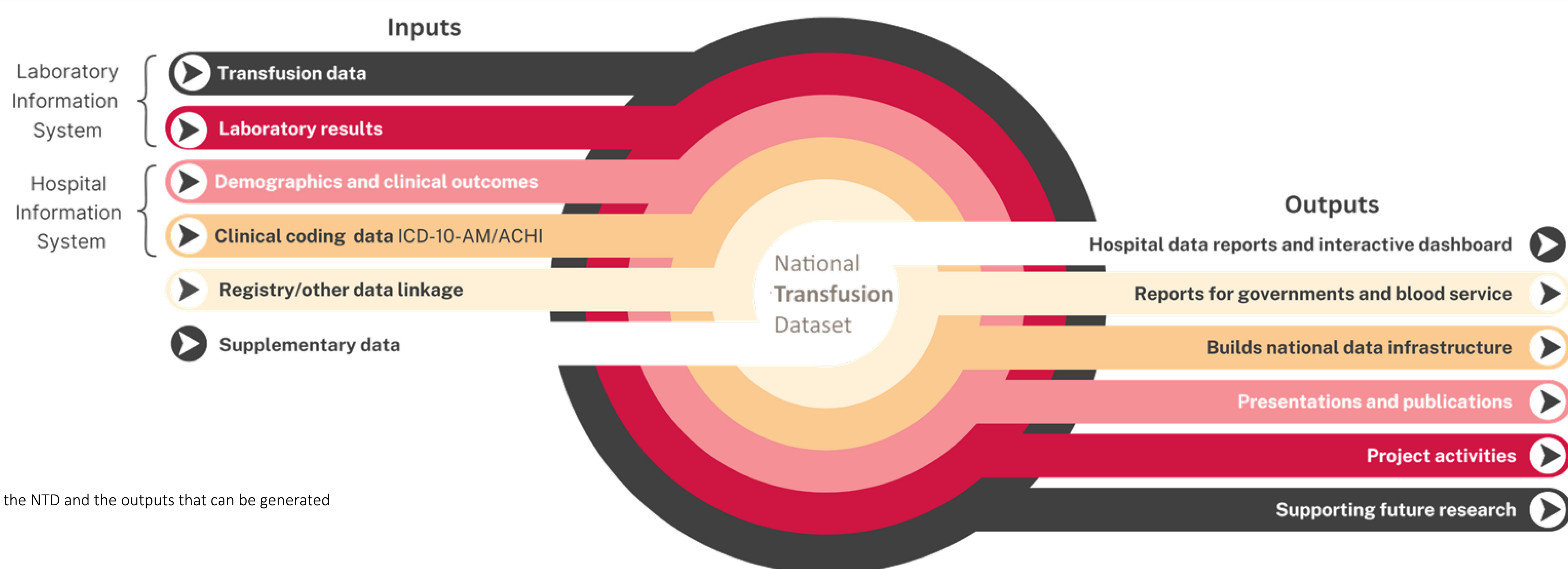


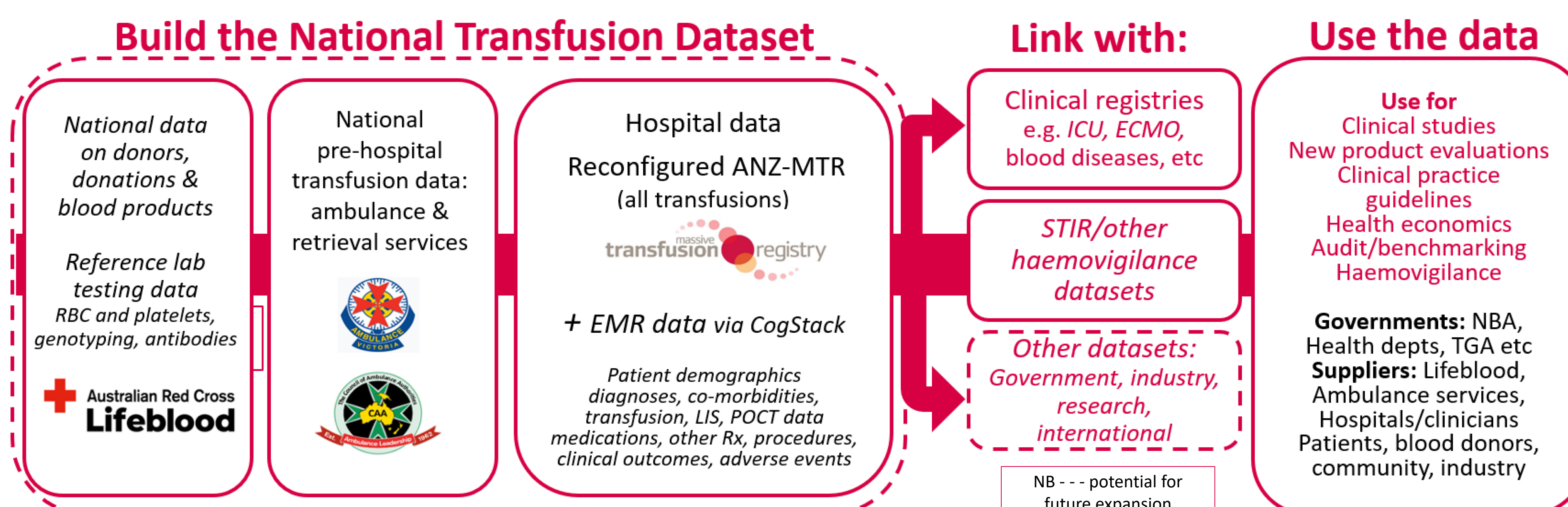
Figure 1. Data sources collected by the NTD and the outputs that can be generated

Method

Building on existing partnerships and working arrangements of the Australian and New Zealand Massive Transfusion Registry, the NTD will capture data on all blood products transfused in patients ≥ 18 years at participating hospitals, ambulance and retrieval services. Data items include demographics, ICD codes for diagnoses and procedures, laboratory results and transfusion information.

Natural language processing using the artificial intelligence CogStack platform is being tested to supplement structured hospital datasets with unstructured electronic medical record data, including transfusion reactions, cell salvage and TEG/ROTEM use. The core dataset will be linked with clinical outcomes data housed in participating registries, including critical care and blood disease registries. Looking ahead, the NTD will link with Lifeblood donor and product data, as well as Blood Matters STIR data to form a 'vein-to-vein' picture of transfusion practices and outcomes and help support haemovigilance activities.

Figure 2. NTD – expansion phase 2022-27: Funded by the NHMRC Blood Synergy and MRFF Research Data Infrastructure grant



NTD website (transfusiondataset.com)



Results

Datasets from five hospitals covering 2017-2023 comprising over 50,000 transfusion episodes, have been received. Two ambulance services have received approval to participate, and pilot linkages have been completed with the ANZICS Adult Patient Database, the Aplastic Anaemia and other Bone Marrow Failure Syndromes Registry, the Lymphoma and Related Diseases Registry, and the Myeloma and Related Diseases Registry. Patients from these registries are among those using high volumes of blood products, including immunoglobulin and RBC. Linking with these and other databases enhances the potential for analysis and provides additional information for risk adjustment, health economics, and evaluations of clinical outcomes. Approvals have been received from a further 30 sites with data requests underway. The NTD is being used to study hospital blood product utilisation, and outputs include feedback to clinicians and benchmarking reports as the NTD expands. Similar work is underway to produce reports for participating ambulance and retrieval services. Projects exploring blood product use and patient outcomes are underway in collaboration with Lifeblood and the ANZSCTS Database.

Conclusion

The NTD will deliver a more complete picture of transfusion practice across Australia, providing evidence on blood use to support policy decisions and enhance blood utilisation strategies. By providing national data and reports, the NTD will drive improvements in transfusion protocols, support more efficient blood management, and contribute to better outcomes for patients. We welcome suggestions for additional analyses using the NTD. Please contact the project team at sphpm.ntd@monash.edu.

Acknowledgments: We wish to acknowledge all participating hospitals, investigators, steering committee and funders for their contribution to the NTD. The expansion of the NTD is supported by an MRFF 2021 Research Data Infrastructure grant (MRFFRD000049), building on previous support from the Australian Research Data Commons, Australian Data Partnerships (DP 708) and the NHMRC Blood Synergy (1189490). Australian governments fund Australian Red Cross Lifeblood to provide blood, blood products and services to the Australian community.

Reference: 1. Australian Red Cross Lifeblood Annual Report 2022-2023