HOSPITAL PHARMACISTS, ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES AND CHRONIC DISEASE:

HELPING TO CLOSE THE GAP

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A thesis submitted in fulfilment of the requirements of the degree of Doctor of Philosophy

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Susan Welch

ACKNOWLEDGEMENTS

For

Mum and Dad

Kenny

Miranda and Calum

with love.

To all the Aboriginal and Torres Strait Islander Peoples I have met along the way,

I'll not be a seagull

I firstly acknowledge, that my place of birth was on Lutruwita (Tasmania), the ancestral lands of the Palawa. I also acknowledge the Gadigal of Eora nation, whose lands I reside on, and I am grateful for the opportunity to complete my thesis on their country. I pay my respects to their Elders past and present, and to any Aboriginal and/or Torres Strait Islander person/s who read this thesis, in part or in its entirety.

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My family, (Kenny, Miranda and Calum) who have been there, always ready for a hug and an encouraging word, to keep me going. xxxooo

ABBREVIATIONS

ACCHO	Aboriginal Community Controlled Organisation
AHMRC	Aboriginal Health and Medical Research Council
AHU	Aboriginal Health Unit
AHW	Aboriginal Health Worker
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
AIHW	Australian Institute of Health and Welfare
ALO	Aboriginal Liaison Officer
AMS	Aboriginal Medical Service
BGL	Blood glucose level
CALD	Culturally and linguistically diverse populations
CFIR	Consolidated Framework for Implementation Research
CKD	Chronic kidney disease
CMI	Consumer Medicines Information
CONSIDER Statement	Consolidated criteria for strengthening reporting of health research involving Indigenous peoples
COPD	Chronic obstructive pulmonary disease
COREQ	Consolidated Criteria for Reporting Qualitative Research
CTG	Closing the Gap
CVD	Cardiovascular disease
DALY	Disability-adjusted life year
DDA	Dose administration aid
ED	Emergency Department

FIP	International Pharmaceutical Federation
FTE	Full time equivalent
GP	General Practitioner
HbA1c	Glycated haemoglobin
HMR	Home Medicines Review
IAHA	Indigenous Allied Health Association
IAHP	Indigenous Australians Health Program
IMeRSe	Indigenous Medication Review Service
IPA	International Pharmaceutical Abstracts
JBI	Joanna Briggs Institute
NACCHO	National Aboriginal Community Controlled Health Organisation
NAIDOC	National Aboriginal and Islanders Day Observance Committee
NDSS	National Diabetes Services Scheme
NIAA	National Indigenous Australians Agency
NT	Northern Territory
PANDA	Psychiatric and Non-prescription Drug and Alcohol Unit
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSA	Pharmaceutical Society of Australia
QAAMS	Quality Assurance for Aboriginal and Torres Strait Islander Medical Services Program
QUMAX	Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People

REDcap	Research Electronic Data Capture
RHD	Rheumatic heart disease
SDPR	Single Digital Patient Record
SHPA	Society of Hospital Pharmacists of Australia

GLOSSARY

First Nations Peoples	Aboriginal and Torres Strait Islander Peoples, Aboriginal and/or Torres Strait Islander people, Aboriginal peoples, Indigenous Australians
Aboriginal Peoples	‘Aboriginal’ is used refer to Aboriginal and Torres Strait Islander Peoples in New South Wales (NSW), where this thesis was conducted – to align with the preference of the Aboriginal Health and Medical Research Council of New South Wales.
Diabetes	As type 2 diabetes accounts for 96% of global total diabetes cases, it was referred to as ‘diabetes’ in this thesis.
Chronic disease	Conditions which have long-term, lasting effects, attributed to genetic, physiological, environmental and/or behavioural factors. (e.g. type 2 diabetes, cardiovascular disease, chronic kidney disease, chronic obstructive pulmonary disease)
Multimorbidity	Multiple chronic conditions (>1)

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1.

Chapter 2.

Chapter 4.

Chapter 5.

Chapter 6.

Chapter 7.

LIST OF TABLES

Publications and communications.

Chapter 2.

Chapter 3.

Chapter 4.

Chapter 5.

Chapter 6.

Chapter 7.

PUBLICATIONS AND COMMUNICATIONS

The following are a list of publications and communications resulting from this thesis.

Peer-reviewed publications that form results chapters of this thesis

1. **Welch S.,** McMillan F., Moles R. Hospital pharmacy services supporting Aboriginal or Torres Strait Islander peoples in Australia: A systematic review. Journal of Pharmacy Practice and Research 2020;50:191 – 204 doi.org/10.1002/jppr.1666. (Chapter 2)
2. **Welch S.,** Patel B., Williams A., Moles R. Connecting the Dots of Care: Survey of Australian hospital pharmacy departments regarding current initiatives in place to care for Aboriginal and/or Torres Strait Islander inpatients. Journal of Pharmacy Practice and Research 2022;52:196 – 218 doi.org/10.1002/jppr.1789 (Chapter 3)
3. **Welch S.,** Moles R., Viardot A., Deweerd P., Daley S., Lee K. Connecting the Dots of Care: A pilot study linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital, using hospital pharmacists. Exploratory Research in Clinical and Social Pharmacy 2023;12:100351 doi.org/10.1016/j.rcsop.2023.100351 (Chapter 5)
4. **Welch S.,** Purcell-Khodr G., Deweerd P., Moles R., Viardot A., Daley S., Lee K. Working together to ensure research conducted with Aboriginal and/or Torres Strait Islander Australians is culturally appropriate illustrated using a pharmacy-intervention study – published online in the Journal Pharmacy Practice and Research April 2025, doi.org/10.1002/jppr.70008 (Chapter 6)
5. **Welch S.,** Moles R. J., Viardot A., Deweerd P., Daly S., Robinson S., Harwood K., Woods C., Chand S., Lee K. Uncovering missed opportunities to provide holistic care for a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples in a metropolitan hospital. (Under review with the Internal Medicine Journal; Chapter 4)

6. **Welch S**., Combridge P., Lee K., Robinson S. Aboriginal Health Workers and pharmacists in a two-way learning collaboration – a pilot in a metropolitan Australian hospital. (Under review - comments addressed, with the Journal Pharmacy Practice and Research; Chapter 7)

Peer reviewed publications that are out of scope of thesis but written during candidature

1. **Welch S**., Robinson S., Langley T., Deweerd P. Identifying the cultural heritage of patients during clinical handover and in hospital medical records. (Letter) Medical Journal of Australia 2019;211,1:44 doi.org/10.5694/mja2.50222 (Appendix A)
2. **Welch S.,** Williams A., Hort A., Patel B. Challenging "business as usual" for acute rheumatic fever and rheumatic heart disease in Australia. Journal of Pharmacy Practice and Research 2020;50, 117-121 doi.org/10.1002/jppr.1651 (Appendix B)
3. Burke A., **Welch S.,** Power T., Lucas C., Moles R. Clinical yarning with Aboriginal and/or Torres Strait Islander peoples—a systematic scoping review of its use and impacts. BMC Syst Reviews 2022;11:129 doi.org/10.1186/s13643-022-02008-0 (Appendix C)

Peer reviewed conference presentations

1. **Welch S**., Patel B., Moles R. Connecting the Dots of Care: Survey of Australian hospital pharmacy departments regarding initiatives in place to care for Aboriginal and/or Torres Strait Islander inpatients. POCHE Indigenous Health Network 8th Annual Aboriginal and Torres Strait Islander Health Research Showcase. Sydney, 17th Oct 2019
2. **Welch S.,** Viardot A., Lee K., Daley S., Deweerd P., Moles R. Connecting the dots of care: Linking Aboriginal and Torres Strait Islander people with diabetes care in hospital using hospital pharmacists – A preliminary analysis. University of Sydney Higher Degree Research conference, University of Sydney, Nov, 2021

3. **Welch S.,** Patel B., Williams A., Moles R. Connecting the Dots of Care: Survey of Australian hospital pharmacy departments – how are we caring for Aboriginal and/or Torres Strait Islander inpatients. International Social Pharmacy Workshop 2022, University of Sydney, July 11-14, 2022
4. **Welch S.,** Viardot A., Lee K., Daley S., Deweerd P., Moles R. Connecting the dots of care: Linking Aboriginal and Torres Strait Islander people with diabetes care in hospital using hospital pharmacists. International Social Pharmacy Workshop 2022, University of Sydney, July 11-14, 2022
5. Williams A., Maddern N., Heck C., Tsai D., McDermott K., Hort A., Cheah S., **Welch S.** Space to grow – a new model of practice to make positive change. Society of Hospital Pharmacists of Australia, Medicines Management Conference, Cairns, Nov 2 – 4, 2023
6. **Welch S.,** Combridge P., Robinson S. Aboriginal Experts and Pharmacists Spark Two-Way Learning Collaboration. Advanced Pharmacy Australia, Medicines Management Conference, Adelaide 14 – 16 Nov 2024

Peer reviewed conference posters

1. **Welch S.,** Patel B., Moles R. Survey of Australian hospital pharmacy departments regarding initiatives in place to care for Aboriginal inpatients. Society of Hospital Pharmacists of Australia, Medicines Management Conference, Gold Coast Nov 14-16, 2019
2. **Welch S.,** Moles R. Systematic literature review: The role of the Australian hospital pharmacist/pharmacy in providing Aboriginal people services. Society of Hospital Pharmacists of Australia, Medicines Management Conference, Gold Coast Nov 14-16, 2019

3. **Welch S.,** Woods C., Chand S., Viardot A., Deweerd P., Eigenmann C., Moles R. Connecting the dots of care: Retrospective review of Aboriginal admissions – data collection pilot. Society of Hospital Pharmacists of Australia, Medicines Management Conference, Gold Coast Nov 14-16, 2019
4. **Welch S.,** McParland L., Ng W.S., Deweerd P. An intervention to assist culturally responsive communication with Aboriginal inpatients – The pharmacists' perspective. VCon – Society of Hospital Pharmacists of Australia, Virtual Conference, Nov 21-22, 2020
5. **Welch S**., Patel B., Williams A., Moles R. Connecting the Dots of Care: Survey of Australian hospital pharmacy departments – how are we caring for Aboriginal and/or Torres Strait Islander inpatients. IRNet National Showcase of Aboriginal and Torres Strait Islander Health Research. Sydney Sep 28 – 30 2022
6. Burke A., **Welch S.,** Moles R. Clinical Yarning with Aboriginal & Torres Strait Islander Peoples: A systematic review of its use and impacts. IRNet National Showcase of Aboriginal and Torres Strait Islander Health Research. Sydney Sep 28 – 30 2022
7. **Welch S.,** Viardot A., Lee K., Daley S., Deweerd P., Moles R. Linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital using hospital pharmacists. Society of Hospital Pharmacists of Australia, Medicines Management Conference Brisbane, Dec 1-3, 2022 (+ lightning talk)
8. **Welch S.,** Viardot A., Lee K., Daley S., Deweerd P., Moles R. Linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital using hospital pharmacists. International Pharmaceutical Federation (FIP) World Congress of Pharmacy and Pharmaceutical Sciences**,** Brisbane, Sep 24 – 28, 2023

9. **Welch S.,** Viardot A., Lee K., Daley S., Deweerd P., Moles R. Linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital using hospital pharmacists. St. Vincent's Hospital Research Week, Oct 25, 2023
10. **Welch S.,** Deweerd P., Daley S., Moles R., Viardot A., Lee K. Working together ensuring cultural safety for First Nations Australians in a metropolitan hospital setting. Society of Hospital Pharmacists of Australia, Medicines Management Conference, Cairns, Nov 2 – 4, 2023

Invited presentations

1. **Welch S.** NAIDOC Week Grand Rounds: Aboriginal Health "How are we closing the gap". St. Vincent's Hospital, Sydney, 9th July 2024

Media releases

1. Society of Hospital Pharmacists of Australia, New research and NAIDOC Week sharpen focus on strength, resilience and respect in Hospital Pharmacy. 1/7/22

Table 1. Authorship attribution statements for published works forming thesis chapters

Chapter	**Candidate's contribution to published work**	**Coauthors' contribution**
2. Systematic review	Developed search strategy; screened titles and abstracts; reviewed full text potentially relevant articles; assigned Donabedian Model (1) level; assessed and assigned Joanna Briggs Institute Levels of Evidence for meaningfulness; writing — original draft; writing – reviewing; editing	**Faye McMillan:** writing — original draft; writing – reviewing; editing **Rebekah Moles:** screened titles and abstracts; reviewed full text potentially relevant articles; checked assigned Donabedian Model (1) level; checked assigned Joanna Briggs Institute Levels of Evidence for meaningfulness; writing — original draft; writing – reviewing; editing
3. What are hospital pharmacists doing? Survey study	Study co-design, responsible for data collection, data analysis and write up.	**Bhavini Patel:** co-designed the study, assisted with data analysis and write up.

		Aleena Williams: provided review and was actively involved in the write up providing cultural guidance. **Rebekah Moles:** co-designed the study, assisted with data analysis and write up.
4. Uncovering missed opportunities: Retrospective study	Conceptualisation; funding acquisition; methodology; investigation/data extraction; data curation; project administration; data synthesis; formal analysis; writing — original draft; writing – reviewing and editing	**Rebekah Moles:** Conceptualisation, Funding acquisition, Methodology, Data synthesis, Formal analysis, Writing — reviewing and editing **Alexander Viardot:** Conceptualisation, Funding acquisition, Methodology, Formal analysis, Writing — reviewing and editing **Pauline Deweerd**: Conceptualisation, Funding acquisition, Methodology, Writing — reviewing and editing

		Scott Daley: Methodology, Writing — reviewing and editing **Sonia Robinson:** Investigation/Data extraction, Data synthesis, Writing — reviewing and editing **Kylie Harwood:** Investigation/Data extraction, Data synthesis, Writing — reviewing and editing **Carolyn Woods:** Methodology, Investigation/Data extraction, Writing — reviewing and editing **Shivangi Chand:** Methodology, Writing — reviewing and editing **Kylie Lee:** Funding acquisition, Data synthesis, Formal analysis, Writing — original draft, Writing — reviewing and editing

5. Connecting the Dots of Care: prospective study	Conceptualisation; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources, supervision; validation; visualization; writing – original draft; writing – reviewing and editing.	**Rebekah Moles:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – reviewing and editing. **Alexander Viardot:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – reviewing and editing. **Pauline Deweerd:** Conceptualization, Funding acquisition, Investigation, Methodology, Resources, Supervision, Visualization, Writing –reviewing and editing.

		Scott Daly: Conceptualization, Funding acquisition, Investigation, Methodology, Resources, Supervision, Visualization, Writing – reviewing and editing. **Kylie Lee:** Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing – original draft, Writing – reviewing and editing.
6. Culturally appropriate research? Assessing a pharmacist-led study	Conceptualisation; methodology; data curation; writing – reviewing and editing; writing – original draft; formal analysis; investigation; validation; project administration; software.	**Gemma Purcell-Khodr**: Formal analysis; validation; writing – reviewing and editing; investigation. **Pauline Deweerd**: Validation; formal analysis; investigation; writing – reviewing and editing. **Rebekah Moles**: Writing – reviewing/ editing. Alexander Viardot: Writing – reviewing and editing.

		Scott Daly: Writing – reviewing and editing. **Kylie Lee:** Conceptualisation; methodology; data curation; investigation; validation; formal analysis; supervision; writing – original draft; writing – reviewing and editing.
7. Two-way learning: a collaboration with Aboriginal health workers	Conceptualisation; Methodology; Investigation/Data extraction; Data curation; Project administration; Data synthesis; Formal analysis; Writing — original draft; Writing — reviewing and editing	**Sonia Robinson:** Conceptualisation, Methodology, Formal analysis, Writing — original draft, Writing — reviewing and editing **Phillip Combridge**: Conceptualisation, Methodology, Formal analysis, Writing — reviewing and editing **Kylie Lee**: Formal analysis, Writing — original draft, Writing — reviewing and editing

In addition to these statements, in cases where I am not the corresponding author of a published item, permission to include the published material has been granted by the corresponding author.

No content produced by generative AI tools has been used in the preparation of this thesis.

Susan Welch

Date: 14th August 2025

As supervisor for the candidature upon which this thesis is based, I can confirm that the authorship attribution statements above are correct.

Professor Rebekah Moles

Date: 14th August 2025

ABSTRACT

Aboriginal and Torres Strait Islander Peoples are resilient, have survived and have actively prospered and cared for their communities for millennia. However, as a result of the ongoing effects of colonisation, Aboriginal and Torres Strait Islander Peoples are disproportionately affected by chronic diseases in Australia.

This thesis focussed on diabetes because for Aboriginal and Torres Strait Islander Peoples, diabetes is (1) often experienced from a young age; (2) associated with stigma and shame; (3) screened for, using a readily accessible test (HbA1c); (4) has devastating complications which can be prevented by early screening and treatment options.

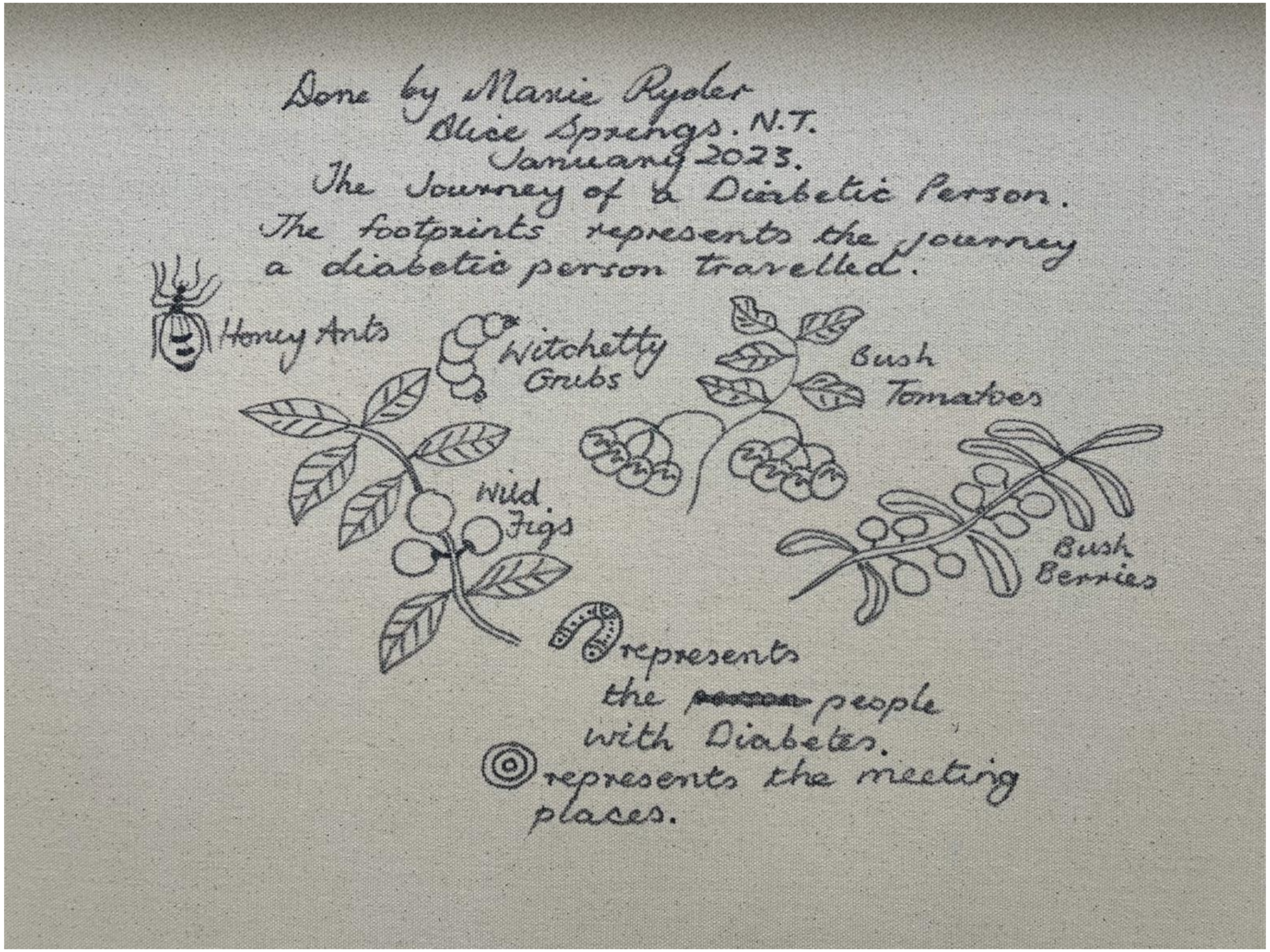
Diabetes, like other chronic diseases, causes preventable admissions to hospital for Aboriginal and Torres Strait Islander Peoples. It follows that hospital pharmacists have an opportunity to contribute to improve health outcomes for and together with Aboriginal and Torres Strait Islander Peoples. Review of the literature and a survey of hospital pharmacy departments nationally, did not illustrate extensive work in this area.

By working together with and listening to the priorities of Aboriginal and Torres Strait Islander Peoples, a new model of care was developed, implemented and evaluated. This was a novel pharmacist-led service that offered Aboriginal and Torres Strait Islander Peoples diabetes risk assessment and referral for specialist review, during their hospital stay. This service could help address identified missed opportunities to provide holistic hospital care.

This thesis produced a body of work to illustrate the importance of taking time to work together with Aboriginal and Torres Strait Islander Peoples to improve health outcomes. In doing this, factors required for wider application of such culturally safe models and future projects were identified. This thesis illustrated that success can only be achieved by ongoing collaborative partnerships, together with Aboriginal and Torres Strait Islander Peoples.

Figure A: Artwork representing “Connecting the Dots of Care” project work published and presented in chapter 5. Artist: Marie Ryder

Figure B: Story of the artwork representing the “Connecting the Dots of Care” project (chapter 5): “Done by Marie Ryder. Alice Springs, N.T. January 2023. The journey of a diabetic person. The footprints represent the journey a diabetic person travelled.” “Honey ants, witchetty grubs, bush tomatoes, wild figs, bush berries” are Northern Territory healthy foods. Symbols representing “people with diabetes and meeting places.”



1. INTRODUCTION

1.1 Definition of chronic disease

Chronic diseases are defined as conditions, which have long-term, lasting effects, attributed to genetic, physiological, environmental and/or behavioural factors (2). Examples of chronic diseases include type 2 diabetes, cardiovascular disease, chronic kidney disease and chronic obstructive pulmonary disease (COPD).

1.2 Prevalence of chronic disease

1.2.1 Worldwide

An estimated 2-10% of adults live with a chronic disease worldwide (for example: total diabetes (types 1 and 2) – 6.1% (3); cardiovascular disease – 7% (4); chronic kidney disease – 10% (5); COPD – 2.7% (6)). Together chronic diseases are responsible for three-quarters of all deaths worldwide (42 million; in 2019) (5, 7). As type 2 diabetes accounts for 96% of global total diabetes cases, (3) it will herein be referred to as ‘diabetes’.

Global life expectancy continues to rise (72.8 years in 2010 to 73.3 years in 2024) (8). This is primarily due to a reduction in overall deaths, for example from cardiovascular disease, tuberculosis and maternal deaths (5). However, as people are living a longer life, we have seen the overall chronic disease health burden and related deaths also rise (chronic disease related deaths: 67% in 2010 to 74% in 2019) (5, 7). By 2050, the top 10 leading causes of disease globally are predicted to include diabetes, cardiovascular disease, chronic kidney disease and COPD (5).

Globally, poverty and socioeconomic status are linked with higher rates of chronic illness, and the subsequent costs of chronic diseases have further compounded socioeconomic impacts (2). Additionally, it is estimated that one-third of adults globally experience multiple chronic conditions (multimorbity) (9). This is particularly relevant since the COVID-19 pandemic. Morbidity and mortality from COVID-19 is increased in the setting of pre-existing chronic disease (10). As a result, COVID-19 has also worsened pre-existing inequality of outcomes resulting from chronic disease in the setting of poverty and low socioeconomic status (10).

1.2.2 In Australia

Nearly one in two (47%) Australians live with at least one chronic disease, and one in five live with at least two (7, 11) (e.g. total diabetes: 5%, of which 4.6% is type 2 diabetes (12); cardiovascular disease: 5.2% (13); chronic kidney disease: 11% (14); COPD: 2.5% (15)). Similar to global figures, life expectancy in Australia has risen, from 81.3 years (in 2010) to 84.1 years (in 2024) (8). In 2022, nearly nine in ten of all deaths (n=171,500) had a chronic condition as an underlying cause (16).

Chronic diseases contribute significantly to the overall health expenditure, individual health burden and resulting mortality (16). In 2020-2021, $14.3 billion was spent on cardiovascular diseases alone, nearly two-thirds of which were hospital-related costs ($9.2 billion) (16). More than half of all hospitalisations are due to chronic disease (51%) equating to 6.4 million hospitalisations in 2021-2022 (16). Patients with chronic disease(s) stay 2.3 times longer compared to those with non-chronic disease-related hospitalisations (7, 11).

In line with worldwide data, a higher burden of chronic disease in Australia is also more associated with lower socioeconomic status. In disadvantaged areas, a greater proportion of people live with at least one chronic disease compared with those in more advantaged areas (63% versus 56%, in 2022) (16). Chronic diseases are also more common among those living in non-metropolitan areas (67% non-metropolitan versus 58% in metropolitan areas; in 2022) (16). Furthermore, nearly one in two Australians (47%) lived with more than one chronic disease 2017-2018 (multimorbidity), which is predicted to rise along with prevalence of chronic disease (7).

1.2.3 Among Aboriginal and Torres Strait Islander Australians

Nearly one in two (46%) Aboriginal and Torres Strait Islander Peoples live with one or more chronic disease (17) (e.g. total diabetes: 7.9%[1] (18, 19); cardiovascular disease: 27% (20); chronic kidney disease: 22% (20); COPD: 3.4% (17).

It is important to understand the prevalence of chronic disease alongside colonisation which caused loss of language and connection to country for Aboriginal and Torres Strait Islander Peoples (21). Colonisation, together with racist government policies including forced child removals, have led to subsequent discrimination and intergenerational trauma and poverty (21, 22). In turn this has increased levels of chronic diseases for Aboriginal and Torres Strait Islander Peoples (22-24). Whilst modifiable risk factor exposure results in almost half (49%) of disease burden for Aboriginal and Torres Strait Islander Peoples (25), these are often intertwined with intergenerational impacts of colonisation, for example: mental health/intergeneration trauma and smoking rates, food insecurity and poverty (21). As a result, focus needs to be broad to tackle the underlying causes rather than blaming the individual (26)

Aboriginal and Torres Strait Islander Peoples have a shorter life expectancy compared with their non-Indigenous counterparts (most recent comparison in 2023: males: 71.9 years versus 80.6; females: 75.6 years versus 83.8) (27). This is directly related to the proportion of

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[1] Prevalence figure not available for type 2 diabetes, as the National survey does not report type 1 and 2 diabetes separately. 18. Australian Institute of Health Welfare. Measure 1.09 Diabetes - Data findings, Aboriginal and Torres Strait Islander Health Performance Framework website. Canberra: AIHW & NIAA; 2023.

chronic disease seen among this group of peoples (28). With this shorter life expectancy, chronic diseases are then the leading cause of death (29).

Burden of disease is not experienced equally across Australia. This is evidenced by Aboriginal and Torres Strait Islander Peoples experiencing more than twice (2.3 times) the total burden of disease than that of non-Indigenous Australians (30). Of the total burden experienced, chronic diseases and acute injuries together account for 63%, 10% of the total burden is from cardiovascular diseases (25). Despite substantial reduction in the burden from cardiovascular disease (by 55.3 to 28.9 DALY[2] per 1,000 population; 2003 to 2018), it remains the leading cause of disease burden for Aboriginal and Torres Strait Islander Peoples (30) (25). Diabetes and COPD burden also fell over this time (diabetes: 25.2 to 14.5; COPD: 24.7 to 19.3 DALY per 1,000 population), however, chronic kidney disease burden rose 2003 to 2018 (10.8 to 13.2 DALY per 1,000 population) (25).

Chronic kidney disease requiring dialysis was the major reason for admission to hospital for Aboriginal and Torres Strait Islander Peoples, (44% of admissions, n = 475,671 in 2017 - 2019) (31). Moreso, diabetes is the cause of one in three preventable hospitalisations for Aboriginal and Torres Strait Islander Peoples – which is five-fold that experienced by non-Indigenous Australians in New South Wales (NSW) (32) and nearly fourfold Australia-wide (6.7 versus 1.8 per 1000 people). (33)

The presence of multimorbidity can lead to increased hospitalisation and is often seen with reduced life expectancy (28, 34). The most recent national data (2018 – 2019) did not report on multimorbidity among Aboriginal or Torres Strait Islander Peoples (17, 35). However, a NSW cohort study found that one in six (16.1%) Aboriginal patients who were admitted to

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[2] Disability-adjusted life year (DALY), is a measure of the number of years lost due to ill health. One DALY equates to one year of full health lost. (REF = ref 2)

hospital at least once over a 10 year period had multimorbidity, compared to one in eight (12.1%) non-Indigenous Australians (36). Despite smaller numbers of Aboriginal Australian respondents, results from a recent review of national self-reported survey data, supported significantly higher multimorbidity among Aboriginal and Torres Strait Islander Peoples (one in four: 24.2% versus one in five: 20.7% $p<0.01$) (37).

Finally, prevalence of chronic disease among Australia's First Peoples is higher among those living in non-remote compared to remote areas, (48% versus 33%) (17). Socioeconomic disadvantage has also been shown to further compound the risk for chronic disease including among Aboriginal and Torres Strait Islander Peoples (28).

1.3 National strategies to address chronic diseases in Australia

1.3.1 In Australia

In Australia, the National Strategic Framework for Chronic Conditions is the overarching strategic framework that underpins population-wide efforts to prevent and address chronic disease (38, 39). This framework also guides state- or territory-based policies and disease-specific strategies (e.g. National Diabetes Strategy, National Strategic Action Plan for Heart Disease and Stroke) (40, 41). Overarching progress is monitored by the Australian Institute of Health and Welfare (AIHW) and results are reported through for example periodic burden of disease studies (42).

The National Strategic Framework for Chronic Conditions has three key objectives:

(1) Prevention: led by the National Preventive Health Strategy 2021–30 (43) together with individual disease-focused organisations (e.g. Diabetes Australia, Heart Foundation, Lung Foundation and Kidney Health Australia) (44-47). Each of these organisations provides resources to guide assessment and treatment and to upskill health professionals, patients and

families (e.g. cardiac risk calculator, educational resources for patients and families, evidence-based guides to direct treatment).

(2) Providing financial support to enable access to care, for individuals with chronic disease: This is enabled by Medicare and the Pharmaceutical Benefits Scheme (38).

(3) Priority populations (38). Priority populations have higher rates of and burden due to chronic disease. Such populations, including Aboriginal and Torres Strait Islander Peoples, may require more support to identify, assess, prevent and treat chronic diseases, in order to reduce associated complications and adverse health outcomes.

1.3.2 Aboriginal and Torres Strait Islander Australians

Overarching guidance and data collection

Nationally, the Aboriginal and Torres Strait Islander Health Plan (40) provides guidance to improve all aspects of health among Aboriginal and Torres Strait Islander Peoples, including chronic disease. This plan is informed by consultation with organisations Australia-wide including the National Aboriginal Community Controlled Health Organisation (NACCHO). This plan is also informed by data from the Aboriginal and Torres Strait Islander Health Survey (17). However, such national data have been shown to have shortcomings (48) and likely underestimate prevalence of chronic disease. This underestimation is likely due to a range of factors including under-diagnosis of initially asymptomatic chronic conditions such as high blood pressure and diabetes, and the sensitive nature of divulging presence of chronic illness, due to shame or stigma (14, 48).

Despite these data quality shortcomings, collection and reporting of data on the health and welfare of Aboriginal and Torres Strait Islander Peoples is essential to assist with directing initiatives. To determine whether such collection methods and use of health and welfare data is appropriate, requires data sovereignty[3] and empowerment of Aboriginal and Torres Strait Islander Peoples in this process (50). To support this, there is the need for interconnected systems that enable access to a complete picture of health (50).

Prevention

Prevention impacts on health and welfare. To this end, the National Guide to Preventive Health Assessment for Aboriginal and Torres Strait Islander Peoples (51) helps guide early identification of chronic disease and linkage with follow-up. This then targets the prevention of associated complications such as macro- and micro- complications from diabetes (51). As part of this preventive health strategy, general practitioners (GPs) are funded by Medicare to assess Aboriginal and Torres Strait Islander Peoples for chronic diseases (52). This is done using the Indigenous-specific preventive health assessment (52). However, such assessments are often inconsistently completed (52) and follow-up is not always organised (52, 53). In turn, this can result in missed opportunities for early care (chapter 4).

Closing the Gap

The National Agreement on Closing the Gap (CTG) was implemented in 2008 to address the inequality with non-Indigenous Australians (54) (See Figure 1). The National Agreement created and promoted a partnership between the Commonwealth Government and Aboriginal and Torres Strait Islander Peoples (54, 55). To achieve this equality, it has incorporated specific targets. The development and implementation of the Closing the Gap targets were led by the National Indigenous Australians Agency (NIAA). This agency was formed in 2019 to advise government on issues affecting Aboriginal and Torres Strait Islander Peoples. As a

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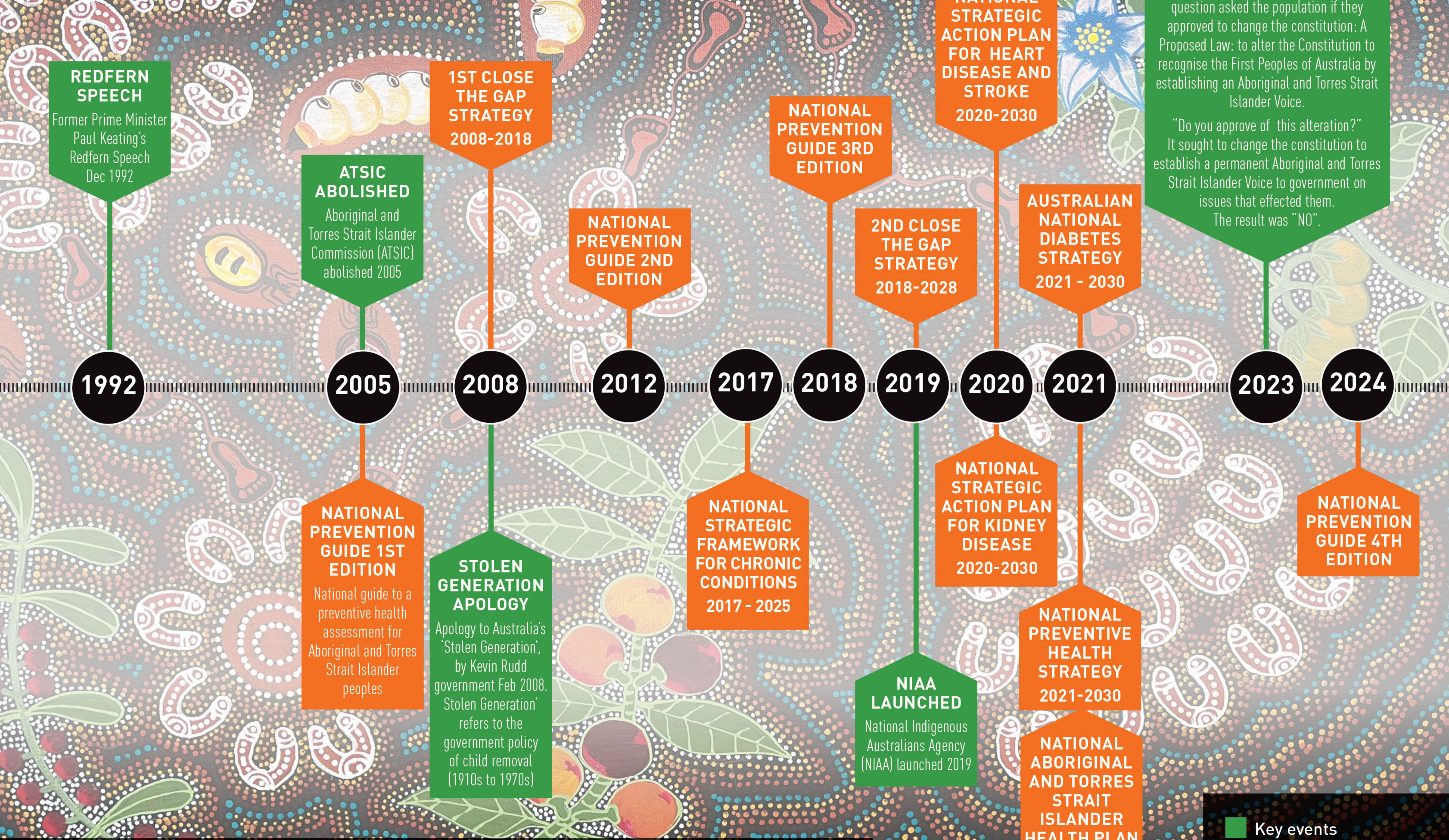
[3] Data sovereignty refers to the right of Indigenous peoples to decide at all stages how data about them is collected, through to dissemination of any findings, use of, as well as ownship of the data. It can reflect not only data about Indigenous peoples but also data related to their lands, waterways and views of the world 49.

Walter M, Lovett R, Maher B, Williamson B, Prehn J, Bodkin-Andrews G, et al. Indigenous data sovereignty in the era of big data and open data. Australian Journal of Social Issues. 2021;56(2):143-56..

result by 2020, the National Agreement on CTG was revised, through collaboration with peak Aboriginal and Torres Strait Islander health bodies (Coalition of the Peaks) (56). This revision enabled Aboriginal and Torres Strait Islander Peoples to decide the priority areas, that they wanted to be included in the National Agreement on CTG (54, 55).

Figure 1: Timeline of national strategies and key events related to chronic disease among Aboriginal and Torres Strait Islander peoples



1992

REDFERN SPEECH
Former Prime Minister Paul Keating's Redfern Speech Dec 1992

2005

ATSIC ABOLISHED
Aboriginal and Torres Strait Islander Commission (ATSIC) abolished 2005

NATIONAL PREVENTION GUIDE 1ST EDITION
National guide to a preventive health assessment for Aboriginal and Torres Strait Islander peoples

2008

1ST CLOSE THE GAP STRATEGY
2008-2018

STOLEN GENERATION APOLOGY
Apology to Australia's 'Stolen Generation', by Kevin Rudd government Feb 2008. Stolen Generation' refers to the government policy of child removal (1910s to 1970s)

2012

NATIONAL PREVENTION GUIDE 2ND EDITION

2017

NATIONAL STRATEGIC FRAMEWORK FOR CHRONIC CONDITIONS
2017 - 2025

2018

NATIONAL PREVENTION GUIDE 3RD EDITION

2019

2ND CLOSE THE GAP STRATEGY
2018-2028

NIAA LAUNCHED
National Indigenous Australians Agency (NIAA) launched 2019

2020

NATIONAL STRATEGIC ACTION PLAN FOR HEART DISEASE AND STROKE
2020-2030

NATIONAL STRATEGIC ACTION PLAN FOR KIDNEY DISEASE
2020-2030

2021

AUSTRALIAN NATIONAL DIABETES STRATEGY
2021 - 2030

NATIONAL PREVENTIVE HEALTH STRATEGY
2021-2030

NATIONAL ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH PLAN
2021 - 2031

2023

VOICE REFERENDUM
The Voice Referendum 2023. The referendum question asked the population if they approved to change the constitution: A Proposed Law: to alter the Constitution to recognise the First Peoples of Australia by establishing an Aboriginal and Torres Strait Islander Voice.

"Do you approve of this alteration?"
It sought to change the constitution to establish a permanent Aboriginal and Torres Strait Islander Voice to government on issues that effected them.
The result was "NO".

2024

NATIONAL PREVENTION GUIDE 4TH EDITION

🟩 Key events
🟧 National strategies

Artwork by Marie Ryder, Alice Springs/Mparntwe 2023 produced to illustrate the candidate's major thesis work. "The story of a diabetic person. The footprints represents the journey the diabetic person travelled." Wild figs, bush tomatoes, bush berries, witchetty grubs and honey ants are healthy foods from the NT.

Close the Gap (CTG) and medications

Many factors needed to be addressed to positively impact the CTG targets. From the early stages of the CTG, coordinated and enhanced access to medications was identified as a key factor. As a result, the CTG arm of the Pharmaceutical Benefits Scheme was implemented in 2010. For Aboriginal and Torres Strait Islander Peoples who registered for the scheme through their GP, medications (including those used to treat chronic disease) (57) were available at reduced costs to improve access. As a result, higher uptake of this subsidised prescription scheme has shown to reduce hospital admissions related to chronic illness (58), increase patient/client acquisition of prescription medications, of GP visits, and of uptake of chronic disease services (59). Despite this, recent work has revealed that uptake of CTG-subsidised prescriptions varied substantially across the country (15-87% in Victoria and New South Wales (NSW); Tasmania, 30-40%) (60). To access CTG registration, it requires accessible primary care services which is not always possible (61, 62). Enabling others for example, hospital health care workers, to register patients for the CTG scheme would go some way to increase opportunity for medication access and improved outcomes.

1.4 Why focus on diabetes in this thesis?

Type 2 diabetes (herein referred to as 'diabetes') has a far-reaching impact in Australia. Diabetes is one of the highest causes of disease burden in Australia, resulting in almost 10% of all hospitalisations, and one in 16 deaths (63). Aboriginal and Torres Strait Islander Peoples experience diabetes nearly three times more frequently their non-Indigenous counterparts (64). Reasons for this stem from lasting effects of colonisation on, for example, food insecurity, intergenerational poverty and poorer social determinants of health (33). As a result, diabetes is the most frequently occurring chronic disease and the second highest cause of potentially avoidable death among Aboriginal and Torres Strait Islander Peoples, after cardiovascular disease (17, 33).

Delayed access to primary health care contributes to poorer health outcomes from diabetes for Aboriginal and Torres Strait Islander Peoples (33, 61). It can mean less opportunity for early screening, treatment and discussion about lifestyle optimisation strategies. This is important because diabetes occurs more commonly in young Aboriginal and Torres Strait Islander Peoples compared with young non-Indigenous Australians (65). Factors which contribute to earlier age of onset and cycle of diabetes include pre-pregnancy levels of diabetes (40) and gestational diabetes (66). As a result young people are predisposed to obesity and diabetes (66). Therefore, we urgently need more options to assess risk earlier and offer treatment options, as needed.

As prevalence of diabetes is higher for Aboriginal and Torres Strait Islander Peoples, current guidance exists and recommends annual HbA1c (glycated haemoglobin) testing for those aged 18 years and over (67). HbA1c gauges blood glucose control over the previous three months (67). However, because of rising incidence of youth diabetes among Aboriginal and Torres Strait Islander Peoples, HbA1c testing is recommended for those aged 10 years and older with specific risk factors (e.g. obesity, maternal gestational diabetes, immediate family member with diabetes) (68).

Despite the availability of HbA1c testing, it is often underutilised (69). Previous studies report that only half of Aboriginal and Torres Strait Islander patients with diabetes have had their HbA1c checked in the last six months (compared to the recommended three), or sought help from an Aboriginal and Torres Strait Islander primary care service (in 2018) (69). Considering the presentation and repercussions of diabetes for Aboriginal and Torres Strait

Islander Peoples, a focus on diabetes with earlier screening using targeted HbA1c testing and accompanying care, is urgently needed.

1.5 Efforts to address diabetes in Australia

1.5.1 Nationally

Diabetes, and its associated burden, is increasing in the Australian population (40). It follows that a targeted approach is needed, which focuses on prevention, awareness, detection, burden reduction, priority populations (including Aboriginal and Torres Strait Islander Peoples and pregnant women) and nationally funded research, to generate evidenced based recommendations (40). Nationally, such efforts to curb diabetes and related complications rates are guided by the aforementioned Australian National Diabetes Strategy (40).

Alongside such efforts, Diabetes Australia also provides guidance and resources to facilitate implementation of Australia's diabetes strategy. Diabetes Australia has state- and territory-based arms and it also manages the National Diabetes Services Scheme (NDSS) (44). Patients registered for the NDSS can access financial assistance via subsidised products and consumables to manage diabetes (e.g. needles, syringes for insulin and blood glucose monitoring strips) (44). The NDSS also provides nationally funded diabetes educational programs (e.g. in schools, with pregnant people, in foot and eye care programs (44)).

Costs associated with diabetes, both direct and indirect (eg. time off work) are high, and can be doubled by the presence of diabetes-related complications (40). Medicare and the Pharmaceutical Benefits Scheme further assist with financial support for medical care and prescribed medication (38).

1.5.2 Among Aboriginal and Torres Strait Islander Australians

The National Diabetes Strategy contains a number of national initiatives which focus on Aboriginal and Torres Strait Islander Peoples (40). For example, Diabetes Australia and NDSS provide culturally safe resources for entire communities, individuals and Aboriginal Health Workers (e.g. Diabetes Yarning, Feltman®/Feltmum®, peer support and Back on Track (44)). To build local capacity, Australian government funding exists to further upskill Aboriginal and Torres Strait Islander Peoples as diabetes health workers.

Other national, Australian government-funded programs also exist which, for example: fund rapid diabetes testing along with training for rural and remote Aboriginal and Torres Strait Islander Medical Services (i.e. Quality Assurance for Aboriginal and Torres Strait Islander Medical Services (QAAMS) Program) (70); fund community-led programs that address chronic diseases, including diabetes (e.g. Indigenous Australians Health Programme (IAHP)] (71).

Much can be learnt from work done in the Aboriginal Community Controlled Organisation (ACCHO) sector (72). In this setting, holistic care, which includes care for family, is offered in a culturally safe environment, by a multidisciplinary team. This method has led to improved health outcomes, including improved risk assessment and treatment of chronic disease, including diabetes (72).

Together with this, community-led programs provide place-based solutions (73). For example, ‘Too Deadly for Diabetes’ founded by Ray Kelly (Kamilaroi Nation; exercise physiologist), is a screening, treatment optimisation, life-style modification (nutrition and exercise) program, run by the Aboriginal and Torres Strait Islander community for community (74). Secondly, a program conducted at Waminda Aboriginal Health and Wellbeing Organisation, on Yuin Country, NSW (75) offers diabetes care by providing continuous glucose monitors, shared medical appointments and culturally appropriate "food appreciation" sessions (75). These two projects are examples of recent community-led, community-implemented programs which have had positive results for people with diabetes, in pockets across the country (74-76).

1.6 Pharmacists' diabetes care role: Aboriginal and Torres Strait Islander Australians

Pharmacists work in different settings in Australia including in the community and in hospitals. An overview of pharmacists' work to help Aboriginal and Torres Strait Islander Peoples with diabetes, is set out below.

1.6.1 Community

In community health, community pharmacists are often the first port of call. They have an important role in offering community-based health promotion activities for diabetes (77). This is particularly valuable given the shame and stigma experienced by Aboriginal and Torres Strait Islander Peoples surrounding a diagnosis of chronic disease especially diabetes (78). As such, community pharmacists have a key role in delivering health messages for Aboriginal and Torres Strait Islander Peoples (78). For example, the national Indigenous Medication Review Service (IMeRSe) (79) feasibility study explored the role of community pharmacists in medication management for Aboriginal and Torres Strait Islander Peoples, including diabetes. However, this work is no longer occurring, due to lack of federal support (79).

Community pharmacists also have a well-recognised role in providing medicines information and chronic disease education (including for diabetes) for Aboriginal and Torres Strait Islander Peoples (78, 80). Previous studies have shown that Aboriginal and Torres Strait Islander Peoples want information to help them and their family understand their medications and to inform their choices about safe medication use (80). Written, plain English information is preferred to empower them and instil self-confidence (80).

Few studies have documented the role of community pharmacists in diabetes screening (81-83), and specifically for Aboriginal and Torres Strait Islander Peoples (78, 84). The ‘Too Deadly for Diabetes’ program mentioned earlier, is facilitated in western Sydney (76) by the local community and a community pharmacist (personal communication with Ray Kelly). However, there is limited evidence of diabetes screening programs specifically tailored for Aboriginal and Torres Strait Islander Peoples in community pharmacies (81).

Community pharmacists have a substantial role in enabling access to other support programs, such as implementing the NDSS (44). They also help to improve medicines access and continuity of care, by facilitating the Closing The Gap (CTG) medicines access program, for Aboriginal and Torres Strait Islander Peoples.

Community pharmacists also facilitate and conduct home medicines reviews (HMR) (85). HMRs can be beneficial for individuals with chronic diseases including diabetes (85) and particularly for Aboriginal and Torres Strait Islander Peoples who experience a higher burden from chronic illness (85). Despite this, barriers to implementing HMRs for Aboriginal and Torres Strait Islander Peoples have been identified (86). These include lack of awareness of the HMR program, lack of relationship building (pharmacist with client, pharmacist with Aboriginal medical service), and the need to provide HMR in a culturally appropriate way (86).

Pharmacists are also being integrated into the community-based ACCHO setting (87). ‘The Deadly Pharmacist’ online training course is accessible nationally (88), developed by NACCHO with the Pharmaceutical Society of Australia. This training course offers knowledge and support to pharmacists working in ACCHOs (88). Pharmacists in ACCHOs encourage self-determination, by empowering patients through health literacy and enabling patient choice throughout their care, treatment and medication use (89). This could then lead to safe use of medications (87, 89), benefits from medication adherence and improved chronic disease markers (including blood glucose levels) for patients with diabetes (87).

Following success in the ACCHO setting (87), the integration of non-dispensing pharmacists into Aboriginal medical services in rural and remote Northern Territory settings has been explored with positive results (90). Their role was mainly for chronic disease management (including diabetes) and included for example, medicines management, medication reconciliation post hospital discharge and HMRs (91). This work has prompted discussions and submission to federal Australian government funding bodies, to consider funding the expansion of these services to all rural and remote Aboriginal medical services.

1.6.2 Hospital

Chronic diseases, including diabetes, cause preventable admissions to hospital for Aboriginal and Torres Strait Islander Peoples (92). Pharmacists work in all areas of the hospital setting (e.g. ward areas, outpatients, governance, purchasing, clinical trials, medication safety etc). In doing so they are involved with all steps of the medicine management pathway (93) for patients during a hospital stay. This work does not focus specifically on Aboriginal and Torres Strait Islander Peoples. However, given that many Aboriginal and Torres Strait Islander Peoples do not feel culturally safe in hospitals (62), there remain opportunities for hospital pharmacists to make positive change in this area.

To support work by hospital pharmacists, in 2017, the NACCHO Pharmacists' Leadership Group was formed (94). Also, an opportunity arose for this PhD candidate to help form a Specialty Practice Group for Aboriginal and Torres Strait Islander health in the then Society of Hospital Pharmacists of Australia (SHPA; 2019) (95). Both groups support pharmacists to improve their understanding of issues faced by Aboriginal and Torres Strait Islander Peoples, and how this can in turn effect medicines use. However, work being done in this space ha s not been qualitatively examined, quantified, nor explored fully to maximise outcomes to improve the health of Aboriginal and Torres Strait Islander Peoples.

1.7 Thesis aims and objectives

The overarching aim of this thesis is to explore the contribution that hospital pharmacists can make when working with Aboriginal and Torres Strait Islander Peoples. I describe current and future models of culturally safe pharmacy care to assist with earlier detection and ongoing management of chronic disease.

This thesis is comprised of six discrete studies. Specific objectives of each are outlined below:

Study 1. Systematic review (Chapter 2)

This study uses a systematic review of the literature to determine the role of the hospital pharmacist and pharmacy in providing health services to Aboriginal and/or Torres Strait Islander Peoples in Australia.

This work has been published in the Journal of Pharmacy Practice and Research (doi.org/10.1002/jppr.1666).

Study 2. What are hospital pharmacists doing? Survey study (Chapter 3)

This study determines the roles of, and specific services provided by, Australian hospital pharmacists and pharmacy departments in providing medicine management services to Aboriginal and/or Torres Strait Islander Peoples admitted to hospital. Actual and perceived outcomes are explored.

This work has been published in the Journal of Pharmacy Practice and Research (doi.org/10.1002/jppr.1789).

Study 3. Uncovering missed opportunities: Retrospective study (Chapter 4)

To help inform clinicians of the presence of chronic disease in a metropolitan hospital setting, this next study describes and quantifies chronic disease markers and reasons for hospital admission among a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples.

This work is under review with the Internal Medicine Journal.

Study 4. Connecting the Dots of Care: Prospective study (Chapter 5)

This exploratory study identifies how urban hospital pharmacists can detect if Aboriginal and/or Torres Strait Islander Peoples admitted to hospital are at risk of, or have, a diagnosis of diabetes.

This work has been published in Exploratory Research in Clinical and Social Pharmacy (doi.org/10.1016/j.rcsop.2023.100351).

Study 5. Culturally appropriate research? Assessing a pharmacist-led study (Chapter 6)

This study determines if the process used to design and implement a pharmacist-led diabetes screening study is culturally appropriate for Aboriginal and/or Torres Strait Islander Peoples admitted to a New South Wales metropolitan hospital.

This work has been published in the Journal of Pharmacy Practice and Research (doi.org/10.1002/jppr.70008).

Study 6. Two-way learning: a collaboration with Aboriginal health workers (Chapter 7)

Culturally appropriate communication is key to enable future expansion of risk assessment by all pharmacists in the hospital. So, to further develop pharmacists' ability to communicate in a culturally safe manner – this study developed, implemented and evaluated a two-way learning program from the perspective of Aboriginal health workers and pharmacists. This study was conducted in a metropolitan hospital in New South Wales.

This work is under review (comments addressed) with the Journal of Pharmacy Practice and Research.

1.8 Thesis outline

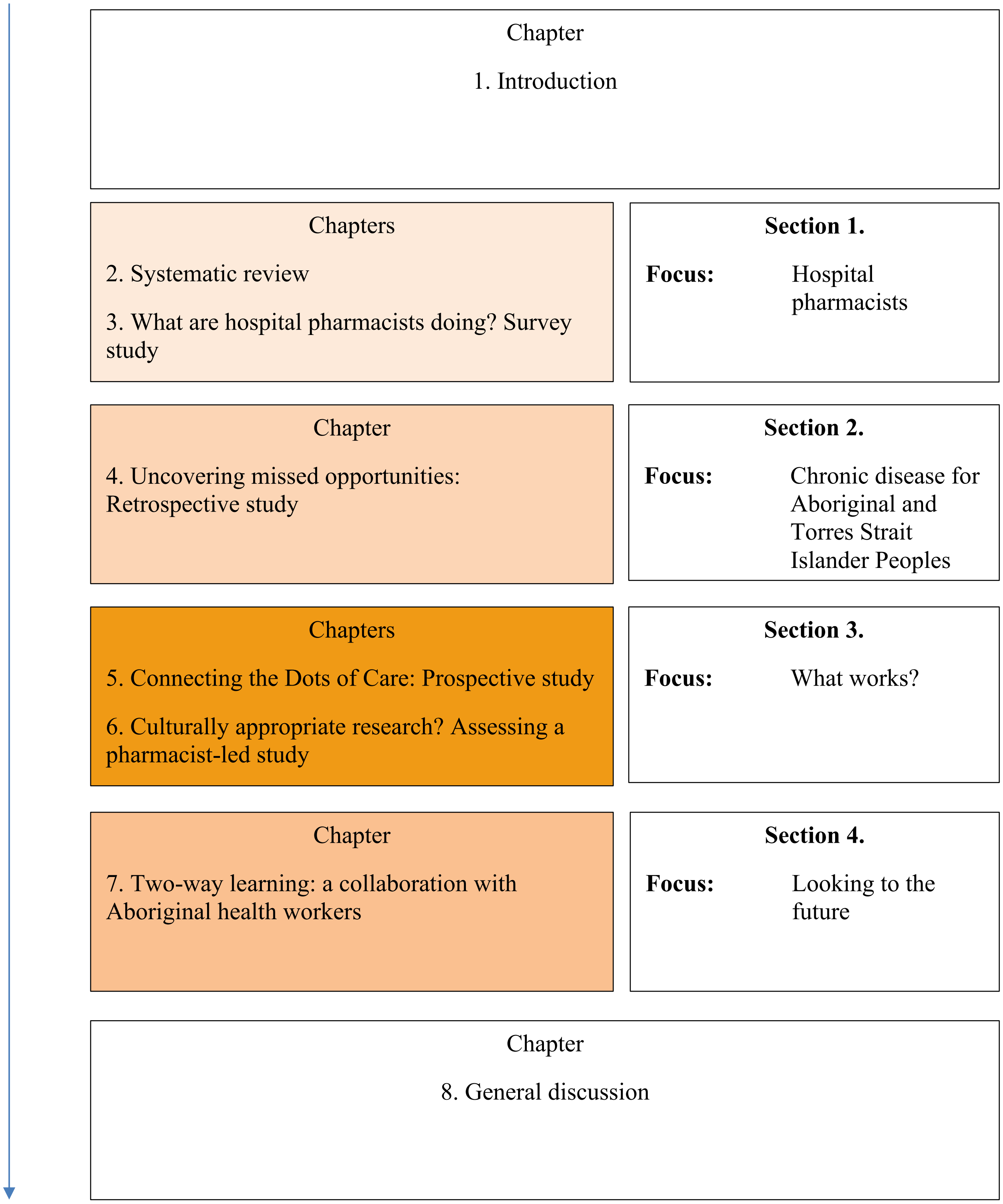
This thesis has been organised into a series of publications with an introduction (chapter 1) and general discussion (chapter 8). Original referencing as provided for the remaining chapters (chapters 2-7) has been retained as in my 'under review' or published journal articles. A separate thesis reference list is provided for chapter 1 (introduction), the bridging pages for chapters 2-7 and for chapter 8 (general discussion).

Chapter 1 (introduction) provides an outline of chronic diseases, their effects for Aboriginal and Torres Strait Islander Peoples, and the existing role for pharmacists to care for chronic diseases including diabetes.

Following this introduction, the thesis is comprised of four key sections spanning six published works (Figure 2): (1) Hospital pharmacists [2 publications]; (2) Chronic disease in Aboriginal and Torres Strait Islander Peoples in hospital [1 publication]; (3) What works for hospital pharmacists to assess risk of diabetes, using a culturally appropriate research process [2 publications]; and (4) Looking to the future: Developing, implementing and evaluating a two-way learning between Aboriginal health workers and hospital pharmacists [1 publication].

The thesis concludes with a general discussion that unpacks key themes from across the six results chapters, along with thesis implications, strengths/limitations, and a conclusion.

Figure 2. Thesis outline: thesis with publications (6) in four sections



2. SYSTEMATIC REVIEW

In Chapter 1, I set the scene for this thesis by demonstrating how historical events are connected to chronic disease that is experienced by Aboriginal and/or Torres Strait Islander Peoples. It established the role for pharmacists to care for people with chronic disease, for example, diabetes. However, work done in this space has not been qualitatively examined, quantified, nor explored fully to maximise health outcomes for Aboriginal and Torres Strait Islander Peoples.

This next chapter (chapter 2) is a systematic exploration of what is known in the literature. It identifies the gaps in knowledge about the role of the hospital pharmacist and the services provided for Aboriginal and/or Torres Strait Islander Peoples. A systematic search of the current literature was conducted (i.e. research articles, editorials, reports and full conference abstracts). The populations included were Aboriginal and Torres Strait Islander Peoples and hospital pharmacists/pharmacy department services in Australia.

This work has been published as: Welch S., McMillan F., Moles R. Hospital pharmacy services supporting Aboriginal or Torres Strait Islander peoples in Australia: A systematic review. Journal of Pharmacy Practice and Research 2020;50:191 – 204 doi.org/10.1002/jppr.1666 (96)

My contribution to this work is outlined in Table 1. (page 19)

JOURNAL OF Pharmacy Practice and Research
Official Journal of the Society of Hospital Pharmacists of Australia
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REVIEW

Hospital pharmacy services supporting Aboriginal or Torres Strait Islander peoples in Australia: a systematic review

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Abstract

Aim: To systematically review the literature to investigate the role of the hospital pharmacist and the services provided for Aboriginal and/or Torres Strait Islander people.
Methods: A systematic literature review was performed following a search from inception to present of MEDLINE, International Pharmaceutical Abstracts (IPA), EMBASE, Scopus and Pubmed, in accordance with PRISMA guidelines. All forms of published literature were included. Aboriginal and/or Torres Strait Islander people and hospital pharmacists/pharmacy department services in Australia were the populations included.
Results: 1592 studies were identified. After removal of duplicates and application of inclusion and exclusion criteria, 16 papers underwent full text review, with 7 papers included in the final review. No high-level evidence articles were found. Joanna Briggs Institute Levels of Evidence for meaningfulness were low. Settings were varied and included rural, remote and urban sites. Five articles were allocated a Donabedian Model level where the structure was described. Two papers described structure and process. None described outcomes. Hospital pharmacy services included development of models for patient care, partnerships and resource sharing in rural and remote areas and ensuring continuity of care.
Conclusion: Systematic review of the literature to determine the role of hospital pharmacy services for Aboriginal and/or Torres Strait Islander people produced limited publications for review. From these, roles identified included: development of models for patient care, partnerships and resource sharing in rural and remote areas and ensuring continuity of care. Future research and publication of work by hospital pharmacists nurturing and developing relationships in partnership with Aboriginal and Torres Strait Islander communities is encouraged.

Keywords: hospital, pharmacists, Aboriginal, Torres Strait Islander, pharmacy.

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Two of the authors are employed on Gadigal land and one is a Wiradjuri woman who works on country. These lands are Aboriginal lands and services are provided to Aboriginal and/or Torres Strait Islander people on these lands. In recognition of the diversity of contemporary Australia and the ability of people to move for social and/or financial reasons, then both Aboriginal and/or Torres Strait Islander people can reside across the country. The terminology which refers to Aboriginal and/or Torres Strait Islander people will be used throughout this paper except when quoting from resources which have used other terminology.

INTRODUCTION

Pharmacists are an important part of health care and the delivery of health and human services. They work throughout hospitals in areas which can potentially assist Aboriginal and/or Torres Strait Islander people during their stay. The medicines management pathway describes the cognitive and physical steps involved in the use of medicines, with a focus on the consumer. Hospital pharmacists have an established role at all steps of the pathway and in overseeing the integration of the steps.[1]

Aboriginal and Torres Strait Islander Health and Disparities

It has been acknowledged that outlining statistics regarding the health of Aboriginal and Torres Strait

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Islander people can give them a sense of overwhelming negativity and inevitability. We wish to acknowledge upfront that this is not our intention, rather we aim to shed light on the fact that the consequences of dispossession, exclusion and poverty have led to these statistics and the statistics are not inevitable.[2]

The estimated resident Aboriginal and Torres Strait Islander population of Australia is 3.3% of the total Australian population.[3] Aboriginal and Torres Strait Islander health is a national priority issue. Indigenous males born between 2015 and 2017 have a life expectancy of 71.6 years (8.6 years less than non-indigenous males) and indigenous females have a life expectancy of 75.6 years (7.8 years less than non-indigenous females).[4,5] The Close the Gap campaign set a target to close the gap in life expectancy by 2031. This target is not on track to be met. There has been no significant change in the gap in chronic disease mortality rates between indigenous and non-indigenous Australians between 2006 and 2017.[4]

These statistics should be considered together with the disadvantages that Aboriginal and/or Torres Strait Islander people experience when it comes to the social and cultural determinants of health and the accessibility of health and wellbeing services. As a result, these are key priorities of the National Aboriginal and Torres Strait Islander Health Plan (2013–2023).[6]

In the latest Health Survey, one in ten (11.1%) Aboriginal and Torres Strait Islander adults had diabetes.[7] Around half (53.1%) with diabetes also had signs of chronic kidney disease. Two in three (65.3%) had at least one risk factor for cardiovascular disease. Nearly one in five (17.9%) had signs of chronic kidney disease, 25% had high cholesterol, 44.4% self-reported being a current daily smoker. Age standardised data showed that they were more than three times as likely as non-indigenous people to have diabetes and it occurred 20 years earlier,[7] and the ischaemic heart disease death rate was nearly twice as high for Aboriginal and Torres Strait Islander people as that for non-indigenous Australians.[8] Those aged 18 years and over were nearly three times as likely as non-indigenous people to have experienced high/very high levels of psychological distress.[7] Potentially avoidable hospitalisations were reported at almost five times the rate of non-indigenous Australians, with over half associated with chronic conditions.[9] Recent work illustrated that there was a higher use of Emergency Departments (ED) by Aboriginal people with chronic disease compared with non-indigenous people, even when adjusted to remove rurality and admissions due to injuries and poisonings.[10]

Like Senior and Carriage, we too wish to acknowledge that, "Aboriginal and Torres Strait Islander people have a resilience in spite of all odds and have a strong engagement with health systems to effect change."[2]

Culturally Competent and Safe Care

The National Aboriginal and Torres Strait Islander Health Plan[6], speaks to the centrality of culture; for many Aboriginal and/or Torres Strait Islander people, true healing is not possible without acknowledgement of spirituality or the relationships of individuals with their family and community, because traditional culture has a holistic view of health that emphasises pluralism, self-determination, community, family, relationships and achieving balance within all the domains of human life.[11-13] As has been recognised in other indigenous groups, Aboriginal and/or Torres Strait Islander people's trust in medicine requires health providers, including pharmacists, to have an understanding of the person's beliefs about Western and traditional medicine within the historical and socioeconomic context.[14] This is a necessary part of cultural autonomy for Aboriginal and/or Torres Strait Islander patients and this in turn, is a crucial step towards improving patient adherence, knowledge and therapeutic outcomes for each person.[14] It is imperative that pharmacists have an understanding of these links in order to work with Aboriginal and/or Torres Strait Islander people to achieve positive outcomes. Caring for Aboriginal and/or Torres Strait Islander people whilst they are in hospital requires an understanding of a number of factors. These include some of the following: cultural beliefs and importance of family and their link with overall health, recognition of institutional racism and deficit discourse and the differences between Aboriginal and/or Torres Strait Islander and non-indigenous patient hospital experiences and barriers to care.[11,13,15-17]

It is important that all health providers, including hospital pharmacists have cultural competence when it comes to caring for Aboriginal and/or Torres Strait Islander people. Cultural competence includes an understanding that the wellbeing of Aboriginal and/or Torres Strait Islander people is strongly connected to country and community, and disconnection from these because of hospitalisation can affect their access to the healthcare system in many ways.[11]

Pharmacy Services

Due to the gap in positive health outcomes, all healthcare professions should endeavour to make changes that result in the closing of this gap. The Pharmaceutical Society of Australia (PSA) and National Aboriginal Community Controlled Health Organisation (NAACHO) have supported the implementation of pharmacists within

Aboriginal Medical Services (AMS) or Aboriginal Community Controlled Health Organisations (ACCHO) and to perform Home Medicines Reviews for Aboriginal and/or Torres Strait Islander clients. These positions are funded by the ACCHO and have been well received by local community members with positive outcomes. These pharmacists educate staff and liaise with external stakeholders, including hospitals, to develop strategic plans for more effective medicine use.

Community pharmacists have been actively involved with Aboriginal and/or Torres Strait Islander health for a number of years through such programmes as the Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) programme and more recently the IMeRSe study. Both are funded under the Community Pharmacy Agreement.[18,19]

Hospital pharmacists, as medication experts in the hospital setting, have experience in the medication management of, for example: all forms of chronic illness; smoking cessation and Emergency Medicine.[20-22] This experience places pharmacists in an ideal position to offer services that support self-determination for Aboriginal and/or Torres Strait Islander inpatients. Their links with community in other areas across transitions of care, could be extrapolated to specifically focus on Aboriginal and/or Torres Strait Islander people who present to hospital to help reduce avoidable hospitalisations and promote continuity of care.[23] The recent creation of the Society of Hospital Pharmacists of Australia Specialty Practice Stream for Aboriginal and Torres Strait Islander Health (2019)[24] as well as the ACCHO Pharmacist Leadership Group (2017) are other innovations that seek to increase the understanding of issues, services and medications when working with Aboriginal and Torres Strait Islander peoples and communities.[25]

Why Hospital Pharmacy Services Need Investigation

The role of the hospital pharmacist is extensive and has been outlined in the Society of Hospital Pharmacists of Australia Standards of Practice for Clinical Pharmacy Services.[23]

It is not known whether there are any specific roles that the pharmacist has with regard to the services provided specifically for Aboriginal and/or Torres Strait Islander people (Figure 1). To provide baseline knowledge of work done by hospital pharmacists, to inform us about existing gaps and on which we can build future work, a systematic review of the literature was required.

The aim of this study was to systematically review the literature to determine the role of the hospital pharmacist and pharmacy in providing health services to Aboriginal and/or Torres Strait Islander people in Australia.

METHOD

This systematic literature review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.[26]

Search Strategy

MEDLINE, International Pharmaceutical Abstracts (IPA), EMBASE, Scopus and Pubmed via LitSearch NCBI account were searched from inception to present. A search was performed of Informit: APAIS-ATSIS (1978-present) and ATSIhealth (1900 – present). Subject headings and truncated keywords related to pharmacy and Aboriginal and Torres Strait Islander were used. (See Appendix 1 for the full search strategy.)

Study Selection

All forms of published works (editorials, reports, primary studies, reviews, guidelines) were included if they satisfied the inclusion criteria.

The authors were aware that very few randomised controlled trials had been conducted to examine this issue, so a deliberately broad inclusion criteria was applied regarding study methodology.

Inclusion Criteria: All forms of published literature were included (research articles, editorials, reports and including full conference abstracts).

The populations included were Aboriginal and Torres Strait Islander people and hospital pharmacists/pharmacy department services in Australia. Articles published in English were included. Studies were included if Aboriginal and/or Torres Strait Islander people were the study focus. If a description of a large Aboriginal and/or Torres Strait Islander population (10% or more) with pharmacist services was included, then it was assumed that services were provided to this population.

Exclusion criteria: community pharmacist services.

The titles and abstracts were screened independently by two investigators and included if they met the pre-defined inclusion criteria. The full text copies of the potentially relevant papers were independently reviewed by two investigators for possible inclusion. Applying the Donabedian Model,[27] a level was assigned to each of the outcomes described that were included in the paper; Structure (S), Process (P) and/or Outcome (O). Study quality was assessed using the Joanna Briggs Institute (JBI) Levels of Evidence for Meaningfulness, with 1 (qualitative

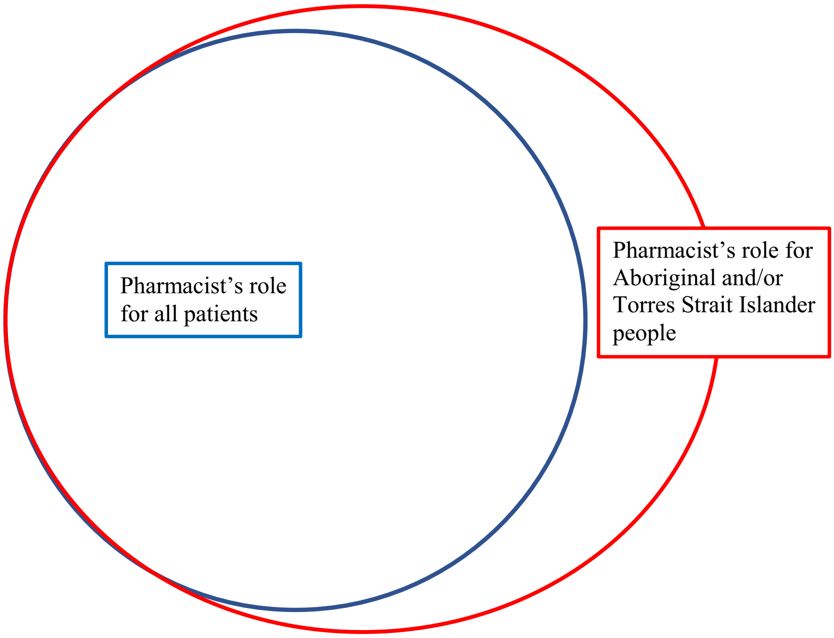

Figure 1 Identification of the role of the hospital pharmacist in the care of Aboriginal and/or Torres Strait Islander people.

or mixed methods systematic review) assigned to the highest level and 5 (Expert opinion) the lowest level.

RESULTS

A total of 1592 publications were identified in the review which equated to 1247 after duplicates had been removed (Appendix 2). After exclusion, 16 papers underwent full text review and seven were included in the final review[28-34] (Figure 2).

No clinical trial data or articles with measurable outcomes were found. The 7 papers included were made up of: guideline[28,29] (2), editorial[30,33] (2), primary (before-after) study[31] (1), published conference abstract[32] (1), report[34] (1). Settings varied and included rural, remote and urban sites. Five included articles were allocated a Donabedian Model level where the structure was described and two described the structure and process of the service that was in place. No studies described any outcome measures (Table 1). According to the JBI checklists for critical appraisal of articles, none of the papers found could be assessed against the criteria included. Instead the Levels of Evidence for Meaningfulness were allocated to each article (Table 1).

Morrissey and Ball[31] (2014) (JBI Meaningfulness level 3) conducted a primary before-after study that involved pharmacy undergraduate students who visited different sites in the Northern Territory. These authors measured student knowledge and identified the services pharmacists provided but did not outline the processes involved or measure outcomes. It also showed that pharmacists had a role in the education of future pharmacists to provide them with knowledge of Aboriginal and/or Torres Strait Islander health issues.

Of the two guideline articles (JBI Meaningfulness level 4), firstly, the Pharmaceutical Society of Australia Guide to Providing Services to Aboriginal and Torres Strait Islander People[28] by Swain (2014) provided useful recommendations for hospital pharmacists, however these specific recommendations were not referenced and did not provide any measure to show whether pharmacists are performing these roles. Secondly, Skellet[29] (2007) provided an overview of the pharmacists role in providing medications for Aboriginal patients.

Two editorials were identified, (JBI Meaningfulness level 5). Carroll's[30] (2015) was included as the service provided was to a large Aboriginal population. It gave an overview of the partnerships, resource sharing, the systems and services that have been set up with the hospital pharmacy in a rural and remote area to enable a sustainable, integrated and culturally appropriate service. Whereas Patel[33] (2014) gave an overview of the role hospital pharmacists can provide in the development of models for patient care such as the Northern Territory Aboriginal Palliative Care Model. She also described the role that the pharmacist can take in the care of Aboriginal patients who require palliative care. It described the process of assisting communication with patient and family surrounding medications and continuity of care issues.

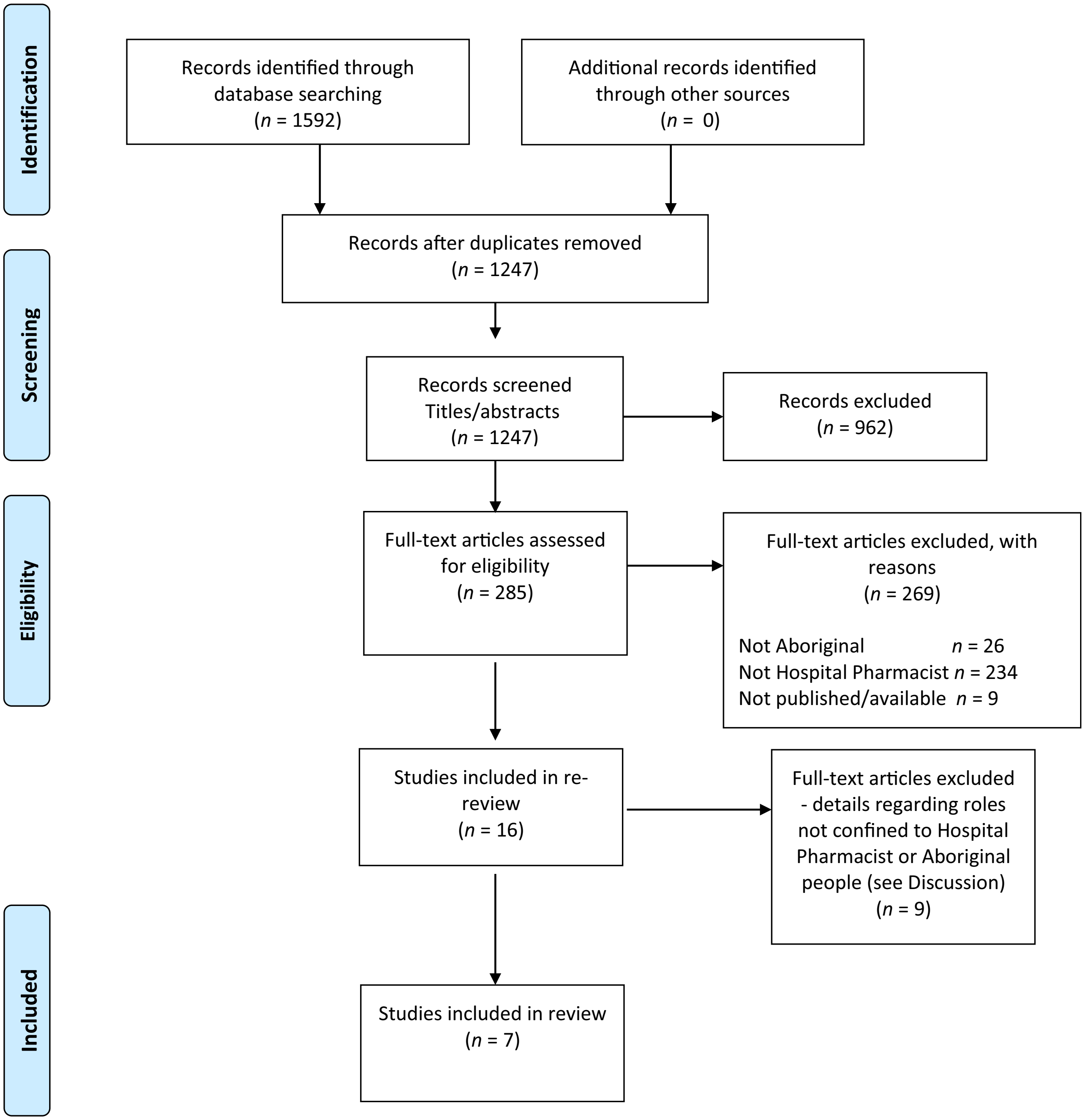

Figure 2 Flow chart of literature search and article selection.

The work by Bryce *et al.*[32] (2012) (JBI Meaningfulness level 3) was a published conference abstract with limited detail, which outlined the effect of a multidisciplinary team with full inclusion of an Aboriginal health worker, on cardiac care for Indigenous Australians and their clinic attendance in the urban setting. The pharmacist was included in this team however their role was not articulated.

The report by Sclater *et al.*[34] (2016) (JBI Meaningfulness level 4) described the structure and process by which a method of identification of Aboriginal and/or Torres Strait Islander patients in hospital can allow a process of pharmacist involvement from admission through to discharge and into the community to assist continuity of care. Outcomes of this were not measured.

There were nine articles rejected post full text review. Reasons for this were primarily because the role of the pharmacist/pharmacy specifically was not described or if it was, then this role and how it focussed on Aboriginal and/or Torres Strait Islander people was not discussed. Whilst Rovers and Mages[35] (2017) provided a

Table 1 Published works reporting structure, process and outcome measures of hospital pharmacy services which support Aboriginal or Torres Strait Islander peoples

Author (year)	Publication type	No. patients	Patient type	Setting	Structural/Process measure	Donabedian Model[20] level Structure (S) Process (P) Outcome (O)	Joanna Briggs Institute level of evidence for meaning fullness
Swain[28] (2014)	Guideline	0	Aboriginal and Torres Strait Islander	Community and hospital	Pharmacists should actively use services of ALO and translator services where available to aid consultation with nominated family members about patient care and medications and helps build rapport. Pharmacists may need to show leadership and advocate for change to establish a more culturally safe environment in hospitals. Build good relationships with primary care providers to assist in obtaining accurate MOA. On discharge take into consideration setting into which pt will be D/Cd eg availability of GP and pharmacy services to ensure adequate supply given on D/C; storage options and information about D/C medication action plan is understood and communicated to primary care providers.	S – Overview of recommended pharmacist role in providing medications for Aboriginal patients	4 (systematic review of expert opinion)
Skellet[29] (2007)	Guideline	0	Aboriginal	ACCHO & hospital	Hospital pharmacists need to be aware and sensitive to fears of hospitals. Strive to build relationships based on openness and trust to promote receptiveness to medical advice. Ensure medications are provided before discharge from hospital . Assess dispensing considerations eg storage post discharge and fridge availability, dosage timing requirements using visual clues, encouragement to take medications even when feeling fine, communication techniques, use of AHW	S – overview of pharmacists' role in providing medications for Aboriginal patients	4

Table 1 (*continued*)

Author (year)	Publication type	No. patients	Patient type	Setting	Structural/Process measure	Donabedian Model[20] level Structure (S) Process (P) Outcome (O)	Joanna Briggs Institute level of evidence for meaning fullness
Carroll[30] (2015)	Editorial	0	>10% area population is Aboriginal	Rural and remote hospital FWLHD (NSW)	Hospital pharmacy team liaises with remote Aboriginal communities re: Medicine availability, access, storage. Collaboration with RFD, Primary health services (Maari Ma Health) and community pharmacies, Broken Hill Uni (Rural Health) Clinical via telehealth: med reviews, education. Hospital pharmacy team works with RFDS, FWLHD DTC, AMSC to ensure availability of approved medications in line with treatment and transfer protocols.	S – outlined partnerships, resource sharing, systems and services that have been set up to be sustainable integrated and culturally appropriate.	5 (Expert opinion)
Morrissey[31] (2014)	Primary study (before/ after)	29	Pharmacy undergraduate students	Rural and remote pharmacy practice/ hospital (NT)	Students attended many sites with different purposes, including Katherine Hospital. It described how pharmacists provide medicines under S100 rural and remote scheme. Challenges of stocking enough vaccines/meds for flood prone area. Involved in emergency planning eg flooding/meliodosis outbreaks	S – Measured student knowledge. Through students' eyes it showed the services pharmacists provided and that pharmacists had a role in education of future pharmacists and their knowledge of Aboriginal health issues	3 (Single qualitative study)
Bryce[32] (2012)	Conference abstract	Not reported	Outreach clinic	Urban hospital (Qld)	MDT cardiac care + AHW	S – showed the effect of a MDT + AHW was: reduced fragmented care; achieved continuity and culturally appropriate coordinated care for indigenous people with cardiovascular disease and improved clinic attendance but the role of the pharmacist in this was not articulated	3

Table 1 (*continued*)

Author (year)	Publication type	No. patients	Patient type	Setting	Structural/Process measure	Donabedian Model[20] level Structure (S) Process (P) Outcome (O)	Joanna Briggs Institute level of evidence for meaning fullness
Patel[33] (2014)	Editorial	0	Palliative	Hospital (NT)	Development of models for patient care. Pharmacist role incl: Make escorts feel comfortable in unfamiliar setting, assist them to communicate back to family (about medications), involve them in post discharge care needs. Set up protocols and develop education resources for primary care providers to manage common end-of-life symptoms.	S – NT Aboriginal palliative care model. P – assist communication, continuity of care	5
Sclater[34] (2016)	Report	0	Aboriginal and Torres Strait Islander	Urban hospital (NSW)	Identification, MOA, Clinical, D/C, continuity of care	S/P – Process in place for identification and pharmacy services	4

PSA = Pharmaceutical Society of Australia; MOA = medications on admission; D/C = discharge; MDT = multidisciplinary team (includes pharmacist); AHW = Aboriginal health worker; NT = Northern Territory; FWLHD = Far West Local Health District; DTC = Drug and Therapeutics Committee; RFDS = Royal Flying Doctor Service; AMSC = Antimicrobial Stewardship Committee; ACCHO = Aboriginal Community Controlled Health Organisation; ALO = Aboriginal Liaison Officer.

comprehensive overview of drug distribution in remote Australia, hospitals were not included in the paper as suppliers of medications alone to remote Aboriginal medical services. Similarly, Tan et al.[36] (2012) followed the medication pathway in rural Queensland and while the description included hospital pharmacists and pharmacies their roles in providing services to Aboriginal and/or Torres Strait Islander people in particular were not discussed. Larkin and Murray[37] (2005) and Davidson *et al*.[38] (2010) both provided a practical overview of how to assist Aboriginal patients with medication management but this was not specific to one sector of health care, instead it was relevant to many areas which may include pharmacy. The work of de Dassel *et al*.[39] (2017) investigated adherence in Indigenous Australians and chronic condition management. While it discussed strategies to improve adherence in this group, many of which should be considered and could be implemented by hospital pharmacists, the paper did not discuss the involvement of hospital pharmacists in these initiatives. Similarly, Tsai *et al*.[40-43] provided much needed information from pharmacokinetic studies of various antimicrobial agents used in the critically ill Aboriginal population residing in the central desert in their four published articles. While the investigating team included a hospital pharmacist and this illustrated that they could be involved in such studies, they did not discuss the role of hospital pharmacists in this setting.

Collective findings regarding outcomes documented in each included publication can be summarised by reporting on each Donabedian Model level. The Structure of services was described: for medication provision by pharmacists;[28,29,31] the steps needed to set up sustainable, integrated and culturally appropriate services;[30] to show the role pharmacists had in the education of future pharmacists regarding Aboriginal health;[31] to show the effect of a multidisciplinary team, including a pharmacist on care and clinic attendance;[32] for the development of the model of care used for Aboriginal palliative care in the NT which included the involvement of a pharmacist;[33] the structure in place for patient identification and the link then to pharmacy services.[34] The Process was described to assist communication and continuity of care surrounding the palliative care of a patient;[33] as well as that developed for patient identification to enable provision of pharmacy services.[34] No Outcomes were described.

DISCUSSION

This review highlights the dearth of literature illustrating the important role that hospital pharmacists can have in working with Aboriginal and/or Torres Strait Islander people. Overall, there were very few published pieces to illustrate such work. Nor was there any work found which described pharmacy services that had been specifically designed and evaluated to support Aboriginal and/or Torres Strait Islander people. Not enough work has been published in relation to health discrepancies between non-Indigenous and Aboriginal and/or Torres Strait Islander people and the impact of hospital pharmacists on this. All the publications included were descriptive in nature rather than providing data on how to facilitate positive change. They described the structure of services and at best, the process by which this was provided. None of the publications investigated or reported on outcome measures. This means that there is still no evidence that the suggested services, functions and approaches lead to positive change in these settings. Only JBI Levels of Evidence for meaningfulness could be assigned to each inclusion and these were found to be of a low level, none more than 3. This type of reporting is in line with previous work which reviewed Indigenous health research overall in Australia, Canada, New Zealand and the USA.[44] In this paper over time in all four countries, overall published research was predominantly descriptive in nature and the distribution of the type of research over time has not changed significantly, from 1987 to 2003.[44] Furthermore, there are limited data regarding hospital pharmacist-provided services to Indigenous populations outside of Australia. From an international perspective, one report described chronic disease management services provided by pharmacists at a number of Indian Health Service hospitals that provide health care to American Indians and Alaska Natives. Services include chronic disease medication management services, education and anticoagulant services. One such facility provides services to 120 American Indian tribes and provides a 1-year general practice residency program.[45]

The effectiveness of strategies to improve health outcomes for Aboriginal and/or Torres Strait Islander peoples depends on several related elements. A health service must first understand the issues impacting and affecting Aboriginal and Torres Strait Islander peoples.[46] Of the seven works included in the review, four described the need for this understanding in detail.[28,29,31,33] The other two made mention of this, however, due to their publication type (editorial and conference abstract), extensive discussion was not provided.[30,32] Secondly, health services should identify the service delivery gaps in order to deliver effective, systemically responsive services.[46] All seven publications included in the review identified service gaps in a variety of settings including in the education of students[31], cultural awareness gaps in dispensing[28,29], and implementation of new models of care.[30,32-34] Community engagement and collaboration are key to success. Positive outcomes have been achieved when Aboriginal Australians design and lead such initiatives.[47] Engagement with community was shown to some degree by all inclusions whether it was illustrated by, for example, the involvement of ACCHOs, internal Aboriginal health units or Aboriginal representation on authorship of guidance documents. Patel's editorial best described an initiative designed and lead by Aboriginal people, The Northern Territory Aboriginal palliative care model, and included the pharmacist's involvement in this development and implementation at the grass roots level.[33]

"Australia has a fundamental responsibility to its First Peoples to structure and resource its health care system to be culturally safe, well-trained and responsive to the needs of Aboriginal and Torres Strait Islander peoples."[47] To do this we must grow our Aboriginal health workforce. Analysis of the registered professions from 2015 identified that 68 pharmacists identified as Aboriginal, which equated to 0.2% of the total 2015 pharmacist registrations. An additional 696 pharmacists were needed to achieve the 2.6% target set by the National Aboriginal and Torres Strait Islander Health Workforce Strategic Framework (2011–2015).[48] In 2017, only 0.4 per cent of the allied health professionals registered under the National Registration and Accreditation Scheme identified as Aboriginal.[49] This is a focus included in the 2019 Closing the Gap Report[2] and should be a focus for healthcare organisations including hospitals to enable positive change.

Supporting public and private bodies have a responsibility to: ensure that funding is made available; projects are developed in an appropriate manner, with or by Aboriginal people; publication of the work is facilitated and enable the growth of the Aboriginal pharmacy workforce.

The lack of published work in this area should encourage any pharmacists working in the field of hospital pharmacy and Aboriginal and/or Torres Strait Islander health with Aboriginal and/or Torres Strait Islander people, to publish their work and share their stories. Hospital pharmacists ideally should seek assistance to achieve this from, for example, universities, senior staff or external grants. Policymakers such as granting bodies associated with the Society of Hospital Pharmacists of Australia have a responsibility to help address the issue through the provision of funding and guidance in project design to enable targeted projects developed by hospital pharmacists together with Aboriginal and/or Torres Strait Islander people, to ensure a coordinated approach to research in this area, in all settings. Policymakers should implement strategies to grow the Aboriginal and/or Torres Strait Islander pharmacist and technician workforce to help provide cultural safety in hospitals and guide and conduct positive research with Aboriginal and/or Torres Strait Islander people.

Limitations: This systematic literature review was of published papers. Work may be underway in this area that it has not yet been published. Some work may have also been in grey literature but it was outside the scope of this review.

FUTURE RESEARCH

The role of the hospital pharmacist/pharmacy in providing services in relationship with Aboriginal and/or Torres Strait Islander people in Australia is not clearly described based on the limited number of published works identified in this review. This review informs future research priorities and the publications included could help generate hypotheses for future studies. These could include the role of hospital pharmacists in sharing knowledge with Aboriginal and/or Torres Strait Islander people to increase understanding of their disease, promoting quality use of medicines by implementing known successful strategies and working in partnership with Aboriginal and/or Torres Strait Islander people to do this with mutual respect. This, together with their role in "aiding the development and maintenance of a respectful, trusting relationship between patient and health professional, one that is not overshadowed by assumptions of poor adherence."[39] Their wider role in taking the lead to promote a culturally responsive health service could also be investigated together with the education of pharmacy students regarding Aboriginal and/or Torres Strait Islander health and the pharmacists role in this. Not forgetting research where the pharmacy and medicine related needs of Aboriginal inpatients in remote, rural and urban settings are investigated by engaging with local communities.[50] Outcomes research is crucial to inform the uptake of projects at multiple sites rather than in isolation. The next instalment in this series of projects will aim to identify work that is actually occurring but has not yet been published.

In order to achieve any of these future outcomes, it is important for all health providers to have cultural competence when it comes to caring for Aboriginal and/or Torres Strait Islander people. Ensuring that the hospital pharmacist workforce is culturally competent is a first step towards guiding success in this area.

CONCLUSION

A systematic review of the literature to determine the role of the hospital pharmacist/pharmacy in providing

Aboriginal and/or Torres Strait Islander people services in Australia produced limited publications for review. They identified that the role includes: development of models for patient care, partnerships and resource sharing in rural and remote areas and ensuring continuity of care. Included studies mainly described structure of the service and, at best, the processes involved. No outcome data for such services has been published to date. Future research and publication of work by hospital pharmacists nurturing and developing relationships in partnership with Aboriginal and Torres Strait Islander communities to develop services explicit in their desire to improve outcomes, and designed to measure the impact on health outcomes, is encouraged.

Conflicts of interest statement

The authors declare that they have no conflicts of interest.

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APPENDIX 1

Search strategy

Search terms used:

Medline (accessed 28 09 2018)

1. Pharmacists/
2. exp Pharmaceutical Services/
3. pharma*.mp.
4. pharmacies/
5. 1 or 2 or 3 or 4
6. Health Services, Indigenous/
7. Oceanic Ancestry Group/
8. (Australian* adj3 (aborigin* or indigen*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
9. (Australia* first and (people* or nation*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
10. Torres Strait Islander*.mp.
11. ATSI.mp.
12. 6 or 7 or 8 or 9 or 10 or 11
13. 5 and 12

IPA (Pharma* AND ((Australian* adj3 (aborigin* or indigen*)) OR (Australia* first and (people* or nation*)) OR Torres Strait Islander* OR ATSI))

Scopus ((Pharma* AND (Australian* W/3 (aborigin* or indigen*)) OR (Australia* first and (people* or nation*)) OR "Torres Strait Islander*" OR ATSI))

Embase (accessed 28 09 2018)

1. pharmacy/
2. pharmacist/
3. pharmaceutical care/
4. pharma*.mp.
5. 1 or 2 or 3 or 4
6. indigenous health care/
7. (Australia* first and (people* or nation*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
8. (Australian* adj3 (aborigin* or indigen*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
9. Torres Strait Islander*.mp.
10. ATSI.mp.
11. indigenous people/ or indigenous australian/
12. 6 or 7 or 8 or 9 or 10 or 11
13. 5 and 12

Informit (APAIS-ATSIS and ATSIhealth)

pharmacy OR pharmacist OR medication* OR prescription* OR prescribing OR chemist*

Pubmed via LitSearch filter

(((((australia[mh] OR australia*[tiab]) AND (oceanic ancestry group[mh] OR aborigin*[tiab] OR indigenous[tw])) OR (torres strait* AND islander*[tiab])) AND medline[sb]) OR ((((au[ad] OR australia*[ad] OR australia*[tiab] OR northern territory[tiab] OR northern territory[ad] OR tasmania[tiab] OR tasmania[ad] OR new south wales[tiab] OR new south wales[ad] OR victoria[tiab] OR victoria[ad] OR queensland[tiab] OR queensland[ad]) AND (aborigin*[tiab]

OR indigenous[tiab])) OR (torres strait* AND islander*[tiab])) NOT medline[sb]) AND English[la]) AND (prescrib* OR pharmac* OR prescrip* OR medication*)

APPENDIX 2

SUMMARY OF INITIAL SEARCH RESULTS

Database	Exported date	*n*=	After duplicate removed *n*=
Medline	21/9/18	247	247
IPA	21/9/18	14	8
Scopus	21/9/18	377	305
EMBASE	28/9/18	378	240
Informit	9/10/18	293	236
APAIS-ATSIS (1978-present)			
ATSIhealth (1900 – present)			
Pubmed via LitSearch 9/10/18	283	211	
NCBI account (From inception to present)			
Total	1592	1247	

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3. WHAT ARE HOSPITAL PHARMACISTS DOING? SURVEY STUDY

As established in chapter 2, little is known from the literature about the role of the hospital pharmacist and pharmacy services provided for Aboriginal and/or Torres Strait Islander Peoples. I hypothesised that hospital pharmacy services for Aboriginal and/or Torres Strait Islander people have been implemented but not published.

The current chapter (chapter 3) presents data from a nation-wide survey of hospital pharmacy departments. It identified that several departments do have pharmacy services specifically for Aboriginal and/or Torres Strait Islander Peoples admitted to hospital. However, evaluation and measurement of the impact of these services on health outcomes were lacking.

This work has been published as: Welch S., Patel B., Williams A., Moles R. Connecting the Dots of Care: Survey of Australian hospital pharmacy departments regarding current initiatives in place to care for Aboriginal and/or Torres Strait Islander inpatients. Journal of Pharmacy Practice and Research 2022;52:196 – 218 doi.org/10.1002/jppr.1789 (97)

My contribution to this original research article is outlined in Table 1. (page 19)

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RESEARCH ARTICLE

Connecting the dots of care: survey of Australian hospital pharmacy departments regarding current initiatives in place to care for Aboriginal and/or Torres Strait Islander inpatients

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Abstract

Introduction: There are limited data describing the role of hospital pharmacists caring for Aboriginal and/or Torres Strait Islander inpatients.

Objectives: To determine roles of and specific services provided by Australian Hospital pharmacists/Pharmacy Departments in providing medicine management services to Aboriginal and/or Torres Strait Islander people admitted to Australian hospitals. The actual and perceived outcomes will be explored.

Method: Mixed method (online survey/ telephone semi-structured interviews). The survey was emailed to all Directors of pharmacy departments listed in The Society of Hospital Pharmacists of Australia Directory (January 2019). Participants were invited for a digital, audio recorded follow-up telephone interview. Recordings were transcribed verbatim and thematically analysed.

Results: Sixty-nine responses were received from 313 pharmacy departments (RR = 22%), of these, 20 (29%) pharmacists agreed to and underwent a semi-structured interview. All hospital categories, states and territories were represented: Metropolitan (33, 48%); regional (22, 32%); rural (12, 17%) and remote (2, 3%).

Over half (44, 64%) had specific processes for Aboriginal and/or Torres Strait Islander inpatients. Service outcome measurement was low (10, 14%). Survey results and qualitative interviews revealed work is being done under the broad themes: culturally safe care; provision of culturally appropriate medicines information; chronic disease management; continuum of care; managing funding models. Potential outcome measures and future plans were proposed.

Conclusion: Several sites have pharmacy services in place specifically for Aboriginal and/or Torres Strait Islander people admitted to hospital which are not included in the literature; however, outcomes of these services were not routinely assessed. The challenges faced are similar to those cited in international literature, including managing continuity of care issues and working in partnership on projects tailored to the needs of Indigenous peoples. Wider knowledge, evaluation and measurement of the impact of these services on health outcomes and equity is needed and would allow hospital pharmacy teams to better tailor initiatives to meet the needs of Aboriginal and/or Torres Strait Islander people.

Keywords: Indigenous, clinical pharmacists, hospital, pharmacy practice.

INTRODUCTION

Two authors are employed on Gadigal land and two authors work on Larrakia land, one of whom is a Yugambeh woman. This article uses terminology throughout as described in Box 1. An estimated 370 million Indigenous people live worldwide, on every inhabited continent.[1] Of these, approximately 798 400 are Aboriginal and/or Torres Strait Islander people, representing approximately 3.3% of the Australian population.[2] They live in every state and territory, with over one third in major cities (37%), almost half (44%) in regional and one-fifth in remote areas (19%).[2] Aboriginal and/or Torres Strait Islander health is a priority issue stated by successive Australian Governments.[3]

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Box 1 Terminology definition

"These lands are Aboriginal lands and services are provided to Aboriginal and/or Torres Strait Islander people on these lands. In recognition of the diversity of contemporary Australia and the ability of people to move for social and/or financial reasons, then both Aboriginal and/or Torres Strait Islander people can reside across the country. The terminology which refers to Aboriginal and/or Torres Strait Islander people (the Indigenous people of Australia) will be used throughout this paper except when quoting from resources which have used other terminology."[4]

"To deny (Australian) Aboriginal agricultural and spiritual achievement is the single greatest impediment to intercultural understanding and perhaps, Australian moral and economic prosperity."[5] Prior to colonisation, Aboriginal and/or Torres Strait Islander people were thriving. The fact that they were resilient, able to adapt to change, and survived in the new world, are still surviving today and are present and contributing to community, is testament to their strength. Despite 200 years of being treated with policy practices based on a deficit model – from "*Dispersal, Protection, Assimilation, Integration, Self-Management* and finally to *Reconciliation*" – Aboriginal and/or Torres Strait Islander people have demonstrated strength and resilience.[6]

Within Australia, no significant change has been seen in the gap in chronic disease mortality rates between Indigenous and non-Indigenous Australians between 2006–2017.[7] This is a direct result of system failures.[8,9] Caring for Aboriginal and/or Torres Strait Islander people in hospital therefore requires an understanding of the aforementioned factors in addition to: recognition of deficit discourse; the negative role hospitals have played in the colonising process; perpetuating institutional racism; and the differences between Aboriginal and/or Torres Strait Islander and non-Indigenous patient hospital experiences and barriers to care.[10,11] Due to these issues and feeling unsafe in a hospital environment, they are 2.5 times more likely to have leave events (e.g. an earlier than planned discharge), leading to delays in adequate care and increased morbidity and mortality.[12] Therefore, it is important that health providers are aware that wellbeing for Aboriginal and/or Torres Strait Islander people is strongly connected to country, law and community, and the effects of disconnection from these because of hospitalisation should be understood and acknowledged.[8,13]

Pharmacists have an important role in healthcare teams, with established roles at all steps of the medication management pathway.[14,15] As health professionals and medication experts it is vital that they are prepared, aware, included and involved in culturally responsive care of hospitalised Aboriginal and/or Torres Strait Islander people. A key role is to facilitate access to medicines, which can be complex due to bureaucracy surrounding funding. Box 2 outlines the rules followed at the time of conducting the study. A recent literature review found seven publications describing the role hospital pharmacists play in the care of Aboriginal and/or Torres Strait Islander people.[4] Authors encouraged future research by hospital pharmacists nurturing and developing relationships in

Box 2 Australian medication funding systems at the time of study

In Australia, funding of medications on discharge from hospital in most states and territories is provided by the Commonwealth Government under the Pharmaceutical Benefits Scheme (PBS). The quantity of medications supplied is as per the PBS quantities, often at least one month. This enables these hospitals to claim costs of medicines provided on discharge from the Commonwealth. The patient would pay a sum (co-payment) for the cost of their discharge medications. Aboriginal and/or Torres Strait Islander people can register for the Closing the Gap (CTG) funded medications scheme, through their primary care provider, which enables them to access medications at reduced or no cost, helping to remove barriers to treatment. This scheme has been shown to reduce hospital admissions due to chronic illness in higher uptake areas, increased medication use and reduced spending among Indigenous Australians.[16,17] Hospital employees have not been allowed to register patients for the CTG or to write prescriptions which can be claimed under the PBS CTG scheme. As a result, Aboriginal and/or Torres Strait Islander people are disadvantaged when discharged from hospital with a barrier to access medications due to the co-payment cost. In some jurisdictions, e.g. NSW, hospital discharge medications are funded by the state government and so the patient does not pay a co-payment. However, this is offset by the fact that a smaller quantity of supply (usually 4–7 days) is provided, which puts pressure on patients to see their GP within days of discharge to ensure continuity of medicines access. Reforms have been made to this system since July 2021 enabling some hospital prescribers to issue CTG annotated prescriptions for dispensing from a community pharmacy and the implementation of an uncapped Indigenous dose administration aids (DAA) Program.

partnership with Aboriginal and/or Torres Strait Islander communities.[4] We hypothesise that hospital pharmacy services for Aboriginal and/or Torres Strait Islander people have been implemented at sites, however reports may not have been published. The aim of this study was to determine the roles of, and specific services provided by, Australian Hospital pharmacists/ Pharmacy Departments in providing medicine management services to Aboriginal and/or Torres Strait Islander people admitted to Australian hospitals. The actual and perceived outcomes will be explored.

METHODS

St. Vincent's Hospital Human Research Ethics Committee approval was obtained, #2018/ETH00593 (3/12/2018).

An explanatory sequential, equal status, mixed methods design[18,19] was used by the collection of quantitative and qualitative data from online survey and telephone semi-structured interviews. This design was chosen to triangulate the quantitative data garnered in the survey through qualitative exploration of how services were provided to Aboriginal and/or Torres Strait Islander people. The online survey questions were developed based on the existing systematic literature review.[4] The survey tool was reviewed for content validity by expert stakeholders (three Directors and two pharmacists); no data were recorded. After minor wording changes were made, the survey was administered. The survey contained 20 questions where tick box options were provided with an option to provide other and further detailed answers (Appendix 1).

The survey was emailed to one person, either the Director of the pharmacy department or their delegate, who were eligible due to being listed in The Society of Hospital Pharmacists of Australia (SHPA) Directory (January 2019), with four reminders (at 2, 4, 6 and 7 weeks post distribution).

All participants were invited to a follow-up semi-structured interview upon conclusion of the survey. Consenting participants were involved in digital, audio recorded telephone conversations. All interviews were conducted by SW on a peer-to-peer basis for the entire study. This allowed for interview standardisation. SW was known to only some interviewees. The semi-structured interview was structured in line with the survey, in order to explore the answers more deeply and investigate further how and why services were provided. Interviews were conducted on a mutually agreed day/time.

Survey data were entered into Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and and descriptive statistics reported. Interview audio recordings were professionally transcribed verbatim using a third-party company (Rev.com). Survey responses and free text data were reviewed and interview transcripts were checked by investigator, (SW). They were coded and tabulated into common themed answers. These were confirmed by authors (RM, BP) and discussion occurred to fit themes into a framework. Quotes were refined by all authors.[20,21]

This report was prepared in accordance with the COREQ criteria[22] (Appendix 2).

RESULTS

The survey was distributed to 313 hospital pharmacy departments on 9/1/19, with 69 completed surveys received following reminders, by its deadline 11/3/21 (response rate = 22%). Respondents represented all hospital categories[23] across Australia: Metropolitan (33, 48%); regional (22, 32%); rural (12, 17%); and remote (2, 3%). Twenty pharmacists agreed to and underwent a follow-up telephone interview, between 10–24 March 2019. Interviews each took on average approximately 30 min. Most, were from regional areas (8 (40%)), while 5 (25%) were from metropolitan-based, principal referral hospitals (Table 1).

Forty-three (62%) hospitals had access to PBS dispensing on discharge. [This does not correlate with access to CTG (Box 2)] (Table 2).

Most sites reported that it was mandatory to ask people if they identify as Aboriginal and/or Torres Strait Islander at hospital presentation (37, 54%), with 24 (35%) reporting they did not know. Mostly this identification was recorded in the medical notes or other areas including electronic record/patient systems or displayed as a visual icon on patient ward lists. Five (7%) stated Aboriginal and/or Torres Strait Islander people were a priority for pharmacist review. From the interviews it was evident that whilst some sites had large proportions of their hospital population identify as Aboriginal and/ or Torres Strait Islander, up to 95% in one site, other sites had few.

Five key themes derived from survey (responses and free text) and interview data were as follows. Of note is that few services had measured outcomes. Table 3. illustrates themes, outcomes and areas for future focus with selected quotes from interviews.

Culturally Safe Care

Forty-four (64%) hospitals had specific pharmacy-led processes for Aboriginal and/or Torres Strait Islander inpatients. Twenty-two (32%), had arrangements with

Table 1 Description of surveys sent, replies received, telephone follow up calls and hospital area and category represented by state

State	NT		Tas		Vic		Qld		NSW		WA		SA		ACT		Total	
Number hospitals sent surveys (n = 313)	6		5		101		58		97		24		19		3		313	
Responses received [n = 69 (22%)]	4		2		19		7		22		8		6		1		69	
Follow up phone call [n = 20 (29%)]	3		1		5		2		6		2		1		0		20	
Hospital Area	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No.	Ph	Total No. n = 69	Ph n = 20 (% total calls)
Metropolitan	1	0	2	1	7	0	3	1	8	1	7	2	4	0	1	0	33	5 (25%)
Regional	1	1	0	0	7	3	2	0	10	4	1	0	1	0	0	0	22	8 (40%)
Rural	1	1	0	0	5	2	1	0	4	1	0	0	1	1	0	0	12	5 (25%)
Remote	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2 (10%)
Hospital Category																		
Principal referral hospitals (n = 31)	1	1	2	1	3	0	3	1	5	1	2	1	3	0	0	0	19	5 (25%)
Public acute group A/Public acute group B hospitals (n = 107)	1	1	0	0	4	2	1	1	7	3	0	0	2	1	1	0	16	8 (40%)
Public acute group C/Public acute group D hospitals (n = 331)	1	1	0	0	8	2	2	0	4	0	0	0	0	0	0	0	15	3 (15%)
Private acute group A/Private acute group B hospitals	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	4	0
Private acute group C/Private acute group D hospitals	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3	1 (5%)
Children's/Women's/Combined Women's and children's (n = 12)	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	3	1 (5%)
Psychiatric hospital (n = 22)	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	3	1 (5%)
Same day hospital (n = 7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub- and non-acute hospitals (public or private rehabilitation) (n = 38)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Other	0	0	0	0	3	1	0	0	0	0	2	0	0	0	0	0	5	1 (5%)

Ref. for peer group numbers: Australian Institute of Health and Welfare 2018. Hospital resources 2016–17: Australian hospital statistics. Health services series no. 86. Cat. no. HSE 205. Canberra: AIHW.

Table 2 Pharmacist and technician positions and Pharmaceutical Benefits Scheme dispensing usage

Pharmacist full time equivalent (FTE)	5–20 FTE	25, 36%
	≤5 FTE	19, 27.5%
	1 FTE	4, 6%
Technician FTE - Most sites had at least 2	≤1 FTE	11, 16%
	>10 FTE	20, 29%
Pharmaceutical Benefits Scheme (PBS) dispensing hospitals	Access to PBS on discharge	43, 62%

local Aboriginal Medical Services (AMS) regarding medications including: supply, storage of cold-chain items, contracted clinical pharmacist positions, or referral to enhance continuity of care. Twenty (29%) did not know if services were in place and 27 (39%) had no arrangements. Nine sites (13%) used interpreters routinely and 8 (12%) involved family routinely when caring for patients. Processes in place to assist with cultural safety and communication, included: Aboriginal Liaison Officers (ALOs); cultural champions; interpreters; cultural advisory committees; mandatory staff cultural awareness training; or inclusion of local Aboriginal language vocabulary in hospital newsletters. Four respondents had policy for use of traditional medicines, often included in the complementary medicines policy, and one site had traditional healer clinics commencing.

Qualitative data described how pharmacists had tried to address Aboriginal and/or Torres Strait Islander workforce issues. Some pharmacy teams had close working relationships with ALOs. One respondent reported a systematic approach of supporting people to complete their episode of care (Box 3).

Provision of Culturally Appropriate Medicines Information

Many sites used culturally specific resources, 39 (57%), obtained from a variety of sources, but 30 (43%) did not use any (Table 4).

Interviewees highlighted that resources were important to assist counselling. The *Medicines Book for Aboriginal and Torres Strait Islander Health Practitioners* was used for a range of medications.[24]

Specific Chronic Disease Management Services for Aboriginal and/or Torres Strait Islander People

Eighteen sites (26%) prioritised pharmacist assessment of Aboriginal and/or Torres Strait Islander people with a range of chronic conditions: nicotine dependency; diabetes; cardiovascular, chronic kidney, infectious and chronic respiratory diseases; mental health; multi-co-morbid conditions; rheumatic heart disease (RHD); chronic pain; or transplant recipients.

Those interviewed described pharmacist involvement in post-discharge monitoring, such as: point of care testing, RHD monitoring, and Outpatients' rehabilitation and diabetes programs.

Continuum of Care (including discharge liaison)

Few sites – 5 (7%) – had specific processes to assist with medicines management for Aboriginal and/or Torres Strait Islander people on or during admission. More, 48 (70%) had processes in place for discharge including: liaising with community pharmacists, GPs and/or AMS; actively involving family; providing dose administration aids (DAA); or simplifying dosing. Communication with primary care providers regarding regular, intermittent treatments occurred via: written means; My Health Record; patient medication lists; discharge summaries; state-based registers or appointment cards.

Discharge services were commonly provided including: communication, assistance with DAA, post discharge monitoring, home medicine review referral or RHD register recording. Discharge processes working well included: communication on discharge; working with ALOs; cultural awareness when counselling and supporting patients who discharge against medical advice.

Managing Different Funding Models to Facilitate Access to Medicines and Pharmacy Services, and Advocacy

It was reported that patients had often been registered to obtain medications free of charge under the Commonwealth funded S100 rural and remote scheme or the CTG PBS programs. After admission to hospital, extreme difficulties had to be overcome to provide discharge medications. Thirteen respondents (19%) stated their involvement with solving CTG enrolment issues in and around the discharge process, requiring substantial liaison. Some patients needed linkage with a CTG registered practice in their area via the ALO, for CTG registration, to enable cost-free medication access. Survey respondents described, and interviewees elaborated on, how PBS-funded dispensing hospitals required different and complex arrangements to enable patients to access medications without extra costs, working around the CTG system (Box 4). Six respondents stated that their

Table 3 Selected responses from telephone interviews which illustrate key messages (themes identified, outcomes measured and areas for future focus)

Key Message		
A. Overall Theme	Subtheme	Telephone interview quote
1. Culturally safe care	Use of: Aboriginal Liaison Officers (ALOs)	*"Having the ALOs on the ward is really important. …, you can work collaboratively with them and ask them questions and to come and see patients etc. …The pharmacists work pretty closely with the ALOs… There's very much a team approach… a lot of it is around discharge planning and what patients are going to do when they go home. There's lots of issues that the pharmacists are looking at, things around how are they going to access their medicines when they go home? …Are they going to have money to afford their medicines? How are they going to get transport to their appointments and to the pharmacy? Are they linked in with the Aboriginal Medical Service? … So that's where the ALOs really help with all of that coordination, so they're linked in with services… (R20)* *"We have a monthly meeting and we review each of the medical codes leaving against medical advice for our whole region. For Aboriginal patients we review the cases to see whether or not there could have been anything we could have done better… there're some things you can't prevent, but where we can that's what we try to do… (The meeting) is run by an (Aboriginal) Aboriginal Liaison Officer, we have pharmacy, medical, nursing (representatives), Aboriginal Health workers, the pharmacist from the Community Controlled Health Service." (R16)*
	Cultural awareness	*"You really do need to sit down and talk on a level that is understood, and actually open up a little bit to them… It's amazing. If you just open that tiny little door, what will come out. If you don't have rapport with patients, they're not going to listen." (R19)* *"We need to acknowledge that we're not the experts in each of the (Aboriginal) cultures and find a way to navigate discussions that we have with the patient, through things like clinical yarning, to make sure that we're getting through to the patient, but also at the same time, we're taking on whatever cues they're giving us, as to whether or not we're being culturally appropriate or not." (R18)*
	Partnerships with Aboriginal Medical Services	*"We have a pharmacist seconded from the hospital out to the AMS, part time. She feels that this is a great way to provide quality use of medicines to that AMS and it's devoid of (medication) supply… It's nice that the hospital could offer this service rather than linking it with supply… They work alongside the doctors, diabetic educators, Aboriginal Health workers, the patients." (R16)*
	Increasing Aboriginal workforce	*"Several years in a row we've had a scheme going with TAFE where we have an Indigenous student in year 11 and 12. They come to us one day a week to work, and they have to do TAFE Certificate 2 – Community Pharmacy whilst they're with us. They have to finish year 11 and 12, and we guarantee that we'll give them 100 days' work, at least, in that time, if they guarantee that they'll finish school and do their Cert-2." (R10)*
2. Provision of culturally appropriate medicines information		*"One of the reasons why I use Medicine Book for Aboriginal Health Workers is because the pictorial is included and they have been developed with (Aboriginal) consultation. I know that's not designed to be patient information but I feel like in the absence of a specific resource it's a more appropriate resource than the CMI." (R13)*
3. Specific Chronic Disease Management services for Aboriginal and/or Torres Strait Islander people	Cardiac – One site described their specific cardiac program.	*"0.6FTE seconded to this project." "Cardiac disease is number 1 cause of death in this population, so it is targeted. If the patient is a cardiology patient, this service cares for them and the patient can access seven days free medication through the hospital by a CTG-like program." (R14) "(This program) empowers the patient…" (R14)*
	Nicotine cessation	*"We try to link patients in that we start on nicotine replacement therapy to some type of program after they leave us.." (R12)*
	Mental health	*"(There were) some occasions where we've had to be really quite creative when patients on clozapine have returned to country to enable their monitoring to be done" "… we actually organized for a finger-prick blood test machine for a patient "(R5)*

Table 3 (*continued*)

Key Message		
A. Overall Theme	Subtheme	Telephone interview quote
	Rheumatic heart disease (RHD)	*"Doctors and nurses are legally mandated to report any new RHD… then that (RHD) database is communicated to whenever a benzathine penicillin is provided… Patients might frequent three, four, five, maybe even half a dozen different Aboriginal Medical Services in a year. So, having a central database is really important (to ensure correct treatment). So, when they come into hospital, we play an important role as well, because we want to know, when was their last dose for medication reconciliation, so we can call the register and (obtain) the information, (which is) really helpful." (R18)*
	Chronic disease rehabilitation	*"Part of the outpatient rehab program is called the Auntie Judy program. It's specifically for Aboriginal patients with chronic conditions… Every week they have a different person from Allied Health speaking to them. We have a session, about medication management, and how pharmacists can help with medications. (It explores) health literacy and is a healthy lifestyle program." (R19)*
4. Continuum of Care (including Discharge liaison.)	Communication with GP and community pharmacy	*"Faxed Discharge Medicines Information Transfer Summary… feedback from GP's and community pharmacies, was really positive and showed they really rely on those summaries in terms of medicine information because the discharge summary is so unreliable and inaccurate… we don't have the capacity to do them for all patients… (and) tend to do them for the high risk patients" (R20)*
	Communication with patient	*"Our hospital population is 90-95% Aboriginal… We have increased our capacity in the pharmacy department and we now have one dedicated clinical pharmacist. So, we're able to actually spend time talking to patients, obtaining best possible medication history, starting these conversations early, speaking to them during their admission rather than not always talking to the patient. So definitely having increased pharmacist capacity allows us to communicate better with all of our patients." (R13)*
	Integrated electronic systems	*"Having integrated electronic systems, from a medicine's history perspective (is good), we can access patient's primary healthcare list of medications because they're on a shared electronic health record… if they're going to a Northern Territory clinic in an outer remote community, they'll be on this shared electronic health record. Once they come into hospital and we click on the green kangaroo (and obtain details)." (R17)*
	Formulary effects	*"Transitions still require a lot of work… So, they have been managed in South Australia (SA) with medicines on a SA formulary, (including) the type of dose administration aid. When they return to the Northern Territory (which has) a different formulary, different brands and medications etc…so much confusion for the patient… we have had transplant failures because patients just not taken their medications for one reason or another, and I don't think they're necessarily to blame." (R17)*
5. Managing different funding models to facilitate access to medicines and pharmacy services and advocacy	Funding model work arounds	*"The hospital chooses to subsidise CTG co-payments and absorbs the cost. (There is) inconsistency in waiving CTG copayments across our health service as not all hospitals do this" (Survey response OL2).* *"(We) have an arrangement with a community pharmacy to pack DAAs for Aboriginal patients before they return to country (which is) at our cost". (Survey response OL19)* *"Through the (pharmacist) admission process we check whether the patient identifies as Aboriginal or Torres Strait Islander and so are suitable for CTG funding… (and document that) on our admission history or on our medication management plan. At the time of discharge, we have that information and we can make sure that they get their medicines for free through the health service which honours the cost." (R12)*
	Cost savings and readmission rates	*"Supply of 7 days free medications = $21/patient, compared with 4 months supply (with a co-payment) which in the main wasn't paid, so it's a cost saving for the hospital. We have a lot of readmissions due to medication. Making sure that their medications don't run out when patient leaves the hospital until they see the GP, is a huge contributor to driving down the 28-day readmission and 90-day readmission and re-myocardial infarction rates. (R14)*

Table 3 (*continued*)

Key Message		
A. Overall Theme	Subtheme	Telephone interview quote
	Advocacy	*"There are patient-centred cultural care guidelines, created by the Aboriginal Health Strategy Communication (unit). pharmacy had a role in their creation and rollout (R18)* *"We are involved with discussions about* *1. national reform which is looking at changing the rules around Section 100 (rural and remote scheme funding of medications) so that it links to the (person's) home address rather than their physical location… patients will (then) be eligible for Section 100 (funding of medications) when they come into the regional or major cities temporarily (because it will be linked to their address not their current location)…. and* *2. expanding the CTG so that public hospitals can write CTG scripts, but the caveat to that is that public hospitals can't dispense them, (which is a barrier to access)" (R20)*
B. Outcome Measures	Specific example	Telephone interview quotes
Examples included: • Assessment of the level of prioritisation of patients in the coronary care unit; • Audit of the quality of information sent to community health services from a hospital cardiac unit; • Assessment of level of understanding of verbal counselling pre-discharge against medical advice and monitoring if medications were taken	Monitoring of before/after data on medication supply after implementing a new hospital subsidised medication scheme akin to a hospital CTG program, entitled Geewan. The scheme was developed in partnership with the local community.	Geewan is the Gunaikurnai language for the Australian bracken fern which grows in the area and it has medicinal purposes. *"(As a result of the program entitled Geewan) We've redone the waiting area outside pharmacy, we have fern photographs and artwork… To show that some places (do provide) respectful medicine access. It's also a theme on our brochure regarding access to medicines at the hospital, for Aboriginal people… The cost barrier was the biggest problem (for access to medications for patients). So now,.. we have posters to assure people who identify as Aboriginal and Torres Strait Islander (that they will) get their medication free….(It) has really built relationships with even regular Kuri clients, because they know when they come here, they're not going to be asked for money, and that's automatically not an embarrassment… As a result of this funded Geewan scheme, we have people who are engaged (in their healthcare). (Before,) they either wouldn't come and get their medicines, or they wouldn't listen to anything about them." (R7)*
C. Future	Area of focus	Telephone interview quotes
	Make a difference	*"There are hundreds of things we can do for us to think that we are doing things better but we need to be making sure that they are being understood and that they are making a difference." (R13)*
	Telehealth	*"Exploring post discharge follow up using telehealth… how we can do post discharge follow up with people over the phone or over telehealth… Future dreams…" (R20)* *"We were working on community access to pharmacists, using telehealth… quite simply because in remote areas, there's no pharmacist. (R15)*
	Interpreters	*"It's something we've been working towards and really pushing… that interpreters should be used more (but) interpreters aren't always available in the language group that we require for the patient. (R13)*
	Publishing	*"We would really love to get support in better understanding how we can also publish (this work) and share it with a wider audience… It's also recognizing that there's a lot of work done in smaller rural hospitals, and they're exactly the hospitals who aren't going to have the university support." (R17)*

PBS hospital honoured the CTG when dispensing medications, i.e. there was low or no cost to the patient if they already had community CTG registration. These were hospitals from Victoria, Western Australia and Tasmania. Four (6%) interviewees described their active involvement in advocating for change in this area.

Box 3 Story – helping to assist patients who need to discharge against medical advice (R16)

We identified the self-discharging patients, particularly the ones who had an infection where we could put in place something where we could have, for example, a discharge ready, even if we don't think that the patient should discharge, but we know that they're going to discharge, we will get discharge medication supply organised for them to have on hand that the nurses can hand to them at midnight, if that's when they choose to leave. So that they can at least go home with their oral antibiotics that are the appropriate ones, that they can take straight away… when we look at the patients who come in with infections, who have a fairly short length of stay… they maybe [have had] 48 hours of IV antibiotics and they're feeling a lot better, start to have maybe family pressure, and they've got children at home, or they have other business that they need to attend to, and they're at risk of missing the next IV antibiotic dose through not being on site, we have processes in place to have the oral antibiotic that's appropriate for them, for them to take home… So, we document quite clearly that they're waiting, and then the nurse at the point of discharge will then have them… An Aboriginal Health worker here has done a bit of a campaign around "if you want to go, let a nurse know."

There's some signs up around the ward, so then the patients will hopefully say "I'm going." And then the nurse can say, "Hang on a minute, let me get your medicine. We're going to give you some medicine to take home and we'd like you to stay but if you really have to go we understand and we want to try and help you."

We're in a luxury situation sometimes, we know our patients well enough that we know the risk.

We can give it as early as we can really. Sometimes you can't because you don't know what you're treating, and there's a risk if you get it wrong, so the doctors obviously negotiate that risk and sometimes they'll say, "No, we're not doing that because we just really want this patient to stay, and even if they go, we want them to come back and get that treatment." So that's the risk/benefit analysis that the doctor's got to undertake which is not easy. But if we know: that they've got a resolving cellulitis and they're responding well to IV Fluclox; that we can send them home with some oral Fluclox and that we can put all the counselling in place and have those discussions in advance, e.g. "We don't want you to go but if you're going to, this will be ready for you, this is how you take it, this is what you do, this is how you follow up. Go to PC… Go to Aboriginal Health Service on Monday to follow it up…"

We did a very small project a number of years ago, where we got our intern pharmacists to then go and try and quantify how well that verbal information was being absorbed by the patients, and whether or not they had an impact. And it was only very small, it was about five or six patients that were interviewed, and the results were that pretty well all of them took the antibiotics, they might not have taken their other medications but they certainly took their antibiotics which was good.

I think it's just having that caring approach to understanding some of the pressures of life for people.

Sometimes there is a stigma attached to DAMA, through the lack of understanding of…sometimes… why people might need to leave hospital. So we do a bit of work round that as well.

Outcome Measures

Few sites – 10 (14%) – had measured program outcomes, which included: assessment of patient preference and understanding of information when using a sun/moon/picture-based medication list; monthly monitoring of discharge against medical advice rates: ensuring pre-emptive discharge medication program was working so patients left with medications; monitoring within a multidisciplinary cardiac service: patient outcomes, costs, smoking cessation and diabetes management (Table 3).

Future

Foci for future pharmacist work included: ongoing advocacy for CTG reform; increasing availability of counselling resources preferably via a central repository; providing access to a pharmacist; connecting with local community; standardising labelling; health literacy; communication improvements; quality use of medicine; and outpatient services.

Increasing access to interpreters and growing the Aboriginal and/or Torres Strait Islander pharmacy workforce were key foci. Ways to do the latter have been

Table 4 Sites or suggested contacts identified to source culturally appropriate resources

Hospital Aboriginal Health Unit Local Aboriginal co-operatives/Aboriginal Medical Services	
Individual hospital prepared leaflets. For example: - One site has developed a leaflet on CTG to give people to discuss with their GP post discharge - Amended medication list with sun/moon adjustments - Hospital funded CTG medication program leaflet (Geewan program)	
Heart Foundation	1. https://www.heartfoundation.org.au/your-heart/aboriginalhealth and https://www.heartfoundation.org.au/your-heart/aboriginal-health/free-heart-health-resources 2. Lighthouse Hospital project are in the process of developing information leaflets https://www.heartfoundation.org.au/for-professionals/aboriginal-health-resources/the-lighthouse-hospital-project
St Vincent's Heart Health website	https://www.svhhearthealth.com.au/aboriginal-heart-health
Cancer Australia	https://canceraustralia.gov.au/affected-cancer/atsi
Asthma Australia	https://www.asthmaaustralia.org.au/qld/education-and-training/i-am-a-health-professional/aboriginal-and-torres-strait-islander-health-services
Diabetes Australia	https://www.diabetesaustralia.com.au/aboriginal-and-torres-strait-islanders https://diabeteswa.com.au/manage-your-diabetes/resources/aboriginal-health-resources/
Mental health specific resources (e.g. 'PILLs, BILLs & QuILLs', Goverment of Western Australia)	https://ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/WATAG/Symposium/2015/PILLS-BILLs-QuILLS.pdf
Headspace National Youth Foundation	https://headspace.org.au/yarn-safe/
Australian Commission on the Safety and Quality in Healthcare	https://www.safetyandquality.gov.au/search/aboriginal
HealthInfoNet	https://healthinfonet.ecu.edu.au/key-resources/resources/
Medicines Book for Aboriginal and Torres Strait Islander Health Practitioners	https://www.remotephcmanuals.com.au/home.html
National Prescribing Service (NPS) – Good Medicines Better Health	Contact: medicines@naccho.org.au
NT Aboriginal and Torres Strait Islander Health Education Resource Directory	https://health.nt.gov.au/professionals/aboriginal-and-torres-strait-islander-health
Sharing The True Stories resources	https://www.cdu.edu.au/centres/stts/stts_resources/index.html
Lowitja website	https://www.lowitja.org.au/resources
Eye health	Careforkidsears.health.gov.au Indigenous eye health unit (Melbourne School of Population and Global Health, University of Melbourne)
Alcohol and Drug Foundation	https://adf.org.au/programs/indigenous-resources/
Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM)	https://www.ashm.org.au/programs/aboriginal-and-torres-strait-islander-program/resources/
Kidney Health Australia	https://kidney.org.au/advocacy/guidance-and-tools/indigenous-health/resources-for-health-professionals

explored: linking with schools to increase awareness of pharmacist and technician roles; holding discussions with funding bodies, e.g. mining companies; and working with TAFEs exploring cadetships.

Assisting the process for publication of work was also identified. Barriers to publication included: low pharmacist FTE in regional/remote areas; no or limited publication experience; and ad-hoc links to universities.

DISCUSSION

This study describes the current hospital pharmacy services for Aboriginal and/or Torres Strait Islander people which were not found in the published literature.[4] More than 60% of those surveyed had specific processes under the described key themes, but this does not indicate the level of quality or impact of such services.

Box 4 Story – Helping to assist patients obtain medications – Closing the Gap funding workaround (R20)

One of the issues that we've been dealing with for a couple of years, is around Indigenous patients from remote areas that are in the regional city for a variety of reasons and how they access their medicines while they're here as outpatients. So they're not inpatients at the hospital, but often they might be here as an escort for a patient who is, or they're here for outpatient follow up, or they have a clinic appointment. So they're sort of linked with the hospital, but now in an outpatient setting. One of the challenges that we have is that they often walk up to the ALO office, to say, "I'm out of medicine". They didn't bring their medicines into hospital with them.

Because no one's really responsible for dealing with medicine supply for these patients when they're outpatients, the ALOs are doing all the coordination of their medication supply. Which of course is really complex because of PBS Section 100 rural and remote or CTG funding schemes. As soon as the person comes into the regional city, they're technically no longer eligible for funded medications (because their registration is linked to their location rather than their home address). They might only be in the regional city for a few weeks, and they just need some supply . . . so you provide that for them.

We have some issues where the ALOs are getting the patient's remote referral faxed through from their remote health centre. They work by liaising with the contractor Section 100 pharmacies in the regional city, to get supply of medicines. Then the medicines would be sent to the ALO office at the hospital and then the ALOs would have all of these patient medicines just sitting there waiting for patients to come and collect them. We only found out about it because someone got given the wrong patient's medicines, they ended up in ED and they were like hang on where did these medications come from? It opened up this can of worms that the ALO office has got like a mini pharmacy there. Even though, they're not dispensing, they're distributing all of these medicines and coordinating supply between community pharmacies. Often these patients are in the regional city as outpatients, so either have had a recent discharge or they're here seeing specialists in outpatient clinics who are making changes to their medications. So just organising a supply of their latest rural script is dangerous in itself because there's no reconciliation about changes made while they were in hospital last week or when they saw the endocrinologist or the renal physician etc at their outpatient appointment yesterday.

There's a real unmet need for Indigenous outpatients who have to come into the regional city for outpatient specialist appointments or they need to hang around in the regional city post discharge, for outpatient follow up. For example, their S100 contracted pharmacies are outside of the regional city, 20 min drive away from the hospital, and the people don't have transport. So they use some of the government couriers that are already in place to transport the medications to the hospital, so they don't have to pick them up from the pharmacy.

Also, each remote health centre has their nominated Section 100 supplying pharmacy, and that's done through a tender process. They cannot just go to any pharmacy, because then they'd have to pay, [while] with Section 100 they get it for free. Also, the hospital can't write CTG scripts because public hospitals are exempt from CTG [funding]. Technically they're not eligible for Section 100 while they're here either (being away from home), but the Section 100 pharmacies [here] acknowledge all the issues and they're generally pretty good, if someone's here for less than four weeks, they'll continue their supply.

But, the Commonwealth put out a directive saying that the [S100] pharmacies aren't allowed to give the medications directly to the patient, they have to through the clinic, like the remote health centre, which caused a whole lot of people to go, "We can't do this anymore." Which you have to [then] sort out. The only option is to either try and get the pharmacy to supply it from Section 100, otherwise you have to send them to a GP or the AMS in the regional city to get reviewed and get CTG scripts. So of course the AMS is already really busy and they don't really want to see people who are here for a couple of weeks.

Respondents were primarily from metropolitan and regional centres (80%) which is consistent with the location of hospitals and the reported numbers of Aboriginal and/or Torres Strait Islander people residing in these areas (81%).

Great breadth and depth of service were uncovered, however there was diversity across centres and a lack of standardisation. It appears that there is room for degrees of both. Different solutions are needed in different settings, e.g. rural versus urban, because they may work under different legislative frameworks and cultural settings. It is important to acknowledge that generalisations cannot always be made to provide solutions. Diversity is to be supported if services are developed in collaboration with Aboriginal and/or Torres Strait Islander people and suit local context (Table 3, B. Outcome measures). The lack of standardisation of approach revealed may indicate a lack of overall professional governance. Interviews revealed that within pharmacy, change seems to be driven by few individuals. Durey identified a similar phenomenon: *"While many health care providers want to improve service delivery to Indigenous patients, the reality in most health settings is that demands for quality and organisational efficiency compete, so there is often little time or resources allocated to understanding the special needs of Indigenous people and the challenges of providing quality primary and follow-up care."*[25] Results indicate that standardisation should be supported when there is evidence that activities could improve patient outcomes and linked to the identified themes.

Design and implementation of programs collaboratively with local Aboriginal and/or Torres Strait Islander people enabled success in many ways including: increased respect; ownership; engagement; reflexive practice and positive outcomes. In general, why programs worked, was because pharmacists considered Aboriginal and/or Torres Strait Islander people and the issues they faced. They worked in a culturally responsive manner, with like-minded individuals, ALOs and community, to explore innovative solutions, providing a service that overcame the obstacles for the person for whom they were caring. Interviews further illustrated how co-designed programs were more successful. Table 4 describes programs and resources that could be used by pharmacists and managers when exploring ways to change pharmacy activities to enhance hospital experiences for Aboriginal and/or Torres Strait Islander people.

There are no Australian Standards of Practice describing the role for hospital pharmacists in Aboriginal and/or Torres Strait Islander health. Whilst pharmacy educators currently have a mandate to make positive change,[26] there is no similar driver for pharmacy practice change. The existence of frameworks to guide practice change in health care currently do not permeate all levels of health care delivery.[26–28] As such, pharmacists' roles in advocating organisational change would go some way to drive change and reduce institutional racism.[11]

Promisingly, 70% of survey respondents highlighted processes in place for Aboriginal and/or Torres Strait Islander patient discharge. However, challenges remained, relating to process-based bureaucracy. Pharmacists spend significant amounts of time assisting patients to gain timely, affordable access to medicines and continuity of care. These complex 'work arounds' need to be highlighted. It was pleasing to note that interviewees are pushing for reform. Brown stated that the way forward has to address systematically *"the enormous deficiencies in available clinical, hospitalisation and procedural resources in the context of much increased mortality in Indigenous Australians."*[29] Pharmacists should be part of this solution, enabling patients to receive the best pharmaceutical care in a culturally responsive, holistic manner during admission.

The S100 (rural and remote) and CTG funding arrangements at the time of study, discriminated against Aboriginal and/or Torres Strait Islander people and their ability to access healthcare – the system is hard to navigate for both clients and healthcare workers, resulting in risk of medication misadventures. Despite pharmacists' best efforts to work around these systems, policy change was required. In August 2020, after interviews were completed, changes were announced that commenced in July 2021, enabling some hospital prescribers to issue CTG annotated prescriptions for dispensing from a community pharmacy and the implementation of an uncapped Indigenous DAA Program.[30,31] In the early stages of this change, implementation issues still exist and ongoing advocacy from hospitals is still a theme and remains relevant to current and future medicines policy. If the administrative work of such programs is completed by the healthcare workers, not the client, then this change may go some way to remove barriers for continuity of care.

Issues surrounding problems at discharge are not unique to Australia. One recent report described the importance of discharge medication reconciliation for patients being discharged to a Canadian First Nations Reserve and the role of the pharmacist.[32] Distinct similarities existed to the issues faced by Australian pharmacists surveyed. The World Health Organization has described health inequalities between Indigenous and non-Indigenous populations in Australia, New Zealand, Canada and the United States. *"All groups highlight the key mechanism for implementing solutions is through partnerships, collaboration, respect and relationships… (and) Indigenous peoples are leading the partnerships in solutions. These success stories all hold to some key principles: there are many ways to relationships, they take time, trust, love and respect to make happen and they take commitment to sustain."*[33]

A useful first step then is for a health service, including pharmacists, to identify the local Aboriginal and/or Torres Strait Islander community/communities, develop relationships and be guided by them in the issues and priorities needing to be addressed. Community engagement and collaboration are key. Positive outcomes have been achieved when Aboriginal Australians design and lead such initiatives.[34] The health issues affecting Aboriginal and/or Torres Strait Islander peoples need to be investigated and understood to identify service provision gaps, which can then be bridged.[35] There is room for a systems-based approach to implement activities that make a difference.

Results revealed that there was a lack of formal acknowledgement of the use and role played by traditional medicines and healers in maintaining overall health of Aboriginal and/or Torres Strait Islander people. Four respondents had policy for the use of traditional medicines, and one site discussed the place of traditional healer clinics. This is in contrast to the setting in China, for example, where all medical care and therapeutic approaches have been integrated to focus on the whole person.[36] Research into Indigenous health has largely focussed on non-Indigenous concepts of health – disease and treatment.[8] This together with a lack of institutional support for Aboriginal and/or Torres Strait Islander systems of healing, could result in a reduced level of care being provided and may be further amplified in regional and remote areas where pharmacist numbers are lower.

Culturally specific resources were used by many sites, from a variety of sources, but 30 (43%) did not use any. A streamlined process and a central national repository are needed for resources to be accessed and used more broadly, enabling easy access and sharing of resources, to be used as is or as a basis for development of other resources, with local communities. The *Medicine Book* is being used to assist counselling for commonly used medicines, to mitigate the problems that exist with the current consumer medicines information (CMI) format.

In healthcare, discrimination occurs at many points: access to services, diagnosis, referral, treatment and outcome, and how care is provided does not always address the needs of those being treated[11,37] This systemic lack of prioritisation indicates unconscious bias nationally. Only 5 (7%) sites stated Aboriginal and/or Torres Strait Islander people are a priority for pharmacist review, illustrating further unconscious bias. Despite policy and need, organisational change has not occurred to enable elimination of institutional racism.[11] Aboriginal and/or Torres Strait Islander people often receive lower quality care and blame is often misplaced – on the person for medication non-compliance rather than on the healthcare professional's communication skills and health literacy.[25] The level of evidence-based pharmaceutical care provided for and received by Aboriginal and/or Torres Strait Islander people compared with non-Indigenous Australians has not been assessed to identify gaps. Neither has the level of implicit bias of pharmacists towards Aboriginal and/or Torres Strait Islander people been assessed with its detrimental effects on communication and patient-centred care, leading to discrimination in clinical decisions.[38] Few sites had measured program outcomes, potentially contributing to the publishing deficit.[4] Despite true outcome measurements being limited, success was gauged from some pharmacists' perspective, suggesting that solutions created and provided on a background of respect and understanding have been most 'successful.' However, given the unconscious bias outlined, pharmacist perceptions may not match patient lived experience. So, future addition of valid outcome measures is extremely important to ensure that pharmacy roles and services are impactful and not tokenistic.

Finally, future inclusion of evaluation including culturally appropriate evaluation, will enhance the quality and success of programs and publication rates. Respondents perceived reasons for low publication numbers included: low staffing numbers; lack of previous publication experience and ad hoc links with universities. Publication bias may therefore exist and have contributed to few publications in this field. Principal referral hospitals historically have more staff and publication experience, however, were not well represented in this study (19 (28%) survey responses and 5 (7%) of interview respondents). This may reflect their level of involvement in this area of health care and further contribute to the low level of publication.

Strengths and Limitations

Using mixed methods has benefitted the understanding of what services were being provided to care for Aboriginal and/or Torres Islander people. It enabled results to be quantified through the survey and provide a richer understanding of the services through the interviews, hence strengthening the findings. However, services were reviewed from the pharmacists' perspective and did not directly engage with service recipients. It was beyond the scope of this study but future work must investigate services from this perspective, so providing insight to the appropriateness and acceptability of the services to Aboriginal and/or Torres Strait Islander people. Future work could also validate the survey tool.

It should be noted that as survey response rate was reasonable but not 100%, and so the true extent of services may be over or underestimated. Limited evidence of service outcomes has been evaluated. Directors of Pharmacy may not have been aware of all initiatives that were occurring.

Results may illustrate a positive bias. Of the 313 pharmacy departments surveyed, 69 responses were received, the majority of which, 44 (64%) had specific processes in place. Whilst there were several sites, 25 (36%), who did respond to the survey despite not having any processes in place, what of those 244 sites that did not respond? Perhaps it suggests that only hospital staff interested in this area responded and as such, results may not be able to be extrapolated across the country. Engagement of pharmacy departments from smaller regional centres rather than principal referral centres in major metropolitan cities may further limit the generalisability of results. More than a third of Aboriginal and/or Torres Strait Islander people reside in major cities, so understanding of services from these sites is needed. Finally, results have provided information at a point in time. New solutions and projects may have been implemented since our survey was conducted.[31,39] Recent policy system changes show that advocacy is a strong ongoing theme to ensure parity in care provided for Aboriginal and/or Torres Strait Islander people.

CONCLUSION

Several sites have pharmacy services or innovations in place specifically to help care for Aboriginal and/or Torres Strait Islander people, admitted to hospital, the outcomes of which were not routinely assessed. The challenges faced are similar to those cited in international literature, including managing continuity of care issues and working in partnership on projects tailored to the needs of Indigenous peoples. Results have helped identify the role of the pharmacist/pharmacy in providing medicine management services to Aboriginal and/or Torres Strait Islander people admitted to Australian hospitals, not included in the literature. Wider knowledge, evaluation and measurement of the impact of these services on health outcomes and equity is needed and would allow hospital pharmacy teams to better tailor initiatives to meet the needs of Aboriginal and/or Torres Strait Islander people.

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CONFLICTS OF INTEREST STATEMENT

AW declares that she is a member of the Australian Pharmacy Council Indigenous Health Strategy group. Other authors have no conflict of interests to declare.

AUTHORSHIP STATEMENT

SW codesigned the study, responsible for data collection and analysis and write up. BP, RM codesigned the study, assisted with data analysis and write up. AW provided review and was actively involved in the write up providing cultural guidance.

ETHICS STATEMENT

St. Vincent's Hospital Human Research Ethics Committee approval was obtained, #2018/ETH00593 (3/12/2018).

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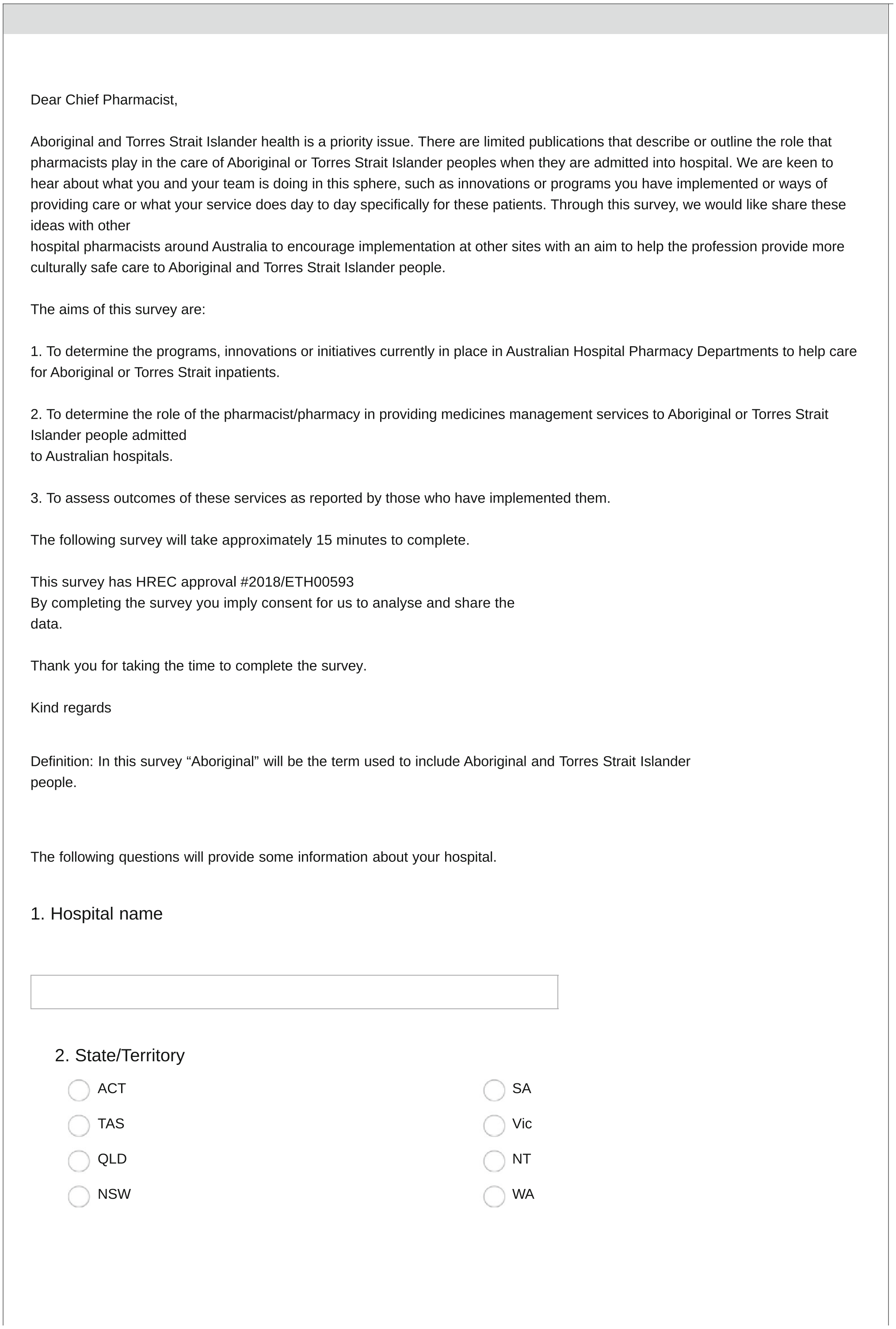
APPENDIX 1

SURVEY TOOL



Dear Chief Pharmacist,

Aboriginal and Torres Strait Islander health is a priority issue. There are limited publications that describe or outline the role that pharmacists play in the care of Aboriginal or Torres Strait Islander peoples when they are admitted into hospital. We are keen to hear about what you and your team is doing in this sphere, such as innovations or programs you have implemented or ways of providing care or what your service does day to day specifically for these patients. Through this survey, we would like share these ideas with other hospital pharmacists around Australia to encourage implementation at other sites with an aim to help the profession provide more culturally safe care to Aboriginal and Torres Strait Islander people.

The aims of this survey are:

1. To determine the programs, innovations or initiatives currently in place in Australian Hospital Pharmacy Departments to help care for Aboriginal or Torres Strait inpatients.

2. To determine the role of the pharmacist/pharmacy in providing medicines management services to Aboriginal or Torres Strait Islander people admitted to Australian hospitals.

3. To assess outcomes of these services as reported by those who have implemented them.

The following survey will take approximately 15 minutes to complete.

This survey has HREC approval #2018/ETH00593
By completing the survey you imply consent for us to analyse and share the data.

Thank you for taking the time to complete the survey.

Kind regards

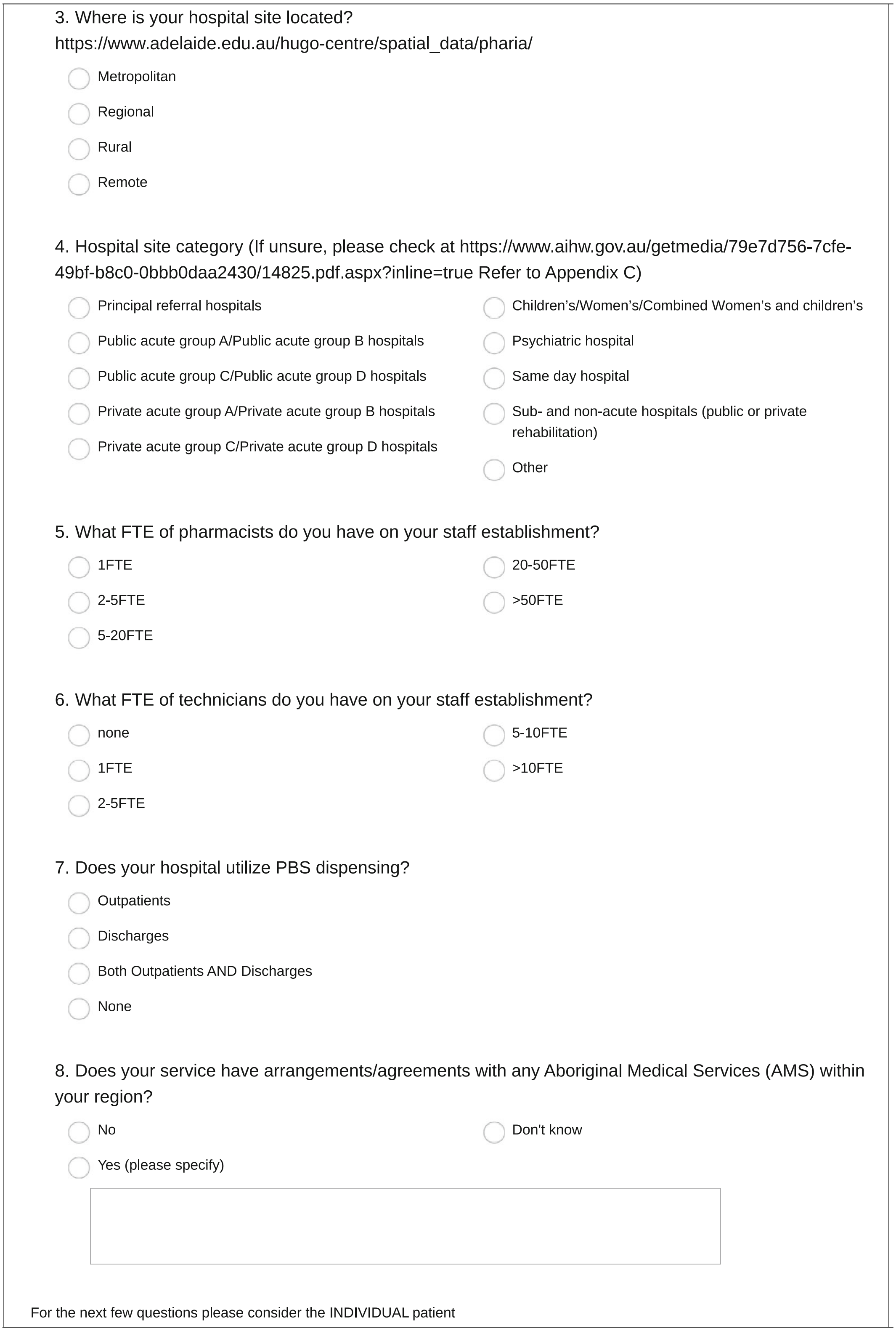
Definition: In this survey “Aboriginal” will be the term used to include Aboriginal and Torres Strait Islander people.

The following questions will provide some information about your hospital.

1. Hospital name

2. State/Territory

- ○ ACT
- ○ TAS
- ○ QLD
- ○ NSW
- ○ SA
- ○ Vic
- ○ NT
- ○ WA



3. Where is your hospital site located? https://www.adelaide.edu.au/hugo-centre/spatial_data/pharia/

- ○ Metropolitan
- ○ Regional
- ○ Rural
- ○ Remote

4. Hospital site category (If unsure, please check at https://www.aihw.gov.au/getmedia/79e7d756-7cfe-49bf-b8c0-0bbb0daa2430/14825.pdf.aspx?inline=true Refer to Appendix C)

- ○ Principal referral hospitals
- ○ Public acute group A/Public acute group B hospitals
- ○ Public acute group C/Public acute group D hospitals
- ○ Private acute group A/Private acute group B hospitals
- ○ Private acute group C/Private acute group D hospitals
- ○ Children’s/Women’s/Combined Women’s and children’s
- ○ Psychiatric hospital
- ○ Same day hospital
- ○ Sub- and non-acute hospitals (public or private rehabilitation)
- ○ Other

5. What FTE of pharmacists do you have on your staff establishment?

- ○ 1FTE
- ○ 2-5FTE
- ○ 5-20FTE
- ○ 20-50FTE
- ○ >50FTE

6. What FTE of technicians do you have on your staff establishment?

- ○ none
- ○ 1FTE
- ○ 2-5FTE
- ○ 5-10FTE
- ○ >10FTE

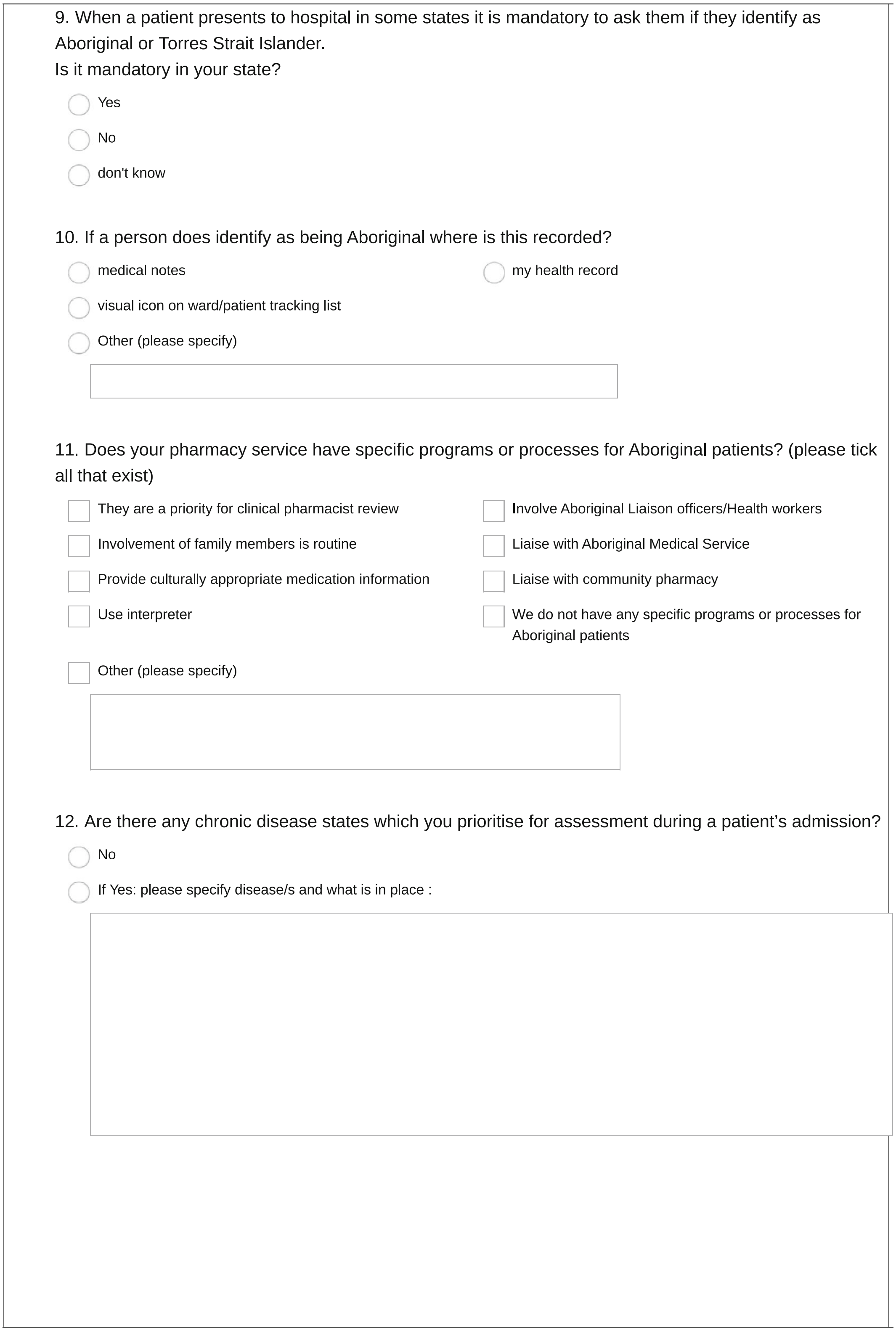
7. Does your hospital utilize PBS dispensing?

- ○ Outpatients
- ○ Discharges
- ○ Both Outpatients AND Discharges
- ○ None

8. Does your service have arrangements/agreements with any Aboriginal Medical Services (AMS) within your region?

- ○ No
- ○ Yes (please specify)
- ○ Don't know

For the next few questions please consider the INDIVIDUAL patient



9. When a patient presents to hospital in some states it is mandatory to ask them if they identify as Aboriginal or Torres Strait Islander.
Is it mandatory in your state?

○ Yes
○ No
○ don't know

10. If a person does identify as being Aboriginal where is this recorded?

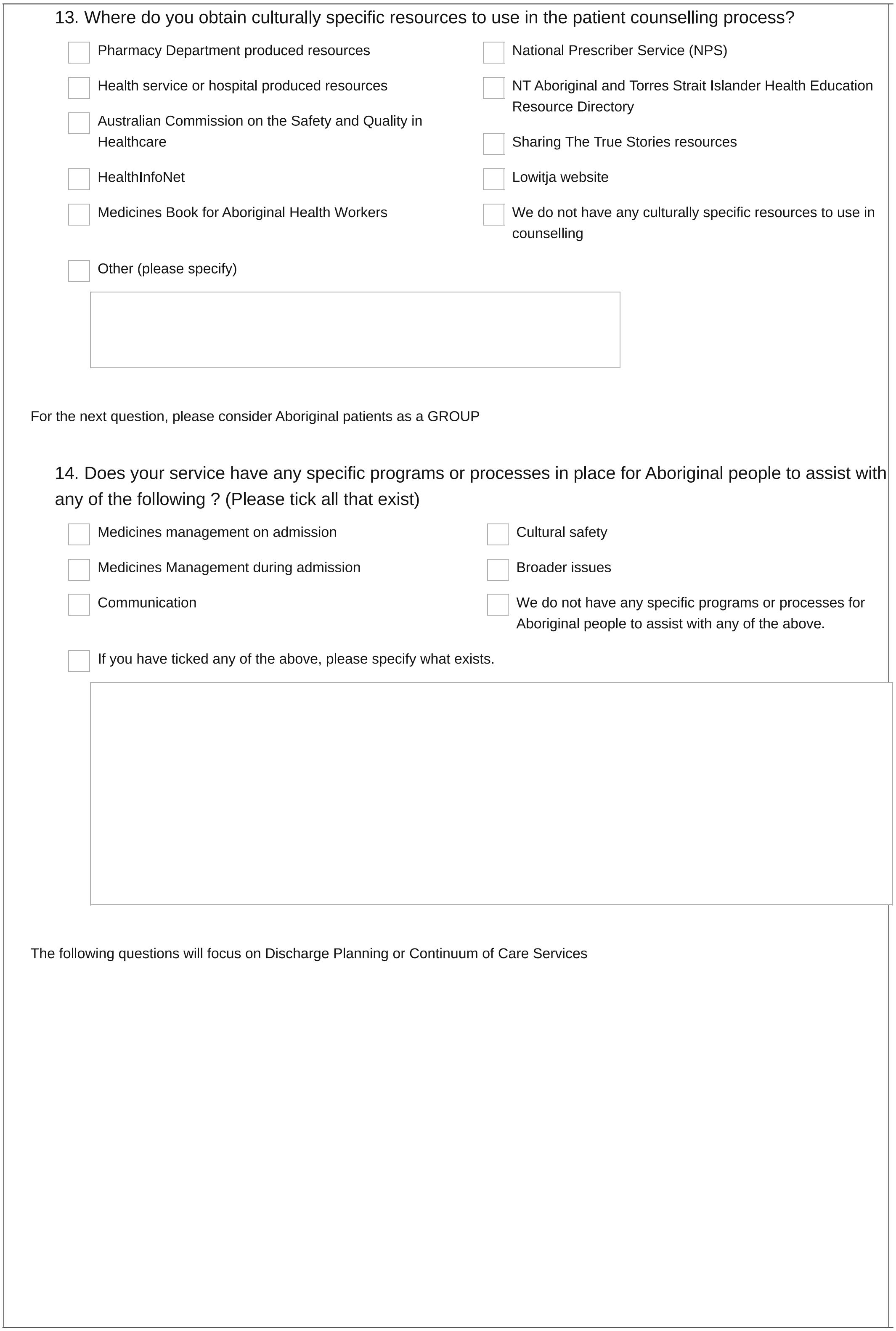
○ medical notes
○ my health record
○ visual icon on ward/patient tracking list
○ Other (please specify)

11. Does your pharmacy service have specific programs or processes for Aboriginal patients? (please tick all that exist)

☐ They are a priority for clinical pharmacist review
☐ Involvement of family members is routine
☐ Provide culturally appropriate medication information
☐ Use interpreter
☐ Involve Aboriginal Liaison officers/Health workers
☐ Liaise with Aboriginal Medical Service
☐ Liaise with community pharmacy
☐ We do not have any specific programs or processes for Aboriginal patients
☐ Other (please specify)

12. Are there any chronic disease states which you prioritise for assessment during a patient’s admission?

○ No
○ If Yes: please specify disease/s and what is in place :



13. Where do you obtain culturally specific resources to use in the patient counselling process?

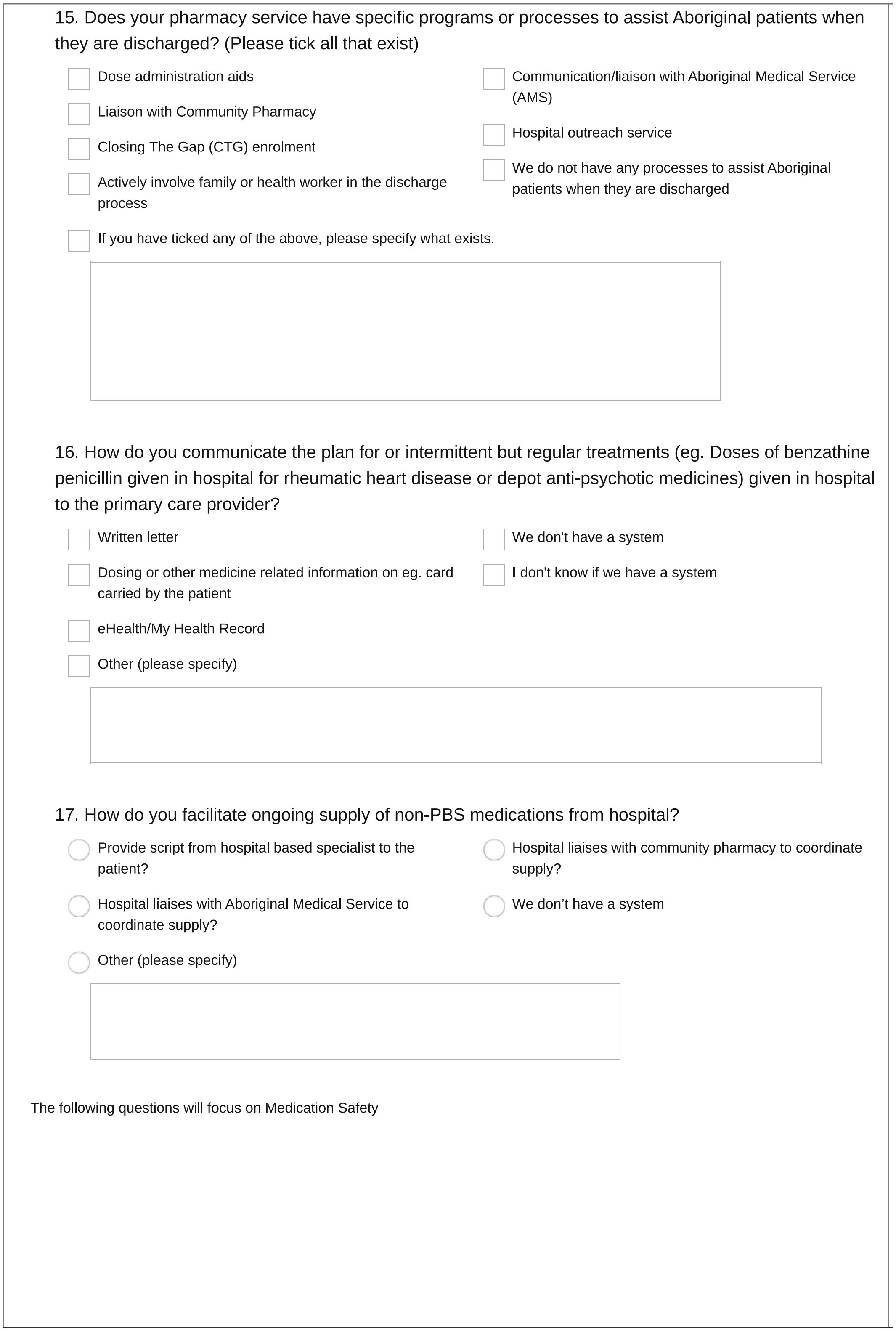
☐ Pharmacy Department produced resources
☐ Health service or hospital produced resources
☐ Australian Commission on the Safety and Quality in Healthcare
☐ HealthInfoNet
☐ Medicines Book for Aboriginal Health Workers
☐ National Prescriber Service (NPS)
☐ NT Aboriginal and Torres Strait Islander Health Education Resource Directory
☐ Sharing The True Stories resources
☐ Lowitja website
☐ We do not have any culturally specific resources to use in counselling
☐ Other (please specify)

For the next question, please consider Aboriginal patients as a GROUP

14. Does your service have any specific programs or processes in place for Aboriginal people to assist with any of the following ? (Please tick all that exist)

☐ Medicines management on admission
☐ Medicines Management during admission
☐ Communication
☐ Cultural safety
☐ Broader issues
☐ We do not have any specific programs or processes for Aboriginal people to assist with any of the above.
☐ If you have ticked any of the above, please specify what exists.

The following questions will focus on Discharge Planning or Continuum of Care Services



15. Does your pharmacy service have specific programs or processes to assist Aboriginal patients when they are discharged? (Please tick all that exist)

☐ Dose administration aids
☐ Liaison with Community Pharmacy
☐ Closing The Gap (CTG) enrolment
☐ Actively involve family or health worker in the discharge process
☐ Communication/liaison with Aboriginal Medical Service (AMS)
☐ Hospital outreach service
☐ We do not have any processes to assist Aboriginal patients when they are discharged
☐ If you have ticked any of the above, please specify what exists.

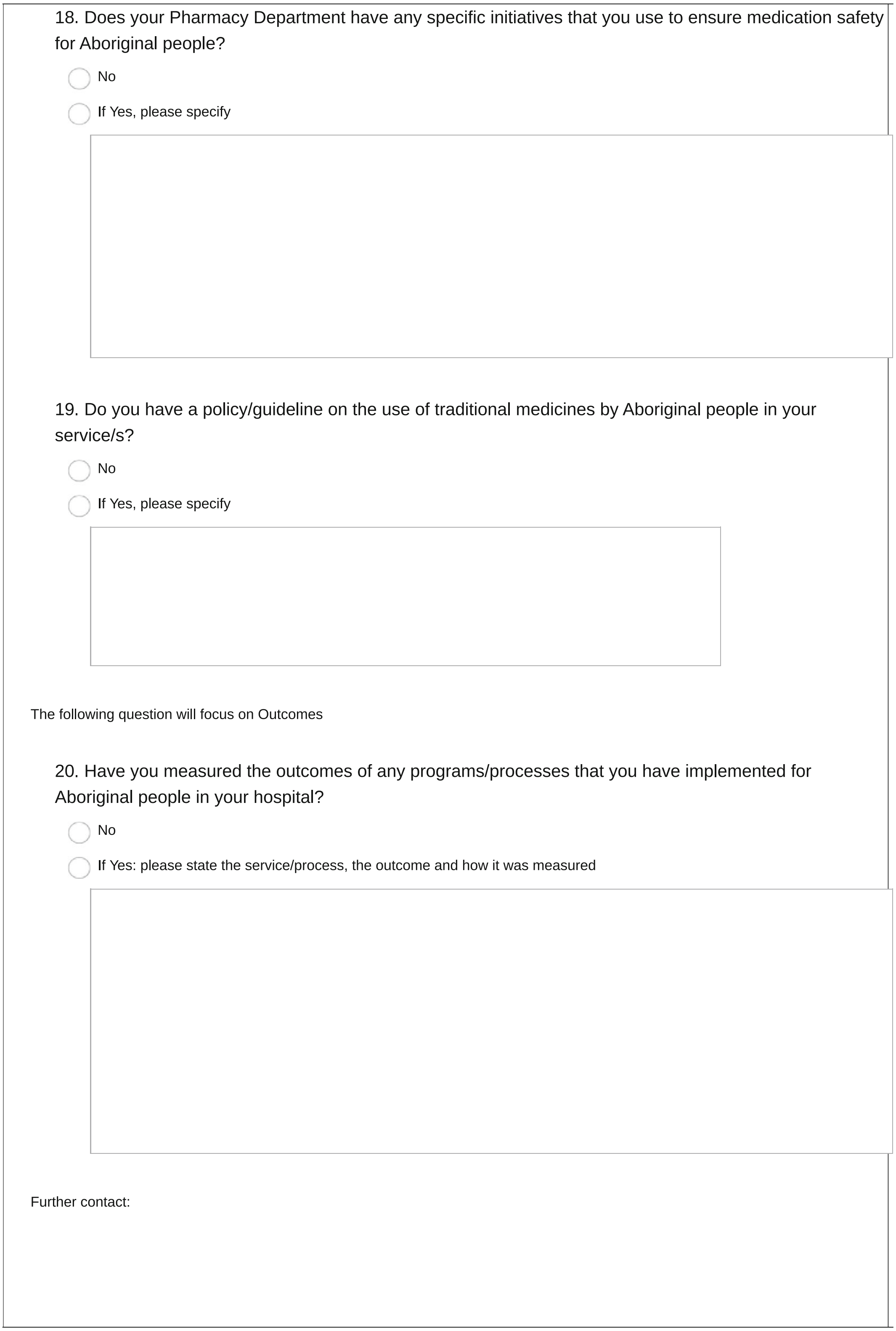
16. How do you communicate the plan for or intermittent but regular treatments (eg. Doses of benzathine penicillin given in hospital for rheumatic heart disease or depot anti-psychotic medicines) given in hospital to the primary care provider?

☐ Written letter
☐ Dosing or other medicine related information on eg. card carried by the patient
☐ eHealth/My Health Record
☐ Other (please specify)
☐ We don't have a system
☐ I don't know if we have a system

17. How do you facilitate ongoing supply of non-PBS medications from hospital?

○ Provide script from hospital based specialist to the patient?
○ Hospital liaises with Aboriginal Medical Service to coordinate supply?
○ Other (please specify)
○ Hospital liaises with community pharmacy to coordinate supply?
○ We don't have a system

The following questions will focus on Medication Safety



18. Does your Pharmacy Department have any specific initiatives that you use to ensure medication safety for Aboriginal people?

○ No

○ If Yes, please specify

19. Do you have a policy/guideline on the use of traditional medicines by Aboriginal people in your service/s?

○ No

○ If Yes, please specify

The following question will focus on Outcomes

20. Have you measured the outcomes of any programs/processes that you have implemented for Aboriginal people in your hospital?

○ No

○ If Yes: please state the service/process, the outcome and how it was measured

Further contact:

21. Would you be like to be contacted for a short semi-structured interview?

○ No

○ Yes, please provide the best contact number

☐

Thankyou for taking the time to complete this survey.

APPENDIX 2

COREQ (CONSOLIDATED CRITERIA FOR REPORTING QUALITATIVE RESEARCH) CHECKLIST

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

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4. UNCOVERING MISSED OPPORTUNITIES: RETROSPECTIVE STUDY

As outlined in chapter 2 and 3, a dearth of literature exists on the important role that hospital pharmacists have working with Aboriginal and Torres Strait Islander Peoples. A few hospitals nationally had conducted, but not shared their work through publication. Also, the impact of these initiatives on health outcomes still needed to be evaluated to guide future work of hospital pharmacy teams.

In addition to that uncovered in chapters 2 and 3 regarding hospital pharmacists' roles, we know that chronic diseases including diabetes have lasting effects and contribute to preventable hospital admissions for Aboriginal and Torres Strait Islander Peoples and their families (chapter 1). However, the levels of chronic disease experienced by and the reasons for hospital admission for Aboriginal and Torres Strait Islander Peoples still needed to be quantified. This would further inform pharmacist-led, hospital-based studies to be designed with Aboriginal and Torres Strait Islander Peoples.

This next chapter (chapter 4) describes levels of chronic disease experienced and the reasons for hospital admissions. It uses data obtained from a retrospective review of cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples admitted to St. Vincent's Hospital, Sydney.

This work is under review with the Internal Medicine Journal as: Welch S., Moles R. J., Viardot A., Deweerd P., Daly S., Robinson S., Harwood K., Woods C., Chand S., Lee K. Uncovering missed opportunities to provide holistic care for a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples in a metropolitan hospital.

My contribution to this original research article is outlined in Table 1. (page 19)

Uncovering missed opportunities to provide holistic care for a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples in a metropolitan hospital

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Conflict of Interest Statement:

Competing interests: No relevant disclosures

Authorship Statement: Contributions to the manuscript

Conceptualisation: SW, RM, AV, PD Funding acquisition: SW, RM, AV, PD, KL Methodology: SW, RM, AV, PD, SD, CW, SC Investigation/Data extraction: SW, SR, KH, CW, SC Data curation: SW. Project administration: SW, Data synthesis: SW, RM, SR, KH, KL Formal analysis: SW, RM, AV, KL Writing — original draft: SW, KL. Writing — reviewing and editing: SW, KL, RM, PD, AV, SD, SR, KH, CW, SC

Ethics Statement:

Ethical approval was obtained from the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and St. Vincent's Hospital, Sydney (Ref: #2020/ETH01314: 8/10/20).

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Main text: 3000

Abstract: 248

Abstract

Background: Chronic disease disproportionately affects Aboriginal and/or Torres Strait Islander Peoples. More is needed to enhance prevention, detection, and chronic disease care.

Aims: To describe and quantify chronic disease markers and reasons for hospital admission in a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples.

Methods: Retrospective medical record review (paper-based and electronic) in a metropolitan tertiary referral, Level 1 trauma hospital in Sydney, New South Wales, Australia. A cohort discharged from the study hospital (January-December 2017), were identified using admission and discharge data. Records were selected for inclusion sequentially based on discharge. Main outcome measures were primary outcomes were demographics, reasons for admission, presence of chronic disease and chronic disease markers.

Results: The patient cohort (n=300) was young [mean age: 45 years (range: 16 – 79)], and primarily male (n=191/300, 64%), with high levels of multiple chronic diseases and related complications. Nearly four in ten had no general practitioner (n=116/300, 39%). Nearly one in five (n=54/300, 18%) had no fixed address. The cohort were often admitted more than once, and admissions were most often for substance use or mental health.

Conclusions: Findings quantify previously unpublished levels of chronic disease markers and reasons for hospital admission of Aboriginal and/or Torres Strait Islander Peoples. Findings highlight missed care opportunities – within hospital for all chronic diseases and on transitions of care to community. More is needed to make hospital system changes that encourage clinicians to provide holistic care. Further research using continuous quality improvement methods could help rethink these systems.

Key words:

Aboriginal, Indigenous, hospital, holistic care, chronic disease

Introduction

In Australia, 91% of non-fatal disease burden is attributed to chronic disease. (1) However, burden is not shared equally. (2) For Aboriginal and/or Torres Strait Islander Peoples, chronic disease stems from colonisation and racist governmental policies, (3, 4) resulting in the burden of disease experienced by Aboriginal and/or Torres Strait Islander Peoples more than double their non-Indigenous counterparts. (1, 5) Prevention and early detection of chronic disease is key to reducing inequality. (6)

Detection of chronic disease can occur at any point in the health care journey (from community to hospital). However, primary care is the focal point for early detection in Australia (6) (e.g. Medicare-funded Aboriginal and/or Torres Strait Islander adult health checks (7)). However, there is variable uptake of preventive assessments (8), and suboptimal links to care. (9, 10) Barriers preventing implementation of health checks in primary care include a focus on acute rather than preventive care, and competing demands on staff. (11) Poorer access to primary care also contributes to patients presenting to hospital. (12-14) Other opportunities are needed to improve detection of chronic diseases, including during hospital admission.

The rate of chronic disease-related hospitalisations among Aboriginal and/or Torres Strait Islander Peoples is nearly five times that of their non-Indigenous counterparts. (12) As a result, more than half (55%) of avoidable hospital admissions are chronic disease related. (12) Among Aboriginal Peoples admitted to hospital, multimorbidity occurs nearly three times the rate of non-Indigenous Australians. (15) Accordingly, hospitals are an untapped opportunity to provide holistic chronic disease care.

For hospital patients, the traditional model of care treats the reason/s for admission and refers to primary care for ongoing management and specialist follow-up. Illnesses identified during hospital admission are reviewed by referral to medical/surgical teams, with overarching management coordinated by the admitting team. If other illnesses are not identified/investigated, due to lack of acute symptoms or need, then linkage to specialist care may not occur. Some hospitals are challenging this traditional model when caring for Aboriginal and/or Torres Strait Islander Peoples. (16-18) For example, one Australian metropolitan hospital emergency department implemented a flexible model to fast-track and coordinate care, led by patient priorities. (16) This relied on dedicated Aboriginal health workers to shape delivery of culturally appropriate care. (16) However, increased efforts are needed to enable holistic chronic disease care more broadly in hospitals. To help inform clinicians of the presence of chronic disease in a metropolitan hospital setting, this study aimed to describe and quantify chronic disease markers and reasons for hospital admission in a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples.

Materials/Methods

Aboriginal leadership:

This study was conceived via a long-standing collaboration between the Aboriginal Health Unit, and the Pharmacy and Endocrinology Departments at the study site. (19) The Executive Director of Aboriginal Health (PD, Yuin nation) and the Aboriginal Health Unit Manager (SD, Yuin nation) – recognised that Aboriginal and/or Torres Strait Islander Peoples were being admitted to hospital with competing health issues. However, the level of disease burden was unknown and not prepared in a quantifiable way via patient records.

An advisory committee provided study oversight, comprised of Aboriginal and non-Aboriginal experts (n=5; Aboriginal Health Unit, Pharmacy, Endocrinology Departments). Meetings were facilitated by SW and held via email, face-to-face or online, individually or as a group to ensure all parties' feedback was considered.

Design:

Retrospective review of medical records (paper-based and electronic systems).

Setting:

Metropolitan, tertiary referral, Level 1 trauma hospital in Sydney, New South Wales, Australia.

Participants:

Aboriginal and/or Torres Strait Islander Peoples discharged from the study hospital (January to December 2017). A cohort of patients were identified using admission and discharge data. Their notes were selected for inclusion sequentially based on discharge (n=300 patients). Cohort size was selected based on advice from a biostatistician.

Data collection:

Definitions and sources of data collected were developed in a pilot of 15 patients (20). Table 1 outlines the data sources and data accessed.

A retrospective audit of medical records (paper and electronic systems) was conducted to determine reasons for admission and baseline disease markers for the cohort. Data were collected by SW, SR (Bundjalung nation) and KH.

The audit consisted of: (1) A review of all patient admissions in 2017 to enable the most complete data possible for each patient; and (2) A review of laboratory results for each patient's most recent tests in 2017.

Primary variables included demographic data, and blood tests typically conducted in relation to chronic disease (Table 2).

To determine the extent of chronic disease, known comorbidities were extracted from medical notes (secondary variables). For example, history of cardiovascular disease, diabetes (any form, herein referred to as "diabetes"), any micro and/or macro complications of diabetes, and presence of chronic kidney or obstructive pulmonary disease (CKD; COPD; Table 2).

Specific team-based reviews were quantified to understand existing supports provided (Table 2; patient review by endocrinology as inpatient or outpatient during 2017; review by Aboriginal Health Unit during admission).

Data management:

De-identified data were collated in Research Electronic Data Capture (REDCap). Prior to entering into REDCap, all data were stored on a password accessible computer or hard copy in a lockable filing cabinet in the Pharmacy Department.

Data analysis:

Data were descriptively analysed using Microsoft Excel.

This report was prepared in accordance with the CONSIDER (21) criteria. (Supplementary material 1)

Ethical approval:

Ethical approval was obtained from the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and the study hospital (Ref: #2020/ETH01314: 8/10/20).

Results

Overview – patient cohort

In 2017, 606 Aboriginal and/or Torres Strait Islander Peoples were discharged from the study hospital. This is equivalent to 1039 discharges in total, representing 2.3% (n=1039/45,174) of overall hospital presentations. The cohort of patients reviewed (n=300/606, 50%) were discharged 602 times in 2017 (the study period; Figure 1).

The patient cohort was young (mean age: 45 years [range: 16 – 79]), and primarily male (n=191/300, 64%). Nearly four in ten patients had no general practitioner, (GP) (n=116/300, 39%). Most patients lived in their home (n=212/300, 71%), however nearly one in five (n=54/300, 18%) had no fixed address (Table 3).

Reasons for hospital admissions

In 2017, the top two reasons for Aboriginal and/or Torres Strait Islander patients being admitted to hospital were ‘drugs and alcohol’, and ‘social and emotional wellbeing / mental health' (Table 3). For patients admitted to hospital, one in two were supported by an Aboriginal Health Worker during their stay (n=127/300, 42%).

Four in ten Aboriginal and/or Torres Strait Islander patients (n=121/300, 40%) were admitted to hospital two or more times. More than one-third of patients did not have a GP (n=116/300, 39%). However, among patients with no fixed address (n=54/300), more than one in two of these did not have a GP (n=29/54, 54%, mean = 2).

Presence of chronic disease

In this patient cohort, the most commonly documented chronic diseases were cardiovascular disease (CVD; n=66/300, 22%) and diabetes (n=60/300, 20%). In addition, one in 14 (n=21/300, 7%) and almost one in ten (n=26/300, 9%) had CKD and COPD, respectively. More than one-third of patients (n=110/300, 37%) had one or more documented chronic disease, and one in six (n=50/300, 17%) had two or more (e.g. CVD, COPD, CKD, diabetes). The majority of patients (n=273/300, 91%) had no family history specified in their medical record.

Presence of chronic disease markers

Renal/chronic kidney disease

Measures of renal function were often checked for patients during their hospital admission (e.g. serum creatinine and estimated glomerular filtration rate [eGFR], n=272/300, 91%). However, more specific markers were rarely checked (e.g. urinary albumin, n=10/300, 3%; urinary albumin: urinary creatinine, n=9/300, 3%). The majority of patients had normal renal function (n= 179/300, 60%) as reported by eGFR. (22) For nearly one in ten patients with abnormal results (n=28/300, 9%), the majority had moderate GRF reduction (n=24/300, 8%), one patient had severe reduction and three had end-stage kidney damage. Three patients were receiving haemodialysis.

Chronic obstructive pulmonary disease

For the 26 patients in the cohort with known COPD (n=26/300, 9%), just over one in five (n=7/26, 27%) had spirometry performed during their hospital stay.

Cardiovascular disease

Nearly three in ten patients (n= 85/300, 28%) had high blood pressure recorded on admission or discharge. Lipids were infrequently checked (n=50/300, 17%), with just over one in five of those with lipids checked (n=17/66, 26%) having documented CVD. Two further patients had no lipids checked despite a family history of premature CVD. (23) Other modifiable risk factors such as tobacco smoking and obesity were present in one in two patients (n= 168/300, 56%), and one in four (79/300, 26%), respectively. Due to the lack of tests taken, absolute cardiac risk (23) was only calculated for a small number of patients (n=41/300, 14%). Among this group, 17% (n=7/41) were considered high risk for developing CVD.

Diabetes

One in five patients had diabetes (n=60, 20%), with just one in ten (n=29/300, 10%) reviewed as an out/inpatient by the endocrinology team. Glycated haemoglobin (HbA1c) was checked in just over one in five patients (n=65/300, 22%). For patients with HbA1c measured with no history of diabetes, just under half (n=16/36, 44%) were eligible for assistance: life-style optimisation (HbA1c: 39 – 46 mmol/mol; n=12/36, 33%) or treatment (HbA1c: > 48mmol/mol; n=4/36, 11%). One in two patients (n=29/60, 48%) with documented diabetes, had HbA1c checked. Of this group, two-thirds (19/29, 66%) had a high score (> 53 mmol/mol) (24) and two in five (n=35/60, 58%) were not documented as receiving diabetes drug treatment. Those with documented diabetes, exhibited a high level of macro and micro complications (e.g. one in two [n=33/60, 55%] and one in three [n=19/60, 32%] respectively).

Discussion

This retrospective review of medical records is of a cross-sectional cohort of Aboriginal and/or Torres Strait Islander Peoples sequentially admitted in 2017 to a metropolitan hospital in NSW. Our findings quantify previously unpublished levels of chronic disease markers and reasons for hospital admission. It highlights missed care opportunities – within hospital and on transitions of care to community. The cohort were often admitted more than once in the study period, admissions were most frequently for substance use or mental health, and nearly one in five experienced multimorbidity (n=50/300; 17%). Nearly four in ten patients had no GP.

Missed opportunities for holistic care – in hospital

Missed opportunities for care were identified for all chronic diseases. These included limited documentation of family history of chronic disease and of screening and relevant testing to enable risk assessment for cardiovascular disease and diabetes. These missed opportunities point to the usefulness of holistic care for this cohort. To provide holistic care in a hospital setting, we suggest drawing on learnings from pioneering Aboriginal Community Controlled Health Organisations (ACCHOs). (25) Such an approach to care, means treating the whole person, including involvement of family/support people, collaborating and information sharing with all health professionals. It also requires systems that encourage close collaborations, such as data linkage that is accessible by health professionals involved in providing care.

It is noteworthy that these missed opportunities occurred in a major metropolitan hospital, where multiple specialist services are available. Also, documenting of family history of chronic disease did not occur. Changes in history-taking processes are needed to prioritise family history for Aboriginal and/or Torres Strait Islander Peoples. Such data could in turn help clinicians predict individual risk of developing chronic disease. (26)

How could we improve opportunistic linkages of care in hospital? For those in our cohort with documented diabetes, one in two (n=33/60, 55%) had macro and one in three (n=19/60, 32%) had micro complications. Better screening and related testing on admission to hospital could help increase targeted reviews by endocrinology. This could lead to more diabetes care being offered during admission. As well, improved frequency of HbA1c testing (currently just 22% overall received HbA1c testing), could help to uncover previously undiagnosed or poorly controlled diabetes. This would go some way to help further prevent late diagnoses and resulting complications. By not screening, this then contributes to chronic disease burden. Likewise, increasing lipid screening, which in this study was only conducted in one in six patients (n=50/300, 17%), could fast-track formal cardiovascular risk assessment and review. (26) Similarly, cardiovascular disease modifiable risk factors could be targeted. In addition, links to care could be offered and treatment provided with tobacco smoking cessation therapies, readily available in hospital settings (e.g. links with quit services and dieticians). In the same way, spirometry rates for those with documented COPD and measurement of urinary albumin – urinary creatinine for those with moderate to severe renal impairment, could be improved to assist treatment optimisation.

Missed opportunities for holistic care – continuity across transitions of care

Such system changes within hospitals could also help promote links with follow-up care. Improved documentation of chronic disease markers could better identify and allow patient follow-up. However, many of our cohort did not have a GP or secure living arrangements, which makes it harder to coordinate and provide seamless care. This supports previous studies which showed that lack of linkages between hospital and primary care providers (25) contributes to hospitals being used as surrogate primary care services. (14, 27)

A systems-wide approach in-hospital could better link patients with primary care. To support this, improved communication is needed on hospital discharge with community-based providers (e.g. GP, community mental health, nursing, Aboriginal Community Controlled Health Organisations). This in turn could help prevent re-admission and complications from preventable causes. (27) Otherwise, the onus of communication is placed solely on individual patients to convey what happened in hospital with care providers in the community. We propose that it is unreasonable to expect patients to shoulder the burden to advocate for their own care, given they face multiple competing priorities and significant multimorbidity.

Technical solutions – in hospital and across transitions of care

In this study, patient information was incomplete and needed to be extracted from multiple distinct platforms. This is both time consuming and cumbersome (Table 1). More streamlined solutions would better describe and quantify chronic illness faced by Aboriginal and/or Torres Strait Islander Peoples. This in turn could improve links with appropriate care, services and follow-up, during hospitalisation and after discharge.

To provide holistic care, clinicians need a complete patient picture. Previous studies have made recommendations to provide clinicians with the complete picture for patients with heart failure. (28) This could be extrapolated to other chronic diseases. For example, having connected, effective clinical information systems; clear legible medical records; shared, easily accessible information flow in and out of hospital (28), and connection of medical records with primary care. (13) However, the present study showed that many of these technical solutions were not happening due to cumbersome data management systems, that contributed to missed care opportunities.

Strengths and limitations of the study

A key study strength was that it was guided by Aboriginal leadership (PD, SD, SR) and built on longstanding collaborations with the local Aboriginal Health Unit, and Pharmacy and Endocrinology Departments. Study limitations include a small cohort size (n=300), drawn from a small one-year cross-section, which equates to just 50% of the overall number of Aboriginal and/or Torres Strait Islander Peoples who were discharged from the study hospital in 2017 (n= 606). However, the cohort size was selected based on input from a biostatistician who recommended that 300 patients consecutively recruited would minimise selection bias and enable sufficiently representative patient characteristics. (15)

Study implications

Practice

Changing long-held ways of providing care in hospital will be difficult to achieve. This work illustrated inadequacies such as missed care opportunities. These results should challenge the way we ask patients for their history (including family history) and in turn inform resulting care. The ability of busy clinicians to provide holistic care requires a system-wide data access change, together with cultural change. The implementation of the Single Digital Patient Record (SDPR) (29) will go some way to improve the ability of clinicians to have a complete patient picture to inform holistic care efforts. However, data is one piece – while usage and application of this data is another. To reduce stigma and shame which surrounds the identification of chronic disease, more is needed to enable culturally safe care. (19)

Policy

This cohort study will help support systemic and cultural change in the provision of holistic care at this site, for and with Aboriginal and/or Torres Strait Islander Peoples.

Future research

This study highlights challenges faced to provide holistic care for a community that experience systemic inequity. (2) It raises more questions and lays the foundation for future work, to investigate different ways to provide care. At this hospital, together with Aboriginal Health Workers, a Chronic Care Coordinator nurse position for Aboriginal health has been created (in 2022) to assist with cultural support, care coordination, connection of follow-up care after discharge. However, prevalence of chronic disease from this study is high and needs more than one coordinator. This coordination role could be supplemented by pharmacist-led chronic disease screening, a model for which has been explored in recent work (30), or a disease specific multidisciplinary team-based approach. (18) More is needed to enable systematic collection of chronic disease markers to enable holistic care. This work needs to be done with local health promotion efforts. (31) To achieve this, relationships based on trust and respect (32) using culturally appropriate communication, could help patients and broader community to reflect on their health choices. (14) Then care can be provided without associated judgement or shame. (33)

Conclusion

This study identified a younger patient cohort of Aboriginal and/or Torres Strait Islander Peoples admitted to hospital, with high levels of multiple chronic diseases and related complications. When patients come to hospital, existing hospital systems did not allow clinicians to view patient data in a way to enable holistic care. Such shortcomings do not encourage clinicians and hospital administrators to think holistically when providing care to Aboriginal and/or Torres Strait Islander Peoples. Single digital patient record could go some way to improve information accessibility. But much more is needed to make system changes that encourage clinicians to provide holistic care. Further research using continuous quality improvement methods could help rethink these systems.

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Figure 1. Patient discharges included in the file review

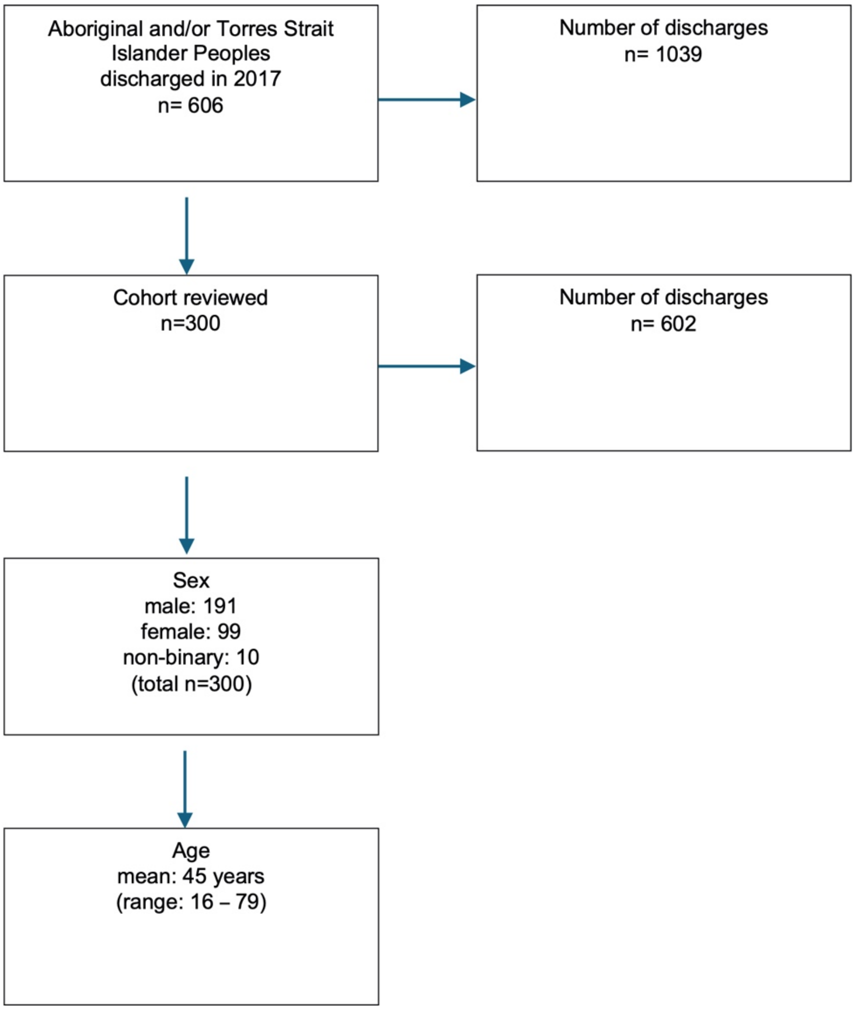

Table 1. Information sources used to identify primary and secondary variables

	Multiple paper-based and electronic platforms	Data extracted
Information sources to identify primary and secondary variables including: chronic disease markers	Online clinical and patient information	Reason for admission, date of Admission/ discharge, demographics
		Electronic discharge summary, eg medical and social history
	Online laboratory reports	BGL, lipids, urinary Alb:Cr ratio, spirometry, chest X-ray
	Casemix summary reports	Medical history & chronic disease status
	Observation charts	BGL, weight, blood pressure
	Electronic medication management systems (eMMS)	Medication information during admission/ discharge
	Paper-based medical records, including general practitioner (GP) and specialist letters	Medical history & chronic disease status
		Reason for admission, date of Admission/ discharge, demographics

Table 2. Primary and secondary variables collected for each patient in the cohort

Primary variables	
Demographic data	Sex Age General practitioner (GP) information provided Living arrangements, (postcode; type: home, nursing home, no fixed address, hostel) Documented: • Employment status • Weight • Height • Obesity score • Tobacco smoking (current) • Alcohol misuse (current) • Illicit drugs (current) • Family history of chronic disease
Admission details	• Number of discharges in 2017 • Reason/s for each admission • Length of stay (for last 2017 admission/ discharge)
Blood tests	Lipids: • Low-density lipoprotein (LDL) • High-density lipoprotein (HDL) • Total cholesterol • Triglycerides • Total cholesterol: HDL ratio Renal markers: • Serum creatinine • eGFR • Urinary albumin • Urinary albumin: urinary creatinine • Dialysis (specify type) Blood pressure (on admission and at discharge): • Systolic • Diastolic • Mean arterial pressure

	Diabetes markers: - Blood glucose level (BGL) in Emergency Department (ED), or the first BGL on admission - BGL on discharge - Glycated haemoglobin (HbA1c)
Secondary variables	
Chronic disease status	Cardiovascular disease Diabetes Chronic obstructive pulmonary disease (COPD) Chronic kidney disease
Diabetes complications	Macro - Ischaemic heart disease - Peripheral vascular disease or - Cerebral vascular disease [Transient ischaemic attack (TIA) / Stroke] Micro - Diabetic retinopathy - Peripheral neuropathy - Chronic kidney disease
COPD	Chest Xray Spirometry
Discharge medications	Medication name/s
Reviewed by: (during 2017)	- Endocrinology team (inpatient or outpatient) - Aboriginal Health Unit (during hospital stay)

Table 3: Retrospective review of patient medical records: demographic profile, reasons for hospital admission, documented chronic disease markers

Patient cohort in a retrospective medical record review (n=300)	
Primary variables	
Demographic data	
Sex (n, %)	M: 191 (64%), F: 99 (33%), Non-binary: 10 (3%)
Age (mean, range of years; median)	Mean: 45 (Range:16 - 79) Median: 43
General practitioner (GP) information provided (n, %)	
• GP specified	184 (61%)
• No GP specified	116 (39%)
Living arrangements	
• Within hospital catchment area (postcode: 2000, 2010, 2011, 2021, 2027)	61 (20%)
• Type	
- home	212 (71%)
- no fixed address	54 (18%)
- hostel	11 (4%)
- other	5 (2%)
- not specified	18 (6%)
Employment status	
• Currently employed	45 (15%)
• Currently unemployed	112 (37%)
• Retired	10 (3%)
• Not specified	133 (45%)
Admission details	
Total number of discharges for patient cohort (in 2017; n, %)	602
• 1	179 (60%)
• 2	65 (21%)
• 3	22 (7%)
• 4	11 (4%)
• 5	8 (3%)
• 6+ (range)	15 (5%; range: 6 - 23)

Reason for admission (Total out of 602 discharges, %)	
• Drugs and alcohol	102 (17%)
• Social and emotional wellbeing / mental health	97 (16%)
• Cardiac	78 (13%)
• Gastrointestinal	61(10%)
• Respiratory	57 (9%)
• Nephrology	33 (5%)
• Infection	25 (4%)
• Trauma	24 (4%)
• Surgical	21 (3%)
• Neurology	17 (3%)
• Oncology	17 (3%)
• Endocrine	14 (2%)
• Immunology	1 (0.2%)
• Other	55 (9%)
Length of stay in days (mean, range; median)	Mean: 7 (range: 0 - 566) Median: 2
Presence of alcohol or illicit drug use (n, %)	
• Alcohol misuse (current)†	Yes: 123 (41%), No: 103 (34%) Not specified: 74 (25%)
• Illicit drugs (current)	Yes: 135 (45%), No: 98 (33%) Not specified: 67 (22%)
Chronic disease specific data	
Family history of chronic disease ‡	Yes: 21 (7%), No: 6 (2%) Not specified: 273 (91%)
• Cardiovascular disease	17
• Diabetes	6
• COPD	3
Cardiovascular disease (CVD) markers (n= 300)	
Known CVD	66 (22%)
Blood pressure (n=300)	
• Admission TOTAL measured (n, %) (median, range)	293 (98%)
- Systolic	(median:123; range:58 –204)
- Diastolic	(median:77; range:40 –125)
- Mean arterial pressure (MAP) alone	3 (1%) (median:87; range:67 -101)
Systolic BP >140 mmHg OR diastolic BP >90mmHg (High)	91 (31%) Systolic (median:150; range:141-204) Diastolic (median:96; range:91 –123)
• Discharge TOTAL measured (n, %) (median, range)	268 (89%)
- Systolic	(median:120; range:81 -189)
- Diastolic	(median:72; range:30 –123)
- Mean arterial pressure (MAP) alone	2 (1%) (median:76; range:74 – 78)
Systolic BP >140 mmHg OR diastolic BP >90mmHg (High)	36 (13%) Systolic (median:147; range:141 – 189) Diastolic (median:107; range:91 – 123)
• High either on admission OR at discharge	85 (28%)

Modifiable risk factors for CVD:	
• Lipids checked (n, %)	50 (17%)
- With known CVD	17 (26%)
- Cholesterol > 7.5	0 (0%)
• Tobacco smoking (current)	Yes:168 (56%), No: 114 (38%) Unknown: 12 (4%)
• Obesity[§] (BMI)	
- 20 – 24.9 (average)	53 (18%)
- 25 – 29.9	41 (14%)
- >/=30	38 (13%)
- <20	10 (3%)
- Unknown	158 (52%)
CVD risk calculated: (n, %) (AusCVDRisk calculator) (26)	41 (14%)
• Age: 30 -74 years (n= 35)	
- High	7 (17%)
- Intermediate	11 (27%)
- Low	17 (41%)
• Age: 18 – 29 years (n=6) (NO high-risk factors present) (26)	6 (15%)
Renal disease markers (n=300)	
• Bloods taken	272 (91%)
• Serum creatinine	272 (91%)
• eGFR[¶] (22) (mL/min/1.73m^2)	272 (91%)
- >/= 90 (normal)	179 (60%)
- 60 – 89 (mild reduction in GFR)	65 (22%) (median: 78; range: 61 - 89)
- < 60	28 (9%) (median: 52; range: 8 - 59)
- 30 – 59 (moderate reduction GFR)	24 (8%) (median: 53.5; range: 32 - 59)
- 15 – 29 (severe reduction in GRF)	1 (0.3%)
- <15 (end stage kidney damage)	3 (1%) (median:9; range: 8 - 12)
• Urinary albumin (22)	10 (3%) (median: 21.5; range: 1.1 – 76)
- Normal	
Male <2.5 mg/mmol	0
Female <3.5	1
- Microalbuminuria	
Male: 2.5 – 25	5
Female: 3.5 – 35	1
- Macroalbuminuria	
Male >25	2
Female > 35	1
• Urinary albumin: urinary creatinine	9 (3%)
• Dialysis (specify type)	3 (1%) (haemodialysis)
Diabetes markers (n=300)	
Blood glucose level (BGL) measured: (n, %)	
• Admission (n, %) (median, range)	222 (74%) (median: 6; range: 3.3 – 33 mmol/L)
(BG monitor in ED OR first formal blood taken)	n=129 (43%): BG monitor in ED
>11mmol/L (n, %)	17 (8%)
• Discharge (n, %) (median, range)	64 (21.3%) (median: 6.3; range: 3.8 – 14.1mmol/L)
> 11mmol/L (n, %)	4 (6%)

HbA1c checked (all patients) (n, %)	65/300 (22%)	
PLUS (24)		
• History of diabetes	29 (10%)	
<39 mmol/mol	3 (1%)	
39 – 46 mmol/mol	5 (2%)	
47 – 53 mmol/mol	2 (1%)	
> 53 mmol/mol (= HIGH)	19 (6%) (range: 55 – 171)	
• No history of diabetes	36 (12%)	
<39 mmol/mol	20 (7%)	
39 – 46 mmol/mol (= HIGH, prediabetes)	12 (4%)	
>/= 48 mmol/mol (= HIGH, diabetes)	4 (1%)	
Patients with history of diabetes	60/300 (20%)	
• Number on treatment	35/60 (58%)	
• Number with diabetes complications (>/= 1)		
- Macro	33 (55%)	
- Micro	19 (32%)	
Secondary variables		
Chronic disease status (documented) (n, %) (M, F, non-binary)		
• Cardiovascular disease	66 (22%) (M:48, F:14, Non-binary: 4)	
• Diabetes	60 (20%) (M:32, F:25, Non-binary: 3)	
• Chronic obstructive pulmonary disease (COPD)	26 (9%) (M:17, F:8, Non-binary: 1)	
• Chronic kidney disease	21 (7%) (M:16, F:4, Non-binary: 1)	
Multimorbidity (n, %) (M, F, Non-binary)		
• >/= 1 chronic disease	110 (37%) (M:72, F:34, Non-binary: 4)	
• >/= 2 chronic disease	50 (17%) (M:33, F:14, Non-binary: 3)	
Diabetes complications	All patients (n=300)	With diabetes (n= 60)
• Macro >/= 1	77 (26%)	33 (55%)
- Ischaemic heart disease	65 (22%)	29 (48%)
- Peripheral vascular disease or	8 (3%)	5 (8%)
- Cerebral vascular disease [Transient ischaemic attack (TIA) / Stroke]	22 (7.3%)	9 (15%)
• Micro >/= 1	29 (10%)	19 (32%)
- Diabetic retinopathy	6 (2%)	5 (8%)
- Peripheral neuropathy	8 (3%)	8 (13%)
- Chronic kidney disease	20 (7%)	12 (20%)
COPD	26 (8.7%)	
• Chest Xray$^{\#}$	17/26 (65%)	
• Spirometry	7/26 (27%)	
Specific team-based reviews (during 2017; documented)		
• Endocrinology team (inpatient or outpatient)	29 (10%)	
• Aboriginal Health Unit (during hospital stay)	127 (42%)	

†. Obesity measure is a mixture of calculated, (if weight and height were available) or estimated on admission to ED

‡. Alcohol misuse (current) = above national guidelines (34)

§. Family history of chronic disease: total does not add up to 100% as some patients had a family history of more than one chronic disease

¶. eGFR = estimated glomerular filtration rate

#. Chest Xray: it is unclear whether a chest Xray was performed specifically because of the COPD

Supplementary material 1: CONSIDER Statement Checklist

Item	**Checklist Item**
Governance	
1.	Describe partnership agreements between the research institution and Indigenous-governing organization for the research, (e.g., Informal agreements through to MOU (Memorandum of Understanding) or MOA (Memorandum of Agreement)). Checked: see page 3 and 9 – Aboriginal Leadership. Through an informal agreement, the study was co-designed with the Aboriginal Health Unit at the study hospital and had support from the Aboriginal Health Committee at the study hospital. Three authors are themselves Aboriginal Australian - from Yuin nation (PD and SD) from Bundjalung nation (SR).
2.	Describe accountability and review mechanisms within the partnership agreement that addresses harm minimization. Checked: see page 4 – Ethics approved, 3 and 9 – Aboriginal leadership The Aboriginal Health Unit at the study hospital provided advice on study design, and guidance throughout. Discussions with the Aboriginal Health Unit were conducted face-to-face and via email (led by SW with Aboriginal Health Unit staff; PD, SD). Feedback on study findings was provided to the Aboriginal Health Unit management for comment and inclusion at every stage. SR (Bundjalung nation) was involved in data collection, analysis and interpretation.
3.	Specify how the research partnership agreement includes protection of Indigenous intellectual property and knowledge arising from the research, including financial and intellectual benefits generated (e.g., development of traditional medicines for commercial purposes or supporting the Indigenous community to develop commercialization proposals generated from the research). Checked: PD, SD, SR will be co-authors of all output arising from this study. N/A financial benefits. We do not expect financial benefits to arise from this study. This study is an analysis of routinely collected data collected at the study hospital from all patients. The analysis is specific to Aboriginal and Torres Strait Islander patients admitted and discharged from the study hospital.
Prioritization	
4.	Explain how the research aims emerged from priorities identified by either Indigenous stakeholders, governing bodies, funders, non-government organization(s), stakeholders, consumers, and empirical evidence

Item	Checklist Item
	Checked: see page 1, 2 – Introduction/literature review, page 3 – Aboriginal Leadership The burden of disease due to chronic diseases experienced by Aboriginal and/or Torres Strait Islander Peoples is more than double their non-Indigenous counterparts. Chronic diseases are often under detected but can lead to preventable complications and hospital admissions for Aboriginal and/or Torres Strait Islander Peoples if care is not received. In response to these prevalence figures on chronic diseases among Aboriginal and Torres Strait Islander peoples, the lead author (SW) approached the Aboriginal Health Unit to see if they wanted to collaborate on a study. This study would help the Aboriginal Health unit and clinicians to better understand the level of chronic disease faced by Aboriginal and/or Torres Strait Islander Peoples locally in a metropolitan hospital setting and reasons for hospital admission. This could also illustrate missed opportunities for chronic disease care. The Aboriginal Health Unit provided advice on study design, and guidance and overview throughout the study.
Relationships (Indigenous stakeholders/participants and Research team)	
5.	Specify measures that adhere and honor Indigenous ethical guidelines, processes, and approvals for all relevant Indigenous stakeholders, recognizing that multiple Indigenous partners may be involved, e.g., Indigenous ethics committee approval, regional/national ethics approval processes. Checked: see page 4 – Ethics approved, page 3 Methods: *Aboriginal leadership:* Ethical approval was obtained from the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and the study hospital (Ref: #2020/ETH01314: 8/10/20). Measures that adhere and honour principles for conducting research with Aboriginal and/or Torres Strait Islander peoples include: the project was designed by focusing on Aboriginal and/or Torres Strait Islander health priorities, knowledge holders were consulted, collaboration, time, Aboriginal governance, reciprocity, it supports Indigenous advancement. This study was conceived via a long-standing collaboration between the Aboriginal Health Unit, and the Pharmacy and Endocrinology Departments at the study site. The Executive Director of Aboriginal Health (PD, Yuin nation) and the Aboriginal Health Unit Manager (SD, Yuin nation) – recognised that Aboriginal and/or Torres Strait Islander Peoples were being admitted to hospital with competing health issues. An advisory committee provided study oversight, comprised of Aboriginal and non-Aboriginal experts. Meetings were facilitated by SW and held via email, face-to-face or online, individually or as a group to ensure all parties' feedback was considered.

Item Checklist Item	
6.	Report how Indigenous stakeholders were involved in the research processes (i.e., research design, funding, implementation, analysis, dissemination/recruitment). Checked: see Author Statement, page 3 and 9– Aboriginal Leadership. Funding was applied for by and granted to the study group which included an Aboriginal co-author (PD). Funding to conduct this study was provided by an Applied Medical Research/ Inclusive Health Fund grant at the study site, 2018. The Aboriginal Health Unit provided advice on study design, and guidance and overview throughout the study. The Author Statement describes contributions made by PD (Yuin nation), SD (Yuin nation), SR (Bundjalung nation)
7.	Describe the expertise of the research team in Indigenous health and research. Checked: page 3 and 9– Aboriginal Leadership. Two authors are from Yuin nation (PD and SD) and lead the Aboriginal Health Unit at the study site. One author is from Bundjalung nation (SR) and together with all other team members works in the provision of Aboriginal and/or Torres Strait Islander health care or education. RM has experience working with Aboriginal collaborators in the field of pharmacy practice and education. KL has extensive research experience working alongside Aboriginal collaborators and community in the field of Aboriginal health and substance use.
Methodologies	
8.	Describe the methodological approach of the research including a rationale of methods used and implication for Indigenous stakeholders, e.g., privacy and confidentiality (individual and collective) Checked: page 3 and 4 - Methods Rationale of methods: This study was conceived via a long-standing collaboration between the Aboriginal Health Unit, and the Pharmacy and Endocrinology Departments at the study site. An advisory committee provided study oversight, comprised of Aboriginal and non-Aboriginal experts This study was a retrospective review of medical records. Aboriginal and/or Torres Strait Islander Peoples discharged from the study hospital (January to December 2017). A cohort of patients were identified using admission and discharge data. Their notes were selected for inclusion sequentially based on discharge (n=300 patients). Cohort size was selected based on advice from a biostatistician.

Item	Checklist Item
	Privacy and confidentiality of data: De-identified data were collated in Research Electronic Data Capture (REDCap). Prior to entering data into REDCap, all data were stored on a password accessible computer or hard copy in a lockable filing cabinet in the Pharmacy Department. All aggregate data were non-identifiable.
9.	Describe how the research methodology incorporated consideration of the physical, social, economic and cultural environment of the participants and prospective participants. (e.g., impacts of colonization, racism, and social justice). As well as Indigenous worldviews. Checked: N/A This was a retrospective medical record review
Participation	
10.	Specify how individual and collective consent was sought to conduct future analysis on collected samples and data (e.g., additional secondary analyses; third-parties accessing samples (genetic, tissue, blood) for further analyses). Checked. This was a retrospective medical record review. N/A no further analysis proposed, Aboriginal Health and Medical Research Council of New South Wales amendments would be required.
11.	Described how the resource demands (current and future) placed on Indigenous participants and communities involved in the research were identified and agreed upon including any resourcing for participation, knowledge, and expertise Checked: Authorship includes Aboriginal health experts who contributed to the study (PD and SD) and SR who was reimbursed for time involved in data collection.
12.	Specify how biological tissue and other samples including data were stored, explaining the processes of removal from traditional lands, if done, and of disposal. Checked: N/A
Capacity	

Item	Checklist Item
13.	Explain how the research supported the development and maintenance of Indigenous research capacity (e.g., specific funding of Indigenous researchers) Checked: page 3 and 9– Aboriginal Leadership Sufficient time allocated (over 12 months) to determine research priorities for this study with Aboriginal investigators (PD, SD). This enabled us to design a study that met Aboriginal priorities. Aboriginal investigator (SR) was involved in data collection and analysis and together with PD and SD, was involved in write-up.
14.	Discuss how the research team undertook professional development opportunities to develop the capacity to partner with Indigenous stakeholders? Checked: see page 3 – Aboriginal Leadership All members of the research team cultural awareness training. SW is a hospital pharmacist-researcher and has undergone cultural responsiveness training. She undertook numerous conversations (over 12 months prior) and throughout the study with Aboriginal community members and the Aboriginal Health Unit to develop this partnership.
Analysis and interpretation	
15.	Specify how the research analysis and reporting supported critical inquiry and a strength-based approach that was inclusive of Indigenous values. Checked: see page 2 Introduction, see page 8 – Discussion, page 9, 10 – Implications, Whilst acknowledging the effects of chronic diseases on Aboriginal and/or Torres Strait Islander peoples together with community efforts to combat them the authors described the ongoing effects of colonisation and the need for holistic care. Results were viewed and analysed with this lens.
Dissemination	
16.	Describe the dissemination of the research findings to relevant Indigenous governing bodies and peoples. Checked: AHMRC reports and review of publications prior to submission Research findings were disseminated to Aboriginal Health and Medical Research Council of New South Wales via annual reports and a review of publications prior to submission.

Item	Checklist Item
17.	Discuss the process for knowledge translation and implementation to support Indigenous advancement (e.g., research capacity, policy, investment). Checked: A community event with Aboriginal Health Unit, advisory committee members and all authors will be held for knowledge translation of results from this study in line with previous knowledge translation activity conducted for earlier stages of this same project (Ref 19, Welch S etc 2025) Results will also be disseminated internally to clinicians and externally via conference presentations and publication, to upskill all clinicians to make system change to target missed care opportunities. Three authors are Aboriginal (PD, SD -Yuin nation and SR – Bundjalung nation) and as such have been involved in building research capacity to support Indigenous advancement.

5. CONNECTING THE DOTS OF CARE: PROSPECTIVE STUDY

As described in chapter 4, when Aboriginal and Torres Strait Islander Peoples are admitted to hospital, a number of opportunities exist to provide holistic care for existing chronic diseases, or risk assess for previously undiagnosed chronic diseases. However, these holistic care opportunities are often missed. This can contribute to potential late diagnosis and development of related complications. This work highlighted the challenges faced to provide holistic care for a community that experience systemic inequity.

In the current chapter (chapter 5), I describe a successful pilot study that aimed to prevent such missed opportunities. This pilot involved the development, implementation and evaluation of a new model of care. The model of care was used by a hospital pharmacist to offer Aboriginal and Torres Strait Islander Peoples diabetes risk assessment and referral for specialist review, during their hospital stay.

This work has been published as: Welch S., Moles R., Viardot A., Deweerd P., Daley S., Lee K. Connecting the Dots of Care: A pilot study linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital, using hospital pharmacists. Exploratory Research in Clinical and Social Pharmacy 2023;12:100351
doi.org/10.1016/j.rcsop.2023.100351 (98)

My contribution to this original research article is outlined in Table 1. (page 19)

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Connecting the Dots of Care: A pilot study linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital, using hospital pharmacists

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ABSTRACT

Background: Diabetes is common among Aboriginal and/or Torres Strait Islander peoples, yet often undetected in hospital.

Objective: To identify how urban hospital pharmacists can detect if Aboriginal and/or Torres Strait Islander patients have diabetes or a higher chance of getting diabetes.

Methods: A multi-methods study used data from patients, and researcher field notes. Aboriginal and/or Torres Strait Islander peoples admitted to hospital over 12-weeks (July–October 2021) were prospectively identified from admissions lists. A hospital pharmacist-researcher visited eligible patients. Consenting participants had their blood glucose and HbA1c checked. Participants with HbA1c $>$ 6.5% (no known diabetes) or 7% (known diabetes) were referred for endocrinology review during their stay. Test results and resultant diabetes plan were shared with their general practitioner. Two days after discharge, participants were called to gauge views on their hospital-based diabetes care. Barcode technology recorded pharmacist time. Voice-recorded field notes were thematically analysed. Ethics approval was obtained.

Results: Seventy-two patients were eligible for inclusion, 67/72 (93%) consented to take part. Sixty-one (91%) patients returned a HbA1c $<$ 6.5, of which, 4/61 (6.5%) returned a HbA1c, 6–6.4. They were contacted to yarn about diabetes prevention. Six of the 67 (9%) qualified for endocrine review, 5 had known diabetes, one newly diagnosed. None were known to endocrinology. All participants telephoned were satisfied with their hospital-based diabetes care. Pharmacist time for initial introductory yarn, consenting process, organisation of HbA1c and results discussion was 20 min or 40 min if referred for endocrine review. Field notes guided understanding of service implementation.

Conclusion: This novel pharmacist-led diabetes screening service for Aboriginal and/or Torres Strait Islander peoples appeared to provide a unique opportunity for screening and referral links in a holistic way. Future research is required to test this model by upscaling to include more pharmacists and other chronic disease screening and referral pathways.

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1. Introduction

Globally, approximately 451 million people (18+ years) live with diabetes, with almost one in two of those undiagnosed (2017).[1] Type 2 diabetes (herein referred to as 'diabetes') is the most prevalent form of diabetes among First Nations peoples worldwide, affecting more than half of all First Nations adults in 2010 (35+ years).[2,3] Diabetes rates in First Nations peoples are profoundly impacted by colonisation, societal racism, institutional racism, child removals and intergenerational trauma.[2,4–7] The terminology which refers to Aboriginal and/or Torres Strait Islander peoples (the First peoples of Australia) will be used throughout this paper except when referring to existing resources which use other terminology to refer to Aboriginal and/or Torres Strait Islander peoples.

In Australia, Aboriginal and/or Torres Strait Islander peoples are diagnosed with diabetes nearly three times more often than other Australians.[8] Aboriginal and/or Torres Strait Islander community leaders and health workers have led longstanding programmes to address diabetes and other chronic diseases.[9,10] Such efforts have seen a 42% reduction in the burden experienced from diabetes among Aboriginal and/or Torres Strait Islander peoples (from 2003 to 2018).[11] Despite the interventions, diabetes remains the second leading cause of death overall among Aboriginal and/or Torres Strait Islander peoples.[8]

A number of diabetes-related issues exist in hospital settings, as diabetes is the second leading preventable cause for an admission among Aboriginal and/or Torres Strait Islander peoples.[12] One risk indicator for admission is having no HbA1c measurement in the past 6 months while taking hypoglycaemic medicines.[13] For those without a diagnosis, efforts to conduct routine glucose screening in an Australian emergency department (ED) has not been shown to increase detection.[14] However, it is not known if automatic measurement of HbA1c in hospital and subsequent referral to diabetes services, can lead to more inpatient endocrine reviews[15] In 2 studies, no improvement was found in documentation of follow-up plans in discharge summaries (range: 24–26% patients had follow up plan in discharge summary.[16,17] Calls to enable systematic documentation of newly diagnosed diabetes in hospital discharge summaries have been longstanding.[14]

Detecting diabetes among Aboriginal and/or Torres Strait Islander peoples is difficult in hospital contexts, due to a range of existing barriers, as outlined by the following examples. Many people do not know they have type 2 diabetes until they experience symptoms of complications.[3] People with diabetes also commonly report experiencing stigma and self-blame.[17–19] Known determinants of health, racism and discrimination are also contributors to the health disparity seen in relation to diabetes.[20,21] Furthermore, in busy hospital environments, providing holistic care[22,23] is often at odds with time management pressures.[24] This makes it challenging to provide culturally safe care in hospitals for Aboriginal and/or Torres Strait Islander peoples. Change is required to enable earlier detection and provision of diabetes care to Aboriginal and/or Torres Strait Islander peoples who are admitted to hospital. Hospital pharmacists could assist this process.

Guidelines in Australia, recommend annual blood testing for Aboriginal and/or Torres Strait Islander peoples to screen for diabetes (from aged 18+).[25] However, this is not always conducted.[26] Earlier detection, along with increased knowledge and education and effective management, is needed to reduce undiagnosed diabetes, prevent complications and morbidity, and improve quality of life in priority populations including Aboriginal and/or Torres Strait Islander peoples.[27–29] Greater investment is needed to prevent and detect diabetes earlier.[30] This is especially relevant as diabetes like other cardiometabolic diseases occur from a younger age[17] and risk increases with age in these groups.[11]

To target these shortfalls in care, a hospital admission could provide an opportunity for integrated holistic care, using a 'One Stop Shop' health care model.[31] It could be hypothesized that a hospital pharmacist could be ideally placed to screen Aboriginal and/or Torres Strait Islander peoples for diabetes and other chronic illness during a patient admission. Hospital pharmacists could then communicate test results and medically – derived care plans with inpatient and community-based services (i.e. to connect the dots of their patients' care). Pharmacists already have an established role in helping people with medications via the Medicines Management Pathway,[32] where they have a key role liaising with admitting teams and in patient advocacy.

In support of the role of pharmacists, the International Pharmaceutical Federation (FIP) recommends that all pharmacists address the global issue of diabetes.[33] However, few studies describe the role of hospital pharmacists in providing diabetes care for Aboriginal and/or Torres Strait Islander people during a hospital stay.[34] While pharmacist-led screening for diabetes has been described in community pharmacy settings in Australia,[35] it has not been documented in the hospital setting.

To address these knowledge gaps, this exploratory study sought to identify how an urban hospital pharmacist could detect if Aboriginal and/or Torres Strait Islander peoples who are admitted to hospital are at risk of, or have, a diagnosis of diabetes. Therefore, a pharmacist-led diabetes screening service was piloted, and the study aimed to:

1. Explore factors which enabled patients to be eligible for inclusion in this diabetes care service.
2. Identify the number of patients who had not previously been identified with diabetes and/or with insufficient glycaemic control prior to hospital admission.
3. Explore perceived patient satisfaction with diabetes care and information provided during their hospital stay.
4. Record the time taken to provide diabetes care during their hospital admission.

2. Method

This multi-methods study used data collected from patients and field notes by pharmacist-researcher (SW). SW is a hospital pharmacist and researcher (she/her) who has undergone cultural responsiveness training and had no prior relationship with eligible patients. Recruitment was conducted systematically with adjustments made iteratively during data collection as needed, to ensure eligible patients could be reached. The study procedures were approved via the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and the study hospital (Ref: #2020/ETH01314: 8/10/20).

2.1. Aboriginal leadership

All authors are employed on Gadigal land in Australia, except one non-Indigenous Australian researcher who lives on Wurundjeri land (KL). Two Aboriginal authors are from Yuin nation (PD and SD).

The project was co-designed by study investigators and the Aboriginal Health Unit (PD) at the study site. The Aboriginal Heath Unit provides support to Aboriginal and/or Torres Strait Islander patients, their families and carers. This team provided advice on study design, implementation, and dissemination of findings. Support was also provided from an Aboriginal health committee based at the study site. This committee comprised of Aboriginal representatives (community and hospital-based) and hospital staff.[36] It was set-up to promote service access and staff engagement with a view to improve the health of Aboriginal and/or Torres Strait Islander peoples.

2.2. Consent

All patients provided informed written consent. A one-page plain English infographic was given to patients to describe the study purpose and scope. It was designed for people with varying levels of literacy comfort. (Supplementary material 1.)

2.3. Setting

A major teaching hospital in metropolitan Sydney, New South Wales, Australia.

2.4. Participant recruitment

Participants included Aboriginal and/or Torres Strait Islander patients, aged 18 years or older, admitted to hospital (Monday to Friday) over a consecutive 12-week period (July to October 2021). Patients were identified via the hospital's Core Patient Administration System [CORPAS]) during admission and were purposively selected.

All consenting patients had their HbA1c screened, and patients were eligible for referral to endocrinology if they met one of two criteria: (1) HbA1c 6.5% or more and no known diabetes; (2) HbA1c was more than 7% and a known diabetes diagnosis.

2.5. Procedure

The procedural steps taken by the lead pharmacist-researcher (SW) are outlined in Fig. 1.

A yarning communication style was used at all stages of patient contact. Yarning is a culturally appropriate method of communication used by Aboriginal and/or Torres Strait Islander peoples to connect and share information and stories.37 Yarning with Aboriginal and/or Torres Strait Islander peoples can help build rapport and enhance two-way communication.38,39

At the conclusion of the study, a planned strategic approach to feedback was used providing knowledge translation and dissemination of findings. All consenting patients were invited to a community barbeque held on hospital grounds and a one-page infographic given to attendees and sent to all other participants.

2.6. Data collection

Data were collected from prospective, consecutive patient enrolment, using REDcap (Research Electronic Data Capture) comprising of a participant questionnaire during hospital admission and on follow-up after hospital discharge (Table 1). Implementation data were also recorded (time taken to provide the diabetes care service, and field note observations) (Supplementary material 2, 3).

The participant questionnaire content and design were developed and informed through expert team discussions. No validity analyses were conducted on the questionnaire. However, each questionnaire was piloted tested for understanding, clarity, ease of use and face validity, with a patient in hospital who had diabetes, and with Aboriginal staff at the study hospital (including co-author PD), prior to data collection commencing. Data collected from participant questionnaires during hospital admission and at follow-up after hospital discharge (Table 1) included both demographic information and laboratory results (e.g. serum creatinine, estimated glomerular function rate, fasting and random blood glucose levels; medications; medication and diabetes management information; self-reported outcomes after hospital discharge). Open-ended questions were asked, and discussions ensued from participant questions if they arose during administration of participant questionnaires. Endocrine review data were collated from participant medical records and through discussions with the endocrine team (Table 1).

2.7. Implementation data

2.7.1. Quantitative

Pharmacist time (in minutes) recorded during the initial meeting (using barcode technology40) and follow-up discussion (using REDCap).

2.7.2. Qualitative

Field note observations were systematically voice recorded (by SW) after each patient interaction and where necessary at other times throughout the study. Methodological decisions made and changes identified during data collection were noted.

2.8. Data analysis

Quantitative and qualitative questionnaire data were extracted from REDCap into Microsoft Excel. Descriptive counts were made in Microsoft Excel.

Field notes were professionally transcribed (using Rev.com) and imported into NVivo version 12. SW reviewed all transcripts, and one-third were checked by RM, KL and then discussed as a group by web conference to reach consensus. Thematic inductive analysis was conducted to map themes to the Consolidated Framework for Implementation Research (CFIR)41 This helped to guide understanding of what worked or could be improved in the implementation of this pharmacist-led diabetes screening service.

This report was prepared in accordance with the CONSIDER42 and COREQ criteria.43 (Supplementary material 4,5).

2.9. Data statement

Data are not available due to ethical restrictions.

3. Results

3.1. Overview of participants

One hundred and ninety patients were identified for recruitment. Of these, more than 6 in 10 were excluded ($n = 118/190$, 62%). Reasons for exclusion included insufficient time to organise bloods and review due to imminent discharge ($n = 30$) and already discharged ($n = 36$; Fig. 2).

Of the patients who were eligible for inclusion in the study ($n = 72/190$; 38%), nearly all ($n = 67/72$; 93%) consented to take part, [female $n = 27$, average age: female = 41 (range: 21–78); male = 40 (range 21–87), Table 2]. Of the 5 patients who did not take part ($n = 5/72$; 7%), this was due to not wanting to be involved (n = 2) or because they felt well cared for in the community (n = 3).

During recruitment, just under one in 7 patients ($n = 25/190$, 13%) had more than one hospital admission. Each were assessed for eligibility at each admission. Of these 25 patients who were re-admitted, seven were already included in the study, 8 were newly included and 10 were excluded.

More than three-quarters of participants ($n = 51/67$; 76%) usually lived in metropolitan areas, followed by regional areas ($n = 9/67$; 13%), with 1 in 10 having no fixed address (n = 7/67; 10%).44

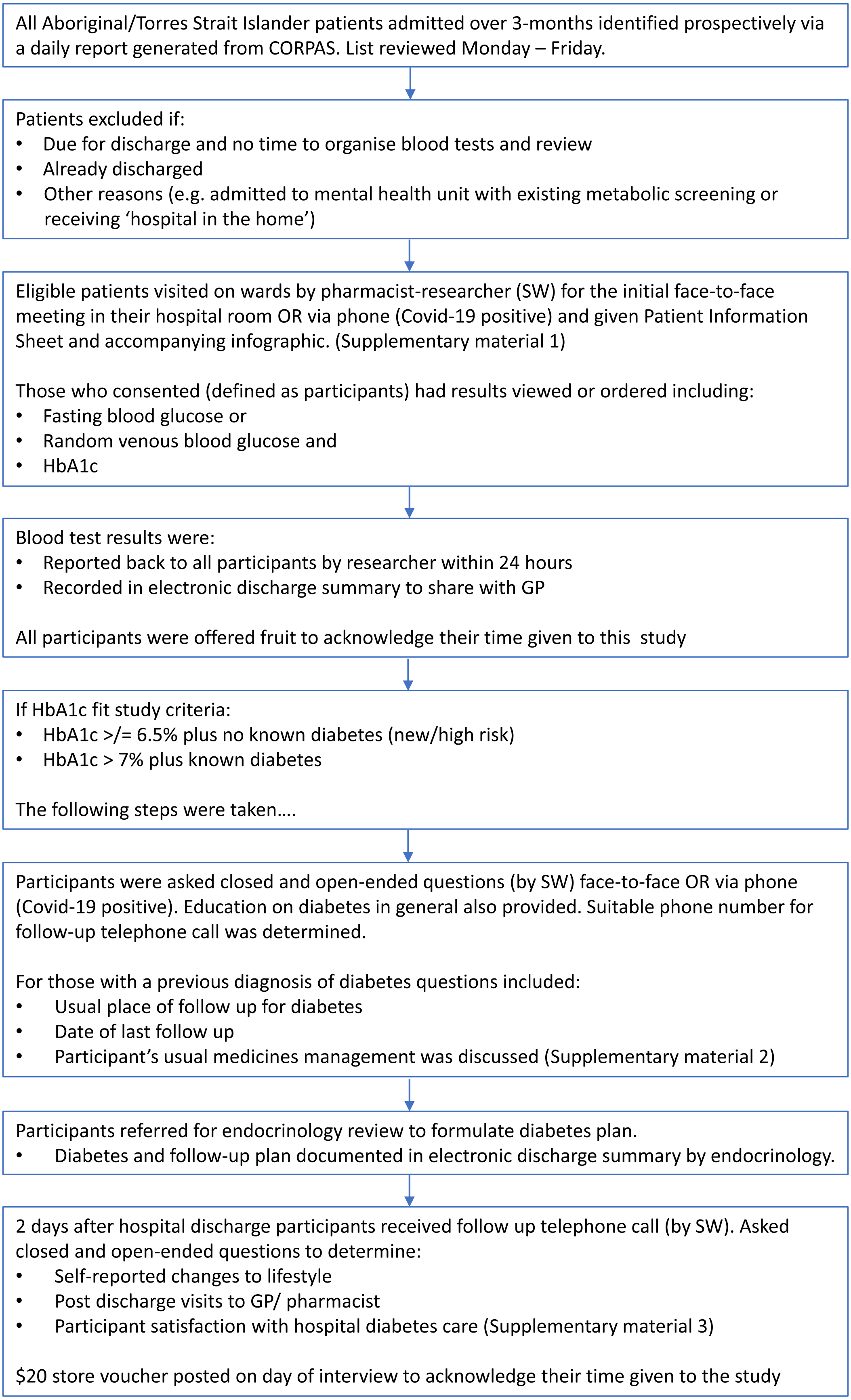
A range of biochemical results were conducted for participants during the study (Table 3).

Nearly one-quarter of participants ($n = 16/67$; 24%) had reduced estimated glomerular filtration rate (eGFR; <90 mL/min/1.73m2). Almost 1 in 10 had high random BGL >/= 11 mmol/L ($n = 6/67$; 9%).

3.2. Participant outcomes during hospital admission

3.2.1. Participants with HbA1c within range

Most participants ($n = 61/67$; 90%) had an HbA1c within range (< 6.5 with no known diabetes or </= 7 with previous diabetes diagnosis) and so did not fit the referral criteria for endocrinology. (Fig. 2.) Of these, 8 in 10 ($n = 49/61$; 80%) had no known diabetes, and 1 in 5 ($n = 12/61$; 20%) had a previous diabetes diagnosis. One participant had an HbA1c result within range, but it was considered invalid and the patient was excluded due to existing active leukemia. Four participants ($n = 4/61$; 6.5%) had an HbA1c between 6 and 6.4% and were referred to their GP to yarn about diabetes.



All Aboriginal/Torres Strait Islander patients admitted over 3-months identified prospectively via a daily report generated from CORPAS. List reviewed Monday – Friday.

Patients excluded if:
- Due for discharge and no time to organise blood tests and review
- Already discharged
- Other reasons (e.g. admitted to mental health unit with existing metabolic screening or receiving 'hospital in the home')

Eligible patients visited on wards by pharmacist-researcher (SW) for the initial face-to-face meeting in their hospital room OR via phone (Covid-19 positive) and given Patient Information Sheet and accompanying infographic. (Supplementary material 1)

Those who consented (defined as participants) had results viewed or ordered including:
- Fasting blood glucose or
- Random venous blood glucose and
- HbA1c

Blood test results were:
- Reported back to all participants by researcher within 24 hours
- Recorded in electronic discharge summary to share with GP

All participants were offered fruit to acknowledge their time given to this study

If HbA1c fit study criteria:
- HbA1c >/= 6.5% plus no known diabetes (new/high risk)
- HbA1c > 7% plus known diabetes

The following steps were taken….

Participants were asked closed and open-ended questions (by SW) face-to-face OR via phone (Covid-19 positive). Education on diabetes in general also provided. Suitable phone number for follow-up telephone call was determined.

For those with a previous diagnosis of diabetes questions included:
- Usual place of follow up for diabetes
- Date of last follow up
- Participant's usual medicines management was discussed (Supplementary material 2)

Participants referred for endocrinology review to formulate diabetes plan.
- Diabetes and follow-up plan documented in electronic discharge summary by endocrinology.

2 days after hospital discharge participants received follow up telephone call (by SW). Asked closed and open-ended questions to determine:
- Self-reported changes to lifestyle
- Post discharge visits to GP/ pharmacist
- Participant satisfaction with hospital diabetes care (Supplementary material 3)

$20 store voucher posted on day of interview to acknowledge their time given to the study

Fig. 1. Study participant recruitment process.

Table 1
Method: Quantitative and qualitative data collected by questionnaire during hospital admission and after hospital discharge.

1. Questionnaire during hospital admission	
1.1 Quantitative	
Data collection points	Data collected
For all patients on the daily admissions lists	• Age (mean age; age bands 18–24, 25–34, 35–44, 45–54, 55–64, 65+) • Gender (male, female, other) • Number of participants included and excluded • Reasons for exclusion
For eligible patients who were visited on the wards and consented to participate, additional data were collected:	• Home postcode, recorded as: metropolitan, regional, rural, remote • Serum creatinine (micromol/L), reported as (ref): o Female: < 88, 88–128, > 128 o Male: < 97, 97–137, > 137 • Estimated glomerular filtration rate (eGFR) (mL/min/1.73m^2) o <90, 90–150, > 150 • HbA1c (%): < 6, 6–6.4 (no known diabetes), >/= 6.5 (no known diabetes), > 7 (already had diabetes diagnosis) • Random blood glucose level (BGL) (mmol/L): < 5, 5–10, >/= 11 • Fasting blood glucose level (mmol/L): < 4, 4–7, >/= 8
For participants who consented, satisfied inclusion criteria, and were referred for endocrinology review, additional data were collected	• Diabetes medications prescribed, if any, collated from participant's notes: yes/no and specified. • Medications usually taken at home: yes/no • Had they been prescribed medications for diabetes: yes/ no • Did they see a doctor for their diabetes usually? If so, was this at a GP practice, Aboriginal Medical Service (AMS), specialist or others • Approximate date of last review before current hospital admission: < 1 week ago, within the last month, within the last 6 months, within 6–12 months, > 12 months • Usual medicines management at home: involvement of others/supports to assist, problems encountered with usage or storage of insulins, their use of daily dose administration aids (e.g. Webster packing) and any difficulties experienced. • Self-reported assessment of medication adherence: o If they ever forgot their medicines and how often (every day, once a week, once a month, other) o If they ever changed the way they took their medicines and how (skip doses, changes dose, takes less than prescribed, takes more than prescribed, other) o If they had existing medical complications from diabetes (related to eyes and feet), any visits made to an optometrist or ophthalmologist, and if laser or eye injections received.
Endocrinology review data:	• Number of participants referred and seen by endocrinology • Number of participants with endocrine/ diabetes plan documented in electronic discharge summary
1.2 Qualitative	
If consent declined	• patients were asked for reasons why
If participants had been prescribed medications for diabetes	• they were asked why they thought they had been prescribed these medicines, and about any concerns or worries about taking them. o Tips used to remember to take their medicines. o Tips used to change the way they took their medicines (if appropriate
2. Follow-up phone questionnaire after hospital discharge	
2.1 Quantitative	
Experienced issues/ problems with diabetes medicines since discharge from hospital	• yes/no
Visited chemist/pharmacy to fill scripts	• if needed; yes/no
Made an appointment to see their GP	• yes/no
Understood the information from the pharmacist about diabetes while in hospital	• yes/no
Understood the instructions for diabetes given to them by endocrine doctor in hospital	• yes/no
Satisfaction with diabetes care in hospital	• unsatisfied, satisfied, very satisfied
Any changes made to lifestyle since recent hospital discharge	• more exercise, changed diet, take medicines, measure BGL, other
Discussed with friends or family about diabetes	• yes/no
2.2 Qualitative – open -ended questions	
Issues faced in relation to their medicines, since discharge from hospital	
Help needed to access chemist/pharmacy to fill scripts	
Help needed to make an appointment to see GP	
Any questions asked about diabetes information provided by the pharmacist	
Any questions asked about instructions for diabetes given to them by the endocrinologist before leaving hospital	
Reasons for level of satisfaction with their diabetes care in hospital	
Any questions or worries about their diabetes care or medication management	

Nearly 1 in 5 participants (n = 12/67; 18%) were opportunistically referred to an Aboriginal health worker, clinical nurse educator or the admitting team to organise endocrine review outside of the study referral criteria (Table 4). All participants (*n* = 67) received a brief intervention (yarn about diabetes).

3.2.2. Participants identified and referred for endocrine review by pharmacist-researcher

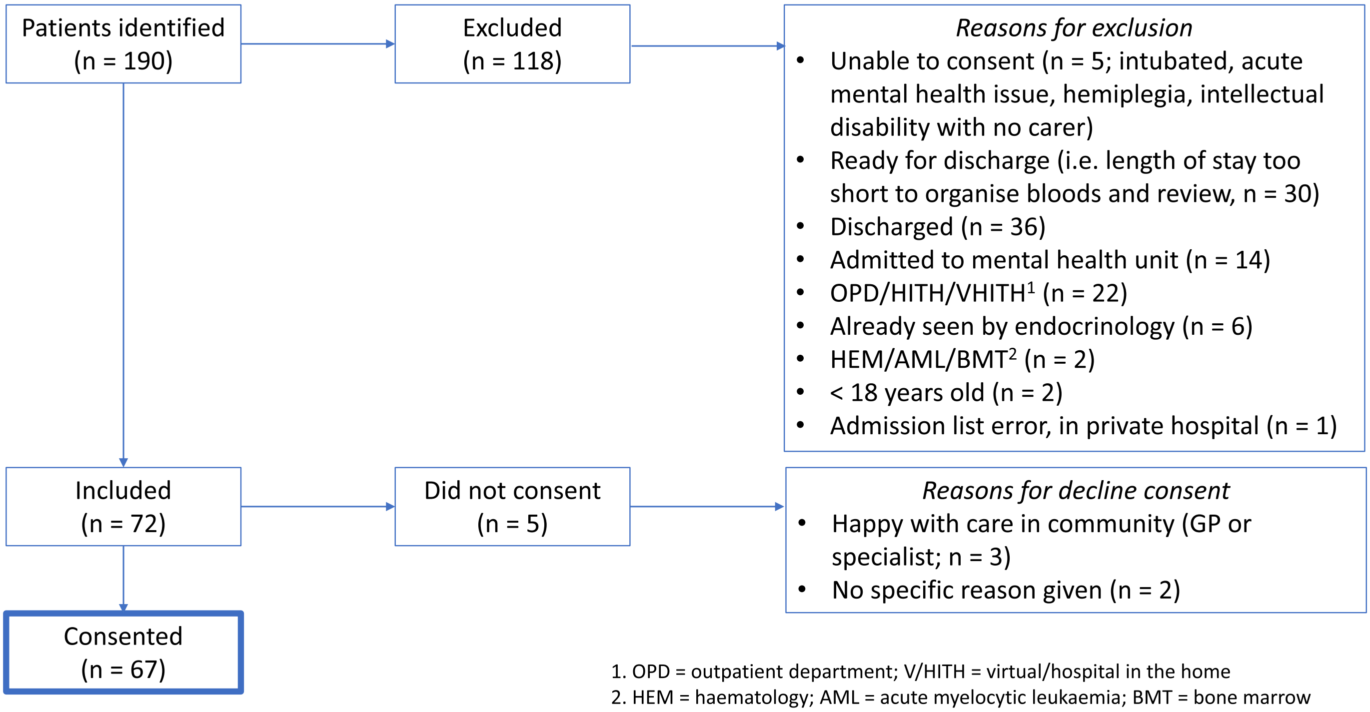
Six participants were identified with high HbA1c (n = 6/67; 9%; n = 1 female; *n* = 5 with a previous diabetes diagnosis >7%; n = 1 with no known diabetes >/= 6.5%) and as such were referred for endocrine review (Fig. 3). Four of these participants (*n* = 4/6; 67%) had been taking diabetes medicines at home prior to admission, most commonly metformin. (Table 5). None were using insulin. Four of these participants (n = 4/6; 67%) had been seen by a doctor at least 6 months prior to admission to treat their diabetes, usually a GP. For all 6 of these participants, diabetes-related complications involving eyes and feet were discussed. Three of these (*n* = 3/6; 50%) reported visiting an optometrist or ophthalmologist in the past. Of the remaining participants, one reported problems with their eyes but had not been seeing an optometrist or ophthalmologist. Two participants reported foot complications related to their diabetes such as numbness and tingling (*n* = 2/6).

3.2.3. Endocrine review data

Five participants (n = 5/6; 83%) who were referred to endocrinology were seen before discharge from hospital. Of these, nearly all (*n* = 4/5; 80%) had an endocrine/diabetes plan documented in their electronic discharge summary. One participant was discharged before endocrinology could visit but their diabetes care plan was documented in their electronic discharge summary for discussion with the GP.

3.3. Participant outcomes after hospital discharge

Nearly 1 in 7 participants (*n* = 9/67; 13%) had left hospital before their results were returned. Of these (*n* = 7/9; 78%) were phoned to give



1. OPD = outpatient department; V/HITH = virtual/hospital in the home
2. HEM = haematology; AML = acute myelocytic leukaemia; BMT = bone marrow transplant

Fig. 2. Patient recruitment.

Table 2
Demographic data for consenting participants.

Age range (years)	Female (n = 27)	Male (*n* = 40)	Total (n = 67)
18–24	6	2	8
25–34	7	4	11
35–44	5	6	11
45–54	2	14	16
55–64	2	10	12
65+	5	4	9
Range	21–78	21–87	21–87
Average	41	51	46

test results (all normal range), and in 5 of these cases the GP was informed by phone. One participant was not able to be contacted and a phone message was left (normal result) and one was not contactable as their phone was disconnected (normal result), neither had a GP listed.

From follow-up phone interviews with patients who were referred for endocrine review by the research-pharmacist ($n = 6$), all participants who needed prescription medicines to be supplied from the local pharmacy reported they had collected these prescription medicines ($n = 4/4$, 100%). More than two-thirds of participants (n = 4/6; 67%) had made an appointment to see their GP and all but one ($n = 5/6$; 83%) had reported that they made lifestyle changes since leaving hospital. More than two-thirds of participants (n = 4/6; 67%) said they had yarned with their family or friends about diabetes since their stay in hospital (Box 1). The follow-up phone call also facilitated further discussions about issues experienced with medicines since discharge.

3.4. Perceived satisfaction

3.4.1. Participants

All participants who were referred by the pharmacist for endocrine review expressed satisfaction with the care received for diabetes in hospital (n = 6/6; 100%; Box 1; follow-up phone interview):

Table 3
Biochemical data collected for consenting participants.

Data			Number (Total n = 67)
Serum creatinine (micromol/L)	Female (n = 27)	<88	26
		88–128	1
		>128	0
	Male (n = 40)	<97	38
		97–137	1
		>137	1
eGFR (estimated glomerular filtration rate, mL/min/1.73m^2)		< 90	16
		90–150	51
		>150	0
Glycosylated haemaglobin (HbA1c) (%)		Within range	57
		6–6.4 (no known diabetes)	4
		>/=6.5 (no known diabetes)	1
		>7 (previous diabetes diagnosis)	5
Blood glucose level (mmol/L)	Random (1 did not have BGL taken)	<5.0	11
		5.0–10.9	46
		>/=11	6
	Fasting	<4.0	1
		4.0–7.9	2
		>/=8.0	0

> *"I enjoyed speaking with the pharmacist and endocrine* [team] *and felt that I was heard, as the junior doctor was writing things down while I spoke.* [male participant, ID21].

> *"I didn't understand about diabetes before, but then while in hospital I was given information and medicines to help me. The endocrinologist also rang me and made a telehealth appointment for next week to make a plan for diabetes treatment going forward as well as for eye and foot review".* [female participant, ID144].

Table 4
Opportunistic referrals made by pharmacist.

Setting	Referral suggestions	Number of patients (n = 12)
Patient on dexamethasone – BGLs slightly high	Close pharmacist BGL monitoring/review and referral to endocrine if remained high (>10 for 24 h)	3
Patient had poor foot care	Asked team to review	1
Patient needed to be linked with new local doctor	Discussed with social work/ team/Aboriginal health workers to assist	3
Patients with known DM needed support	Asked team to refer for Diabetes clinical nurse educator visit	2
Known DM but did not fit study referral criteria but would benefit from endocrine involvement	Suggested team refer to endocrine for review.	
	- Foot infection with previous partial amputation	1
	- High BGL whilst taking dexamethasone	1
	- Insulin infusion in Intensive Care then discharged to ward without endocrine review.	1

> *"You [the hospital pharmacist and everyone] did what was needed to be done. A girl from the chemist came and spoke to me about diabetes as part of a uni study and gave me strawberries. I made them last as long as I could because it meant so much to me."* [male participant, ID94].

3.5. Implementation

3.5.1. Pharmacist time

The initial meeting with patients took approximately 11 min (range: 5–25 min). It comprised of an introductory yarn, which was key to providing culturally safe care, the consenting process and requesting for the HbA1c to be added to existing bloods or new bloods to be taken.

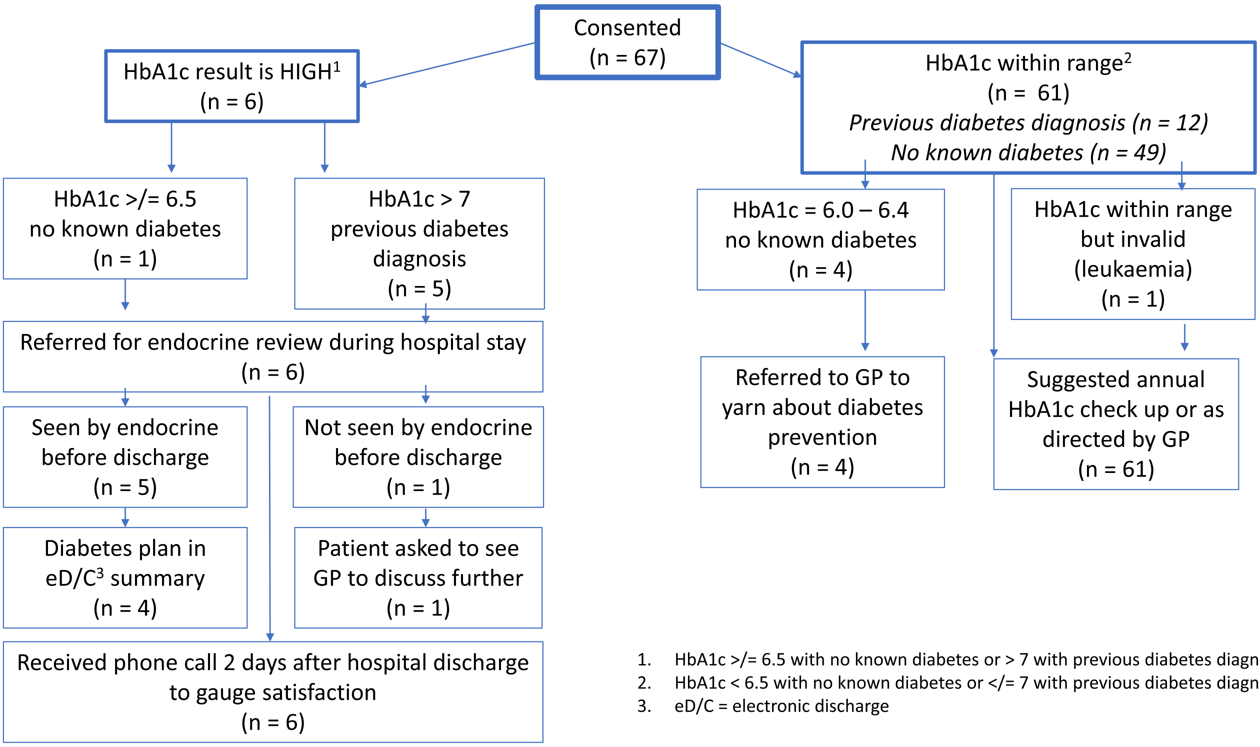
Nearly 8 in 10 HbA1c tests were requested by the pharmacist-researcher (SW; n = 53/67; 79%), of which just a few participants required new bloods to be taken (n = 3/53, 6%). The remaining tests had already been requested by a junior doctor (n = 14/67; 21%).

Time taken to deliver the diabetes care service was approximately 10 min (range: 3–22 min). This included discussing the participant's results, answering their questions, completing medical notes, electronic discharge summary and alerting the admitting team. For the 6 participants who had high HbA1C results and were referred for endocrine review, approximately 29 min was spent talking to them about the interpretation of the result and their ongoing management (range: 20–60 min; Fig. 4).

3.5.2. Understanding of service implementation gained from field note observations

Seven themes were identified from field notes collected on service implementation: barriers (to recruitment; to service); culturally safe care45; satisfaction; my (pharmacist-researcher, SW) learning; role of pharmacist; overall study benefits and future directions. Illustrative quotes under each theme can be seen in Table 6.

Themes were mapped to the Consolidated Framework for Implementation Research (CFIR) (Table 6). Characteristics that effected the overall implementation of the study such as the ability of the pharmacist to provide culturally safe care contributed to a number of the domains and was key to successful service provision. Barriers to recruitment as a result of COVID-19 were included in the Outer Setting domain. Characteristics of the organisation e.g. processes required to obtain an HbA1c result and competing priorities of the endocrine team were examples of factors coded to the Inner Setting domain. Barriers to recruitment such as patient eligibility due to length of hospital admission could be affected by the level of cultural safety experienced by the patient during the hospital stay. As a result, these were also included as a contributing factor in the Inner Setting domain as well as being coded under Individual's Characteristics. The role of the pharmacist in connecting care within the hospital and across transitions of care was important in the Process of Implementation for the service.



1. HbA1c >/= 6.5 with no known diabetes or > 7 with previous diabetes diagnosis
2. HbA1c < 6.5 with no known diabetes or </= 7 with previous diabetes diagnosis
3. eD/C = electronic discharge

Fig. 3. Consenting participants' Journey.

Table 5
Additional data collected for participants who consented, satisfied inclusion criteria, and were referred for endocrinology review.

Diabetes and medication management data (from interview during admission)			Number (n = 6)
Known diabetes	Yes		5
	No		1
Diabetes medications prescribed (at home)	No		2
	Yes		4
	specify	metformin	4
		sitagliptin	1
		dapagliflozin	1
		Exenatide	1
		semaglutide	1
		insulin	0
Usually takes medications at home	Yes		6
	No		0
Usually sees a doctor for their diabetes	No		2
	Yes		4
	Where?	GP practice	4
		Aboriginal Medical Service (AMS)	0
		Specialist	0
		Other = Hospital cardiac clinic	1
Date of last diabetes review (approx.) (n = 4)	<1 week ago		1
	Within the last month		1
	Within the last 6 months		2
	Within 6–12 months		0
	>12 months		0
Usual medicines management at home (Self reported)			
Help with medicines at home?	No		5
	Yes		1
	Who?	Partner/spouse	1
Who collects your medicines from the pharmacy?	Me		5
	Other = medicines are delivered		1
Participants using dosing aid eg webster pack	Yes		1
	No		5
Experiencing problems using the dosing aid eg webster pack	Yes		0
	No		1
Do you ever forget to take your medicines?	No		4
	Yes		2
	How often?	Every day	0
		Once a week	0
		Once a month	1
		Other = rarely	1
Do you change the way you take your medicines sometimes?	No		5
	Yes		1
	How?	Take less than prescribed	1
Existing medical complications from diabetes (related to eyes and feet) (Self reported)			
Have you ever had any problems with your eyes?	No		5
	Yes		1
	Do you see an optometrist/ opthamologist?	Yes	3
		No	3 (includes 1 who has had problems)
	Have you ever had laser or eye injections?	Yes	0
		No	6
		Don't know	0
Do you ever get…	Foot numbness	Yes	2
		No	4
	Foot pain	Yes	0
		No	6
	Foot tingling	Yes	2
		No	4
	Foot infections	Yes	0
		No	6

4. Discussion

This study piloted a pharmacist-led model of care to detect risk of diabetes for Aboriginal and/or Torres Strait Islander peoples admitted to a metropolitan hospital in New South Wales (Australia). Overall, participants were positive about the diabetes care received from this new service, with nearly 1 in 10 participants referred for endocrine review during their admission ($n = 6/67$; 9%), and one patient (1.5%) newly diagnosed with diabetes. This service offered a unique opportunity for participants to 'yarn' about diabetes with a pharmacist ('brief intervention').

Diabetes screening and referral for specialist review – like what was offered in this novel pharmacist-led service, is not standard practice for Australian hospital-based pharmacists.[46,47] Screening for diabetes is available in the community pharmacy context in Australia[35,47] and internationally.[33,48,49] However, in a hospital setting, routine screening is not offered and referral for endocrine review typically requires a formal electronic referral to endocrinology by the admitting medical team. In the present study, pharmacists were permitted to directly contact endocrinology registrar and request a patient review during their hospital stay. This adjustment to the hospital process, circumvented the need for a medical referral to endocrinologists. In turn, it also enabled easier linkages between patients and clinicians, as well as specialist review during the hospital admission. It is well established that self-reporting of diabetes screening is not sufficient to ensure best care is provided.[50] This study highlighted the potential value of pharmacist-led screening programmes to detect diabetes risk earlier in patients attending hospital.

Brief intervention offered by hospital pharmacists have been conducted for tobacco smoking cessation,[51] intranasal naloxone (for patients at risk of harm from opiates),[52] and to improve health literacy in general.[53] However, we were unable to find published studies documenting implementation of hospital pharmacist-led diabetes brief intervention for Aboriginal and/or Torres Strait Islander peoples. The use of brief intervention for other health risks behaviours is well established (e.g. drug and alcohol),[54,55] as well as its use in primary care[56] and community pharmacy settings.[57] In the context of Aboriginal and/or Torres Strait Islander health and alcohol, a previous study described elements of 2-way yarning, using humour to build rapport, allowing time and sharing lived experiences to make connection and remove the power imbalance between client and clinician.[58] This process "acknowledges and brings together Aboriginal peoples' notion of health and healing with Western methods".[58] This is similar to the approach taken by Aboriginal-led, diabetes programmes offered in communities.[28] Such programmes which include opportunities for brief intervention have reported positive outcomes for individuals, families and whole communities. In this same community-based study, participants expressed "a feeling of belonging and optimism about their ability to improve their health."[28] Similarly, in the present study, brief interventions offered were tailored to each patient and their needs at the hospital bedside, for all participants to benefit, even those who did not require referral to endocrine. This provided participants with the opportunity to reflect on their health and lifestyle to promote behaviour change. Opportunities to 'yarn' with participants about a range of topics related to diabetes (a 'brief intervention') received positive feedback from participants. However, much more research is needed to examine acceptability, feasibility and effectiveness of pharmacist-led diabetes programmes in hospital settings.

This study took a holistic approach to diabetes care which considers each person's social, emotional, and cultural wellbeing and connects them earlier to appropriate care. Aboriginal and/or Torres Strait Islander peoples describe feeling stigma and blame in relation to obesity and a diabetes diagnosis.[18,19] The holistic and non-judgemental approach offered by this pharmacist-led diabetes service appeared to provide a unique opportunity to promote autonomy of patients in improving their understanding of their healthcare and available

Box 1
Follow-up phone questionnaire after hospital discharge (n = 6).

Satisfaction with diabetes care in hospital
[satisfied (n = 1/6), very satisfied (n = 5/6)]

Experienced issues/ problems with diabetes medicines since discharge from hospital
(*n* = 1/6)

Visited local pharmacy to fill scripts (if needed)
[yes (*n* = 4/6), have not needed (n = 2/6)]

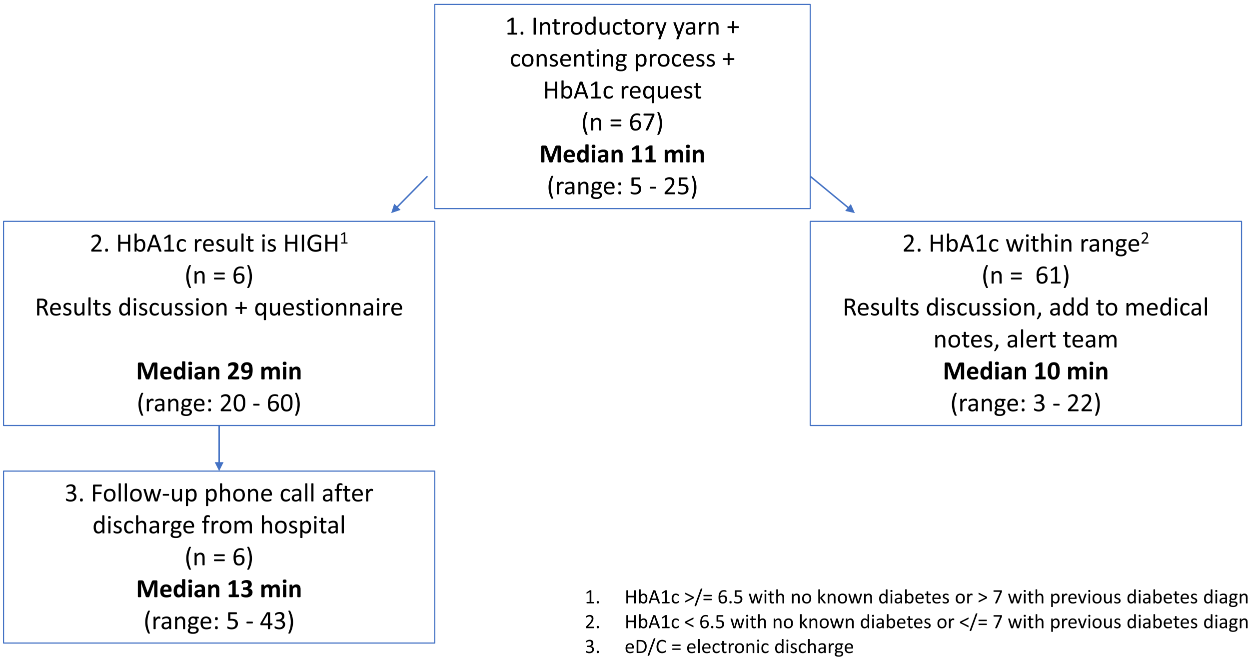
Made an appointment to see their GP
[yes (*n* = 4/6)

Understood the information from the pharmacist about diabetes while in hospital
[yes (*n* = 6/6)]

Understood the instructions for diabetes given to them by Endocrine doctor in hospital (*n* = 5)
[yes (n = 3/5)]

Any changes made to lifestyle since recent hospital discharge?
(n = 5 had made changes – not mutually exclusive)
Changed diet (*n* = 2), Take medicines (n = 1), Measure BGL (n = 1), Other* (n- = 5)
Other* changes included:
"*watching day to day diet, BGL (measuring), (taking) meds – is sometimes a bit hard but you just have to deal with what you have.*" "*(I now) work with family to deal with everything.*"; Podiatrist follow-up had been booked.; "*I drink more water and more fruit. I feel better and had time to think and put mind in good place. Eating healthily and having time to think has really helped my anxiety as well.*" [female participant, ID144]

Discussed with friends or family about diabetes
[yes (n = 4/6)]



1. HbA1c >/= 6.5 with no known diabetes or > 7 with previous diabetes diagnosis
2. HbA1c < 6.5 with no known diabetes or </= 7 with previous diabetes diagnosis
3. eD/C = electronic discharge

Fig. 4. Pharmacist's time.

prevention and treatment options.[59,60] There was an immediate benefit for the patient, e.g. an increase awareness of frequency of HbA1c testing, which benefits their family, community and future generations. However, it is also worth considering the time needed to offer a holistic bicultural care approach[58] in a busy hospital environment. For example, in the present study the initial introductory yarn, consenting process, organisation of HbA1c and results discussion took around 20 min or 40 min for individuals referred for endocrine review.

This study has a number of strengths and weaknesses that need mentioning. In terms of strengths, the study was designed with

Table 6
Themes derived from pharmacist-researcher (SW) field note observations mapped to Consolidated Framework for Implementation Research (CFIR) Domains.

Theme	Sub-theme	Sub-theme	Illustrative quotes
Barriers	Barriers to recruitment	COVID[b]	Initially in the early days of COVID, "I realized that COVID positive patients, can't be visited initially. So, their enrolment time frame is also delayed, to when they are not no longer positive and I can then go visit them. This is impacted on two patients so far" Following this, modifications were made so, e.g. "patient consent was obtained over the phone and she was happy to be involved. I was able to send her through the paperwork, to her phone so that she had the information sheets. She's a young girl and, she was keen to be involved as well. So, there was no problem and I'm glad that I was able to give her that opportunity, even though she was in the COVID (ward) and provide her with some education e.g. annual screening." "Participant has been in COVID, but she'll be going at some stage. So, I've given the diabetes leaflets to the pharmacist to add to the discharge bag. She is newly diagnosed with diabetes and the endocrine team are continually following her up."
		Patient eligibility[b, c,d]	"A number of patients are excluded after the weekend because I might see them Friday and there's no time between coming back on Monday and getting everything organized." "For one HbA1C (ID 37) the lab called me to say that because the patient had leukemia that affects the test and means that it's not valid. It was 4.6 and it was low, but it's not a true indication of glucose control."
	Barriers to service	HbA1c testing[c]	"HbA1c tests are done once a day….It's a real barrier to be able to coordinate care, especially for people who are not in hospital for that long at times, due to whatever indication they've come in for, then to be waiting for that test result to come back - only once a day is quite a rate-limiting step."
		Communicating with GP[b]	"I spoke with a guy and he was really happy that I had come to see him. He left unfortunately today, before I could speak to him, but I rang him and he answered and we had a chat on the phone. I said that everything was going fine. His result was normal. And he said it was no worries that I didn't see him before he left. I said his GP wasn't specified in the discharge summary and he (the patient) wasn't given a copy. So, I asked who his GP was, whether it's okay for us to send it to the GP. So, I added the note to the GP, spoke to the resident to be able to re-finalise it, and to make sure that it goes to the GP now that we know who the GP was. He was happy to do that.
		For healthcare review[c]	"Factors that can influence whether patients have been seen pre discharge include the fact that I work Monday to Friday, the HbA1c's are only done once a day with a 4-h turnaround time, patients have a short length of stay and the endocrine registrar may have competing patient prioritises."
Culturally safe care[a,c,d,e]	Module 2: Patient experience of health care[45]	Communication[58]	"I will be able to alert him of the result and try and encourage him to do annual testing. He didn't want to really take/use any treatment, even if he did have diabetes. As it turns out he doesn't, but it enabled me to have a discussion about not wanting to do anything. He'd rather just sit it out because he saw what his auntie had to go through and didn't want to do that. So, we had a chat about what the auntie had gone

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Table 6 (*continued*)

Theme	Sub-theme	Sub-theme	Illustrative quotes
			was okay. He also had the opportunity to ask other questions about some of his concerns about his medicines."
Satisfaction[e]		Participant[d]	"I texted the participant, that the regional centre CNE will be calling him next week to check out how he is and to invite him back to their hospital outpatient clinic for diabetes, if he would like, and he texted back and said, that's great."
			"The phone call went well and patient was very happy with everything and he felt like that, when we spoke that he could feel really open that he could trust me."
			"One gentleman was really happy when I was consenting him, that he felt that he had a lot of sugar in his life and wanted to know whether he had diabetes or not. He was interested to know how quickly the result would come back. So, he felt good that he would be able to get that done. He said that it pleased him, that it would be done quickly while he was in hospital."
			"I had a chat with him and he wanted to be involved. His opinion was that it's good to know and act upon it early. So, he was happy to be involved."
			"I gave her results (normal) to her, and she was happy. I gave her the strawberries and she was overwhelmed. She said, it's really made her day."
		Investigator	"It's been really great to be able to educate people about diabetes including the need to get annual testing."
			"The pictorial version of the project has been really beneficial, in the consenting process to help people to understand what the project's about. It's been really simple to use and I'd really recommend others to use it…… The 1st patient couldn't read, so loved it."
			through and he said that she ended up on insulin. So, it enabled us to talk about diabetes in general and how, even if it was a little bit high, then the early 'connecting with care' could actually mean that he might just be able to modify, e.g. his diet and exercise to prevent him needing to take medication. He seemed a bit more positive about that."
		Empowerment	"I had a chat with him. His opinion was it's good to know and act upon it if need be early. So, he was happy to be involved."
		Treated respectfully	"(He) consented to be part of that study and said, if I can help future generations by being involved in research, then that's a great thing. He was happy to be involved."
			"He said to me that he really felt the cultural support within the hospital had been great, e.g. his talks with the Aboriginal health worker…. and the pharmacist coming to see him with (my) yellow folder and the Aboriginal flag - that is really great. He was very supportive of the study being undertaken at the hospital."
		Family inclusion	"We had the chat about how his HbA1c & everything was fine…. it's just good for him to know, and how perhaps his family could have it done as well. He knew that his grandma had diabetes and so, he thought that was a good idea to check with the rest of his family, particularly his mum, although he felt that she was probably on top of it. He was keen to know about the result (to tell) his mum and the potential for how it could help his family."
			"Saw a gentleman this morning and gave him his normal result. He was really happy because he could now tell his family, who'd been pestering him to get checked, that he

(continued on next page)

Table 6 (*continued*)

Theme	Sub-theme	Sub-theme	Illustrative quotes
		Staff	“The endocrine CNE was happy with, how things had been working.” “..registrar said that she saw my note in the discharge summary and she said it was good.” “..it actually enables me to then give a clearer picture to the pharmacist, looking after the patient about the patient's story and any insight that I might've had about their background that they shared (with me), to help the pharmacist also provide culturally appropriate care to that patient. Pharmacists seem pleased with that insight.”
Pharmacist-researcher (SW) learning[e]			“The level of patient consent in this project supports the fact that people really want to know whether they need to do anything to make their health better.” “I gave her results (normal) to her, and she was happy with that. I gave her the strawberries and she was overwhelmed. She said, it's really made her day. This was a young person that has insecure living arrangements …this was really telling for me..I was glad she was involved.” “It never ceases to amaze me how thankful people are to get a gift of strawberries. It really amazes me that such a small gesture can actually be so welcomed by people.”
Role of pharmacist		Education[a,e] – patients, staff	“Education provided to patients when I went to see them about their diabetes. The tools used were the New South Wales, “Diabetes 10 ways to help your diabetes” leaflet and I also my hand drawn explanation of what is diabetes - using a cartoon style drawing. I wanted, to simplify the concept…I looked online to get a simplified cartoon explanation and used that to devise my drawing. “ “For people that have normal results, even the education surrounding diabetes, risks and the requirement for annual HbA1c testing, and to answer any questions that they might ask, is good.” “I spoke to her and realized that she couldn't be included in the study, but we went through the benefits of checking HbA1c annually and early identification and linking with care and the benefits of it. Also” what is diabetes” - using the drawing that I made. She was happy for me to make an addition to her discharge summary for the GP to follow-up on getting HbA1c and random blood glucose checked to monitor for diabetes.”
		Connecting care[a,b,e]	“I needed to speak to the heart failure, doctor before ringing the patient as I needed to make an appointment in the diabetes and obesity clinic for him.” “I called his GP, spoke to the practice nurse and left a message to report the blood results.” “She has known diabetes, but she needed some extra education. So that's been coordinated with the CNE.” “I checked his levels, all good. He was keen to hear, how it was. He never had any diabetes issues in the past, but it was good to know the result. He also wanted me to let the homeless health, know that he was here, which I was able to do.”
Overall study benefits[c,d]			“I realize that my (SW) getting HbA1c tests done and speaking to the team can actually change practice in its own right. So, it's like an advertising campaign in the wards.” “For (the person) to know that they had a normal test result was really, comforting. I could hear it in people,

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Table 6 (*continued*)

Theme	Sub-theme	Sub-theme	Illustrative quotes
			that they were really happy to hear the result and some people even really verbalized what comfort that was to them and to their families." "It's been really great to be able to educate people on diabetes and the need to get annual testing. To identify, people that have poorly controlled diabetes and the one girl who was previously unknown to have type two diabetes. It's been really good to be able to educate the pharmacists as we go along, just being able to discuss their patients in more depth with regard to the diabetes risk. Also having opportunistic discussions about Aboriginal health with pharmacists and other team members, like doctors etc., when I'm explaining the study to them and giving them a broader knowledge about the diabetes risk for Aboriginal people and the need for annual checking. Also, just the gratitude of people to be involved in the study. People want to know, and actively be involved with their health."
Future			"Ensure it is clear for pharmacists when HbA1c is not an appropriate measure." "Where HbA1c is not an adequate marker, having random BGL >11 could also be a referral criteria for pharmacists to endocrine." "HbA1c's are currently only done once a day. In the setting of a short length of stay, this can be a rate-limiting step as to whether we can link them in with care or not. It can be requested as an urgent test but usually it's not regarded as an urgent test within the system. So, that might be something after this study that could be worked through." "Organise a pharmacist CE with patient and homeless health nurse about lived experience surrounding CTG and, other lived experience with regard to medications." "I just noticed that sometimes if I can't link people with endocrine, there's something I can do for them, such as referring them to outpatient CNE in the community, eg in regional areas or calling the GP with the results. I saw patient today and gave him the 10 tips leaflet. Even though I might not be able to complete all the points within the study for referral, due to timing, there seems to still be something that we can offer."

CFIR Domains[41]: a. Intervention characteristics, b. Outer setting – external factors, c. Inner Setting- organisational characteristics, d. Individuals' characteristics, e. Process of implementation.

Aboriginal co-investigators (PD, SD) who helped co-design the model of diabetes care offered and as a result, incorporates culturally safe practices.[45] This was reflected by the high number of patients who consented to take part ($n = 67/72$; 93%) and the satisfaction expressed by patients referred to the endocrinology unit. This was a pilot study which developed and implemented a pharmacist-led diabetes screening model. To limit confounding variables in delivery of this new model, it was only conducted at one study site with one pharmacist. So, in relation to weaknesses, just one metropolitan study site was involved (New South Wales; NSW) and the pharmacist providing the service was also the lead researcher. While this Australian state (NSW) has the largest per capita proportion of Aboriginal and/or Torres Strait Islander Australians,[61] the findings are not generalisable to regional or rural settings, or to other urban Australian sites, or may differ if provided by other pharmacists. Further, more than 6 in 10 patients were excluded from the study. The reasons for exclusion were related to the study being conducted in a busy metropolitan hospital environment – where short length of stay is a symptom of the public health service design. More work is needed to consider the benefits of this diabetes service and how it could be better aligned in the existing hospital setting. Despite these challenges, a willingness from clinicians to upscale this service is currently being considered at the study site.

4.1. Implications

Several implications have arisen from this study. This diabetes screen and care model could be adopted by other hospitals, with adaption for local context with communities and Aboriginal health professionals. To do so, the pharmacists would need to be trained to provide culturally safe care[62] together with an understanding of the social and cultural determinants of health and the effect of colonisation on the prevalence of diabetes.[63] This approach could also benefit other priority groups where stigma around life-style changes can be common (e.g culturally and linguistically diverse populations (CALD) and women who are pregnant).[64–66] Pharmacist referral criteria were based on HbA1c result together with or without prior diagnosis of diabetes. On reflection, a high BGL result (more than 10 mmol/L for more than 24 h) could also trigger a referral for endocrine review, as it currently does for medical teams. Accordingly, future research could consider expansion of the pharmacist referral criteria for endocrine review and include a high BGL. This work has the potential to change how people are cared for by pharmacists when they are in hospital and could be broadened to include other chronic disease screening and referral pathways.

5. Conclusions

This pilot of a pharmacist-led diabetes screening service, identified how a metropolitan hospital can detect if Aboriginal and/or Torres Strait Islander peoples who are admitted to hospital are at risk of, or have, a diagnosis of diabetes. This pilot showed that pharmacist-lead diabetes bi-cultural care provides screening and linking with care in a holistic manner. Future research is required to test this model by upscaling the service to include more pharmacists in the screening role and could be broadened to include other chronic disease screening and referral pathways.

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CRediT authorship contribution statement

Susan Welch: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Rebekah Moles:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – review & editing. **Alexander Viardot:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – review & editing. **Pauline Deweerd:** Conceptualization, Funding acquisition, Investigation, Methodology, Resources, Supervision, Visualization, Writing – review & editing. **Scott Daly:** Conceptualization, Funding acquisition, Investigation, Methodology, Resources, Supervision, Visualization, Writing – review & editing. **Kylie Lee:** Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

No conflict of interests exist for SW, RM, KL, PD, SD, AV.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2023.100351.

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Connecting the Dots of Care

Making it easier for hospital pharmacists to work out if Aboriginal and Torres Strait Islander patients can be linked with diabetes care while in hospital.

ST VINCENT'S HOSPITAL
SYDNEY
A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

Diabetes and Aboriginal and Torres Strait Islander People

Aboriginal and Torres Strait Islander people are 3 times more likely to be diagnosed with diabetes than non-Indigenous Australians. Getting appropriate diabetes care is important to help them have a healthy lifestyle. But for Aboriginal and Torres Strait Islander people, accessing diabetes care can often come too late.

About this project:

This project is looking to find better ways to work out if Aboriginal and/or Torres Strait Islander people have diabetes or have a high chance of having diabetes. We are doing this so that people can ask questions and be linked with doctors who can help keep them well. You are invited to take part in this study.

What will happen?

A hospital pharmacist will come to check your blood test results during your hospital stay.

If needed, a HbA1c blood test will be done to see how likely it is that you will get diabetes.

Once your test results are back, a diabetes nurse or doctor will come have a yarn about diabetes with you if needed.

A diabetes care plan will be discussed with you and given to your local doctor.

2 days after your hospital visit, the hospital pharmacist will call to see how you are going.

After the phone call a $20 voucher will be sent to you in the post.

Once the study is finished, we will feed back the findings at a BBQ. If you can't attend, an info sheet will be mailed to you.

Remember: You do not have to take part in this study - it is your choice. You can pull out at anytime.

For more information contact Ms Susan Welch on (02) 8382 2125 or
The Chairperson, AH&MRC Ethics Committee, 35 Harvey St. Little Bay. NSW, 2012 - email: ethics@ahmrc.org.au

Version 1 - Date: 31/08/2020

CDC Questionaire 1

Appendix 1. Medicines management semi-structured interview framework

– pharmacist to complete during visit on ward

For patients with known diabetes: HbA1c > 7

and patients with new or high risk of diabetes: HbA1c > 6.5

Appendix 1. Medicines management semi-structured interview framework
- pharmacist to complete during visit on ward
For patients with known diabetes: HbA1c > 7
and patients with new or high risk of diabetes: HbA1c > 6.5

age	______________________
gender	○ male ○ female ○ other
Excluded	○ Yes ○ No
why excluded	○ About to be discharged (no time for blood/endocrine r/v) ○ Not able to consent (acute mental health) ○ other
excluded other	___________________________
consent	○ yes ○ no
reasons why not mentioned	___________________________
Phone Number	______________________
Home Postcode	______________________
Serum creatinine	______________________
Date of test	______________________
HbA1c (%)	______________________

date of HbA1c	__________________________________
Random BGL	__________________________________
date of Random BGL	__________________________________
Fasting BGL	__________________________________
date of fasting BGL	__________________________________
Known diabetes	○ Yes ○ No
Diabetes medications	○ yes ○ no ○ yes, previously unknown (not charted)
If yes specify	☐ metformin ☐ gliclazide ☐ insulin ☐ empagliflozin ☐ sitagliptin ☐ linagliptan ☐ saxagliptan ☐ glibenclamide ☐ glimepiride ☐ glipizide ☐ alogliptan ☐ vildagliptin ☐ dapagliflozin ☐ ertugliflocin ☐ pioglitazone ☐ arcabose ☐ dulaglutide ☐ exenatide ☐ liraglutide ☐ semaglutide ☐ other
Other diabetes med (please specify)	__________________________________

Insulin - please specify	☐ Optisulin ☐ Novorapid ☐ Apidra ☐ Protaphane ☐ Ryzodeg ☐ Levemir ☐ Actrapid ☐ Apidra ☐ Humalog ☐ Toujeo ☐ Fiasp ☐ Humulin NPH ☐ Mixtard 30/70 ☐ Mixtard 50/50 ☐ Humulin 30/70 ☐ Novomix 30 ☐ Humolog Mix 25 ☐ Humalog Mix 50 ☐ other
Other insulin (please specify)	______________________
Medicines taken at home	○ Yes ○ No
1. You been prescribed some medicines for diabetes	○ Yes ○ No
a. Why do you think you have been prescribed these medicines?	____________________________
b. What concerns or worries do you have (if any) about taking these medicines?	____________________________
2. Do you see a doctor for your diabetes ?	○ Yes ○ No
2 a. Where do you see a doctor for your diabetes ?	☐ GP ☐ AMS ☐ specialist ☐ other (specify)
other doctor (specify)	______________________
3. When did you last see a doctor about your diabetes ? (before hospital)	○ < 1 week ago ○ within the last month ○ within the last 6 months ○ within 6 - 12 months ○ > 12 months
4. Do you have anyone helping you with your medicines at home?	○ Yes ○ No

If Yes (specify who)	☐ Partner/spouse ☐ Family member ☐ Friend ☐ Neighbour ☐ Community nurse ☐ Other (specify)
Other helper	__________________________________
5. Who collects your medicines from the pharmacy?	☐ Me ☐ Partner/spouse ☐ Family member ☐ Friend ☐ Neighbour ☐ Community nurse ☐ Other (specify)
Other collector	__________________________________
Using insulin	○ Yes ○ No
6. Do you have any problems using/ storing/ remembering your insulin?	○ Yes ○ No
6 a. what problems do you have with insulin ?	☐ Using ☐ Storing ☐ Remembering
specify insulin problem	____
7. Do you use a Webster pack to help with your medicines?	○ Yes ○ No
7 a. Do you have any difficulties (if any) using the Webster pack?	○ Yes ○ No
7b What difficulties do you have ?	☐ Hard to get the tablets out ☐ Don't understand how to use it correctly ☐ Other (specify)
Other difficulties (specify)	__________________________________
8. Do you ever forget to take your medicines ?	○ Yes ○ No
8a. How often do you forget >	○ Every day ○ Once a week ○ Once a month ○ other (please specify)

Other forgetting (please specify)	__________________________________
8b. What do you do to help to remember to take your medicines?	__________________________________
9. Do you change the way you take your medicines sometimes? (e.g. skip, change dose, take less or more than prescribed)	○ Yes ○ No
9 a. If changes made , please specify	☐ skip doses ☐ change dose ☐ take less than prescribed ☐ take more than prescribed ☐ other (please specify)
other changes (please specify)	____________________________
9 b. What do you do to help, when you change the way you take your medicines?	__________________________________

For patients with HbA1C >6.5 - From your blood test results you may be at risk of diabetes and

For patients with HbA1C > 7:

- Diabetes can sometimes affect your eyes and feet.

10. I was wondering about your eyes. 10 a. Have you ever had any problems with your eyes from diabetes that you know of?	○ Yes ○ No
10 b. Do you see an optometrist/ ophthalmologist?	○ Yes ○ No
10 c. Have you ever had laser OR eye injections?	○ yes ○ no ○ don't know
11. I was wondering about your feet. Do you ever get... 11 a. Foot numbness?	○ Yes ○ No
11b. Foot pain	○ Yes ○ No
11 c. foot tingling?	○ Yes ○ No
11 d. Foot infections	○ Yes ○ No

The information gained from these questions will be written in your patient notes as background for the referral to a diabetes doctor (endocrinologist), where applicable

CDC Followup Call

Record ID	________________________
Seen by Endocrine as inpatient	○ Yes ○ No
Date seen by Endocrine	________________________
Endocrine plan in d/c summary	○ Yes ○ No
Endocrine plan	______________________________
date/time of call	________________________
1. Are you having any issues/problems with your medications since you left hospital?	○ Yes ○ No
1a. please specify	______________________________
2. Have you been to the chemist/pharmacy to fill your scripts (if needed)?	○ yes ○ no ○ haven't needed to
2a. Is there something I can do to help with this?	○ Yes ○ No
2b describe what they needed.	______________________________
3. Have you made an appointment to see your doctor yet?	○ Yes ○ No
3a. Is there something I can do to help with this?	○ Yes ○ No
3b describe what help was offered	______________________________

When you were in hospital you saw the pharmacist and they had a chat about diabetes...

4. Did you understand the information the pharmacist gave you about diabetes?	○ Yes ○ No
4a. I can answer any questions for you now, if you have any.	○ Yes ○ No
4c. specify topics asked about (pharmacist)	____________________

When you were in hospital, you saw a doctor (endocrinologist) or nurse about diabetes...

5. Did you understand the instructions given to you about diabetes when you left the hospital?	○ Yes ○ No
5a. I can answer any questions for you now, if you have any.	○ Yes ○ No
5c. specify topics asked about (endocrine)	____________________
6. How satisfied were you with the diabetes care you got in hospital ?	○ Unsatisfied ○ Satisfied ○ Very satisfied
6a. Why do you say this?	____________________
7. Are you doing anything different now to help manage / lower your chance of getting diabetes - since leaving hospital?	☐ More exercise ☐ Changed diet ☐ Take medicines ☐ Measure BGL ☐ Other? .....
Other (please specify)	____________________
8. Did you have a yarn with your friends or family about diabetes after your hospital stay?	○ Yes ○ No
9. Do you have any questions or worries about diabetes that you would like to chat about?	○ Yes ○ No
specify question topics asked	____________________
date/ Time call stopped	____________________
Call duration (mins)	____________________

Supplementary material 4: CONSIDER Statement Checklist

Item	**Checklist Item**
Governance	
1.	Describe partnership agreements between the research institution and Indigenous-governing organization for the research, (e.g., Informal agreements through to MOU (Memorandum of Understanding) or MOA (Memorandum of Agreement)). Checked: see page 7 – Aboriginal Leadership. Through an informal agreement the study was co-designed with the Aboriginal Health Unit and had the support from an Aboriginal health committee at the study site. Two authors are from Yuin nation (PD and SD)
2.	Describe accountability and review mechanisms within the partnership agreement that addresses harm minimization. Checked: see page 6 – Ethics approved, 7 – Aboriginal leadership The Aboriginal Health Unit provided advice on study design, implementation, and dissemination of findings throughout the study. Discussions with the Aboriginal Health Unit were conducted face-to-face and via email. They provided guidance throughout the study. Feedback on study findings was provided to the Aboriginal Health Unit management every stage.
3.	Specify how the research partnership agreement includes protection of Indigenous intellectual property and knowledge arising from the research, including financial and intellectual benefits generated (e.g., development of traditional medicines for commercial purposes or supporting the Indigenous community to develop commercialization proposals generated from the research). Checked: PD, SD will be co-authors of all output arising from this study. N/A financial benefits.
Prioritization	
4.	Explain how the research aims emerged from priorities identified by either Indigenous stakeholders, governing bodies, funders, non-government organization(s), stakeholders, consumers, and empirical evidence Checked: see page 3-5 – Introduction/literature review, page 7 – Aboriginal Leadership

Item	Checklist Item
	Aboriginal and/or Torres Strait Islander peoples are diagnosed with diabetes nearly three times more often than other Australians. Diabetes is often under detected but it is the second leading preventable cause for an admission to hospital for Aboriginal and/or Torres Strait Islander peoples. In response to these prevalence figures on diabetes among Aboriginal and Torres Strait Islander peoples, the lead author (SW) approached the Aboriginal Health Unit to see if they wanted to collaborate on a study to improve diabetes screening and care in a metropolitan hospital. The Aboriginal Health Unit provided advice on study design, implementation, and dissemination of findings in the co-design process and throughout the study.
Relationships (Indigenous stakeholders/participants and Research team)	
5.	Specify measures that adhere and honor Indigenous ethical guidelines, processes, and approvals for all relevant Indigenous stakeholders, recognizing that multiple Indigenous partners may be involved, e.g., Indigenous ethics committee approval, regional/national ethics approval processes. Checked: see page 6 – Ethics approved The study procedures were approved via the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and the study hospital (Ref: #2020/ETH01314: 8/10/20).
6.	Report how Indigenous stakeholders were involved in the research processes (i.e., research design, funding, implementation, analysis, dissemination/recruitment). Checked: see Author Statement, page 7 – Aboriginal Leadership, page 21 - Funding Funding was applied for by and granted to the study group which included an Aboriginal member, (PD). Funding to conduct this study was provided by a Applied Medical Research/ Inclusive Health Fund grant at the study site, 2018. The Aboriginal Health Unit provided advice on study design, implementation, and dissemination of findings in the co-design process and throughout the study. The Author Statement describes that PD was involved with Conceptualization; Funding acquisition; Investigation; Methodology; Resources; Supervision; Visualization; Writing - review & editing.
7.	Describe the expertise of the research team in Indigenous health and research. Checked: see Title page, page 6 – Method, page 7 – Aboriginal Leadership, page 21 – Funding Two authors are from Yuin nation (PD and SD) and lead the Aboriginal Health Unit at the study site. All other team members work in the provision of Aboriginal and/or Torres Strait Islander health care or education. KL has extensive research experience working alongside Aboriginal collaborators and community in the field of Aboriginal health and alcohol.

Item Checklist Item	
Methodologies	
8.	Describe the methodological approach of the research including a rationale of methods used and implication for Indigenous stakeholders, e.g., privacy and confidentiality (individual and collective) Checked: see page 3-5 – Introduction/literature review, page 8 – Procedure A range of efforts were made to ensure cultural safety during the research for study participants. For example, culturally acceptable methods of communication (e.g. yarning to build rapport, time allowed for participants to be comfortable with the processes involved, opportunity to receive information about diabetes and their personal results, and information on the findings in a culturally sensitive manner). All aggregate data were non-identifiable.
9.	Describe how the research methodology incorporated consideration of the physical, social, economic and cultural environment of the participants and prospective participants. (e.g., impacts of colonization, racism, and social justice). As well as Indigenous worldviews. Checked: see page 3-4 – Introduction/literature review, page 8 – Procedure, page 18,19 – Discussion The methodology incorporated culturally appropriate communication, undertaken with the understanding of participants' environment within the hospital setting and time required to build rapport and allow questions and discussion. These conversations were also conducted with an understanding of the stigma often experienced by patients, surrounding diabetes. Guidance was obtained from Aboriginal members of the study group, throughout the study to help ensure cultural safety of participants.
Participation	
10.	Specify how individual and collective consent was sought to conduct future analysis on collected samples and data (e.g., additional secondary analyses; third-parties accessing samples (genetic, tissue, blood) for further analyses). Checked: see page 7 – consent, N/A no further analysis proposed, Aboriginal Health and Medical Research Council of New South Wales amendments would be required.
11.	Described how the resource demands (current and future) placed on Indigenous participants and communities involved in the research were identified and agreed upon including any resourcing for participation, knowledge, and expertise Checked: see Figure 1 and page 8 – Procedure

Item	Checklist Item
	Participants were offered fruit in hospital and a $20 store voucher if they were interviewed after discharge from hospital, to acknowledge their time given to the study. Authorship includes Aboriginal health experts who contributed to the study (PD and SD).
12.	Specify how biological tissue and other samples including data were stored, explaining the processes of removal from traditional lands, if done, and of disposal. Checked: N/A
Capacity	
13.	Explain how the research supported the development and maintenance of Indigenous research capacity (e.g., specific funding of Indigenous researchers) Checked: page 7 – Aboriginal Leadership Sufficient time allocated (over 12 months) to determine research priorities for this study with Aboriginal investigators (PD, SD). This enabled us to design and study that met Aboriginal priorities and could be culturally safe in patient recruitment.
14.	Discuss how the research team undertook professional development opportunities to develop the capacity to partner with Indigenous stakeholders? Checked: see page 6 – Method, SW is a hospital pharmacist-researcher and has undergone cultural responsiveness training. She undertook numerous conversations (over 12 months prior) and throughout the study with Aboriginal community members and the Aboriginal Health Unit to develop this partnership.
Analysis and interpretation	
15.	Specify how the research analysis and reporting supported critical inquiry and a strength-based approach that was inclusive of Indigenous values. Checked: see page 17-19 – Discussion, page 20 – Implications, Whilst acknowledging the effects of diabetes on Aboriginal and/or Torres Strait Islander peoples together with community efforts to combat them the authors described the ongoing effects of colonisation. Results were viewed and analysed with this lens. The importance of a bi-cultural model of care was recognised and implemented in the study and this led to care being provided in a holistic manner.
Dissemination	

Item	Checklist Item
16.	Describe the dissemination of the research findings to relevant Indigenous governing bodies and peoples. Checked: see page 8 – Procedure, AHMRC reports and review of publications prior to submission At the conclusion of the study, a planned strategic approach to feedback was taken that provided knowledge translation and dissemination of findings. All consenting patients were invited to a community barbeque held on hospital grounds and given a one-page infographic (face to face or by post). Research findings were disseminated to Aboriginal Health and Medical Research Council of New South Wales via annual reports and a review of publications prior to submission.
17.	Discuss the process for knowledge translation and implementation to support Indigenous advancement (e.g., research capacity, policy, investment). Checked: see page 8 – Procedure, page 20 – Implications, page 21 – Conclusions On conclusion of the study, a planned strategic approach to feedback was used providing knowledge translation and dissemination of findings. All consenting patients were invited to a community barbeque held on hospital grounds and given a one-page infographic (face to face or by post). This diabetes screen and care model could be adopted by other hospitals, with adaptation for local context with communities and Aboriginal health professionals. Future research is required to test this model by upscaling the service to include more pharmacists in the screening role. The service could also be broadened to include other chronic disease screening and referral pathways.

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	6
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	6, title
Occupation	3	What was their occupation at the time of the study?	6
Gender	4	Was the researcher male or female?	6
Experience and training	5	What experience or training did the researcher have?	6
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	6
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	6, 7
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	19
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	10
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	8
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	8, 22
Sample size	12	How many participants were in the study?	10
Non-participation	13	How many people refused to participate or dropped out? Reasons?	5
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	8, 22
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	8
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	26,30
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	9, 22
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	9
Field notes	20	Were field notes made during and/or after the inter view or focus group?	9
Duration	21	What was the duration of the inter views or focus group?	14, 15
Data saturation	22	Was data saturation discussed?	N/A
Transcripts returned	23	Were transcripts returned to participants for comment and/or	N/A

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	10
Description of the coding tree	25	Did authors provide a description of the coding tree?	10, 40 - 51
Derivation of themes	26	Were themes identified in advance or derived from the data?	10, 15
Software	27	What software, if applicable, was used to manage the data?	8, 9, 10
Participant checking	28	Did participants provide feedback on the findings?	13, 14
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	40 - 51
Data and findings consistent	30	Was there consistency between the data presented and the findings?	20
Clarity of major themes	31	Were major themes clearly presented in the findings?	15, 16
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	40 - 51

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

6. CULTURALLY APPROPRIATE RESEARCH? ASSESSING A PHARMACIST-LED STUDY

As illustrated in chapter 5, the pilot of a novel pharmacist-led model of care to detect risk of diabetes for Aboriginal and Torres Strait Islander Peoples was successfully developed, implemented and evaluated. This model of care identified patients admitted to hospital, who did not have a previous diabetes diagnosis and those who needed extra diabetes care, to help with blood glucose control. It provided an opportunity for all participants to yarn about diabetes. This process enabled holistic diabetes care to be offered during a patient's stay in hospital, independent of their reason for admission.

Not only did this study show positive results, but it was also important to determine if the design and process of implementation used, was culturally appropriate. The current chapter (chapter 6) describes how this validation was achieved across four analyses. This will help enable future work to be implemented by pharmacists in a culturally appropriate manner.

This work has been published as: Welch S., Purcell-Khodr G., Deweerd P., Moles R., Viardot A., Daley S., Lee K. Working together to ensure research conducted with Aboriginal and/or Torres Strait Islander Australians is culturally appropriate illustrated using a pharmacy-intervention study – published online in the Journal of Pharmacy Practice and Research April 2025, doi.org/10.1002/jppr.70008 (99)

My contribution to this original research article is outlined in Table 1. (page 19)

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RESEARCH ARTICLE

Working together to ensure research conducted with Aboriginal and/or Torres Strait Islander Peoples is culturally appropriate illustrated using a pharmacy-intervention study

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[8] Burnet Institute, Melbourne, Australia

Abstract

Background: Historically, health research conducted in Australia with Aboriginal and/or Torres Strait Islander Peoples has not been requested by communities. Health policies cite evidence for inclusive care including cultural perspectives.
Aim: To determine if the design and implementation of a pharmacist-led diabetes screening study was culturally appropriate for Aboriginal and/or Torres Strait Islander Peoples admitted to a metropolitan hospital, located in New South Wales (NSW), Australia.
Method: Data were drawn from four components: (1) timeline and key steps to develop the study, (2) study alignment with the *NSW Aboriginal health ethics guidelines: key principles*, (3) elements and processes of bicultural care, and (4) the extent of community participation. Ethical approval was granted by the Human Research Ethics Committee of the Aboriginal Health and Medical Research Council of NSW (Reference no: #1709/20) and the St Vincent's Hospital Human Research Ethics Committee (Reference no: #2020/ETH01314) and the study conforms to the Australian *National statement on ethical conduct in human research*. In the original intervention study, informed consent was obtained from all participants via distribution of a project information sheet and completion of a written consent form.
Results: The process to design and implement the larger study demonstrated cultural appropriateness across four analyses. Strengths included involvement from knowledge holders and Aboriginal clinician-researchers. Analyses illustrated respect for community priorities as central to the research process. This required sufficient time for respectful conversations, formation of strong partnerships, and reciprocity. Future studies should ensure time is set aside to build relationships with patients in concept building and design phases. Results cannot be generalised to another hospital. However, study findings could inform diabetes care efforts in other hospital settings.
Conclusion: Respectful, non-rushed two-way communication was crucial to the cultural appropriateness of the study. This study offers suggestions for pharmacists wishing to conduct research in this area. Future research is needed to incorporate Indigenous research methodologies into study designs and to apply the Australian Bicultural Care model to other clinical settings.

Keywords: Aboriginal and Torres Strait Islander Peoples, Indigenous Australian, hospital pharmacist, research, culturally appropriate.

INTRODUCTION

All authors are employed on Gadigal land in Australia, except one who is employed on Wurundjeri land in Australia (KL) and one on Osage land (GPK) in the United States of America. Two authors are Yuin nation (PD and SD) and one author is Gundungurra nation (GPK).

The terminology which refers to Aboriginal and/or Torres Strait Islander Peoples (the First Peoples of Australia) will be used throughout this paper except when referring to existing resources which at times use other terms. Within New South Wales (NSW), the term

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'Aboriginal' is preferred over 'Aboriginal and Torres Strait Islander' by the Aboriginal Health & Medical Research Council of NSW.[1,2]

Historically, health research conducted with Aboriginal and/or Torres Strait Islander Peoples has not been requested by communities or informed by their priorities.[3] As a result, communities have been disempowered in the research process,[3,4] and research has been limited by a Western-centric (biomedical) lens. However, in the past 30 years, health policy efforts have cited evidence for more inclusive health care that includes cultural perspectives and healing traditions of Aboriginal and/or Torres Strait Islander Peoples.[5] The term 'bicultural care'[6] has been used in this context and refers to the concept of offering evidence-based medical approaches alongside Aboriginal and/or Torres Strait Islander approaches to care. To facilitate such inclusive approaches, research must be guided by and conducted with the community.[7]

Few publications describe hospital pharmacists working with Aboriginal and/or Torres Strait Islander Peoples.[8] A number of hospital pharmacy services exist across Australia specifically for Aboriginal and/or Torres Strait Islander Peoples. However, these have not had the opportunity to be evaluated or measure impact on health outcomes.[9] Some recent work in a metropolitan setting provides valuable outcome data on the impact of holistic team-based care (including hospital pharmacists and Aboriginal and/or Torres Strait Islander Peoples) and medication supply on discharge.[10,11] To our knowledge, no studies have documented the steps taken by hospital pharmacists to deliver 'bicultural care'. In Aboriginal Community Controlled Health Organisations (ACCHOs), pharmacists routinely integrate holistic care in a culturally safe environment with positive outcomes.[12,13]

In Australia, national[14,15] and state-based guidelines[7] help ensure research conducted with Aboriginal and/or Torres Strait Islander Peoples is safe and ethical. In addition, three Australian states have Aboriginal and/or Torres Strait Islander-specific human research ethics committees (South Australia, Western Australia, and New South Wales). Despite this, a recent survey of researchers in Aboriginal and/or Torres Strait Islander health found that existing research was mainly based on non-Indigenous notions of health, led by non-Indigenous researchers, and conducted in non-Indigenous settings.[16] Prioritising partnerships with Aboriginal and/or Torres Strait Islander researchers and communities and embedding Indigenous research methodologies into all aspects of the research are likely to produce research that is culturally appropriate and valuable to communities.[17,18]

In a Canadian commentary on Indigenous research methodologies in pharmacy practice, relationality, reciprocity, and storytelling with metaphors were core elements.[18] Australian studies have highlighted the role of researcher reflexivity in Aboriginal and/or Torres Strait Islander health research.[3] These processes can enhance researchers' understanding of power imbalances, centre the needs of Aboriginal and/or Torres Strait Islander Peoples, and decolonise the research process.[4,19] However, to our knowledge, no previous Australian studies have documented approaches by hospital pharmacists to enable research to be conducted in a culturally appropriate way. To address this shortcoming, this paper seeks to guide researchers, including pharmacists, through the process of conducting culturally appropriate research with Aboriginal and/or Torres Strait Islander Peoples. Specifically, we aimed to determine if the process used to design and implement a pharmacist-led diabetes screening study[8] was culturally appropriate for Aboriginal and/or Torres Strait Islander Peoples admitted to a NSW metropolitan hospital.

Study objectives will:

1. Describe steps taken to develop the study, collect data, and disseminate findings.
2. Map how the study aligned with the Aboriginal Health & Medical Research Council of NSW (AHMRC) *NSW Aboriginal health ethics guidelines: key principles*[7] for conducting research with Aboriginal and Torres Strait Islander Peoples.
3. Determine elements and processes of bicultural care present in study interactions by mapping field notes to the Australian Bicultural Model of Care.[6]
4. Determine the level of community participation by Aboriginal and/or Torres Strait Islander Peoples in the research process.[20]

METHOD

Ethics Statement

Ethical approval was granted by the Human Research Ethics Committee of the Aboriginal Health and Medical Research Council of NSW (Reference no: #1709/20) and the St Vincent's Hospital Human Research Ethics Committee (Reference no: #2020/ETH01314) and the study conforms to the Australian *National statement on ethical conduct in human research*. In the original intervention study, informed consent was obtained from all participants via distribution of a project information sheet and completion of a written consent form.

Study Design

This study explored the approach taken in a larger intervention study (Connecting the Dots of Care) that aimed to optimise diabetes care for Aboriginal and/or Torres Strait Islander Peoples admitted to a metropolitan hospital located in the Australian state of NSW.[8]

Aboriginal Leadership

The larger study was co-conceived using iterative cycles of feedback led by the pharmacist-researcher (SW) and the director and manager of the hospital site's Aboriginal Health Unit (PD and SD respectively; Yuin nation). The Aboriginal Health Unit provides support to Aboriginal and/or Torres Strait Islander patients, families, and carers. In the larger intervention study, the unit gave the pharmacist-researcher (SW) practical advice to ensure the cultural safety of study participants. Project support was also provided by the Aboriginal health committee at the study site. This committee is composed of Aboriginal representatives (community and hospital-based) and hospital staff and is responsible for improving the health of Aboriginal and/or Torres Strait Islander Peoples admitted to the hospital. In this study, the Aboriginal Health Unit was consulted on the study design, had oversight of the processes being used, reviewed and contributed to data analysis, and worked with the pharmacist-researcher (SW) to conduct analysis of the 'level of community participation by Aboriginal and/or Torres Strait Islander Peoples in the research process'.

Connecting the Dots of Care Study

This larger Connecting the Dots of Care study aimed to identify how metropolitan hospital pharmacists could detect if Aboriginal and/or Torres Strait Islander patients had diabetes or a higher chance of getting diabetes. The main study outcomes have been published elsewhere.[8]

Setting

A major teaching hospital in metropolitan Sydney, NSW, Australia.

Participants

Participants in the larger intervention study (Connecting the Dots of Care)[8] were Aboriginal and/or Torres Strait Islander patients, aged 18 years or older, admitted to the study hospital (Monday to Friday) during a 12-week period from July–October 2021.

Data Sources, Collection, and Analysis

Data for this study were drawn from four discrete components to determine if the research process was culturally appropriate (Table 1):

1. *Timeline and key steps taken to develop the study*: Key steps taken during study development, data collection, and dissemination of findings were documented visually on a timeline (by SW). The timeline was checked by the Yuin nation co-author (PD) and by KL.
2. *How the study aligned with AHMRC Aboriginal health ethics guidelines*: The approach taken mapped the key elements of the 'timeline' figure against the AHMRC *Aboriginal health ethics guidelines: key principles*[7] (by SW, checked with PD and KL). These five principles demonstrate how research projects bring (1) net benefits for Aboriginal people and communities, (2) Aboriginal community control of research, (3) cultural sensitivity, (4) reimbursement of costs, and (5) enhancement of Aboriginal skills and knowledge. Note that studies involving Aboriginal Peoples in NSW are required to obtain ethical approval from the AHMRC Human Research Ethics Committee.[7] This mapping enabled us to gauge how well the AHMRC Aboriginal health ethics guidelines[7] were embedded in the study.
3. *Elements and processes of bicultural care present in the study by mapping researcher-pharmacist field notes to the Australian Bicultural Model of Care*:[6] Field notes by the pharmacist-researcher (SW) documented during data collection (July–October 2021) provided reflective impressions on service implementation and patient interactions and the reflexivity required. Each field note (n = 196) was audio recorded on a mobile phone (by SW), later transcribed using Rev (Rev.com, Inc., Austin, TX, USA) and checked (by SW) prior to analysis.

The Australian Bicultural Model of Care[6] provides a template to document elements of bicultural approaches to health care. The three levels of care in this model are interpersonal processes (relationship building), treatments to promote healing, and service-level factors that can help or hinder care. This model was developed by a Gundungurra scholar (GPK) in the context of a study to improve screening and uptake of treatment for unhealthy alcohol use (drinking above recommended guidelines) in Aboriginal and Torres Strait Islander community-controlled primary care settings.[21] Using principles of the Australian Bicultural Care Model,[6] field

Table 1 Study objectives and associated data sources

Method	Timeline of key steps taken (Figure 1)	How study aligns with the AHMRC Aboriginal health ethics guidelines[7] (Figure 3)	Elements and processes of bicultural care present in study (Figure 4a–c)	Extent of community participation in research process
Objective	Describe steps taken to develop study, collect data, and disseminate findings	Map how the study aligned with the AHMRC Aboriginal health ethics guidelines[7] for conducting research with Aboriginal and Torres Strait Islander Peoples	Determine elements and processes of bicultural care present in study interactions by mapping field notes to the Australian Bicultural Model of Care[6]	Determine level of community participation by Aboriginal and/or Torres Strait Islander Peoples in research process
Data source(s)	Reflected upon and documented key steps taken during: • Relationship building (internal and external to the hospital) • Study development • Data collection • Dissemination of findings	Timeline of key steps (Figure 1) was mapped against each item of the AHMRC Aboriginal health ethics guidelines[7]	Review of field notes documented by pharmacist-researcher during data collection (July–October 2021; n = 196) and mapped against Australian Bicultural Care Model[6] (developed by a Gundungurra scholar [GPK])	Assess community participation in research process using tool adapted by Snijder et al.:[20] • Timeline (Figure 1) • Study infographic tools (Figure 2a,b) • Study alignment with AHMRC Aboriginal health ethics guidelines[7] (Figure 3)

AHMRC = Aboriginal Health & Medical Research Council of NSW; GPK = Gemma Purcell-Khodr.

'CONNECTING THE DOTS OF CARE'		STEPS TAKEN
Improve cultural awareness in metropolitan hospital pharmacy department	2010	Sought advice from AHU Built links with the only Aboriginal health professional employed at study site hospital
Identify when Aboriginal Peoples are admitted to hospital	2014	Worked with AHU to improve admission process. Mandatory question asked on admission, now visible to staff in patient software. Patient name marked with Aboriginal flag icon[a]
Brainstorm how pharmacists can help Aboriginal patients admitted to hospital	2015 – 2017	Process developed with AHU for pharmacists to assist with continuity of care in relation to medicines (supply, communicate, educate)
Improve cultural responsiveness in pharmacy care	2018	Senior hospital pharmacist attended half-day cultural responsiveness workshop run by IAHA
Enhance cultural appropriateness of communication with Aboriginal patients in hospital		With AHU: developed, conducted and evaluated Yarnin'[b] cards; conducted clinical yarning workshops for pharmacists hospital-wide
Enhance pharmacist learning of chronic disease in Aboriginal and Torres Strait Islander contexts		Discussions with AHU about published and local evidence; importance of early diabetes detection; importance of pharmacists' role in prioritising Aboriginal patients (e.g. as an advocate and liaison with staff/family)
Communicate with knowledge holders about proposed concept for diabetes care study[c]		*Endocrine* (individual clinicians and whole department) • Fostered joint understanding on need for study, sought advice on study design, referral pathways during admission and on discharge *AHU* • Built on previous work with pharmacy department to improve knowledge of chronic illness burden in community; introduced pharmacy team to community members; committed to find ways for pharmacists to be of value to Aboriginal patients • Discussed and reviewed cultural appropriateness of study design, data collection, analysis approach *Community* • Sought advice from Aboriginal leaders/relevant organisations: on cultural safety, study design and implementation • Sought advice from site-based Aboriginal Health Committee: for support study concept and design feedback on need being met *Research experts* • Sought advice on all aspects of study from researchers with expertise in Aboriginal and Torres Strait Islander health, pharmacy care *Project advisory committee formed* • Brought together Aboriginal and Torres Strait Islander and non-Indigenous Australian experts to oversee the study and ensure participant wellbeing • Regular meetings (face-to-face or online), and by email, or 1:1 (with SW) to ensure all feedback was heard
Obtain project funding		Applied for and awarded grant funding
Develop study tools and related collateral[d]	2019	*Worked with advisory team, Aboriginal staff and research supervisors* • Patient information statement form presented in an infographic way to accommodate varying comfort with reading English and the data collection tools *Worked with Aboriginal graphic designer* • To develop, pilot and produce culturally appropriate study infographic *Worked with Aboriginal leaders and research experts* • To develop verbal script to recruit patients to the study

Figure 1 Timeline describing steps taken to develop study, collect data, and disseminate findings. Timeline shading: grey = prior to participant recruitment; black = after participant recruitment began. AHU = Aboriginal Health Unit; GP = general practitioner; IAHA = Indigenous Allied Health Association; PD = Pauline Deweerd; SW = Susan Welch. [a]Flag icon: image of Aboriginal Australian flag.[29] [b]Yarning is a culturally appropriate method of communication used by Aboriginal and/or Torres Strait Islander Peoples to connect and share information and stories.[30] [c]Communication with knowledge holders occurred throughout the study development, implementation, analysis, and dissemination. [d]Feedback sought, obtained and incorporated. [e]Soft fresh fruit chosen to accommodate varying comfort with eating and oral health. [f]Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS): map of Indigenous Australia.[31]

Build knowledge	2020	*Increased pharmacist-researcher understanding* To address stigma and blame around diabetes • Incorporated gentle discussions on diabetes care with 'soft landings'[25] to enable non-judgemental brief yarns
		Participants • Increase their understanding of diabetes care (via brief intervention), linked with care in community (via GP)
		Patients' GP • Provided with knowledge and understanding on patients' diabetes test results, care and plan received during hospital admission
Acknowledge time given to the study		Individuals' contributions to the study recognised in spirit of reciprocity[7] • Patients who consented to take part were offered fresh soft fruit during initial yarn[e] • Participants followed up after hospital discharge and received a $20 store voucher by mail
Obtain ethical approvals		Aboriginal Health and Medical Research Council (AHMRC) • Aboriginal specific human research ethics committee • Hospital-based human research ethics committee
Recruit participants and collect data	2021	Conversations with participants assisted by: • Yarnin' cards previously developed with AHU (SW/PD) • AIATSIS[f] Indigenous Australia interactive map to share with participants where we were from • Culturally appropriate diabetes resources
		Benefit to clients for taking part in the study: • Immediate (test results, brief yarn on diabetes) • Sustained (test results and care plan shared with GP)
		Weekly 1-page updates for study Advisory Committee and research supervisors
		To ensure study consistency, discussions with endocrinology (doctors/nurses) when staff changes occurred during participant recruitment
		Active and reflexive listening to learn from yarns with participants – informed subsequent discussions with other participants (by senior hospital pharmacist lead)
		Approaches to offer brief yarns on diabetes screening and care with patients shared with pharmacists in hospital wards
Knowledge translation for participants and community[d]	2022	Provided barbeque on hospital grounds to feedback study findings; local investigators had input into food and drink options (AHU [PD], endocrine dietician)
		All participants received an invite to attend community barbeque by post/text message, with a reminder 7 days before the knowledge translation event
		Staff from hospital site invited to celebrate with participants at community barbeque (e.g. AHU, endocrine, pharmacy, hospital executive)
		1-page infographic designed about the study and key findings (accommodating varying comfort with reading) and shared with all at community barbeque and via mail
Knowledge translation for wider professionals[d]	2023	Results presented to AHU management, external and site-based Aboriginal Health Committee and Advisory committee. Discussed and reviewed cultural appropriateness of interpretation, knowledge translation, write up
		1-page infographic about the study and results shared with knowledge holders by email, discussions and/or formal slide during presentations to staff
		Fully drafted manuscript submitted to AHMRC for review prior to submission to peer reviewed journal as per ethical requirement[7]
		Manuscript published in peer reviewed journal

Figure 1 (*continued*)

notes were reviewed individually (by SW, GPK, KL), then via online discussions to identify key elements to provide bicultural pharmacist-led diabetes care.

4. *Extent of community participation in research process*: A tool adapted by Snijder et al. to assess community participation in research[20] was used (by SW, PD). Participation was assessed across a spectrum, from 1, no participation, to 7, self-mobilisation. The level of participation is considered at four stages in the research process: (1) diagnosis (identification of a community's priorities), (2) development (of appropriate strategies to address the priorities), (3) implementation (of the strategies), and (4) evaluation (the effectiveness of the strategies/project).

Two authors assessed the level of community participation (SW, PD). First, a summary of the study and its outcomes was provided (by SW) using the timeline (Figure 1), study infographic tools (Figure 2a,b), and a map showing study alignment with the AHMRC *NSW Aboriginal health ethics guidelines: key principles*[7] (Figure 3). A 'walk-through' of the community participation assessment template[20] was presented (by SW). SW and PD independently scored each phase of the project using paper and pen. Differences were debated until consensus was reached.

RESULTS

Four separate analyses helped determine if the research process used was culturally appropriate for Aboriginal and/or Torres Strait Islander Peoples admitted to a metropolitan hospital. Each analysis is detailed in what follows.

Timeline and Key Steps Taken to Develop Study

The timeline illustrated important elements required to allow sufficient time and opportunity for respectful conversations, the formation of strong partnerships, appropriate communication styles (e.g. yarning, infographics), and reciprocity (Figure 1).

Time taken to nurture relationships (within and external to the study site) were built on trust and mutual respect over several years (2010–2023). Flexible timeframes enabled the study to mesh with local priorities (as described by PD and SD to SW). To do so, study engagement occurred without presumption that the study would be implemented. This enabled culturally appropriate communication and discussion with Aboriginal community members and health professionals at the study site.

Knowledge holders with a range of expertise contributed to the study design (Aboriginal community leaders, Aboriginal health, pharmacy, endocrinology). In total, seven investigators and mentors guided the study. Of the seven, three were Aboriginal Australians (PD, SD, and a community leader). Expertise of non-Indigenous collaborators included research (pharmacy, public health, Aboriginal health) and endocrinology. Feedback was actively requested and incorporated from all knowledge holders, which helped to remove power imbalances between study participants and researchers and between Aboriginal and non-Indigenous researchers.

How the Study Aligns with the AHMRC Aboriginal Health Ethics Guidelines

Figure 3 depicts how the study aligns with the AHMRC *NSW Aboriginal health ethics guidelines: key principles*.[7] Providing immediate benefit from the research for individuals, their extended family, and community was a core theme. For example, at an individual level, each participant was equipped with diabetes knowledge, linked with care if needed and/or requested, and in some cases (n = 10) their risk of diabetes was identified earlier. During discussions with participants in hospital some expressed that at a community level they wanted to share, while others could share if they wished, their diabetes knowledge learned during the study with family and community members (e.g. enabling early identification of diabetes risk and of glycated haemoglobin [HbA1c] testing).

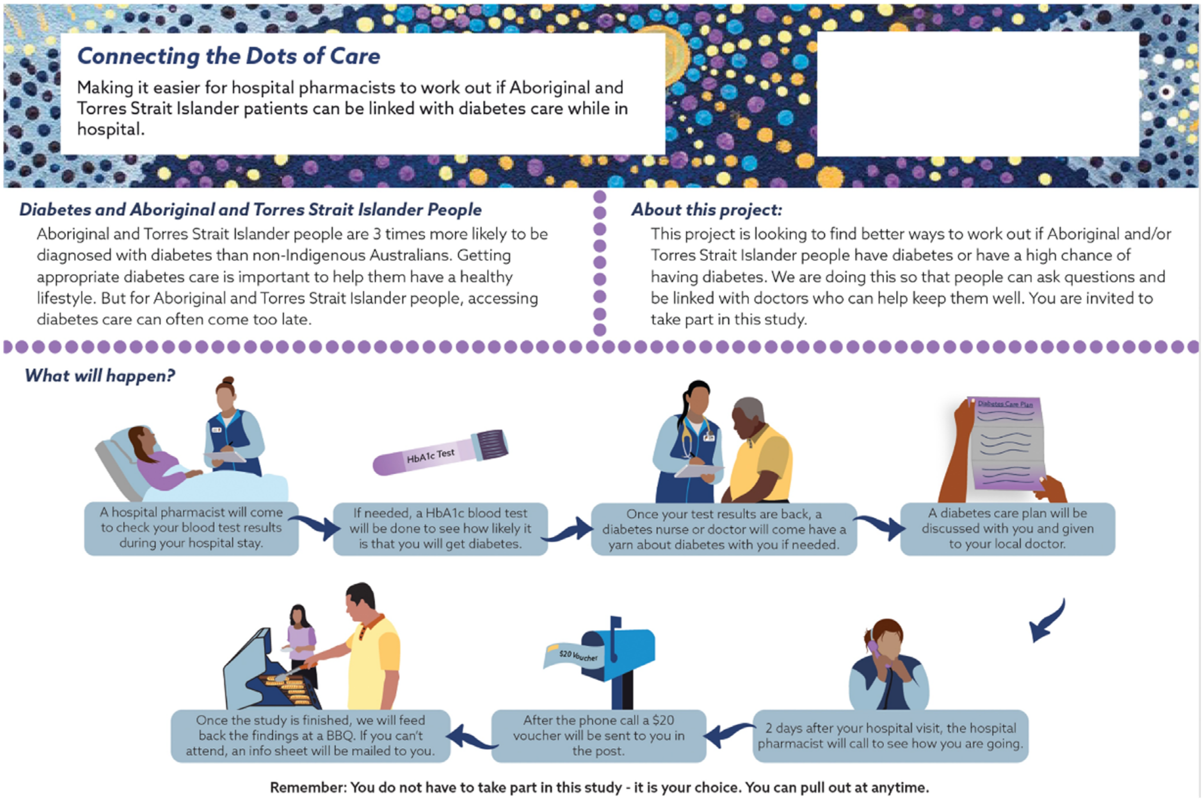
Mapping Field Notes to Australian Bicultural Model of Care

Key elements used to provide bicultural pharmacist-led diabetes care were identified using the Australian Bicultural Model of Care.[6] Elements across all three levels were identified: (1) interpersonal processes, (2) treatment and healing (delivery of bicultural care), and (3) service strategies (factors that help or hinder delivery of diabetes care) (Figure 4).

Interpersonal Processes

Supportive and respectful bicultural care was consistent in interactions between the pharmacist-researcher and study participants. Yarning occurred with managed humour, sufficient time, sharing of experiences and respect, honesty, and reliability. In turn, this appeared to

(a) To explain the project:



Connecting the Dots of Care

Making it easier for hospital pharmacists to work out if Aboriginal and Torres Strait Islander patients can be linked with diabetes care while in hospital.

Diabetes and Aboriginal and Torres Strait Islander People

Aboriginal and Torres Strait Islander people are 3 times more likely to be diagnosed with diabetes than non-Indigenous Australians. Getting appropriate diabetes care is important to help them have a healthy lifestyle. But for Aboriginal and Torres Strait Islander people, accessing diabetes care can often come too late.

About this project:

This project is looking to find better ways to work out if Aboriginal and/or Torres Strait Islander people have diabetes or have a high chance of having diabetes. We are doing this so that people can ask questions and be linked with doctors who can help keep them well. You are invited to take part in this study.

What will happen?

A hospital pharmacist will come to check your blood test results during your hospital stay.

If needed, a HbA1c blood test will be done to see how likely it is that you will get diabetes.

Once your test results are back, a diabetes nurse or doctor will come have a yarn about diabetes with you if needed.

A diabetes care plan will be discussed with you and given to your local doctor.

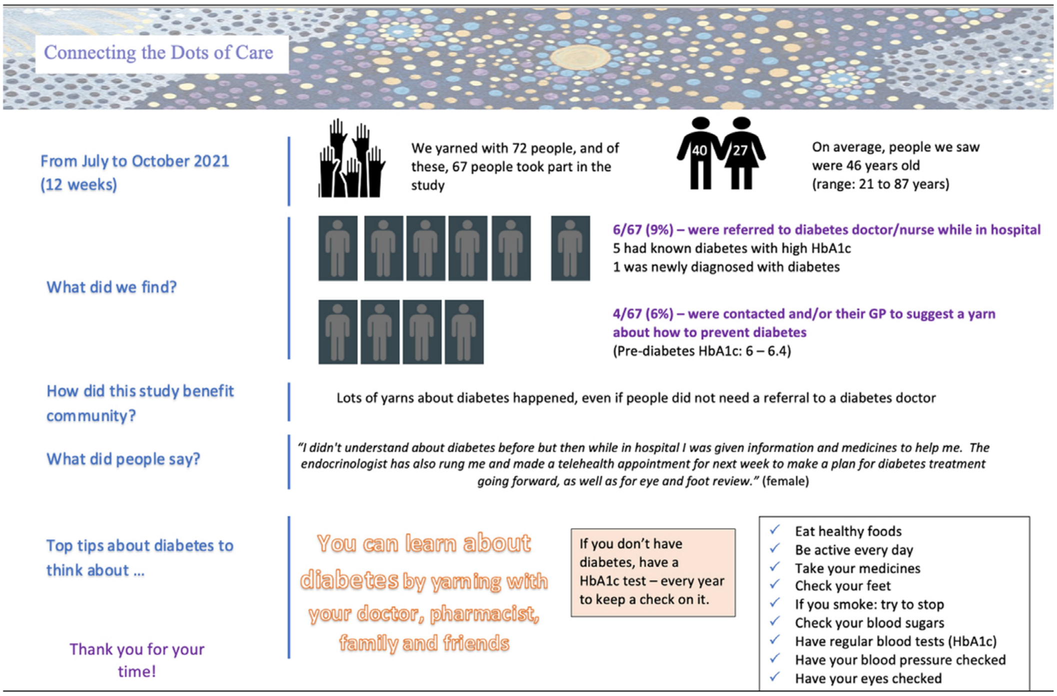
2 days after your hospital visit, the hospital pharmacist will call to see how you are going.

After the phone call a $20 voucher will be sent to you in the post.

Once the study is finished, we will feed back the findings at a BBQ. If you can't attend, an info sheet will be mailed to you.

Remember: You do not have to take part in this study - it is your choice. You can pull out at anytime.

(b) To explain the results:



Connecting the Dots of Care

From July to October 2021 (12 weeks)

We yarned with 72 people, and of these, 67 people took part in the study

On average, people we saw were 46 years old (range: 21 to 87 years)

What did we find?

6/67 (9%) – were referred to diabetes doctor/nurse while in hospital
5 had known diabetes with high HbA1c
1 was newly diagnosed with diabetes

4/67 (6%) – were contacted and/or their GP to suggest a yarn about how to prevent diabetes
(Pre-diabetes HbA1c: 6 – 6.4)

How did this study benefit community?

Lots of yarns about diabetes happened, even if people did not need a referral to a diabetes doctor

What did people say?

"I didn't understand about diabetes before but then while in hospital I was given information and medicines to help me. The endocrinologist has also rung me and made a telehealth appointment for next week to make a plan for diabetes treatment going forward, as well as for eye and foot review." (female)

Top tips about diabetes to think about ...

You can learn about diabetes by yarning with your doctor, pharmacist, family and friends

If you don't have diabetes, have a HbA1c test – every year to keep a check on it.

- ✓ Eat healthy foods
- ✓ Be active every day
- ✓ Take your medicines
- ✓ Check your feet
- ✓ If you smoke: try to stop
- ✓ Check your blood sugars
- ✓ Have regular blood tests (HbA1c)
- ✓ Have your blood pressure checked
- ✓ Have your eyes checked

Thank you for your time!

*Artistic elements used in infographics were based on original artwork designed for the study by Ms Caitlin Wharton.
Artwork in the infographic header: Dalarinji - "Ours belonging to us" by Aboriginal artist Lani Balzan

Figure 2 Infographics* used in Connecting the Dots of Care study to explain the project and explain the results. (a) To explain the project. (b) To explain the results. BBQ = barbeque; GP = general practitioner; HbA1c = glycated haemoglobin. *Artistic elements used in infographics were based on original artwork designed for the study by Ms Caitlin Wharton. Artwork in infographic header: Dalarinji – 'Ours belonging to us' by Aboriginal artist Lani Balzan.

help build trust in the participant–pharmacist relationship. It also provided the foundation to offer pharmacist-led diabetes care (Figure 4a, Level 1).

Treatment and Healing (Delivery of Bicultural Care)
Options in black text depict bicultural care approaches, and those in grey represent Western healing approaches (Figure 4b, Level 2). Key bicultural treatment and healing options were delivered in brief yarns on diabetes (brief intervention). Yarns aimed to improve health literacy and empower patients to make behaviour change on their own terms. Western approaches were important to link patients with follow up care after hospital discharge (e.g. screening tests, diabetes results shared with a general practitioner [GP] or other hospital, links with local support providers).

Service Strategies (Factors that Help or Hinder Delivery of Diabetes Care)
Figure 4c (Level 3) depicts service strategies needed to help deliver diabetes care in a culturally appropriate way. For example, it was important to have a system to respectfully identify Aboriginal and/or Torres Strait Islander patients in hospital.[29] Likewise, it was important to have strong partnerships with staff and management using easy communication methods to facilitate referrals to linked care (e.g. text messages during business hours). Reflexive social advocacy by the pharmacist helped enable access to referrals to other services (e.g. Aboriginal Medical Service or Aboriginal Health Worker to assist with GP referral).

Extent of Community Participation in the Research Process[20]

Of the four phases of project development, three (diagnosis, development, and evaluation) had a high level of participation (score of 6/7). Just one phase (implementation) required further discussion to achieve consensus (final score of 4/7; equating to 'participation by consultation' reflecting that 'community participated in activities decided upon by outsiders').

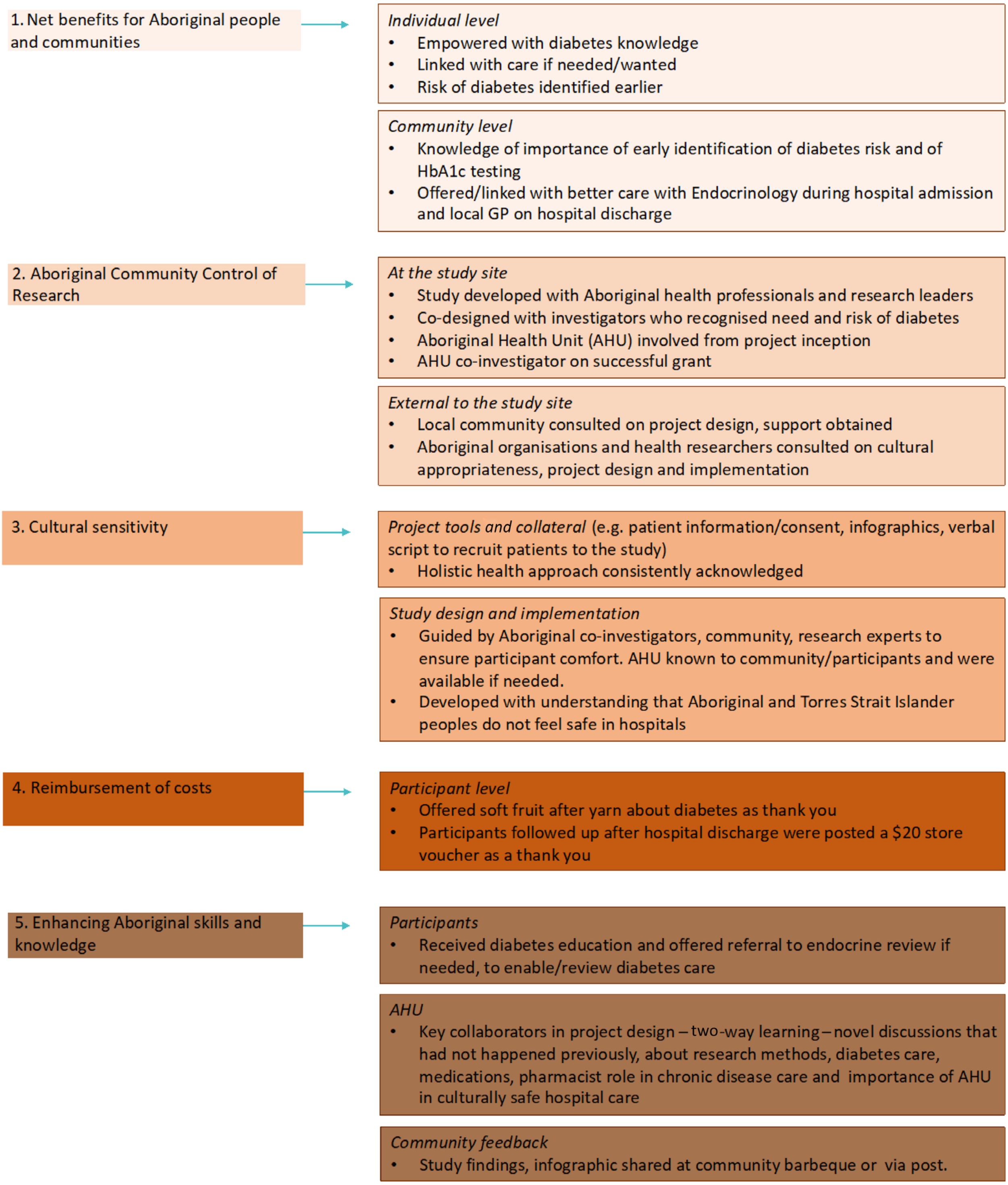
DISCUSSION

This paper intended to help build capacity in the hospital pharmacist community to conduct culturally appropriate research. We did this by describing and assessing steps taken to undertake a larger intervention study (Connecting the Dots of Care). First, we assessed the level of cultural appropriateness of the research intervention. The timeline of key steps taken and the mapping to the AHMRC *NSW Aboriginal health ethics guidelines: key principles*[7] show the depth and longevity of planning required to conceive and undertake our study. The mapping to the Australian Bicultural Model of Care (developed by Gundungurra scholar GPK)[6] and assessment of community participation assessed the study's cultural appropriateness. Mapping data to the Australian Bicultural Care Model[6] enabled us to determine the extent of bicultural elements in the research process (from conception to knowledge translation) and included consideration of participant satisfaction.

A key strength of this study was involvement from a range of knowledge holders, as illustrated within the timeline and the key steps taken throughout, as well as the study alignment with the AHMRC Aboriginal health ethics guidelines.[7] Another key strength was the involvement of Aboriginal clinician-researcher authors throughout the study from conception through to analysis, interpretation, and write-up (PW, SD). This helped ensure accountability of the study with community and health service partners. Assessing community participation across the lifespan of the research project also aided in upholding the principles of ethical, transparent research.

Community Prioritisation and Participation

Taking time to build relationships was prominent in this study. Sufficient time helped create opportunities for study partnership, participation, and guidance from Aboriginal and/or Torres Strait Islander Peoples. Respect for community was central to the research process and helped ensure the study met community priorities.[7,15] Respectful two-way relationships with Aboriginal community leaders, researchers, and health professionals helped nurture successful relationships.[6] This occurred both within the research team and with participants when seen by clinicians after discharge in hospital outpatient care. To facilitate this, a side-by-side approach was taken, with researchers walking with clinicians and participants to improve screening and diabetes care.



1. Net benefits for Aboriginal people and communities

Individual level
- Empowered with diabetes knowledge
- Linked with care if needed/wanted
- Risk of diabetes identified earlier

Community level
- Knowledge of importance of early identification of diabetes risk and of HbA1c testing
- Offered/linked with better care with Endocrinology during hospital admission and local GP on hospital discharge

2. Aboriginal Community Control of Research

At the study site
- Study developed with Aboriginal health professionals and research leaders
- Co-designed with investigators who recognised need and risk of diabetes
- Aboriginal Health Unit (AHU) involved from project inception
- AHU co-investigator on successful grant

External to the study site
- Local community consulted on project design, support obtained
- Aboriginal organisations and health researchers consulted on cultural appropriateness, project design and implementation

3. Cultural sensitivity

Project tools and collateral (e.g. patient information/consent, infographics, verbal script to recruit patients to the study)
- Holistic health approach consistently acknowledged

Study design and implementation
- Guided by Aboriginal co-investigators, community, research experts to ensure participant comfort. AHU known to community/participants and were available if needed.
- Developed with understanding that Aboriginal and Torres Strait Islander peoples do not feel safe in hospitals

4. Reimbursement of costs

Participant level
- Offered soft fruit after yarn about diabetes as thank you
- Participants followed up after hospital discharge were posted a $20 store voucher as a thank you

5. Enhancing Aboriginal skills and knowledge

Participants
- Received diabetes education and offered referral to endocrine review if needed, to enable/review diabetes care

AHU
- Key collaborators in project design – two-way learning – novel discussions that had not happened previously, about research methods, diabetes care, medications, pharmacist role in chronic disease care and importance of AHU in culturally safe hospital care

Community feedback
- Study findings, infographic shared at community barbeque or via post.

Figure 3 How the 'Connecting the Dots of Care' study[8] aligns with the Aboriginal Health and Medical Research Council of NSW (AHMRC) *NSW Aboriginal health ethics guidelines: key principles*[7] for conducting research involving Aboriginal and Torres Strait Islander Peoples. GP = general practitioner; HbA1c = glycated haemoglobin.

The importance of guidance and mentorship from Aboriginal and/or Torres Strait Islander colleagues cannot be understated yet is challenging to achieve in pharmacy practice, where the workforce is small. To achieve this in the present study, knowledge holders were sought out (by SW) to share perspectives and experiences, which in turn strengthened the design and informed implementation and dissemination of outcomes. Despite this, the assessment of community participation (implementation phase) achieved a final score of 4/7 (by two reviewers, SW and PD). This score equated to ‘participation by consultation’. This score is understandable given that study participants did not have a voice in the overall study design. Instead, Aboriginal leadership in the study hospital guided the study as local knowledge holders. Future studies should invest more time to build relationships with patients in the study design phase to ensure optimal study success.

Hospitals are historically unsafe, stressful places and a particularly vulnerable setting for Aboriginal and/or Torres Strait Islander Peoples.[22] In the larger intervention study, Aboriginal community members and health workers felt safe to participate and generously shared their knowledge while knowing it would be shared in published literature. The respectful research process and relationship building likely empowered Aboriginal staff and study participants to take part (consented, $n = 67/72$; 93%) and are reflected in the satisfaction expressed by patients referred to the endocrinology unit (satisfied [$n = 1/6$], very satisfied [$n = 5/6$]).[8] While often not enough time or resources are allocated to ensure cultural safety in hospitals,[22] this study demonstrated how community expectations could be met when enough time is set aside to fully develop and conduct research projects.[15]

Reciprocity was a key theme in relationships developed throughout the study.[23] Reciprocity took different forms, in line with key national ethical guidelines.[14,15] Initial discussions with participants involved the sharing of stories to develop mutual connection and trust (Figure 4a, Level 1). Individual contributions to this study were recognised by offering fresh soft fruit. Participants followed up after hospital discharge received a $20 store voucher by mail. Knowledge translation for participants and community occurred at a community barbeque with an infographic about the study and its key findings. The approach taken is similar with other Aboriginal health studies in diabetes care.[24]

Communication Strategies in Research Process

Respectful, non-rushed two-way communication was crucial to study success. Our analysis using the Australian Bicultural Model of Care[6] showed that such communication can enable relationships to be built, aiding the development of bicultural research methodologies and improving cultural appropriateness of research outcomes and dissemination methods. Examples included respectful yarning, active listening, reflexivity, use of infographics, and feeding back findings using plain English. The importance of reflexivity was highlighted in both the timeline (Figure 1) (as active and reflexive listening) and at level 2 of mapping to the Australian Bicultural Model of Care[6] (as reflexive care tailored to patient). All strategies helped build trust and were fundamental to good communication. These elements also helped increase comfort for all parties to have their voice heard throughout the study.[6] Similarly, in other studies, time spent early in the research process to build trust positively impacted recruitment and study outcomes.[6] The communication approach used in this study was similar to that of previous studies, including one that used ‘soft landings’ to help Aboriginal and Torres Strait Islander participants feel comfortable in surveys on alcohol use.[25]

However, in the hospital setting, it can be difficult to conduct bicultural research due to practical constraints, the use of a non-Western methodology, and the institutional racism and discrimination faced by Aboriginal and/or Torres Strait Islander Peoples in and out of hospital.[26] This work illustrated the range of factors that could hinder research being conducted in a culturally appropriate way (i.e. structural, staff personalities, knowledge-based). Awareness of such factors will be important to help clinician-researchers to target systems that could negatively impact the research process and harness those aspects that would strengthen it.[6,18]

Limitations

This study was conducted at one site in a single metropolitan study location in NSW, Australia. Accordingly, results cannot be generalised to another hospital, even in a metropolitan setting given the diversity of Aboriginal and/or Torres Strait Islander Peoples in Australia. However, study findings could inform another community’s efforts in a hospital setting. The level of Aboriginal and/or Torres Strait Islander community participation was assessed by only two authors (one non-Indigenous), which may have included an element of bias.

Study Implications

As a result of the larger intervention study (Connecting the Dots of Care),[8] the hospital study site is actively

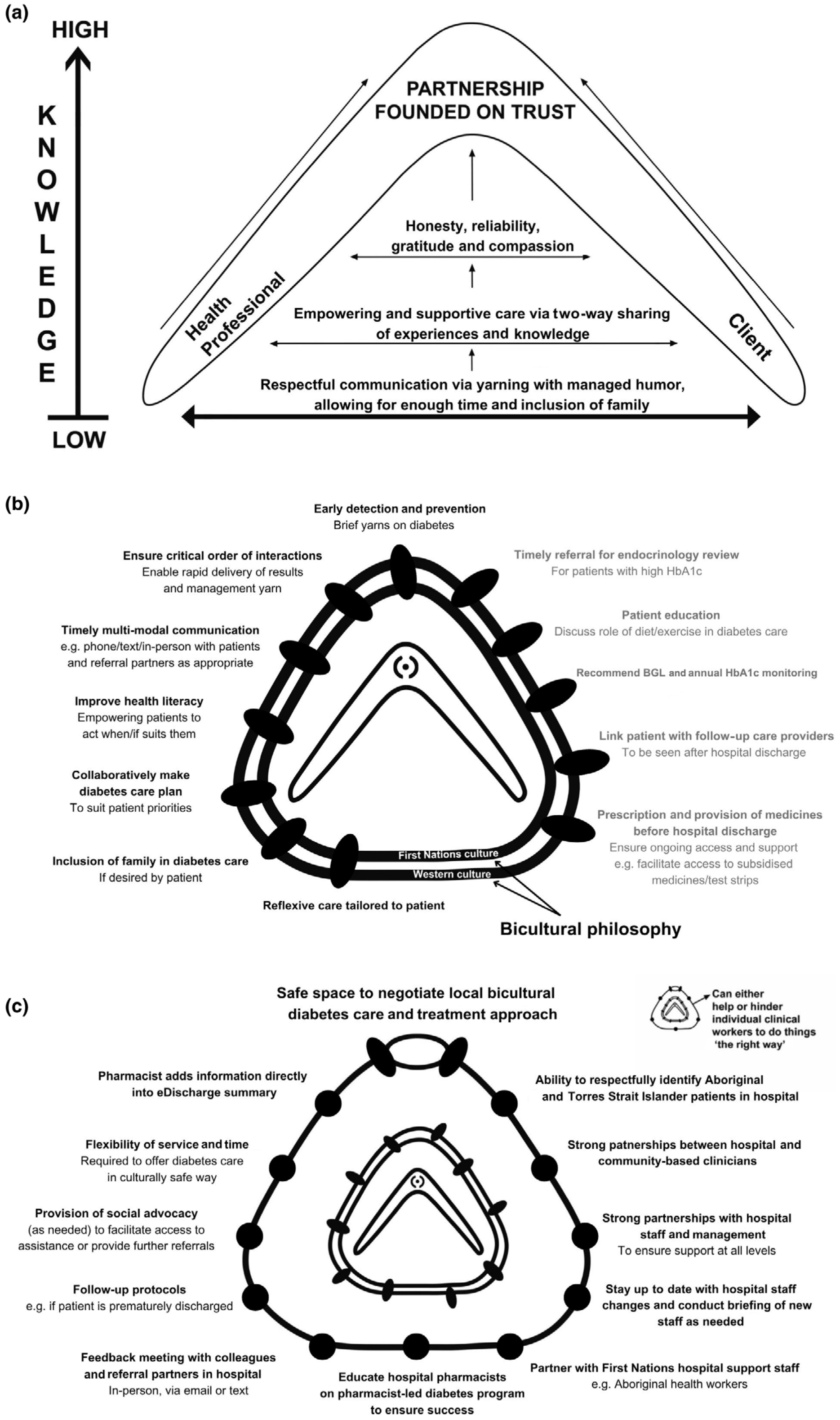

(a)
HIGH
KNOWLEDGE
LOW
PARTNERSHIP FOUNDED ON TRUST
Honesty, reliability, gratitude and compassion
Health Professional
Client
Empowering and supportive care via two-way sharing of experiences and knowledge
Respectful communication via yarning with managed humor, allowing for enough time and inclusion of family
(b)
Early detection and prevention
Brief yarns on diabetes
Timely referral for endocrinology review
For patients with high HbA1c
Ensure critical order of interactions
Enable rapid delivery of results and management yarn
Patient education
Discuss role of diet/exercise in diabetes care
Timely multi-modal communication
e.g. phone/text/in-person with patients and referral partners as appropriate
Recommend BGL and annual HbA1c monitoring
Improve health literacy
Empowering patients to act when/if suits them
Link patient with follow-up care providers
To be seen after hospital discharge
Collaboratively make diabetes care plan
To suit patient priorities
Prescription and provision of medicines before hospital discharge
Ensure ongoing access and support e.g. facilitate access to subsidised medicines/test strips
Inclusion of family in diabetes care
If desired by patient
First Nations culture
Western culture
Reflexive care tailored to patient
Bicultural philosophy
(c)
Safe space to negotiate local bicultural diabetes care and treatment approach
Can either help or hinder individual clinical workers to do things 'the right way'
Pharmacist adds information directly into eDischarge summary
Ability to respectfully identify Aboriginal and Torres Strait Islander patients in hospital
Flexibility of service and time
Required to offer diabetes care in culturally safe way
Strong patnerships between hospital and community-based clinicians
Provision of social advocacy
(as needed) to facilitate access to assistance or provide further referrals
Strong partnerships with hospital staff and management
To ensure support at all levels
Follow-up protocols
e.g. if patient is prematurely discharged
Stay up to date with hospital staff changes and conduct briefing of new staff as needed
Feedback meeting with colleagues and referral partners in hospital
In-person, via email or text
Educate hospital pharmacists on pharmacist-led diabetes program to ensure success
Partner with First Nations hospital support staff
e.g. Aboriginal health workers

Figure 4 Mapping research process used in Connecting Dots of Care study to Australian Bicultural Care Model* in three levels. (a) Level 1: Service strategies, interpersonal processes. (b) Level 2: Treatment and healing (delivery of bicultural care). (c) Level 3: Service strategies (factors that help or hinder delivery of diabetes care).* Black text represent bicultural care approaches, grey/faded text represent Western healing approaches. BGL = blood gluclose level; HbA1c = glycated haemoglobin. *The artwork and concept of the three levels presented in this figure are based on work led by Gemma Purcell-Khodr and collaborators in a cluster randomised controlled trial conducted with Aboriginal Community Controlled Health Services to improve screening and treatment for unhealthy alcohol use, funded by the National Health and Medical Research Council via a Project Grant (Reference no: APP1105339) and the Centre of Research Excellence in Indigenous Health and Alcohol (Reference no: APP1117198).[6]

looking to expand this pharmacy-led diabetes screening and care service to involve more pharmacists. This study offers suggestions for pharmacists wishing to conduct research in this area (Figures 1–4). This includes the need for pharmacists to be educated on topics such as care of research participants, the importance of culture in holistic care, and culturally safe communication.

Expansion to other hospitals would require tailored communication strategies informed by local knowledges. This will help ensure research is aligned with community priorities and expectations. With these learnings in mind, the usefulness of this service for other chronic diseases in the hospital setting could be explored beyond diabetes.

It is worth considering the utility of the Bicultural care model[6] to help design, implement and evaluate research and care in other hospital settings. This would require adaptation and training to enable its use by busy clinicians.

Globally, pharmacists have been involved with strategies to promote health equity in a variety of settings.[27] However, incorporation of Indigenous research methodologies into pharmacy practice and practice-based research is in its infancy.[18] The ability of researchers to conduct culturally appropriate research with community and/or health service partners relies on the researcher having a deep understanding of the peoples and the settings where the research is to be conducted.[18] It also requires equal partnership with communities.[7] Such a deep understanding is required for pharmacists to undertake continuous learning through reflective practice.[28]

Conclusion

This paper demonstrated how the process followed to design and implement a pharmacist-led diabetes screening study in a NSW metropolitan hospital was culturally appropriate for Aboriginal and/or Torres Strait Islander Peoples. Respect for community priorities was central in every step of the research process. This required sufficient time and opportunity for respectful conversations, formation of strong partnerships built on mutual respect and trust, and reciprocity. The study offers suggestions for pharmacists wishing to conduct research in this area. Future research is needed to explore how to incorporate Indigenous research methodologies into study design and to apply the Australian Bicultural Model of Care[6] in clinical settings.

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CONFLICT OF INTEREST STATEMENT

KL is Board Director of the Alcohol and Drug Foundation and Board Director (Victorian representative) of the Australasian Professional Society on Alcohol and Drugs, and is supported by National Health and Medical Research Council Ideas Grants (Reference no: APP1183744, APP2036689) and the Medical Research Futures Fund (Reference no: MRF2021660). The authors declare that they have no additonal conflicts of interest.

AUTHORSHIP STATEMENT

Susan Welch: Conceptualisation; methodology; data curation; writing – review and editing; writing – original draft; formal analysis; investigation; validation; project administration; software. **Gemma Purcell-Khodr:** Formal analysis; validation; writing – review and editing; investigation. **Pauline Deweerd:** Validation; formal analysis; investigation; writing – review and editing. **Rebekah Moles:** Writing – review and editing. **Alexander Viardot:** Writing – review and editing. **Scott Daly:** Writing – review and editing. **Kylie Lee:** Conceptualisation; methodology; data curation; investigation; validation; formal analysis; supervision; writing – original draft; writing – review and editing.

ETHICS STATEMENT

Ethical approval was granted by the Human Research Ethics Committee of the Aboriginal Health and Medical Research Council of NSW (Reference no: #1709/20) and the St Vincent's Hospital Human Research Ethics Committee (Reference no: #2020/ETH01314) and the study conforms to the Australian *National statement on ethical conduct in human research*. In the original intervention study, informed consent was obtained from all participants via distribution of a project information sheet and completion of a written consent form.

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OPEN ACCESS STATEMENT

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DATA AVAILABILITY STATEMENT

Data are not available due to sensitive nature of data collected of Aboriginal and Torres Strait Islander Peoples admitted to hospital.

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7. TWO-WAY LEARNING: A COLLABORATION WITH ABORIGINAL HEALTH WORKERS

Based on the pharmacist-led model of care, presented in chapter 5 and validated by work described in chapter 6, it was recognised that future pharmacists need training so they can implement models of culturally safe, pharmaceutical care for Aboriginal and Torres Strait Islander Peoples in hospital.

The validation presented in chapter 6 highlighted that respectful, non-rushed two-way communication was found to be crucial for the delivery of culturally appropriate care and research. As a result, the current chapter (chapter 7) describes how further training involving a two-way learning collaboration between Aboriginal health workers and hospital pharmacists was developed, implemented and evaluated. Such a collaboration is an important initiative that could be expanded for pharmacists working with Aboriginal health workers at all hospital sites, to make positive change.

This work is under review (comments addressed) with the Journal of Pharmacy Practice and Research as: Welch S., Combridge P., Lee K., Robinson S. Aboriginal Health Workers and pharmacists in a two-way learning collaboration – a pilot in a metropolitan Australian hospital.

My contribution to this original research article is outlined in Table 1. (page 19)

Aboriginal Health Workers and pharmacists in a two-way learning collaboration – a pilot in a metropolitan Australian hospital

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Abstract

Background: The metropolitan hospital-based two-way learning program was co-cultural unsafety in hospitals, adversely affecting access to care and medication. Two-way learning between AHWs and pharmacists was proposed to enhance culturally safe pharmacist communication, supporting safe and effective medication practices.

Aim: To develop, implement and evaluate a two-way learning program for AHWs and pharmacists, in a metropolitan hospital in New South Wales.

Method: The metropolitan hospital-based two-way learning program was co-created by, PC (Wiradjuri), SR (Bundjalung) and SW. Program implementation involved AHWs and ward-based pharmacists visiting Aboriginal patients together during routine care. Prospective evaluation used piloted, semi-structured electronic surveys, sent to AHWs and pharmacists after the visits, to explore program perceptions. Quantitative results were descriptively analysed. Qualitative results were thematically analysed.

Results: Over 50% of ward-based pharmacists (n=10/19) and all AHWs (n=4/4) who completed the survey, participated in two-way learning visits. Visits increased the confidence of AHWs working with pharmacists, and pharmacists in communicating with Aboriginal patients. All AHWs and most pharmacists (n=8/10) reported changes in their practice and shared positive experiences. An overarching theme of "Provision of holistic pharmaceutical care" and four subthemes were identified (Patient/family confidence, comfort and satisfaction; Improve processes/organisation; Build connections with communication, rapport and trust; Enable education and understanding about medications and culture).

Conclusion: Two-way learning was transformative for almost all who took part. It employed culturally appropriate methods and marked the beginning of ongoing learning opportunities between AHWs and pharmacists. Ultimately enhancing culturally safe patient care to enable understanding of medications and their safe use.

Key words:

pharmacist, medication safety, Aboriginal, Indigenous, hospital, communication, cultural safety

Conflict of Interest Statement:

The authors declare they have no conflicts of interest

CRediT Authorship statement:

Conceptualisation: SW, SR, PC; Methodology: SW, SR, PC; Investigation/Data extraction: SW; Data curation: SW; Project administration: SW; Data synthesis: SW; Formal analysis: SW, SR, PC, KL; Writing — original draft: SW, SR, KL; Writing — reviewing and editing: SW, SR, PC, KL

Ethics statement

Ethical approval was obtained from two Human Research Ethics Committees in an Australian jurisdiction (Ref: #1709/20: 11/5/21) and from the study hospital (Ref: #2020/ETH01314)

Consent statement

Consent to take part in this evaluation was implied by completion of the electronic evaluation survey. Staff who completed the survey were informed that all responses provided were non-identifiable and no identifying information would be presented in write up.

Funding statement: There was no funding provided to conduct this study

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Data availability statement: The data for this study will not be shared, as we do not have permission from the participants or ethics approval to do so.

Introduction

Aboriginal and Torres Strait Islander Australians often feel culturally unsafe in hospitals due to ongoing effects of colonisation and institutional racism (1). This impacts their ability to receive care (including medications) (2) and adversely effects their health and burden of disease (2). In this paper, we use 'Aboriginal' to refer to Aboriginal and Torres Strait Islander Peoples in New South Wales (NSW), where this work was conducted – to align with the Aboriginal Health and Medical Research Council of New South Wales (3, 4)

Aboriginal Peoples often experience a higher burden of chronic illnesses and associated medication use. (5) Accordingly, medication management and safety are important issues, where pharmacists can assist. (6) While there is no evidence that medication adherence for Aboriginal Peoples is less than for non-Indigenous Australians, this myth enables health providers to bring biases to discussions about medications. (7) Factors such as complexity of medication access programs and health literacy surrounding them further discriminate and complicate care. (8) It is in this setting where the importance of health professionals using a culturally appropriate approach (e.g. respect and reciprocity) including communication skills (e.g. yarning) is demonstrated. (9) Personal attributes are key, such as understanding (from truth telling) and willingness to listen and learn from Aboriginal Peoples (10), using two-way learning.

Two-way learning can occur in any setting when individuals from different cultures work together at the "cultural interface". (11) When conducted well, two-way learning can dismantle power imbalances, empowering Aboriginal Peoples to prioritise Aboriginal ways of knowing being and doing in the delivery of health care. (12, 13) Two-way learning approaches were beneficial in supporting Aboriginal scholars in alcohol research (14) and in university student-teacher education. (15)

In the community pharmacy setting, two-way learning between Aboriginal Health Workers (AHWs) and pharmacists is used to enable medicines education. (13) One study found that such a collaboration enhanced sharing of knowledges across cultures and strengthened pharmacist learnings. (13) This example was also used in a workshop, primarily attended by hospital-based pharmacists, in Darwin, Northern Territory (NT). (16) This workshop targeted pharmacists' cultural responsive communication, facilitated by NT Elders. (16) This same study concluded that self-reflective practice and further support was needed to help pharmacists assess competence and feedback on culturally appropriate communication. (16)

Enhancing Aboriginal Peoples' health literacy is crucial for safe medication use and positive health outcomes. (13) Culturally responsive communication, together with medication information, can help improve patients' health literacy about their medications. (16-18) It can also help increase quality and safer use of medicines. (13, 16, 18) For example, a patient must feel culturally safe, empowered and supported to ask questions about medications and their use, to enhance their understanding and safe medication use. (2, 19) Accordingly, a two-way learning approach could build understanding about health literacy and medications in particular (19), with Aboriginal Peoples, to help provide a culturally safe environment. (13)

Multidisciplinary teams enable collaborative care, provided by those with different viewpoints. (20) They improve health outcomes and hospital pharmacists are key members. (20) Further, those teams that include AHWs have resulted in positive hospital experiences and outcomes for Aboriginal Peoples. (21, 22) Collaboration between AHWs and pharmacists has been encouraged by the Pharmaceutical Society of Australia when providing culturally safe care for Aboriginal Peoples. (23) To further develop pharmacists' ability to communicate in a culturally safe manner, this study aimed to develop, implement and evaluate a two-way learning program from the perspective of AHWs and pharmacists, in a metropolitan hospital in New South Wales.

Methods:

Aboriginal leadership:

This two-way learning program was co-created by the Aboriginal Health Unit Manager (PC, Wiradjuri), the Aboriginal Program Nurse Educator (SR, Bundjalung), and a senior hospital pharmacist (SW). The study was conceived from a long-standing collaboration between the Aboriginal Health Unit and the Pharmacy department at the hospital site. (9)

Authors were employed on Gadigal land (PC, SR, SW), and on Wurundjeri land (KL).

Design:

Prospective evaluation of a hospital two-way learning program.

Setting:

Metropolitan, tertiary referral, Level 1 trauma hospital in Sydney, New South Wales, Australia.

Participants:

Aboriginal health workers and ward-based pharmacists at the hospital study site.

Procedure:

1- Development phase

Previous work conducted to help hospital pharmacists provide culturally safe care for Aboriginal Peoples included developing and implementing yarning cards to assist communication (24). These cards were introduced with a multi-pronged education strategy. However, we identified more was needed to improve culturally safe practice for pharmacists interacting with Aboriginal patients. When this concept was presented to the hospital yarning circle (comprised of Aboriginal staff and community at the hospital site; facilitated by SR), two-way learning between AHWs and pharmacists was suggested. Scope of the visits was brainstormed with all AHWs at the hospital site.

2- *Implementation phase*

The program was launched by SW and PC with all AHWs and pharmacists at the study hospital (August 2023), in any hospital ward. AHWs and pharmacists were encouraged to visit Aboriginal patients together (i.e. usually one pharmacist with one or more AHW) during regular patient visits. Visits aimed to help AHWs and pharmacists learn from each other, improve understanding and health communication, and establish partnerships to enable culturally safe care for Aboriginal patients. They observed each other's patient interactions, asked questions and shared knowledge. Duration of each visit depended on care required.

3- *Evaluation phase:*

Semi-structured evaluation surveys (using Survey Monkey) were created by three authors (PC, SR, SW). There were two versions of this survey, for AHWs and for pharmacists. Surveys were piloted with all AHWs at the study hospital, to refine structure and wording. Surveys were sent to all AHWs and ward-based pharmacists (May – June 2024) after the visits. No identifying data were collected to improve completion rates and to offer a confidential space to give honest feedback.

Both surveys included questions to gauge acceptability and feedback on the two-way learning visits. The survey had seven sections. **Quantitative sections** asked about: (1) Involvement in two-way learning visits; (2) Location of visit; (3) Staff confidence level [before and after visits, measured on a four-point Likert Scale (from "not confident" to "really confident")] (Table 1.); (4) Perceived connection between AHWs/pharmacists following the two-way learning visit. (Table 1.) **Qualitative sections** asked about: (5) What happened during the visit; (6) Perceived change to their practice following the two-way learning visit; (7) Positives to share and further comments.

4- *Knowledge translation phase*

Results were disseminated to pharmacists by SW at a regular education meeting, and to AHWs and pharmacists by SW and SR at a NAIDOC morning tea (National Aborigines and Islanders Day Observance Committee). For AHWs who were unable to attend, SW shared results face-to-face. For other hospital staff, results were presented at Grand Rounds during NAIDOC week. Results were also shared via conference presentations to upskill pharmacists more broadly.

Data analysis:

1- Quantitative:

Data were descriptively analysed using the SurveyMonkey analytics tool.

2- Qualitative:

Thematic analysis (25) involved coding by SW, confirmed by coauthor (SR). Discussion occurred to identify themes and align these within a framework (SW, SR).

This report was prepared in accordance with the CONSIDER (21) criteria (Supplementary material 1).

Ethical approval:

Ethical approval was obtained from two Human Research Ethics Committees in New South Wales (Ref: #1709/20: 11/5/21; Ref: #2020/ETH01314).

Consent:

Consent was implied by completion of the electronic evaluation survey. Staff who completed the survey were informed that responses were non-identifiable, and that no identifying information would be presented in dissemination of findings.

Results

The majority of ward-based pharmacists (n=19/22) and AHWs (n=4/5) at the study site completed the survey. (Table 2)

1- Quantitative data:

Of staff who completed a survey, just over half of the pharmacists (n=10/19) and all AHWs (n=4/4) took part in a two-way learning visit. (Table 2.) Visits occurred in many wards across the hospital, including: emergency department, medical and surgical wards, haematology, cardiology/cardiac surgery and the Psychiatric and Non-prescription Drug and Alcohol Unit (PANDA). Pharmacists who completed a survey but had not been on a visit (n=9/19), commented on time constraints and lack of opportunity as contributing factors. (Table 2.) Visits were perceived to increase staff confidence of AHWs in working with pharmacists, and pharmacists in communicating with Aboriginal patients (Figure 1). After the two-way learning program was implemented, AHWs and pharmacists sought help from each another. (Table 2)

2- Qualitative:

Thematic analysis of qualitative survey question answers, (sections 5 – 7) identified an overarching theme of "provision of holistic pharmaceutical care". Four subthemes were identified. Table 3 illustrates the themes and selected quotes from survey answers.

Subtheme A. Patient/family confidence, comfort and satisfaction. Visits provided different opportunities to help AHWs and pharmacists understand each other's and the patient/ family's priorities. AHWs expressed how the visits were positive for the patients involved. They noticed this both from the patient's level of understanding of medications and their appreciation of timely care being provided. Whilst pharmacists observed firsthand, the effect that AHWs had in assisting the patient/family feel comfortable to enable care.

Subtheme B. Improve processes/organisation. AHWs and pharmacists described how the visits helped increase their knowledge of the positive role of AHWs/pharmacists and improved their understanding of the importance (to the patient) of earlier involvement of AHWs/pharmacists working together. Both groups expressed that this experience helped increase their understanding about each other and their roles and it will influence how each provides future patient care.

Subtheme C. Build connections with communication, rapport and trust. AHWs and pharmacists appreciated the multidisciplinary approach to patient education and building rapport, including with family. Both had opportunities to share knowledge by modelling methods of communication and increasing understanding about the patient's story, their medications and ongoing organisation of medication supply to support their safe use. Both AHWs and pharmacists felt that observing each other and working together, helped make them feel more comfortable to connect and to communicate with patients, including about medications.

Subtheme D. Enable education and understanding about medications and culture. All AHWs were happy to work alongside their pharmacist colleagues and learn what pharmacists contribute. Education opportunities evolved and AHWs found that they gained knowledge about medications to better help their patients. Pharmacists were given an opportunity to gain understanding about factors which might influence engagement in treatment, such as racism.

All AHWs and most pharmacists (n=8/10) changed their practice following the two-way learning visits. Two pharmacists said that the visits did not change their practice. Of these, one said they had not been able to see the patient with the AHW due to a patient-directed discharge. The other pharmacist said that: *"I treat everyone the same and equally"*.

Finally, positive experiences were shared by AHWs and pharmacists following the two-way learning visits. They were asked to share further thoughts on the two-way learning opportunity.

"I believe that the pharmacists should ensure they consult with Aboriginal and Torres Strait Islander patients, alongside and in consultation with AHWs." (AHW)

"I think collaborative care with pharmacists and AHWs is a fantastic initiative and improves patient-centred care." (Pharmacist)

Discussion:

National guidelines encourage pharmacists to work with AHWs to provide culturally safe care (23), however, this is not routine practice. (16) Pharmacists at the hospital study site identified support needed to enhance their communication with Aboriginal Peoples. This study illustrated the development and implementation of a hospital-based two-way learning program, involving AHWs and pharmacists in a metropolitan hospital. This prospective evaluation illustrated the perspective of AHWs and pharmacists working together to provide patient care for Aboriginal Peoples during their hospital stay. It provided personal accounts of the two-way visits from AHWs and pharmacists and the positive impact on their practice. Many benefits were described, primarily the contribution of each profession in patient interaction, confidence to respectfully work together and enhanced communication (often about medications). A key strength of the study was the co-creation of the two-way learning visits program, with Aboriginal leadership (SR, PW).

Communication:

Culturally appropriate communication is vital for providing culturally safe care for Aboriginal Peoples in any health setting, including hospitals. (2) This can provide an environment where trust can be developed and in turn, help Aboriginal patients learn about medications (26) and their safe use. Yarning, a culturally appropriate communication method, is effective to build rapport and enhance two-way communication. (27) Yarning is also a vital component of developing relationships with Aboriginal Peoples, along with humour, allowing time, mutual sharing and connection. (28) Our results showed benefit for pharmacists not only to understand yarning and its role in providing culturally safe care, but to observe culturally appropriate communication in action, modelled by AHWs during the learning visits.

Medication safety:

While appropriate health communication ensures patient-led health care is fostered, it can also impact safe medication use. (2) Barriers to medication safety have been identified for Aboriginal Peoples in the community health setting (29, 30) and in Aboriginal Community Controlled Health Organisations (30) (e.g. lack of cultural appropriate resources, lack of cultural awareness and safety experienced by the clients, lack of health literacy). As a result, NACCHO (National Aboriginal Community Controlled Health Organisation) worked with other organisations, for example the National Prescribing Service, to produce medication safety resources. (31) Much could be learnt from NACCHO's work to inform patient interactions in hospital about safe use of medications.

AHWs have been shown to improve many aspects of acute care for Aboriginal Peoples including culturally appropriate communication between patient and care providers. (21, 32) They also support medication safety (30). However, lack of education for AHWs on medication safety can impact their ability to support patients in this way (30). This two-way learning program, (pharmacists and AHWs) did provide such support for AHWs in a metropolitan hospital setting. Similarly, previous work has shown that a lack of understanding of the AHWs extensive role, by other care providers, can limit their impact to provide holistic patient care. (33) Participants in this two-way learning program declared that this was a benefit of the program and would change their future practice, including promotion of medication safety practices.

Enabling broader discussion:

Gaining insights from the perspective of participants, provided opportunities to counter misinformation, which can potentially impact patient care. The provision of the ‘same’ or ‘equal’ care for everyone, as expressed by “*I treat everyone the same and equally*”, while well meaning, highlighted a potential barrier for provision of culturally appropriate patient care for Aboriginal Peoples. This presented an opportunity to discuss equity of care. Ongoing effects of colonisation mean that Aboriginal Peoples do not have equality in healthcare (34) and notion of providing ‘equal care’ highlights the risk that ‘treating everyone the same’ has in perpetuating this inequality. (35)

To illustrate this, Aboriginal Peoples face many barriers to safe medication use that their non-Indigenous counterparts do not face. For example, ongoing effects of racism (institutional and personal) and discrimination which can lead to lack of treatment opportunities and advice about medications being provided; language barriers or counselling being provided using a western health model can lead to misunderstanding about the safe use of medications. (29) These together with the social determinants of health (e.g. poor housing, education, food and financial insecurity) means that Aboriginal Peoples experience a higher burden of chronic disease. (36) It follows that if they are provided with the ‘same care’ by pharmacists, this does not overcome these other barriers to safe medication use and this negatively effects health outcomes. (29) Access to and the safe use of medications are key components of providing evidence-based, equitable health care. (37) Equity in healthcare is key for positive health outcomes. (35) Pharmacists are important enablers of this (37), and could start by communicating in a culturally safe manner (2) and by learning from AHWs.

Strengths and limitations

Key strengths of this project are that it incorporated Aboriginal and/or Torres Strait Islander informed methodologies (yarning, two-way learning). Aboriginal health professionals (PC, SR) were involved from conception to publication.

Limitations included a small sample size which limited quantitative analyses conducted. Demographic details were not collected to ensure anonymity of survey responses. While surveys sought to explore AHW and pharmacist opinion on the two-way learning visits, they were not explicitly asked about improvements. Factors to increase pharmacist/AHW confidence, engagement or benefit from taking part were not explored.

Study implications:

This two-way learning program was transformative for almost all participants. Culturally appropriate methods of communication and learning were employed to increase understanding for AHWs and pharmacists and develop pharmacists' ability to provide culturally safe care.

The two-way learning visits at the study hospital marked the beginning of ongoing learning opportunities between AHWs and pharmacists, to enhance culturally safe care. While qualitative results did include recounted patient reports of enhanced understanding and "Patient/family confidence, comfort and satisfaction" (Subtheme A), it would be useful to evaluate health communication about safe medication use from the patient perspective. This could inform the process for future work. This is also important because it is only when communication is culturally appropriate (as determined by the patient) that patients will be empowered to ask questions. This impacts health literacy surrounding medications and their safe use. (17) It would be useful to understand factors which may increase pharmacist/AHW confidence, level of engagement or benefit gained from taking part. For example, did these increase with the number of two-way learning opportunities or stage of career. The clinical pharmacy service is standard across the hospital, in all ward areas visited by a pharmacist, however, subtle differences between pharmacists could be due to personality or level of experience rather than service provision. Future work could investigate the impact of any variation, to illustrate where further support is required. All such work must be implemented together with Aboriginal Peoples and informed by their priorities.

Conclusion:

Culturally appropriate communication is vital for providing safe care to Aboriginal patients in hospitals. The two-way learning program was transformative for almost all health professionals who took part. This initiative employed culturally appropriate methods and marked the beginning of ongoing learning opportunities between AHWs and pharmacists at the hospital study site. Ultimately enhancing culturally safe patient care was the first step to increase patients' understanding of medications and their safe use.

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Table 1: Questions used to measure staff confidence and connection

Measurement	Participant	Survey questions:
Quantitative ***Staff confidence levels*** (questioned before/after the two-way learning visit)	Pharmacist	*How confident did you **[pharmacist]** feel about speaking to Aboriginal patients [BEFORE / AFTER] you visited them together with the AHW?*
	Aboriginal Health Worker (AHW)	*How confident did you [**AHW**] feel about working with the pharmacist to assist Aboriginal patients with medications [BEFORE / AFTER] you visited them together?*
Qualitative ***Perceived connection between AHWs/ pharmacists*** (questioned after the two-way learning visit)	Pharmacists and AHWs	*Have you asked the [AHW / pharmacist] for assistance with/for a patient in any way since your two-way learning visit? (yes, no)*
		Has a(n) [AHW / pharmacist] asked you for assistance in any way, since your two-way learning? *If not, why?*

Table 2: Quantitative survey results from Aboriginal Health Workers and Pharmacists

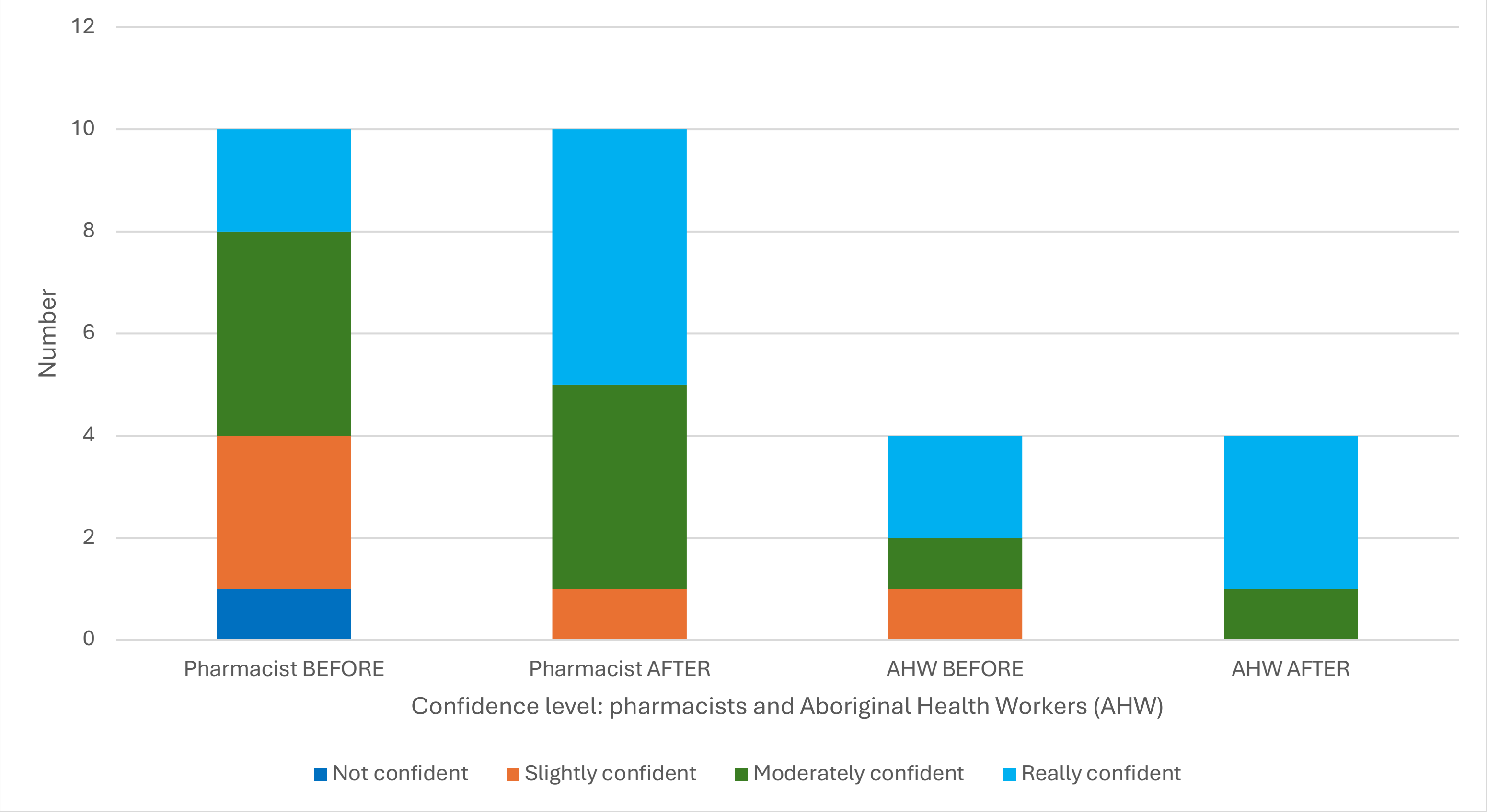
Quantitative results	Aboriginal Health Workers (AHWs) (n= 5)	Pharmacists (ward-based) (n=22)
Number staff completed survey	4	19
Number staff had been on a two-way learning visit	4	10
Number staff had NOT been on a two-way learning visit	0	9
Reasons for not attending a two-way learning visit (included)	N/A	Lack of time 1 Not managed to take part yet 4 Lack of consistent ward cover 2 Aboriginal patients were not present on the ward at the time 2
AFTER two-way learning visit help was sought from one another?	Sought help from pharmacists 4 Been sought out by pharmacist for help 3	Sought help from AHWs 6

Table 3: Key themes identified from qualitative survey responses and selected quotes (AHWs and pharmacists)

Overarching theme: Provision of holistic pharmaceutical care	**Quotes**	
Subthemes:	Aboriginal Health Worker (n=4)	Pharmacists (n=10)
A. Patient/family confidence, comfort and satisfaction	• *Patients are clearer and understand which medications they have been given, why and how to take them.* • *The patient was happy that they were cared for in such a prompt manner*	• *AHW made the patient feel comfortable and assisted with explaining discharge plan including medications which we discussed.*
B. Improve processes/organisation	• *I am now more confident to contact pharmacists regarding patient medications issues, I have been able to resolve issues regarding patient's medications more promptly and efficiently in collaboration with pharmacists. We have been able to get medications to patients if they have left the hospital without their medications* • *It has changed my practice, but I also think it has changed pharmacists' practices so that it is more beneficial to patients... Also, any patient issues regarding medications could be resolved by pharmacists and AHWs collaboratively working together*	• *I have met more of the AHW staff team members and feel more confident to contact and approach them for help as required.* • *I think collaborative care with pharmacists and Aboriginal Health Workers is a fantastic initiative and improves patient-centred care*
C. Build connections with communication, rapport, and trust.	• *This opportunity also allows the pharmacists to understand the needs and complexities of the clients I'm working with. It allows for education around the institutionalised racism and inequities that*	• *Yes (it has changed my practice as) it ensures that I am being respectful and completely*

	Aboriginal patients face in hospitals and why they may be hesitant to engage in treatment. It also allows for the building of rapport and trust in the pharmacy service.	*aware of a patient and their story prior to communicating with them* • *It just made me feel more at ease about the way to approach patients and their families, and reinforced the importance of liaising with AHW to help build rapport with patients and their families and provide them ongoing support, including for navigating medication management issues.* • *It allowed for ground to be broken quicker than if it was just me*
D. Enable education and understanding about medications and culture	• *The pharmacy team are very approachable, experienced and knowledgeable and we can learn a lot from them as it will influence and benefit the way Aboriginal health workers provide care. It is also an opportunity to share cultural knowledge that will help further clinical practice.*	• *Assists with communicating appropriately and as a result I feel patients are more understanding of their medications and the ongoing plan.*

Figure 1. Staff confidence levels before and after two-way learning visits: Confidence of pharmacists to speak with Aboriginal Peoples and confidence of Aboriginal Health Workers to work with pharmacists



Supplementary material 1: CONSIDER Statement Checklist

Item	**Checklist Item**
Governance	
1.	Describe partnership agreements between the research institution and Indigenous-governing organization for the research, (e.g., Informal agreements through to MOU (Memorandum of Understanding) or MOA (Memorandum of Agreement)). Checked: see page 3 and 11 – Aboriginal Leadership. Through an informal agreement, the study was co-created with the Aboriginal Health Unit (PC Wiradjuri nation) and the Aboriginal Program Nurse Educator SR, Bundjalung nation) at the study hospital. The initiative was a suggestion by the hospital's yarning circle, (comprised of Aboriginal staff and community at the hospital site; facilitated by SR).
2.	Describe accountability and review mechanisms within the partnership agreement that addresses harm minimization. Checked: see page 6 – Ethical approval obtained, see page 3 and 11 – Aboriginal leadership The Aboriginal Health Unit at the study hospital provided advice on study design, and guidance throughout. Discussions with the Aboriginal Health Unit were conducted face-to-face and via email (led by SW with Aboriginal Health Unit staff; PC). Feedback on study findings was provided to the Aboriginal Health Unit management for comment and inclusion at every stage. PC (Wiradjuri nation) and SR (Bundjalung nation) was involved in data collection, analysis and interpretation.
3.	Specify how the research partnership agreement includes protection of Indigenous intellectual property and knowledge arising from the research, including financial and intellectual benefits generated (e.g., development of traditional medicines for commercial purposes or supporting the Indigenous community to develop commercialization proposals generated from the research). Checked: PC and SR are co-authors on all output arising from this study. N/A financial benefits. We do not expect financial benefits to arise from this study. This study is an analysis of participant survey responses.
Prioritization	
4.	Explain how the research aims emerged from priorities identified by either Indigenous stakeholders, governing bodies, funders, non-government organization(s), stakeholders, consumers, and empirical evidence

Item	Checklist Item
	Checked: see page 1, 2 – Introduction/literature review, page 3 and 11 – Aboriginal Leadership Aboriginal and Torres Strait Islander Australians often feel culturally unsafe in hospitals due to ongoing effects of colonisation and institutional racism. Previous research has demonstrated the importance of health professionals using a culturally appropriate approach including communication skills (eg yarning). Yarning cards had been introduced at the study hospital for pharmacists together with education. Further efforts were needed to improve culturally safe practice for pharmacists interacting with Aboriginal patients. The hospital yarning circle recommended the adoption of two-way learning strategy. The Aboriginal Health Unit provided advice on study design, and guidance and overview throughout the study.
Relationships (Indigenous stakeholders/participants and Research team)	
5.	Specify measures that adhere and honor Indigenous ethical guidelines, processes, and approvals for all relevant Indigenous stakeholders, recognizing that multiple Indigenous partners may be involved, e.g., Indigenous ethics committee approval, regional/national ethics approval processes. Checked: see page 6 – Ethical approval obtained, see page 3 Methods: Aboriginal leadership Ethical approval was obtained from the Human Research Ethics Committees of the Aboriginal Health and Medical Research Council of New South Wales (Ref: #1709/20: 11/5/21) and the study hospital (Ref: #2020/ETH01314). Measures that adhere and honour principles for conducting research with Aboriginal and/or Torres Strait Islander peoples include: the project was designed by focusing on Aboriginal and/or Torres Strait Islander health priorities, knowledge holders were consulted, collaboration, time, Aboriginal governance, reciprocity, it supports Indigenous advancement. This study was conceived via a long-standing collaboration between the Aboriginal Health Unit, and the Pharmacy Department at the study site. They knew that Aboriginal and Torres Strait Islander Australians often feel culturally unsafe in hospital. Previous research has demonstrated the importance of health professionals using a culturally appropriate approach including communication skills (eg yarning). Yarning cards had been introduced at the study hospital for pharmacists together with education. Further efforts were needed to improve culturally safe practice for pharmacists interacting with Aboriginal patients. The hospital yarning circle recommended the adoption of two-way learning strategy. The project was co-created with Aboriginal staff (PC, SR).

Item	**Checklist Item**
	Meetings with both AHWs and pharmacists were facilitated by SW and held via email, face-to-face or online, individually or as a group to ensure all parties' feedback was considered.
6.	Report how Indigenous stakeholders were involved in the research processes (i.e., research design, funding, implementation, analysis, dissemination/recruitment). Checked: see Author Statement, page 3 and 11– Aboriginal Leadership Aboriginal stakeholders were involved in all aspects of the research process from design, development, implementation and evaluation. They were involved in dissemination of results to all staff involved, including the wider hospital community. The Author Statement describes contributions made by PC (Wiradjuri nation) and SR (Bundjalung nation) .
7.	Describe the expertise of the research team in Indigenous health and research. Checked: see page 3 and 11 – Aboriginal Leadership One author is from Wiradjuri nation (PC) and was the Manager of the Aboriginal Health Unit at the study site. One author is from Bundjalung nation (SR) and together with team members (PC, SW) works in the provision of Aboriginal and/or Torres Strait Islander health care or education. KL has extensive research experience working alongside Aboriginal collaborators and community in the field of Aboriginal health and substance use.
Methodologies	
8.	Describe the methodological approach of the research including a rationale of methods used and implication for Indigenous stakeholders, e.g., privacy and confidentiality (individual and collective) Checked: see page 3 and 6 - Methods Rationale of methods: This study was conceived via a long-standing collaboration between the Aboriginal Health Unit, and the Pharmacy Department at the study site. The project was co-created with Aboriginal staff (PC, SR). The hospital yarning circle recommended the adoption of two-way learning strategy to improve culturally safe practice for pharmacists interacting with Aboriginal patients. Privacy and confidentiality of data: Non-identifiable data were collected using SurveyMonkey and analysed descriptively using the SurveyMonkey analytics tool. All aggregate data presented were non-identifiable.

Item	Checklist Item
9.	Describe how the research methodology incorporated consideration of the physical, social, economic and cultural environment of the participants and prospective participants. (e.g., impacts of colonization, racism, and social justice). As well as Indigenous worldviews. Checked: see page 2 – Introduction, page 4 - Methods Previous research has demonstrated the importance of health professionals using a culturally appropriate approach (e.g. respect and reciprocity) including communication skills (e.g. yarning). Personal attributes have been shown to be key, such as understanding (from truth telling) and a willingness to listen and learn from Aboriginal Peoples, such as via two-way learning. When conducted well, two-way learning can dismantle the power imbalance and empower Aboriginal Peoples to prioritise Aboriginal ways of knowing being and doing in the delivery of health care. This initiative which implemented Aboriginal ways of learning, was suggested by the hospital yarning circle. The design and purpose of the two-way visits was developed by three authors (SR, PC, SW). Scope of the visits was brainstormed with all AHWs at the hospital site. The aim of the visits was for AHWs and pharmacists to learn from each other, improve understanding and health communication, and to establish partnerships to enable them to provide culturally safe care for Aboriginal patients.
Participation	
10.	Specify how individual and collective consent was sought to conduct future analysis on collected samples and data (e.g., additional secondary analyses; third-parties accessing samples (genetic, tissue, blood) for further analyses). Checked. Consent to take part in this evaluation was implied by completion of the electronic evaluation survey. Staff who completed the survey were informed that all responses were non-identifiable, and that no identifying information would be presented in write up. N/A no further analysis proposed, Aboriginal Health and Medical Research Council of New South Wales approval of such amendments would be required.
11.	Described how the resource demands (current and future) placed on Indigenous participants and communities involved in the research were identified and agreed upon including any resourcing for participation, knowledge, and expertise Checked: Authorship includes Aboriginal health experts who contributed to the study (PC and SR).
12.	Specify how biological tissue and other samples including data were stored, explaining the processes of removal from traditional lands, if done, and of disposal.

Item	**Checklist Item**
	Checked: N/A
Capacity	
13.	Explain how the research supported the development and maintenance of Indigenous research capacity (e.g., specific funding of Indigenous researchers) Checked: see page 3 and 11– Aboriginal Leadership Sufficient time allocated to determine research priorities for this study with Aboriginal investigators (PC, SR). This enabled us to design a study that met Aboriginal priorities. Aboriginal investigators (SR and PC) were involved in data collection design, analysis, dissemination of results and write-up.
14.	Discuss how the research team undertook professional development opportunities to develop the capacity to partner with Indigenous stakeholders? Checked: see page 3 – Aboriginal Leadership SW is a hospital pharmacist-researcher and has undergone cultural responsiveness training. She undertook numerous conversations prior and throughout the study with the Aboriginal Health Unit to develop this partnership. KL has extensive research experience working alongside Aboriginal collaborators and community in the field of Aboriginal health and substance use.
Analysis and interpretation	
15.	Specify how the research analysis and reporting supported critical inquiry and a strength-based approach that was inclusive of Indigenous values. Checked: see page 2 Introduction, see page 9 - 11 – Discussion, see page 12 – Implications Acknowledging the effects on Aboriginal and/or Torres Strait Islander Peoples of lack of cultural safety in hospitals, and the impact on their use of medications is important for ongoing positive health outcomes, This initiative together with data collection and analysis, aimed to support cultural safe communication practices and empowerment of Aboriginal Peoples. AHWs and pharmacists worked together to achieve transformative experiences and learning for those involved.
Dissemination	
16.	Describe the dissemination of the research findings to relevant Indigenous governing bodies and peoples. Checked: AHMRC reports and review of publications prior to submission

Item	Checklist Item
	Research findings were disseminated to Aboriginal Health and Medical Research Council of New South Wales via a review of publication prior to submission.
17.	Discuss the process for knowledge translation and implementation to support Indigenous advancement (e.g., research capacity, policy, investment). Checked: see page 6 - Methods Results were disseminated internally to pharmacists by SW at a regular education meeting, and to AHWs and pharmacists by SW and SR at a NAIDOC morning tea (National Aborigines and Islanders Day Observance Committee). For AHWs who were unable to attend, SW offered face to face 1:1 to share results. For other hospital staff, results were presented at Grand Rounds during NAIDOC week. Externally, results were shared via conference presentations to upskill pharmacists more broadly, and to encourage two-way learning visits at other hospital sites. Authors (PC, Wiradjuri nation and SR, Bundjalung nation) have been involved in all stages throughout the project and as such it has supported building research capacity and Aboriginal advancement.

8. GENERAL DISCUSSION

"Australia has a fundamental responsibility to its First Peoples to structure and resource its health care system to be culturally safe, well-trained and responsive to the needs of Aboriginal and Torres Strait Islander Peoples" Lowitja Institute, 2018 (100)

This thesis explored the contribution that hospital pharmacists can make when working with Aboriginal and Torres Strait Islander Peoples. From the limited literature available, it showed the role hospital pharmacists can have in developing models of care and partnerships, and resource sharing to ensure continuity of care. A national survey of hospital pharmacy departments (97) highlighted a broader scope needed for hospital pharmacists in relation to Aboriginal and Torres Strait Islander patients. For example, the involvement by hospital pharmacists in providing culturally safe care; culturally appropriate medicines information; chronic disease management; facilitating continuum of care; and managing impact of funding models on access to medicines and pharmacy services.

This thesis demonstrated multiple missed opportunities for connected, holistic, chronic disease care. The subsequent development and implementation of a novel hospital pharmacist-led diabetes screening and referral service (98) further supported the contribution by pharmacists in this setting. Pharmacists identified patients at risk of diabetes and in need of care, educated patients and staff and connected patients with care in hospital. The pharmacists' contribution was shown to promote respectful, non-rushed two-way communication (99, 101-105).

This thesis also highlighted the role of pharmacists in contributing to culturally safe care (106). For example, the role of pharmacists using resources to empower patients and improve health literacy; enhance multidisciplinary communication, and to stand up for Aboriginal patients, as advocates – tackling racist attitudes from other staff or institutional racism (107-109).

The contribution of data access to missed care opportunities

This thesis uncovered how lack of **access to patient data can contribute to missed care opportunities during hospital stays.** Limited access to patient data prevented easy linkage of patient data to inform care; and holistic care being offered during a hospital stay (chapter 4). The need to provide data linkage is supported by the upcoming launch in NSW of the Single Digital Patient Record (110). This initiative – which will enable information sharing across the NSW health system, will be important for hospitals and for primary care, for example, to enable appropriate and timely referral to specialists (111). However, the first step to providing holistic care will be to enable staff to access a more complete patient picture from linked patient data (98). It follows that once data can be linked, healthcare providers can then think about providing holistic care during a hospital stay. Providing the way to enable access to data, should enable the will to change how holistic care and chronic disease prevention are provided for Aboriginal and Torres Strait Islander Peoples whilst in hospital. Further, Austin et al (112) illustrated how direct consultation with community can assist with the process of systems change and provision of culturally-informed hospital care for Aboriginal and Torres Strait Islander Peoples.

The need for change: overcoming missed opportunities

This thesis **illustrated the need for change so that barriers to care can be overcome** for Aboriginal and Torres Strait Islander Peoples. This is interwoven with the need for Aboriginal and Torres Strait Islander Peoples to feel culturally safe.

My findings showed that Aboriginal and Torres Strait Islander Peoples admitted to hospital experienced multimorbidity (36), higher rates of chronic disease-associated complications and lack of access to community care and secure living arrangements which contributed to hospitalisation risk (chapter 4). The level of multimorbidity found in this work (more than one in three, 37%), was higher than previous reports. For example, another NSW hospital cohort study, found the level one in six (16%) (36), two-fold lower than the current work. While a national self-reported survey found a level of one in four (24.2%) (37). Considering this, hospital admission presents an opportunity for care that is unrelated to the reason for admission. This is even if the care could have been provided in community settings. Such opportunities were often missed (chapter 4). These findings were supported by other health professionals in various Western Australian health settings (113). In this work the authors described that other organisational priorities often compete with the time, money and staff required, to provide holistic care for Aboriginal and Torres Strait Islander Peoples (113).

The need to act when opportunities for care in hospital arise, is aligned with efforts to reach Closing the Gap targets (114), and the National Aboriginal and Torres Strait Islander Health Plan (115). Available preventive options when such opportunities arise, are guided by the National Preventive Health Strategy (43). Given that Aboriginal and Torres Strait Islander Peoples experience higher potentially preventable hospitalisation rates, compared with non-Indigenous Australians (116), and they are less likely to receive some medical/surgical treatments (116), any opportunity should be taken to provide care if wanted (chapter 4). Despite 63% of research (2008 – 2020) (109), being conducted with a focus of improving health services for Aboriginal and Torres Strait Islander Peoples, my work has uncovered opportunities to provide holistic care in hospital.

My pharmacist-led diabetes risk assessment and linkage with care presents a potential solution to address such missed opportunities (98). No other work has described pharmacists in such a role in a hospital setting. Other changes in the provision of health care have been explored to provide holistic care. However, unlike my findings, these do not address missed opportunities to offer and link other medical care during a hospital stay. For example, Blignault et al (117) showed that transfer of care from a metropolitan hospital to community should be holistic, culturally-informed and multidisciplinary, to reduce chronic disease readmission rates and enhance patient, family and staff experiences. The Blignault et al (117) team included pharmacists when needed, to provide education and medication supply. Harrop et al (118) implemented culturally-informed cardiac care by a team which included a pharmacist, and went a step further in achieving equitable cardiac care for those involved. Some insight has been provided by Austin et al (112) to understand community wishes for a new hospital and holistic, culturally-informed care was a priority. My findings build on this work by illustrating how pharmacists can be utilised to further develop systems and provide linkage of holistic care during hospital admission (98).

Pharmacists making change: new ways of working

This thesis illustrated a novel approach to support and change how holistic healthcare can be provided during a hospital stay (98). I explored **new ways for pharmacists to provide care in collaboration with Aboriginal Health Units and community** (98). Capacity building of culturally-responsive pharmacists is needed to enable this, and a novel approach by using two-way learning in hospital illustrated how this could be achieved (chapter 7). This work illustrated that yarning (119) requires practice, guidance and learning in a respectful environment, supported by such a two-way learning program (chapter 7) (99). Further, within capacity building, upskilling pharmacists to understand and welcome the use of traditional medicines is also needed, both in the community and hospital settings (78). Similarly, the Aboriginal Health Care Framework in South Australia recommended traditional healers be incorporated into mainstream health care to enable healthier Aboriginal communities (120).

This is rare but increasing in hospitals (96, 97). Traditional healers (e.g. Ngankari healers) (121) were invited to provide care at one hospital site surveyed in my work, whilst others had systems to enable the use of traditional medicines (97). Such change could help address the cultural determinants of health for those in hospital (120).

This thesis identified the role of pharmacists in an advocacy role, to drive change at national (96, 97), institutional (97-99, 122), workforce and personal levels (chapter 7). It has illustrated how this can be achieved. Such advocacy takes time, and needs to be informed by priorities of Aboriginal and Torres Strait Islander Peoples (99). For example, this thesis illustrated that access to medicines is extremely challenging for Aboriginal and Torres Strait Islander Peoples particularly on discharge from hospital (97). It detailed how hospital pharmacists implement extraordinary processes to work around the barriers, to enable medication access (97). Recent Australian work described a pharmacist-led solution to provide medications on discharge under a hospital-funded Close the Gap (CTG) system, which was rolled out across Queensland (123). The extent of system complexity surrounding the provision of medications illustrated in this thesis was expanded on by Gilbert et al (124). They described the ongoing nature of national level pharmacist-led advocacy, needed for medication access at hospital discharge. Similarly, internationally Kiles et al illustrated how pharmacists in the U.S.A. can contribute by advocating for change in health policy, tackling social determinants of health, which impact medication access and health equity (125). In Aotearoa New Zealand, Te Karu et al (126) described how patients were blamed for poor adherence rather than enabling change in the health system. The findings from this thesis highlighted that these issues also exist in Australian healthcare and pharmacists can assist to challenge such biases. The findings provided in this thesis have illustrated to all Australian hospital pharmacists that they should continue to advocate for changes in healthcare to enable equity (124, 127).

Cultural safety is important

This thesis **increased pharmacist understanding about the importance of cultural safety** in the provision of equitable health care (106, 113, 128, 129) and Aboriginal and Torres Strait Islander Peoples (127). In line with existing national guidelines (78), it showed that programs should be developed with Aboriginal and Torres Strait Islander Peoples, listening and tailoring services to their healthcare priorities (98, 99). Others have documented that the approach used to provide care (130) and develop rapport and relationships (131), are vital to enable a safe space for Aboriginal and Torres Strait Islander Peoples. My findings would support this, as I illustrated that respectful communication and time are needed to build trust between pharmacists and Aboriginal and Torres Strait Islander Peoples (99, 132).

This thesis uncovered that not only are healthcare system changes needed to enable culturally safe, holistic care (112), but this is together with workforce cultural change (chapter 4) (107, 131). Workforce cultural change includes for example, personal attributes of care providers and cultural responsiveness of staff involved in the provision of care (chapter 4) (130). In a culturally safe setting, clinical safety and equity of care should be provided (116). Without culturally safe care, Aboriginal and Torres Strait Islander Peoples will continue to experience stigma and discrimination. This not only negatively effects their wellbeing but results in inequitable and poorer standards of care (116, 117, 129, 133).

Communication and time are needed to develop trusting relationships – key to providing a culturally safe healthcare environment (132). However, in busy hospital environments, this thesis showed the challenges of providing holistic, culturally safe care (chapter 4) – which is often at odds with time management pressures (113). In metropolitan hospital settings (the setting of this thesis), there are other pressures such as bed pressures and patient flow, which can overshadow the need to listen and address patient specific needs (98, 117). In stark contrast to the fast-paced hospital environment, much can be learnt from Aboriginal Community Controlled Health Organisations (ACCHOs), that are designed to offer holistic care in a culturally safe environment specific for their community (72, 89). ACCHOs are community controlled and governed (134). As such they provide self-determined healthcare for the community (89, 134). Healthcare professionals work collaboratively (135) and ensure that the cultural determinants of health are met and empower clients to be involved in their own healthcare (89). Findings from this thesis found that this is generally not the case in hospitals currently (chapter 4) (98). In this way, embedding culture and holistic care into the design of new hospitals and hospital systems as suggested by this thesis (chapter 4, 7) (98) will help to ensure culturally safe care is provided (112).

Incorporating Indigenous methodologies in hospital pharmacy research

This thesis was novel in promoting the use of **Indigenous methodologies in Australian hospital pharmacy research** and represents some of the first examples published in Australia (98, 99). In NSW, where this thesis was conducted, the Aboriginal Health and Medical Research Council of NSW (AHRMC) supports ethical principles for conducting research with Aboriginal and Torres Strait Islander Peoples (136). AHMRC also encourages Indigenous methodologies based upon knowing, being and doing, to ensure that research conducted with Aboriginal and Torres Strait Islander Peoples is respectful and safe (136). In alignment with AHMRC, the priorities of Aboriginal and Torres Strait Islander Peoples (137) (patients and Aboriginal Health Unit) were central throughout this thesis, in project design, implementation and dissemination of findings.

This thesis used Indigenous methodologies, which included respectful listening, allocation of sufficient time (99) and two-way learning between hospital pharmacists and Aboriginal Health Workers (AHWs) (chapter 7). This thesis also incorporated the Australian Bicultural

Care Model (138), developed by Gundungurra scholar Gemma Purcell-Khodr, to assess cultural appropriateness of the research process (99). It enabled reflection which used culturally-informed methodology (138). This enhanced our findings by illustrating Aboriginal and Torres Strait Islander priorities in the research process (99). Yarning, a culturally appropriate form of communication, was highlighted as an important component of building rapport in the Australian Bicultural Care Model (99, 138) as well as in the development of yarning cards/resources (139) and it was a primary focus of the two-way learning program (chapter 7). Similarly, yarning has positively been described by others in a research (119, 140), clinical (141), healthcare intervention (142) and health educational settings (143). Use of yarning enabled a greater understanding of the healthcare journey, from the Aboriginal and Torres Strait Islander Peoples' perspective (98, 99) (chapter 7).

The importance of incorporating Indigenous methodologies into health research is widely recognised but often neglected by researchers, including pharmacists (144-149). This thesis is complemented by a comprehensive overview of Indigenous methodologies and demonstrates the importance of their inclusion in pharmacy practice research (150). A variety of benefits exist from the inclusion of Indigenous methodology into the research process. For example, recent Australian work suggested that "Indigenous ways of knowing, being and doing" should inform and strengthen methodology used to conduct scoping reviews (151). Another recent example described by Canadian librarian MacLeod, developed a new template for researchers to follow when citing (and so acknowledging) in their research oral contributions made by Elders and knowledge holders (152). This thesis used Indigenous methodology of two-way learning to counter healthcare bias (130) when providing care for Aboriginal and Torres Strait Islander Peoples (chapter 7). So too did Patel (153), who focused on the role of hospital pharmacists to understand different world-views, their impact on medication use and to improve cross-cultural communication.

A partnership with AHWs was developed through Indigenous methodology, two-way learning. This empowered AHWs and increased health literacy, when working with hospital pharmacists to provide care involving medications. Similarly, the methodology and benefits of working with AHWs has been supported by others (118, 130, 154-157). For example, Wilson et al described the importance of working with AHWs as being vital to work respectfully with Aboriginal and Torres Strait Islander Peoples in health (130). Likewise, it has been proposed that non-Indigenous healthcare workers should work with and learn from AHWs to provide appropriate care (131). Despite this, limited reports have described the role of AHWs in acute care (118, 155, 157) and so this thesis adds this area of knowledge, particularly pharmacists working together with AHWs (chapter 7).

Pharmacist research: promoting publication and sharing of knowledge

Guidance for pharmacists to conduct culturally appropriate research and report their outcomes, is recommended by national guidelines (137, 158) and consolidated criteria, for example CONSIDER (146). However, in a developing area of pharmacy practice research there is room for pharmacist-specific focussed work to further support pharmacists (97). This thesis attempts to provide this supportive guidance in a novel way (99). For example, my work, guided by Aboriginal coinvestigators throughout, illustrated the research process by focussing on the time and steps needed to build relationships and trust for a successful research process. I provided guidance on how to align the research to the AMHRC key principles by mapping my research to those key principles as an example for future researchers. Other influencing factors also need to be considered in the research process for success. To illustrate these, I used the Australian Bicultural Care Model (138) to retrospectively map and highlight helpful or hindering factors (e.g. at levels of interpersonal processes, treatment and healing and service strategies). Finally, we used an adapted tool by Snijder et al (159) to assess the level of community participation in all stages of my research (chapter 6). Each of these guiding elements can be used by others retrospectively in a similar manner, or prospectively when co-designing and implementing research with Aboriginal and Torres Strait Islander Peoples.

Limited publications have been written by pharmacists working with Aboriginal and Torres Strait Islander Peoples. Lack of publications mean there is less opportunity for pharmacists to learn from “what works or doesn’t work”. Wider knowledge is needed to guide hospital pharmacy teams to assist with uptake of “what works”. These could then have a positive impact on health outcomes and equity of care Aboriginal and Torres Strait Islander Peoples (96, 97). Since the beginning of this thesis, some recent work by pharmacists has supported this direction of increasing sharing by publication. Whether it is in pharmacy practice and health equity (127), access to medications after hospital discharge (123), improving acute cardiac care and clinical outcomes (118), pharmacokinetics (160), clinical pharmacy indicators for equity of pharmacy services (161), workforce cultural competence (162), national professional bodies (95) and policy (163). However, we still have much to do to increase publication of pharmacy initiatives and their outcomes. As well to incorporate Indigenous methodologies into research (150), as this thesis does (chapter 7) (98, 99). This together with providing a supportive network (95, 164), should increase numbers of Aboriginal and Torres Strait Islander pharmacist researchers and non-Indigenous researchers engaging with community to conduct research together.

Strengths and limitations

Key strengths of this thesis are that each stage was co-created with Aboriginal co-investigators, together with guidance from Aboriginal knowledge holders in the local community where the study hospital is located (on Gadigal land, in Sydney, New South Wales, Australia). This collaboration was founded on relationships that were developed over

15 years, to enable the voices of Aboriginal Peoples to be heard and incorporated in their own time. Relationships were developed through reflection and were based on trust (165). Clinician-researchers, such as myself worked alongside Aboriginal clinicians. This enabled Aboriginal clinician voices to be prioritised. It also ensured that culturally safe practices were incorporated into the study design (chapters 4, 5, 6 and 7). All published papers and those under review have been written with Aboriginal co-authors. An Aboriginal graphic designer was commissioned to design the infographics on pages 140, 164 (in chapter 5 and 6).

Study findings were shared with community in a variety of culturally safe gatherings, to share the outcomes of this work (chapters 3 – 7). Culturally safe gatherings signifies that learnings from the research were shared in a safe space for all those involved, allowing time for questions and respectful conversation (e.g. outside in the hospital gardens), food was provided (e.g. a barbeque with healthy food options; NAIDOC cake), information was shared to allow for all literacy levels (e.g. infographics) (98). This is in contrast with other methods of sharing research findings, for example in a published report. Culturally safe gatherings help to ensure community are provided with information so that the community can benefit from and be empowered by the research findings (166).

Aboriginal Peoples have enhanced the methodology by the incorporation of Indigenous methodologies wherever possible, for example yarning (119, 140-143), two-way learning (101-105) the Australian Bicultural Care Model (138), development of infographics and the incorporation of these into study methods (e.g. consenting process, dissemination of findings).

The variety of methodologies used in this thesis helped enhance cultural safety and rigour as required by ethical guidance (167). The decision to use a range of methodologies was to promote inclusion and patient cultural safety. This was especially important in the hospital setting where patients experience stigma in healthcare (14, 48), which is intertwined with the ongoing effects of colonisation (21). Methods used in chapter 6 (99) were particularly unique as they brought together four separate analyses. Each had been used previously either in published works (138, 159) or ethical guidelines (99). However, in this instance they were used in a novel way to further understand and communicate the level of cultural appropriateness of the research (98, 99). These diverse methodologies strengthened my ability to collect both quantitative and qualitative data from a variety of sources (e.g. participants, pharmacist-researcher, patient medical records). Thematic analysis provided further insights, reflections and conclusions.

Limitations of this thesis include the tools (e.g. surveys) used, which were not validated. Future work could conduct validation studies for the tools used, to further enhance their usability. Participant opinions were canvassed in only two sections of the thesis (chapters 5 and 7). This was often beyond the scope of the work conducted, [e.g. lived experiences of patients were not explored in the two-way learning visits (chapter 7)]. Despite these, participant satisfaction of the novel pharmacist-led screening service was determined (chapter 5).

Throughout, numbers were small (i.e. survey respondents, participants included in pharmacist-led diabetes risk assessment, and AHWs/pharmacists involved in two-way learning). However, these were the numbers available for inclusion at the time, and findings were still able to be drawn from the numbers included. Despite small numbers, further results or biases were uncovered [e.g. the majority of survey respondents had implemented services for Aboriginal and Torres Strait Islander Peoples, (chapter 3), service changes to enable greater patient recruitment for diabetes risk assessment were identified, (chapter 5)] This thesis was conducted at a single site and so findings are not generalisable to other sites

However, learnings can inform implementation discussions in conjunction with local communities at other locations.

Implications

Providing data to inform ongoing discussions

This thesis has identified numerous opportunities to provide holistic care in hospital, but that these opportunities are often missed. Prior to uncovering our findings in chapter 4, the level of missed opportunities were previously unknown. Missed opportunities resulted from lack of easy access to patient data, and competing priorities in the hospital environment which in turn effects the ability for staff to prioritise and provide holistic care (chapter 4). This work illustrated a setting of frequent hospital presentations, high levels of chronic disease and associated complications in a young cohort, with insecure living arrangements and primary care options. Now this has been identified, this work can be used to inform discussions and change policy for Aboriginal and Torres Strait Islander Peoples who present to hospital. This work gives a mechanism to assist through hospital pharmacists providing risk assessments to patients for chronic disease (e.g. diabetes) (98).

Pharmacists connecting care

The novel pharmacist-led diabetes screening service was developed and implemented, with referral for specialist review (98). Such a hospital pharmacist-led risk assessment and referral service had not been previously described for Aboriginal and Torres Strait Islander Peoples. Traditionally, hospital pharmacists do not have license to make direct referrals for specialist review in hospitals. This is note-worthy, because despite a two-fold difference in the level of chronic disease burden experienced by Aboriginal and Torres Strait Islander Peoples (63), access to specialist services has been reported at less than half that for non-Indigenous

Australians (116). As outlined in this thesis, the need is evident and a solution is possible, where hospital pharmacists can risk assess and offer specialist referral during a hospital stay, for those who need care (98). This work developed relationships with Aboriginal and Torres Strait Islander Peoples as well as endocrinologists and devised a method which links patient care in a culturally appropriate way (98, 99). Frequently hospital pharmacists work with many hospital teams (medical, nursing, allied health) in a positive way, which enables this novel model of care to be implemented. However, it is only possible if they work in a culturally safe manner. Importantly though, the biggest effect of this service was the provision of brief intervention for diabetes, for all participants seen by the pharmacist. This knowledge can then be shared with others to benefit community more broadly.

Encourage and guide publication

In a novel way, this thesis assessed cultural appropriateness of a research process, using a variety of methods including an Indigenous methodology, the Australian Bicultural Care Model (99). This has been published with the hope of educating others, to guide and enhance research methodologies used by hospital pharmacists in conjunction with Aboriginal and Torres Strait Islander Peoples. In general, the publications resulting from this thesis begin to fill a significant gap in the literature (96). They are some of the first such pieces published by a hospital pharmacist in Australia. As such, they lead the way to inspire others and make positive change in the way that Aboriginal and Torres Strait Islander Peoples receive care in hospitals.

Contributing to bridge the metropolitan/urban research gap

This thesis fills a significant gap by reporting on research that has focussed on chronic disease markers for patients presenting to a metropolitan Sydney hospital, to further understand the complexities faced by urban Aboriginal and Torres Strait Islander Peoples

(168). Also, by sharing results from the culturally appropriate, hospital pharmacist-led screening program, it illustrates how pharmacists can help bridge the shortage in staff required (169) to be able to connect care for Aboriginal and Torres Strait Islander Peoples.

The outputs of this thesis provide an important and timely contribution to how hospital pharmacists can contribute when working with Aboriginal and Torres Strait Islander Peoples. When contemplating the broader impact of this thesis work, a number of implications exist for policy, practice, community and future research.

Policy

Policy change is needed to connect data systems, to enable easy access for clinicians, including hospital pharmacists, to provide holistic care. Prioritisation of holistic care provision and refocussing of care to ensure that the hospital priorities are in line with the priorities and needs of the patient and community. Hospital pharmacists need to work with specialist teams to forge change in existing care pathways, and policy may need to enable such change. For example, direct referral pathways (pharmacist to specialist team) should be embedded into standard care. Pharmacists working to address impacts of social determinants of health, for example medication access, can help ensure related policy is changed within the hospital setting. So too, pharmacists should enable discussions about medication or treatment, to be inclusive of family and Aboriginal Health Workers. This will support policy change with how care is provided, to help address the cultural determinants of health, leading to improved ‘health and wellbeing’ outcomes (170).

Practice

This work will help make change to how pharmacists work with, provide care and prioritise Aboriginal and Torres Strait Islander Peoples for pharmaceutical care in hospital. As evidenced by results from 2019 NSW survey of Aboriginal Experiences of Hospital Care, (171) work still needs to be done. It states that in the hospital setting, compared with non-Indigenous Australians, Aboriginal Peoples received significantly less information about their treatment, and were less likely to have the information presented in a way which they could understand and enable them to manage at home (171). Patient understanding was also reported to be enhanced, when they were supported by an Aboriginal Health Worker in hospital (171). This thesis shows that hospital pharmacists are in a perfect position to be able to assist with the recommendations made for urban hospitals, to provide information about treatments using culturally appropriate resources. Together with this, it follows that pharmacists working with AHWs such as explored in this thesis (chapter 7), is an important partnership to ensure patients are provided with the right amount of information, in a way that they can understand.

Community

This thesis has implications for Aboriginal and Torres Strait Islander community who receive care in hospitals and staff who work in hospital. This thesis was informed by the priorities of the local community and involved Aboriginal Peoples throughout. Further to this, the wellbeing and cultural safety of Aboriginal and Torres Strait Islander Peoples involved was paramount, across all aspects of this thesis. This thesis provides evidence which the local Aboriginal and Torres Strait Islander community can use to help drive change in how care is provided. For example, we now know the level of missed opportunities for holistic healthcare in one Sydney metropolitan hospital and the factors that contribute to them. This knowledge can inform policy and practice change to benefit Aboriginal and Torres Strait Islander Peoples. Similarly, this thesis has empowered Aboriginal and Torres Strait Islander Peoples to help address inequities in chronic disease care. For example, it has provided an opportunity to receive pharmacist-led holistic connected hospital care free of (actual or perceived) stigma or judgement. To share research outcomes, findings from this thesis were shared with the community. This further empowered and supported involvement of Aboriginal and Torres Strait Islander Peoples in their healthcare and health choices. Finally, this thesis has empowered Aboriginal and Torres Strait Islander clinicians and clinician-researchers. The implication of this is that capacity has been built upon which they can lead future research and continue to make positive changes in healthcare.

Research

This thesis will inform future relationships, discussions and innovation and sets the scene for future research. More work is needed to further incorporate Indigenous methodologies into the design of Australian pharmacy practice research (99, 150). Our work (99) mapped a research process retrospectively against the Australian Bicultural Care Model (138). Future work is needed to apply it prospectively for example, in clinical settings or in service design.

Evaluation is needed of the two-way learning program from the perspective of the patient who is involved (chapter 7). Future projects are needed to validate study tools used in this thesis especially from the patient perspective (e.g. survey, patient experience).

A future implementation study is required for expansion of the hospital pharmacist-led chronic disease screening service, for example: for a wider variety of chronic disease and implementation by different pharmacists. Further to this, the logistics and outcome from commencement of such a service in a regional setting should be compared with the current metropolitan setting. Pharmacists should support any projects which promote a whole of hospital change in care delivery for Aboriginal and Torres Strait Islander Peoples (131).

Pharmacist bias needs to be closely monitored in the hospital setting, to ensure that culturally appropriate care is offered by all (172-174) and equity of care is achieved (128). This should be addressed through self-reflection, improved communication and working together with Aboriginal and Torres Strait Islander Peoples to remove racism and discrimination (107, 175).

Conclusion

Globally, chronic disease results in significant burden. However, the burden of chronic disease is not equally shared across Australia, due to ongoing effects of colonisation. Aboriginal and Torres Strait Islander Peoples are engaged in their own health but culturally unsafe hospital systems do not enable holistic care to be provided.

Hospital pharmacists can contribute to help close the gap of healthcare for Aboriginal and Torres Strait Islander Peoples **and must do so**. This thesis has explored existing and new roles for pharmacists to help enable positive outcomes for Aboriginal and Torres Strait Islander Peoples with chronic diseases. Pharmacists can assist to identify and link care in hospital, to help prevent and treat chronic diseases, thus reducing associated complications and adverse health outcomes.

Novel future models of culturally safe pharmacy care were designed, implemented and evaluated to assist with earlier detection and ongoing management of chronic disease. Factors required to enable wider application of such models were identified together with ongoing collaborative partnerships with Aboriginal and Torres Strait Islander Peoples. Future research could explore for example, broader implementation of the pharmacist-led chronic disease screening and referral service, validation of tools used in this thesis, patient perspectives, and further inclusion of Indigenous methodologies in pharmacy research. Such research should always be undertaken in partnership with Aboriginal and Torres Strait Islander Peoples.

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10. APPENDICES

A. Ethical approvals

Thesis chapter	Human Research Ethics Committee	
	St. Vincent's Hospital, Sydney	Aboriginal Health and Medical Research Council of New South Wales (AHMRC)
Chapter 3	#2018/ETH00593: 3/12/18	N/A
Chapter 4	#2020/ETH01314: 8/10/20	#1709/20: 11/5/21
Chapter 5	#2020/ETH01314: 8/10/20	#1709/20: 11/5/21
Chapter 6	#2020/ETH01314: 8/10/20	#1709/20: 11/5/21
Chapter 7	#2020/ETH01314: 8/10/20	#1709/20: 11/5/21

B. **Academic contributions beyond the scope of this thesis:** “Identifying the cultural heritage of patients during clinical handover and in hospital medical records.”

Identifying the cultural heritage of patients during clinical handover and in hospital medical records

To the Editor: In the recently published article by Morgan and colleagues[1] and associated podcast, the authors raised the issue of future research into the outcomes of identification of Aboriginal and Torres Strait Islander peoples in hospital. The implementation of a visual identification methodology has previously been described[2] and was put in place in partnership with the hospital department of Aboriginal health. The purpose of this identification initiative was to encourage all medical professionals who care for Aboriginal and Torres Strait Islander patients to question what they can do to assist them while they are in hospital. We describe here the positive outcomes of this process. In addition to hospital pharmacists,[2] the visual alert system is also used by other departments and professionals within the hospital, such as cardiothoracic care, the emergency department (ED), Aboriginal health, and speech pathology, as well as ward-based nursing and medical staff.

The Aboriginal and Torres Strait Islander patients' identification system is used by health care providers within the hospital to easily identify the patients they need to visit, to provide culturally appropriate resources and services and links to other services, and to enhance the care patients receive and enable them to remain in a caring hospital environment. At ward level, nursing and medical staff use the identification system to highlight the referral process needed to link with Aboriginal health workers — connecting the right resources to the right people. Because of the visual alert,[2] staff feel more aware of the cultural needs of the patient before they meet them.

Specifically in the ED, there is a system-wide approach that firstly identifies Aboriginal and Torres Strait Islander patients presenting to the ED using the visual alert at triage, and then implementing initiatives that aim to reduce the level of "did not wait for treatment" episodes. The Heart and Lung Stream at St Vincent's Hospital uses the system to identify Aboriginal and Torres Strait Islander patients early during their admission in order to provide culturally specific education, resources and follow-up after hospital discharge.

We encourage others to explore this initiative in their hospital, together with cultural responsiveness training, to enhance the care of Aboriginal and Torres Strait Islander peoples during and after their hospital visit.

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Competing interests: No relevant disclosures. ■

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C. **Academic contributions beyond the scope of this thesis: "**Challenging "business as usual" for acute rheumatic fever and rheumatic heart disease in Australia.

Conflicts of interest statement

The author declares that he has no conflicts of interest.

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CHALLENGING "BUSINESS AS USUAL" FOR ACUTE RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE IN AUSTRALIA

The SHPA Aboriginal and Torres Strait Islander Health Specialty Practice Stream[1] would like to highlight the release of the 2020 Australian guidelines[2] for the prevention, diagnosis and management of acute rheumatic fever (ARF) and rheumatic heart disease (RHD), as an excellent opportunity for SHPA and members to take steps towards closing the health gap associated with these conditions.

ARF and RHD

ARF occurs when the body mounts an autoimmune response to an untreated *Streptococcus pyogenes* or group A *Streptococcus* (GAS) bacterial infection of the upper respiratory tract and possibly skin. It can cause lasting heart damage known as RHD, caused by damage to heart valves from a single or many ARF episodes.

RHD is a disease of disadvantage. It is preventable and treatable. Accurate estimates of the burden of disease world-wide rely on a variety of data measurements and so are difficult to compare. The highest prevalence rates are in children aged 5–14 years old; in sub-Saharan Africa they are at 5.7 cases per 1000 people, and in the Pacific at 3.5 cases per 1000 people, in this age group. In Australia, prevalence rates are estimated to be 0.5 per 1000 people in Aboriginal and Torres Strait Islander Australians.[3]

Due to improvements in living standards and access to medical care, the burden of the disease is now borne by Indigenous Australian communities (Table 1). The number and rate of ARF diagnosis in Australia increased every year from 2013 to 2017.[3] In December 2017, 87% of people living with RHD were Indigenous Australians (3687 diagnoses) and the NT had the highest rate and greatest number of new RHD diagnoses.[4]

Business as Usual

To prevent recurrences of ARF and progression of RHD, secondary prevention with intramuscular benzathine benzylpenicillin G (BPG) is recommended every 21–28 days, for a minimum of 5–10 years. BPG is the only RHD control strategy shown to be clinically and cost effective at both community and population levels to prevent the development of recurrent attacks of ARF.[5-7]

The delivery of greater than 80% of scheduled injections is a key performance indicator for optimal patient outcomes.[8] In 2017, among Indigenous Australians prescribed BPG, 37% (394 people) received >80–100% of prescribed doses.[3] Medication shortages affected BPG supply over the 20 years from 1994 to 2014.[9] Pharmaceutical Benefits Scheme (PBS) data can be extracted to account for items issued through the PBS and Repatriation PBS. However, PBS data does not include medications dispensed through the Remote Area Aboriginal Health Services (RAAHS) program.[9] This scheme enables bulk supply to Indigenous Australians in remote communities, without the need for an individual prescription.[10] A substantial proportion of BPG for ARF secondary prophylaxis is likely to be dispensed under the RAAHS program.[9] Inclusion of medicines dispensed via RAAHS in PBS figures would provide a more complete picture of medication use throughout Australia and enable monitoring of medication use and shortages in remote communities.[9]

Challenging "Business as Usual"

A recent perspectives piece in the *Medical Journal of Australia* suggested that it is not economically viable to continue "business as usual".[10] The pharmaceutical industry has made impressive contributions to improvements in public health and chronic disease management

Table 1 Summary of state and territory ARF and RDH data collection methods and case numbers (2013–2017)

State/territory	QLD	WA	SA	NT	NSW	ACT	Vic	TAS
Is ARF is a notifiable disease?	Yes	Yes	Yes	Yes	yes	No	No	No
Is RHD is a notifiable disease?	Yes	Yes	Yes	Yes	Yes for < 35 years	No	No	No
Does a register of dosing exist?	Yes[a,b,11]	Yes[a,b,11]	Yes[a,b,11]	Yes[a,b,11]	Yes	No	No	No
Number of new RHD diagnosis per 100,000 all Australian population (actual cases)[3]	2 (524)	2 (212)	1 (76)	37 (449)	2 ARF (43)	No data	No data	No data
New RHD diagnoses among Indigenous Australians – per 100,000 population (actual cases)[3]	34 (356)	39 (188)	33 (67)	118 (432)	4 ARF (20)	No data	No data	No data

ACT = Australian Capital Territory; NT = Northern Territory; NSW = New South Wales; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia.

[a] Australian Government provides funding under Rheumatic Fever Strategy.

[b] Australian Institute of Health and Welfare collates data.

over the last century with vaccination for infectious diseases, innovations in drug dose formulations (long acting depots or implants) and continuous infusions for at home use.

This has not been so for ARF and RHD, however. No significant changes have occurred since the introduction of long acting BPG around 50 years ago.[7] Slow and painful injections are administered every 21–28 days. This poses difficulties for patients and families, huge demands on health services and often leads to treatment failure. The number of actively managed patients is highest in the 15–24 years age group – an age when people are assuming new cultural, economic, educational and social roles.[11] This too is the age group where mobility and travel – associated with schooling, for example – are high. As a result, tracking of doses given is made more difficult. A number of locally-appropriate strategies have been employed to help improve the uptake of secondary prophylaxis – for example in the NT, including the 'full moon strategy' in central Australia, which led to a 10% increase in uptake over a 4-year period; however, still well below therapeutic levels (57%).[12]

Environmental controls to prevent infection, such as reduction in overcrowding and access to functional health hardware, also needs to be a focus.[3] Cannon *et al.*[11] estimated the costs associated with treating the expected 10 000 new cases of RHD over the next 25 years, with the current treatment protocol, to be in excess of $300 million. If the priorities in managing RHD and ARF expanded to include investment in the development of novel pharmaceutical treatments, formulations or vaccinations together with a targeted approach to improve environmental causes, who knows what the potential savings would be?

The Future and Hospital Pharmacists

With the launch of the EndRDH[13] strategy as a public health priority in Australia in early 2020, there is hope. We encourage hospital pharmacists and SHPA to become actively involved.

In the absence of a national register, secondary prophylaxis with BPG doses can be difficult to track. The SHPA Aboriginal and Torres Strait Islander Health Specialty Practice Stream has collected information on the register of doses around the country, which is available on the SHPA Discussion Forum as a resource[14] (Table 1).

Hospital pharmacists are well placed to assist patients with ARF and RHD, by working with Aboriginal and Torres Strait Islander communities to ensure that the treatment is optimised by:

- Working with the person and community to assist health literacy in a culturally responsive manner, to empower them in their understanding of the disease and its treatment;
- Targeting the "5 priorities during Hospitalisation" and discharge planning;[2]
- Accessing the RHD register to check registration, dosing and liaising to assist treatment;
- Identifying and referring unregistered patients to a local registration system;
- Identifying of last dosing details and providing patient reminders;
- Ensuring BPG doses are given when due during hospital admissions;
- Providing details of dosing to the register and the person;

- Working with others involved in the treatment of patients – for example, community pharmacists to ensure continuity of care.[15]

Useful resources are available from Rheumatic Heart Disease Australia.[16]

SHPA and Specialty Practice group actions should align with the five strategies outlined in the EndRHD campaign.[9]

Conflicts of interest statement

The authors declare that they have no conflicts of interest.

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D. **Academic contributions beyond the scope of this thesis:** Clinical yarning with Aboriginal and/or Torres Strait Islander peoples—a systematic scoping review of its use and impacts.

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Systematic Reviews

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Clinical yarning with Aboriginal and/or Torres Strait Islander peoples—a systematic scoping review of its use and impacts

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Abstract

Objectives: To explore how clinical yarning has been utilised as a health intervention for Aboriginal and/or Torres Strait Islander peoples and if there are any reported impacts yarning might have on health outcomes.

Study design: Systematic scoping review of published literature.

Data sources: A one-word search term "yarning" was applied in Scopus, EMBASE, CINAHL, MEDLINE, International Pharmaceutical Abstracts, Australian Public Affairs Information Service-Health, and the Aboriginal and/or Torres Strait Islander Health Bibliography databases. Databases were searched from inception to May 20, 2020.

Study selection: Studies were included where clinical yarning had been used as a health intervention. Inclusion and exclusion criteria were developed and applied according to PRISMA systematic and scoping review reporting methods.

Data synthesis: A total of 375 manuscripts were found from the initial data search. After removal of duplicates and removal of manuscripts based on abstract review, a total of 61 studies underwent full-text review. Of these, only five met the inclusion criteria of utilising yarning as a clinical intervention. Four of these studies described consumer self-reported health outcomes, with only one study looking at improvements in objective physiological health outcomes.

Conclusions: Whilst clinical yarning may be a culturally appropriate intervention in healthcare, there are limited studies that have measured the impact of this intervention. Further research may be needed to ascertain the true benefits of this intervention.

Keywords: Aboriginal and/or Torres Strait Islander, Yarning, Clinical yarning, Health outcomes

Background

Aboriginal and/or Torres Strait Islander peoples in Australia belong to the world's oldest continuing cultures. As a direct consequence of colonisation, Aboriginal and Torres Strait Islander peoples face far worse health outcomes than the broader population of the nation [1]. The gap in life expectancy is 8 years less than the national average with two thirds of Aboriginal and/or Torres Strait Islander peoples dying before the age of 65 years [2]. This has been an ongoing problem, with various strategies put in place to try to improve the gap that exists between Aboriginal and Torres Strait Islander peoples and the rest of Australia. The Closing the Gap (CTG) strategy has been in place since 2007, where Australian governments have worked together to deliver better health, education and employment outcomes [1]. Despite these efforts, recent reports still estimate that the targets for reducing the gap in mortality will not be met by 2031 [1].

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Issues impacting the health of Aboriginal and/or Torres Strait Islander peoples include having higher rates of non-communicable diseases, as well as increased disadvantage and lower levels of education [1]. With respect to health, they are 2 times more likely to have a myocardial infarction compared to the standard population, 1.2 times more likely to have hypertension and 4 times more likely to have type 2 diabetes [1, 3]. These statistics are important, because any change that can potentially improve health outcomes for Aboriginal and/or Torres Strait Islander peoples should be considered as a serious alternative to the systems currently in place. Providing healthcare to Aboriginal and/or Torres Strait Islander peoples should ensure a holistic approach that is provided in a culturally safe and appropriate manner [4]. One of the techniques that is considered culturally appropriate is clinical yarning [4].

Before a more in-depth look at what clinical yarning is, a general look at what the term yarning means to Aboriginal and/or Torres Strait Islander Australians is important. Yarning is a conversation that involves the sharing of one's own stories and the creation of new knowledge [4]. It prioritises Aboriginal and/or Torres Strait Islander ways of communicating, in that it is culturally appropriate and respectful [5]. Yarning has a special place in Aboriginal culture, and the practice has been around for millennia. Yarning involves a 2-way dialogue of sharing and receiving information between people that is built on the relationship that the parties involved have with each other, certain cultural protocols that should be followed and respects what each person wishes to get out of the dialogue [4]. It should be noted that this is however a general definition, and it is hard to make an accurate description of exactly what yarning is, as it can be applied differently from person to person and even have different application across Aboriginal nations in Australia [4].

Due to the long history of the use of yarning as a culturally safe form of communication between Aboriginal and/or Torres Strait Islander Australians, there recently has been a switch to yarning-based communication for research and therapies for Aboriginal and/or Torres Strait Islander populations [5]. The idea behind this move to approach research and health in the framework of the yarn is to hopefully result in more accurate portrayal of Aboriginal and/or Torres Strait Islander perspectives compared to standard closed-style questioning [5]. Closed-style questioning could also be confrontational to an Aboriginal and/or Torres Strait Islander person and trying to further develop a relationship when this barrier has been formed can be difficult [5]. In this way, it is apparent that clinical yarning may be aligned with patient-centred care and shared decision making principles, allowing opportunities for a less paternalistic approach to healthcare [5].

Yarning in a clinical setting has three interrelated areas that are recommended in order to engage a patient in their healthcare journey. The first involves the "social yarn" where one tries to find common ground with the patient. This first part of the yarn is the steppingstone for applying the other two areas of the clinical yarn [5]. The second dimension of the clinical yarn is known as the "diagnostic yarn" where the diagnostician encourages the patient to tell their health story which means the patient might describe in detail the events about their life that may relate to the patient's present medical conditions. This is best performed as an open-ended dialogue where the practitioner will unpack the relevant pieces of information and apply it to their own knowledge which will inform their decision about how to best manage the condition the patient has presented with [5]. Finally, the "management yarn" is implemented. In this stage, the practitioner will provide straight forward information to the patient but may use metaphors and stories connected to the patient's life to make it easier for the patient to understand the condition they have. Also, by involving the patient in the decision-making process they may become more motivated in their own health and regain their autonomy. Regaining autonomy has been cited as being a key part of the clinical yarn, as many Aboriginal and/or Torres Strait Islander peoples believe their autonomy has been stripped from them since the time of colonisation [5].

Other countries with Indigenous populations have similar interventions that Australia could integrate into its healthcare system. The Native American people have a similar concept to yarning groups called "Talking circles" [6]. Talking circles are a traditional way that Native Americans come together to communicate and solve problem. In the circle, people are given a voice to express themselves freely and are empowered to have a voice and feel heard and supported [6]. A study by Nadeau et al. looked at the implementation of monthly 2-h talking circles with other interventions to get Native elders to talk about tobacco use and their beliefs and perceptions with it [7]. They found that from these interventions, elder knowledge about commercial tobacco products was increased and the elders who took part believed that the implementation of the talking circles was effective [7]. Another study conducted by Wilken and Nunn, looked at the effect talking circles may have on medication adherence [8]. They found that although more studies are needed in the area, talking circles may have an impact in improving medication adherence in Native Americans with uncontrolled type 2 diabetes [8].

The studies mentioned did show that Indigenous focused communication methods and using it as a clinical tool may lead to improvements in Indigenous patient outcomes. By implementing a clinical yarning approach to Aboriginal and/or Torres Strait Islander health care, there could be benefits associated with it that are not seen within the conventional healthcare system. It has been stated that the conventional system is often seen as a barrier to improving health outcomes for Aboriginal and/or Torres Strait Islander peoples [5]. Issues include lack of the use of Indigenous languages, the use of medical jargon and the clinical approach to providing "Western" healthcare [5]. These issues can cause Aboriginal and/or Torres Strait Islander peoples to feel alienated from their healthcare and make them disengage from the healthcare system [5]. Generally, Aboriginal and/or Torres Strait Islander peoples do want to be involved with their healthcare [5, 9]; however, the information is often presented in a way that is incongruent with Aboriginal and/or Torres Strait Islander peoples' beliefs about health, making it harder for them to connect [5, 9].

Using clinical yarning as a framework may make conversing with Aboriginal and/or Torres Strait Islander peoples more accessible and meaningful and potentially may have positive impacts on health outcomes contributing to lessening the health disparity gap. This review therefore questioned "how has clinical yarning has been utilised as a health intervention for Aboriginal and/or Torres Strait Islander Peoples?" and "what are the impacts of yarning on health outcomes?" By answering these questions, we may be able to make inference as to whether health outcomes may be better achieved using traditional communication techniques than through western styles of health communication.

Method

Search strategy

A single-word search strategy was used—"yarning". This single term was chosen because yarning is a unique word to explain conversation within the Aboriginal and/or Torres Strait Islander context. "Clinical yarning" due to being a new and developing concept was not used as the search term as it was perceived that this may be too narrow to pick up the relevant studies. The term "yarning" was therefore entered as a keyword search term into seven databases. Databases included Scopus, EMBASE, CINAHL, MEDLINE, International Pharmaceutical Abstracts (IPA), Australian Public Affairs Information Service (APAIS)-Health and the Aboriginal and/or Torres Strait Islander (ATSI)-Health Bibliography. The database searches were conducted between March 2020 and May 2020 and identified published publications from database inception up until May 20, 2020. The PRISMA systematic review reporting method was used to collate the data obtained [10]. Details of the search strategy and yields are tabulated in Appendix 1.

Eligibility criteria

Only manuscripts written in English, reporting on primary research outcomes, were included for review. Hence, conference abstracts, editorials, commentaries, opinion articles and other literature reviews were excluded. Studies were excluded if the manuscript did not pertain to yarning for health and if yarning was used only as a data collection tool rather than a health intervention. If yarning was use as both a data collection tool AND a health intervention, the manuscript was included. Studies were also excluded if yarning was reported only as an important outcome of how healthcare should be delivered. For example, if yarning was considered a useful method to convey health information however it was not actually used as the health intervention itself, the manuscript was excluded. Table 1 shows all inclusion and exclusion criteria applied.

Study selection and data extraction

The searches were undertaken by one author (AB) by using the agreed upon inclusion/exclusion criteria. Validation of search results was conducted by another author (RM), who undertook independent searches in three of the seven databases with the same yields identified. Search results from all databases were exported into EndNote [11] where duplicates were removed.

Table 1 Inclusion/exclusion criteria

Inclusion	Exclusion
Written in English	Not written in English
Publication reporting on primary research outcomes	Conference abstract, editorials, commentaries, opinion articles and other literature reviews
Yarning was used as a health intervention	Yarning not in the context of health
Australian	Not Australian
	Yarning only used for data collection
	Yarning mentioned as a way healthcare should be delivered but not used as an intervention

Titles and article types were then screened by the lead author (AB), followed by an abstract review. Full-text review followed and was conducted by two authors, and where there was any ambiguity over a publication's inclusion or exclusion, a discussion by two authors (RM and AB) occurred to reach consensus. Hand searches of references were also conducted to identify other relevant studies.

Data were extracted from the included publications according to the following descriptive categories found in Table 2. These included the location of the intervention; the healthcare professional or other involved in the yarn (for example, if it involved an Aboriginal and/or Torres Strait Islander healthcare professional or non-Indigenous person), which population group was targeted (i.e. health condition and other demographics); how yarning had been used in the health care system (for example, how it was applied—individual or group, face to face or via another medium); and the outcomes reported and the tools used to measure the outcomes (for example qualitative interviews or monitoring of health parameters). Two authors were responsible for the data extraction and analysis. Data were initially extracted by AB and validated and supplemented by RM.

Data analysis and quality appraisal

The data extracted from each of the studies under the framework were then descriptively analysed using an inductive approach to explore which if any participant outcomes were improved and if these improvements were believed to be a direct result of the yarning intervention. No other themes were explored. Both AB and RM analysed each of the publications separately and came to the same conclusions with respect to the outcomes of yarning after discussion. Comments about the outcomes were tabulated in the "Other Comments" section of Table 2.

The quality of included publications was assessed by utilising the appropriate Joanna Briggs Institute (JBI) checklist [17]. These included the checklist for quasi-experimental studies, and the checklist for qualitative research where appropriate. JBI was chosen, as it contains tools for various types of research studies. The authors assigned a quality score of one for every met criterion of the appropriate checklist applied (Appendix 2). This meant that a maximum score of nine was possible. A descriptor of a poor quality was applied to any publication that received a score of 4 or lower, moderate was the descriptor used for publication scoring between 5 and 7 and good was the applied descriptor to those scoring 8 and above. Regardless of quality ranking, no publications were excluded based on their quality assessment.

Results

In total, there were 375 papers identified via the database search. After duplicate removal and title screening, 184 abstracts were screened for inclusion. During the abstract review phase, publications were removed where it was apparent that the manuscript was not a primary research article, or yarning was not used as a health intervention. The remaining 61 publications underwent a full-text review where a further 56 publications were removed and no additional publications identified. The majority of those removed at this stage were excluded as the yarning was primarily a data collection tool only and not used as a healthcare intervention (n=35). Other reasons for exclusion included publications where yarning was reported as an intervention but was not used as the intervention in the study (n=8) or the manuscript was an editorial or conference abstract rather than a primary research article (n=13) (Fig. 1). In total, five publications were included in the extraction phase [12–16]. Table 2 provides a description of each individual study including the overall study objective, who conducted the yarning process and the outcome of each study.

The five yarning studies were published between 2005 and 2018. There was a range of health topics that were the focus of the yarning interventions with two out of the five studies focusing on maternal and child health [15, 16]. One focused on a range of health topics [12], one focused on smoking [13] and one on cardiovascular health [14]. In two of the studies, the people providing the yarning intervention were Aboriginal [13, 16]. In two studies, the people conducting the yarning were non-Indigenous [12, 15], and in one study, the nationality of the staff at the Aboriginal Medical Service (AMS) that were involved in the yarning intervention was not stated [14]. The involvement of Aboriginal community in the development of the interventions or the research study was apparent in four out of the five studies [12–15].

Two of the studies were mainly focused on the creation of a resource [15] or policy [13] document and used a participatory action research approach to create these resources that would eventuate as health interventions. Both studies used yarning to gather stories and experiences of participants to empower participants to improve health behaviours by applying a trauma informed lens, such as the damage a mother may cause her unborn child through unhealthy

Table 2 Data extracted from included publications

Author and year	Location	Overall study objective	Who performed the yarning and training received	Involvement of Community in development of intervention	How the yarning intervention was conducted	Target audience of the yarning intervention	Main topic of focus/health condition addressed.	Method of programme evaluation	Programme outcomes	Other Comments
Begley et al. [12]	Brisbane South Division of General Practice, Queensland	To provide information on health to local Aboriginal community	General practitioners (non-Indigenous) in the area that had expressed interest ($N=8$). Cultural awareness and communication training were provided, and GPs were supplied an Indigenous health resource manual	Inala elders, were involved in selecting topics of interest and reviewing GP training resources	GPs delivered group education sessions in a community setting in their lunch breaks. Yarning was used to improve access to quality health information	Local Aboriginal community members including elders, young women's groups and parent groups.	General topic areas: common cold, immunisation, women's health, chronic disease management, and child health.	Self-Report A qualitative and quantitative evaluation is conducted after each topic cycle	Knowledge (100% of participants reported "they learnt something"). Satisfaction and understanding (85% reporting ease of understanding based on yarning format). GP's reported improved understanding of Indigenous community, communication, holistic health and importance of family.	This intervention was reported as an ongoing initiative and improved knowledge and programme satisfaction
Fletcher et al. [13]	Victorian Aboriginal Community Controlled Health Organisation. (VACCHO)	To develop an inclusive policy around smoking habits for workers in the VACCHO.	The Project Officer who conducted yarns was an Aboriginal staff member of VACCHO. Details re-training were not reported	Aboriginal staff were involved in this participatory action research at both the development and implementation stages.	The intervention was conducted in phases. These included drop-in sessions for all VACCO workers, informal yarns in corridors and meeting places where smoking was common, and yarning sessions with managers after policy development.	All VACCHO staff members were involved in order to start conversations about smoking and produce a smoking policy for VACCHO	Smoking	Personal views around smoking habits and smoking consequence were qualitatively gathered during yarning sessions. A participatory action research framework was used to develop policy.	This programme resulted in policy development that banned smoking within all VACCHO buildings and vehicles, and within 3 m of air vents or within 3 m of all entrances and exits of the buildings. Many staff also reported wanting to give up smoking and support was imbedded into policy.	The intervention described resulted in a new policy, rather than having a focus on individual outcomes. Indirect impact on health however was reported.

Table 2 (continued)

Author and year	Location	Overall study objective	Who performed the yarning and training received	Involvement of Community in development of intervention	How the yarning intervention was conducted	Target audience of the yarning intervention	Main topic of focus/health condition addressed.	Method of programme evaluation	Programme outcomes	Other Comments
Dimer et al. [14]	Metropolitan Aboriginal Medical Service (AMS) in Western Australia	To improve cardiovascular health	Staff at the AMS provided the intervention (not stated if Indigenous) Details of training were not reported	Focus groups with Aboriginal health professionals and community members were conducted prior to programme implementation to ensure it would meet community needs and expectations.	Yarning was used to deliver education about cardiovascular disease including diet, exercise, medications, risk factors. This was provided alongside an exercise-based intervention. The clinic was run each Thursday from 9am-1pm, and participants could come at any time within this timeframe with a flexible approach to attendance rather than an appointment-based system.	Aboriginal people were referred by a medical practitioner or self-referred based on high cardiovascular risk. 64% of participants were female.	Cardiovascular health	Mixed methods were employed to evaluate the outcomes of the programme. These included interviews, questionnaires and yarning sessions as well as objective assessment of cardiovascular risk factors. Changes in risk factors were evaluated pre- and post-programme using paired *t* tests. $P < 0.05$ was accepted for statistical significance	Twenty-eight participants who attended at least 8 weeks of sessions achieved a significant decrease in BMI, waist girth, blood pressure, and an increase in 6-min walking distance. Qualitative consultation revealed strong support for the programme.	The flexibility of the intervention offered was perceived as more culturally appropriate. Participation increased during the study period. The yarning outcomes of improvements in physiological health parameters cannot be separated from the exercise effect.

Table 2 (continued)

Author and year	Location	Overall study objective	Who performed the yarning and training received	Involvement of Community in development of intervention	How the yarning intervention was conducted	Target audience of the yarning intervention	Main topic of focus/health condition addressed.	Method of programme evaluation	Programme outcomes	Other Comments
Crouch [15]	The Loddon Mallee rural region of Victoria	To develop and test a community-led resource to support and empower parents to improve health behaviours	The interviewer was a female full-time Malle District Aboriginal Service (MDAS) clinician of Anglo-Saxon heritage Details of training were not reported.	Permission was sought by local elders to conduct the participatory action research study.	21 Aboriginal individuals, families, Elders, professionals and various community members were invited to share their experiences of positive parenting, childhood memories and what children can teach carers. Yarning was used to create an antenatal yarning resource that was written from the perspective of a baby in the womb. This resource was then used with small groups to see how they responded to the tool.	Community members (men, woman and Elders) were involved in the first yarning stages to create the resource. The tool being developed was targeted at Pregnant Aboriginal women.	Antenatal health	Qualitative yarning interviews to create a resource using a participatory action research framework.	The outcomes of the research were the development of a resource for pregnant women to improve their health and the health of their unborn children.	The intervention described resulted in a new resource for pregnant females and their families, rather than have a focus on individual's outcomes. Indirect impact on health was reported.

Table 2 (continued)

Author and year	Location	Overall study objective	Who performed the yarning and training received	Involvement of Community in development of intervention	How the yarning intervention was conducted	Target audience of the yarning intervention	Main topic of focus/health condition addressed.	Method of programme evaluation	Programme outcomes	Other Comments
Campbell et al. [16]	Nine remote Cape York communities, Queensland	To evaluate the implementation of the Baby One Program (BOP), an Australian family-centred programme for improving child health.	Indigenous health workers from the Apunipma Aboriginal community-controlled health organisation. Details of training were not reported	Not stated	BOP includes 15 visits from health-workers throughout pregnancy and up until the time the child is 2 years and 10months. 7 Baby baskets are delivered with contents of the baskets containing resources for mother and baby. The health worker also has a yarn with the family at each visit with a range of health promotion topics to cover. A programme that started at confirmation of pregnancy and lasted until the baby was 2 years, yarning was used as an information delivery tool	Pregnant women from the time they know they're pregnant until the baby is 2 years and 10 months	Child health and development	Qualitative evaluation through yarning with staff and families in the community.	The programme was perceived to be useful and necessary by both health workers and family members. Yarning was seen to be beneficial in exchanging information; Information was easier for the mothers to understand, the programme promoted good health through behaviours such as quitting smoking and reducing consumption of alcohol. Health workers reported a reduced risk of families engaging with the Department of Child Safety because of the support provided by the BOP	This study focuses mainly on the implementation of the service rather than health outcomes for children. Improved knowledge was perceived.

behaviours such as smoking [15]. A powerful quote from the Fletcher et al. study page 95 “we need to talk about why we are doing this; smoking is killing our mob, and this is part of trying to change that” highlights how the participation in creating these resources was also allowing participants to reflect on their own health behaviours, therefore possibly having indirect impact of health outcomes of participants [13]. One study focused on implementation evaluation rather that direct health outcomes [16]. Only two studies therefore aimed to have direct impact on health outcomes [12, 14]. However, the study by Begley et al. only measured self-reported process outcomes such as knowledge and perceptions of the programme rather than actual health outcomes [12]. The study by Dimer et al. was the only study to evaluate physiological outcomes as a result of the intervention [14]. This pre-post evaluation of cardiovascular risk showed significant changes in participants’ health parameters, although the effect of the yarning without the other intervention of exercise cannot be determined [14].

Quality of the included publications was ascertained using the appropriate JBI checklists. The Qualitative research JBI checklist was applied to 4 studies [12, 13, 15, 16] and the Quasi-experimental JBI experimental checklist applied to the Dimer et al. study [14]. The study quality varied from poor to moderate (Appendix 2); however, based on the death of literature, no studies were removed based on quality assessment.

Discussion

This review focused on the use of yarning as a health intervention. Only five papers out of the 375 found during the initial search had attempted to use clinical yarning as an intervention, and even of those included, only one reported on physiological patient results. The study quality also varied from poor to moderate based on the JBI quality appraisal. Studies showed that yarning was used in a variety of settings and modes which included individual one-on-one yarning or group yarning. It was also used as part of a multimodal intervention, or to create policy or healthcare resources, or as a tool to improve overall public health knowledge. Due to the large variation in studies and the way yarning was used as an intervention and the lack of patient-specific outcomes reported, it is difficult to make any overall conclusions on the impact yarning has on health outcomes.

All included studies in this review had been published within the last 15 years. This may be because focus on Aboriginal and/or Torres Strait Islander health may have gained greater momentum in more recent times. The health disparities between Aboriginal and/or Torres Strait Islander peoples and non-Indigenous Australians was described in the title of a news article from The Age as a “disgrace” [18] around the time of the first publication included in this review [12]. Today, whilst the health statistics for Aboriginal and/or Torres Strait Islander peoples have improved somewhat [2], Australia still has a very long way to go to improving Aboriginal and/or Torres Strait Islander health and healthcare.

Looking at literature from outside Australia, conducted using Indigenous communication strategies in Native American cultures that bare similarities to “yarning” [7, 8], researchers have concluded that there does seem to be a correlation between an Indigenous focus in communication and some improvement of health outcomes [7, 8]. However, it should be noted that due to these being separate cultures, we cannot draw firm conclusions that the same results would occur in Australia hence more research, using a variety of methods in Australia may need to occur.

As culturally appropriate healthcare has been reported to be necessary [19], it may be more appropriate for Aboriginal and/or Torres Strait Islander health professionals to be the healthcare providers for Aboriginal and/or Torres Strait Islander patients. However, the number of Aboriginal and/or Torres Strait Islander health workers are scarce [20], which means that all health professionals may need to be trained to provide culturally appropriate healthcare to this population. In this review, two studies involved non-Indigenous health professionals as the people conducting the yarning [12, 15]. For example, in the study by Begley, local general practitioners were trained to provide clinical yarning on a range of topics [12]. Other studies in the review however did not describe the training provided to the clinical yarners.

The “Yarn with me” resource explores the framework of the clinical yarn and the three fundamental areas that form its framework [5]. It should be noted however that none of the studies in this review referred to this framework nor was it identified or described in any published manuscript. It is not fully clear how the yarning was provided within these studies. In fact, some studies were conducted prior to the release of this framework [12–14]. This framework [5] however may be a useful guide for future clinicians and researchers and may assist in health practitioner training.

Including Aboriginal and/or Torres Strait Islander health in curricula are now mandated accreditation

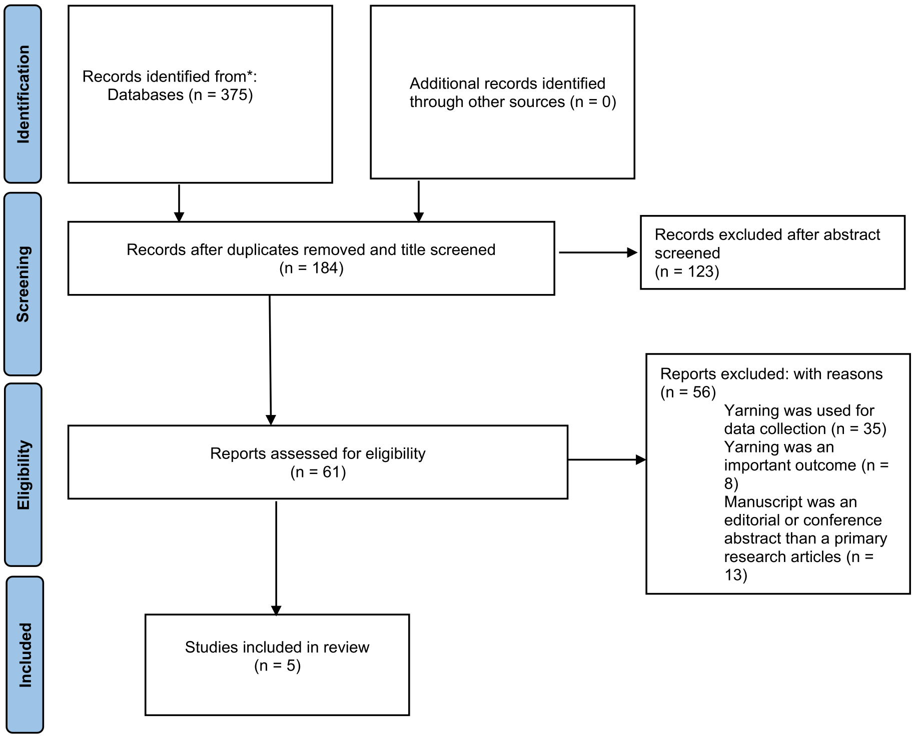

Fig. 1 PRISMA flow diagram of included studies

requirements in medical, pharmacy, and nursing schools in Australia [21, 22]. Universities also have graduate attributes that articulate the importance of Aboriginal and Torres Strait Islander cultural awareness and safety and have also recognised that all academic staff should gain knowledge and awareness to assist graduates to obtain these attributes [22]. Recent initiatives have been undertaken to empower health students to open their eyes to the importance of Aboriginal culture and health issues [23, 24]; however, there is still a long way to go to ensure health graduates are ready to provide specialised and tailored services to Aboriginal and/or Torres Strait Islander consumers, such as yarning. A systematic review by Ewen et al. in 2012 identified two studies that had evaluated medical students' skills in providing culturally appropriate care, and similar to this review, they were unable to conclude that Indigenous health curricula is having any impact on Indigenous health care outcomes [25]. What can be concluded however is that more research and education in this space is required. It should also be noted that whilst learning about and participating in clinical yarning may be part of the journey to becoming a culturally competent practitioner, it is not the full picture. Other aspects to cultural competence include being able to provide a safe space where Aboriginal and/or Torres Strait Islander peoples feel comfortable seeking advice, being able to recognise one's own personal biases and being able to overcome them and having a background knowledge of the history that Aboriginal and/or Torres Strait Islander peoples went through in the country now called Australia that led to certain outcomes today.

The studies included in this review were not established to be of high quality after the application of the appropriate JBI checklist. No conclusive data were gathered to prove the effectiveness of clinical yarning, and none employed high-quality design to assess this outcome [26]. In fact, the studies by Fletcher et al. [13] and Crouch et al. [15] were borderline in whether clinical yarning was in fact used as an intervention and received a moderate score in their quality appraisal. As stated however, though yarning was used primarily as a method to create a resource or policy, these studies in fact resulted in behaviour changes for some involved in these studies. For these reasons, in comparison to the other excluded studies these two studies which involved yarning for a "clinical" purpose were included in this review.

Only one study reported on actual physiological outcomes [14] while others reported on other process evaluation outcomes only [12, 13, 15, 16]. The study by Dimer et al. [14] used both yarning and exercise as the intervention to improve cardiovascular risk factors, and because of the multimodal intervention and the lack of a control group, it is difficult to make a determination if the yarning added to improvements in patient outcomes. In saying that, it may not be culturally appropriate and hence ethical to undertake more rigorous clinical trials in this area to prove that yarning indeed has impact on health outcomes. Further, future studies may also look to gather patient perspectives of clinical yarning interventions in a more qualitative manner to draw inferences of benefit. Despite the lack of findings of clinical yarning's impact, it is apparent that none of the publications stated that clinical yarning would be a detriment to healthcare and health communication. Hence, it does appear that it is a well-received way to provide health information to Aboriginal and/or Torres Strait Islander patients. Some papers cite the use of clinical and research yarning is a good method to break down barriers and walls of communication that would generally be present when using standard methods of communication [5, 27]. Due to centuries of the First Nations People being treated in the traditional western paternalistic style of health care, implementation of this more culturally appropriate style of care could be seen as an olive branch in trying to address the issues that have for been affecting these communities for years. Future studies of the benefits of using a variety of techniques could occur simultaneously as this becomes more widespread in practice and policy.

From the included studies therefore, inference can be made that if yarning was widely used as a healthcare intervention in this population group, health outcomes may be improved. In fact, the study by Dimer et al. noted that over the duration of the Cardiac Rehabilitation Service, patient attendance rates increased [14]. This is important because it points to the hypothesis that if culturally competent healthcare delivery is implemented, it may be possible to facilitate greater interest in one's healthcare and encourage Aboriginal and/or Torres Strait Islander peoples to actively take part in their healthcare.

The main strengths of this review include the wide array of databases that were used to undertake the search and that the lead author was able to review the studies with an Aboriginal lens, as he is a proud Wiradjuri man. Further, the validation of the database yields and data extraction from included publications was provided by a second author. The review however is not without limitations. As the reviewers restricted the search strategy to "yarning" only, articles may have been missed describing communications with Aboriginal and/or Torres Strait Islander peoples that chose not to use this terminology. Further, by only including publications published as primary research articles, some articles may have missed other reported outcomes of clinical yarning that could be found in the grey literature such as conference abstracts or unpublished research reports.

Conclusion

Whilst clinical yarning may be an appropriate way to provide care to Aboriginal and/or Torres Strait Islander peoples, more research is needed in this area due to the scarcity of research. This review showed a range of ways that clinical yarning had been utilised as a healthcare intervention but did not allow for any clear conclusions to be made regarding its impact on health outcomes.

Appendix 1

Table 3

Table 3 Database Yield with the single word "yarning" search strategy

Database	Extracted papers
Scopus	116
Embase	87
CINAHL	49
MEDLINE	61
IPA	0
APAIS-Health	47
ATSI-Health	15

Appendix 2

Quality appraisal rankings

Table 4

Table 5

Table 4 JBI qualitative research checklist

	Is there congruity between the stated philosophical perspective and the research methodology?	Is there congruity between the research methodology and the research question or objectives?	Is there congruity between the research methodology and the methods used to collect data?	Is there congruity between the research methodology and the representation and analysis of data?	Is there congruity between the research methodology and the interpretation of results?	Is there a statement locating the researcher culturally or theoretically?	Is the influence of the researcher on the research, and vice- versa, addressed?	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Author quality rank
Begley et al.	U	Y	Y	U	Y	U	N	U	Y	Poor
Fletcher et al.	Y	Y	Y	U	Y	Y	Y	U	Y	Moderate
Crouch	U	Y	Y	Y	Y	Y	N	N	Y	Moderate
Campbell	U	Y	Y	Y	Y	N	N	Y	Y	Moderate

Table 5 JBI quasi-experimental JBI checklist

	Is it clear in the study what is the cause' and what is the "effect" (i.e., there is no confusion about which variable comes first)?	Were the participants included in any comparisons similar?	Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Was there a control group?	Were there multiple measurements of the outcome both pre- and post-intervention/exposure?	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Were the outcomes of participants included in any comparisons measured in the same way?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?	Author quality rank
Dimer et al.	Y	Y	Y	N	N	Y	Y	Y	Y	Moderate

JBI checklist legend (*Y* yes, *N* no, *U* unsure, *NA* not applicable)

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Authors' contributions
AB and RM were responsible for the literature search, data extraction, manuscript writing and review. SW, TP and CL were responsible for the manuscript writing and review. The author(s) read and approved the final manuscript.

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Availability of data and materials
Full texts of included publications are publicly available.

Declarations

Ethics approval and consent to participate
As this is a review of the literature, no consent was required.

Consent for publication
All authors have consented to having this manuscript published.

Competing interests
The authors declare that they have no competing interests.

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