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Department of Health

Western Australian Nursing and Midwifery Workload Models Project

Final Project Report

August 2020

Chief Nursing and Midwifery Office
Western Australia

This document was endorsed in its entirety by the WA Nursing and Midwifery Workload Models Project Control Group on the 29th October 2020.

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Acknowledgements

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Queensland

- Office of the Chief Nursing and Midwifery Officer

Victoria

- Department of Health and Human Services
    - Health and Wellbeing Division

Western Australia

External Bodies

- Edith Cowan University: Centre for Nursing, Midwifery and Health Services Research, School of Nursing and Midwifery
- Health Roundtable, Australia

Unions

- Australian Nursing Federation Industrial Union of Workers Perth
- United Workers Union

WA Health

- Child and Adolescent Health Service
    - Child and Adolescent Mental Health Service
- Department of Health
    - Chief Nursing and Midwifery Office, Clinical Excellence Division
    - Information and System Performance Directorate, Purchasing and System Performance Division
    - System Wide Industrial Relations, Strategy and Governance Division
    - Workforce and Employment, Strategy and Governance Division
- East Metropolitan Health Service
- North Metropolitan Health Service
    - Mental Health, Public Health and Dental Services
    - Women and Newborn Health Service
- South Metropolitan Health Service
- Western Australian Country Health Service.

Abbreviations

AIHW	Australian Institute of Health and Welfare
ANFIUWP	Australian Nursing Federation Industrial Union of Workers Perth
BPF	Business Planning Framework
BR+	Birthrate Plus®
CNM	Chief Nursing and Midwifery
CSF	Clinical Services Framework
EBA	Enterprise Bargaining Agreement
EEI	Employee Engagement Index
HSPs	Health Service Providers
HSS	Health Support Services
ICN	International Council of Nurses
NICE	National Institute for Health and Care Excellence
NSW	New South Wales
NHpPD	Nursing Hours per Patient Day
PCG	Project Control Group
QLD	Queensland
RoGS	Report on Government Services
USA	United States of America
VIC	Victoria
WA	Western Australia
WACHS	Western Australian Country Health Service

Executive Summary

The provision of appropriate nursing and midwifery services is fundamental to the delivery of high-quality and safe patient care. Indeed, safe nurse/midwife staffing has been identified internationally as a critical issue for patient safety and the quality of care in hospitals, community and all other settings in which care is provided[1]. Aligning to the principles of safe nurse/midwife staffing ensures that an appropriate number of nurses, with a suitable mix of education, skills and experience, is available to meet patient care needs, whilst ensuring that the working environment and conditions support staff in the provision of high-quality care.

An abundance of evidence exists which demonstrates that improvements in patient and workforce outcomes is associated with improved numbers of nurse/midwife staffing. However, there is limited and inconclusive evidence linking improved outcomes with the specific methodology used to inform minimum - or safe - staffing numbers. With no consensus on the most appropriate and effective method to determine optimal staffing, varying methodologies have been developed internationally, and within Australia, to estimate the number of nurses/midwives required to provide patient care. In Australia, there are two primary workload management models utilised; legislated nurse/midwife-to-patient ratios, applied within the Victorian and Queensland public health sectors and Nursing Hours per Patient Day (NHpPD), applied within all other Australian public health jurisdictions.

In this context the WA Chief Nursing and Midwifery Office has led the Western Australian (WA) Nursing and Midwifery Workload Models Project to review, research and evaluate the potential impact on the WA health system if the nurse/midwife-to-patient ratio legislation currently operating in Queensland and Victoria were to be introduced into this State.

Central to this project has been the consideration of a range of impact measures, to determine if variances in performance between WA, Victoria and Queensland could be attributed to the underpinning nursing/midwifery workload management model. Analysis of patient safety and quality metrics, patient satisfaction data and workforce outcome data was undertaken across the jurisdictions. Additionally, a benchmarking model was developed to compare daily staffing profile numbers and projected annual expenditure to determine the potential outcome variance, should nurse/midwife-to-patient ratios be implemented into WA.

The project findings demonstrated no pattern or commonality that would indicate one state's performance was consistently or materially different to the others, nor that would suggest benefit of one nursing/midwifery workload management model over another.

During the course of this project however, it became apparent that NHpPD is not suited to support the breadth and complexity of maternity services. Likewise, the unique context of rural and remote services within the WA Country Health Service (WACHS) was highlighted and must be considered in the planning of future workload management. The project outcomes also identified that workload management is an issue of concern for WA nurses and midwives. It is imperative that actions to explore

[1] International Council of Nurses, 2018

and address these issues are undertaken to enable WA nurses and midwives to provide optimal care.

In light of all project findings, careful consideration must be given on the likely disruption to the WA public health sector, and potential impact on the provision of safe and quality care, should WA align with either of the legislated nurse/midwife-to-patient ratio models currently operating in Victoria and Queensland. In this context, retaining the existing NHpPD workload management model in WA is recommended, noting that significant amendments are required to ensure it is reflective of contemporary models of care, patient acuity and current nursing and midwifery practice.

It is imperative that regardless of the workload management model utilised in WA, it must achieve optimal staffing numbers with consideration of the education, skills and experience of the workforce. Aligning workload management methodology with the principles of evidence-based safe staffing, will best support the state's nurses and midwives to provide safe, high-quality and sustainable health care for all Western Australians.

Introduction

Ensuring that services are staffed with the appropriate number and mix of nurses and/or midwives is essential to the delivery of high-quality and safe patient care. It is well evidenced that improved levels of nurse/midwife staffing is linked to better patient and workforce outcomes. However, there is limited and inconclusive evidence linking improved outcomes with the specific methodology used to inform minimum staffing numbers. As such, a number of staffing methodologies are currently in use worldwide with some jurisdictions adopting specific staffing methodology to estimate the optimal number of nurses/midwives required to provide patient care. Within Australia, there are two primary workload management models utilised:

1. Legislated nurse/midwife-to-patient ratios - applied within the Victorian and Queensland public health sectors, and
2. Nursing Hours per Patient Day (NHpPD) - applied within all other Australian public health jurisdictions.

Arising from the 2018 Enterprise Bargaining Agreement (EBA) negotiations, the WA Chief Nursing and Midwifery (CNM) Officer established the WA Nursing and Midwifery Workload Models Project Control Group (PCG) to review nursing and midwifery workload management models. In August 2019, the WA CNM Officer (as Chair of the PCG) commenced a project to review, research and evaluate the potential impact on the WA health system if the nurse/midwife-to-patient ratio legislation currently operating in Queensland and Victoria were to be introduced into WA.

Central to this project has been the consideration of a range of impact measures, to determine if variances in performance between WA, Victoria and Queensland could be attributed to the underpinning nursing/midwifery workload management model. To inform this review, an analysis of patient safety and quality metrics, and workforce data, was undertaken across the jurisdictions. Likewise, a comparison of staffing profiles and projected expenditure was undertaken to determine the potential outcome variance in WA, should nurse/midwife-to-patient ratios be implemented into this State.

This document provides an overview of the WA NHpPD methodology and a synopsis of nursing and midwifery workload management systems in the Victorian and Queensland public health sectors. Findings from the comparison review of the impact measures, including patient and workforce outcomes, and variances between estimated daily staffing profile numbers and projected annual expenditure will be discussed. Finally, the project outcomes will inform and justify the final recommendations.

Background

Principles of evidence-based safe staffing

In 2018, the International Council of Nurses (ICN) released a position statement on evidence-based safe nurse staffing, which defines safe staffing as *'an appropriate number of nurses* (that) *is available at all times across the continuum of care with a suitable mix of education, skills and experience to ensure that patient care needs are met and that the working environment and conditions support staff to deliver quality*

care'[2]. The position statement outlines a number of elements required to achieve evidence-based care, noting that determining optimal staffing requirements is a complex issue.

The position statement does not support the use of one workload management model over another. Instead the ICN recommend that robust tools, used in conjunction with professional judgement, are implemented to ensure that decisions on nurse staffing are *'evidence-based and supported by information systems based on reliable real-time data, agreed metrics, benchmarking and best practice'* [3].

It is imperative, that whatever methodology is used to inform minimum staffing numbers, the principles of evidence-based safe staffing are observed.

Nursing and midwifery workload staffing methodologies in Australia

Two primary nursing and midwifery workload management systems exist within the Australian public health care sector; NHpPD and legislated nurse/midwife-to-patient ratios. However, hybrid models, combining elements of both methodologies, and separate models for midwifery services, are also used in some Australian jurisdictions. Regardless of the system, effectiveness is dependent on a sound understanding and consistent application.

The majority of jurisdictions including WA, the Australian Capital Territory, South Australia, New South Wales, Northern Territory and Tasmania principally use the NHpPD workload methodology, or a hybrid model. Queensland and Victoria are the only states in Australia to have introduced legislation to regulate nursing and midwifery workloads, implemented by nurse/midwife-to-patient ratios.

Western Australia

NHpPD was introduced into WA in 2002, via an Exceptional Matters Orders issued by the Australian Industrial Relations Commission, which is a schedule to both the:

- *WA Health System - Australian Nursing Federation - Registered Nurses, Midwives, Enrolled (Mental Health) and Enrolled (Mothercraft) Nurses Industrial Agreement 2018* and the
- *WA Health System - United Voice - Enrolled Nurses, Assistants in Nursing, Aboriginal and Ethnic Health Workers Industrial Agreement 2018*.

Guiding Principles

The NHpPD model provides a systematic, benchmarked monitoring and measuring system to identify and report the minimum number of direct nursing and/or midwifery hours required, and provided, to meet patient care needs in a specific clinical area. It is designed to be applied in association with critical thinking, professional judgement and clinical decision making. Characteristics such as patient complexity, intervention levels, patient mix and activity assist in identifying the direct clinical care hours required to provide safe and high-quality patient care.

NHpPD methodology is inherently flexible, allowing predictive roster and shift planning. Hours can be averaged over rosters to enable greater hours to be provided

[2] International Council of Nurses, 2018, p. 1
[3] International Council of Nurses, 2018, p. 3

at times of higher acuity and fewer during times of lower acuity. This flexible design enables the frontline nurse/midwife leader to use professional judgement and clinical decision making to increase or decrease hours to accommodate fluctuation in patient activity and/or acuity, assisting them to remain within the NHpPD target.

NHpPD workload methodology is determined and described in the *'NHpPD Application Manual - Guiding Principles, 2019 revised edition'*. The guiding principles specify ward categories, associated hours and criteria for measuring diversity, complexity and nursing tasks required[4].

Governance

Both the *WA Health System - Australian Nursing Federation - Registered Nurses, Midwives, Enrolled (Mental Health) and Enrolled (Mothercraft) Nurses Industrial Agreement 2018* and the *WA Health System - United Voice - Enrolled Nurses, Assistants in Nursing, Aboriginal and Ethnic Health Workers Industrial Agreement 2018* incorporate the NHpPD principles, enabling the Australian Nursing Federation Industrial Union of Workers Perth (ANFIUWP) and United Workers Union (previously titled United Voice), to participate in ongoing development and refinement of NHpPD. In collaboration with the Health Service Providers (HSPs), this ensures reasonable workloads for nursing and midwifery staff.

The CNM Officer, on behalf of the Department Chief Executive Officer, as System Manager in accordance with section 19 (2) of the *WA Health Services Act 2016*, provides oversight and management of NHpPD[5]. This centralised governance maintains consistency in the application of NHpPD and facilitates the provision of transparent biannual reporting to the ANFIUWP and United Workers Union.

Monitoring and Reporting

State-wide reporting of NHpPD on behalf of the CNM Office is supported and collated centrally through Health Support Services (HSS), in particular the NHpPD HSS monitoring and reporting tool. This tool has undertaken multiple enhancements since inception, the most significant with the transition of HSPs to the patient administration system known as WebPAS.

The NHpPD HSS tool, implemented in 2011, automatically extracts patient activity (from WebPAS) and nursing/midwifery direct clinical care hours (from RoStar). Direct clinical care hours are those provided by front line staff, for example; clinical and registered nurses/midwives and enrolled nurses. Indirect hours are excluded, for example those provided by senior registered nurses, nurse practitioners, or clinical nurse/midwife consultants, managers or specialists.

Whilst the NHpPD HSS tool provides an overview of NHpPD across WA Health, it does not provide data in real time to enable front line leaders to staff services. As a result, HSPs have developed various in-house business intelligence tools to monitor and report NHpPD at a local level. These tools are predominantly used by ward and unit leaders to manage workforce resources on a shift-by-shift basis using professional judgment and clinical decision-making.

[4] WA Health, 2019
[5] Government of Western Australia, 2016

Of note, whilst the NHpPD HSS tool is used for metropolitan hospitals within WA, it is not used for all hospitals within WACHS. Regional Resource Centres, Integrated District Health Services and nominated Small Hospitals throughout WACHS report NHpPD through a manual upload into the Nursing Workload Monitoring System Program.

Reclassification

Submission of a business case is required to have an area classified, in the case of a new area, or reclassified, as in the case of changing configuration. Reclassification of a NHpPD category can occur where the complexity, ward activity or speciality changes. Robust processes for review, reclassification and grievance reporting of NHpPD are governed by the WA Health State Workload Review Committee.

Limitations

Implemented into WA in 2002, several limitations to the NHpPD model have subsequently been identified. These include:

- Classification codes no longer contemporary, nor reflective of current patient acuity, models of care or environmental/social determinants of care
- Perceived lack of transparency or understanding of the input/analysis and output aspects of the process, leading to inconsistencies in application and reporting of NHpPD
- No standardised software to support NHpPD, with potential for confusion and inconsistency created by the use of parallel reporting systems
- Functionality for rural and remote areas within WACHS
- Suitability of NHpPD to support maternity services
- Complex processes and length of time required for reclassification.

Should NHpPD be retained as the workload management methodology in WA, these limitations must be addressed to ensure that the model is reflective of contemporary models of care, patient acuity and aligns with the principles of evidence-based safe staffing.

Victoria

In 2015, Victoria was the first state to legislate minimum nurse/midwife-to-patient ratios with the introduction of the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015.* The Act prescribes mandatory minimum requirements for nursing and midwifery staffing levels in specified clinical settings and provides an additional level of health service compliance beyond clinical guidelines[6].

Of note, Victorian mental health services are not included within the scope of the Act, relying instead on traditional staffing models.

Ratios provide a rigid methodology, based on ward bed numbers, to determine the number of patients assigned to each nurse or midwife on a morning, afternoon and night shift for each ward. The number of nurses/midwives can be increased during periods of high acuity and activity but there is no allowance to adjust staffing for periods of lower acuity or activity.

[6] Victorian State Government, 2015

Although the methodology is rigid, flexible application of ratios enables an even distribution of workload dependent on patient acuity, whereby nurses and midwives can be either assigned fewer, or more patients, than determined by the ratio.

Recent amendments to the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015*[7], namely; the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Act 2019* and the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Bill 2020,* will result in the expansion of nurse/midwife-to-patient ratios in various clinical wards and settings[8,9].

Queensland

In 2016, the Queensland Government legislated minimum nurse/midwife-to-patient ratios in the state's public acute adult medical and surgical inpatient wards[10]. The legislation was expanded in 2019, to include all adult acute mental health wards in prescribed facilities. In February 2020, the Queensland Government mandated minimum nurse workforce requirements within prescribed Queensland Health residential aged care facilities. Maternity and paediatric services are not included within the scope of the Queensland minimum nurse/midwife-to-patient ratios.

Application of the *Nursing and Midwifery Workload Management Standard, Hospital and Health Boards Act, 2011* provides notional ratios for the minimum numbers of nurses or midwives for a ward, based on the number of patients within that ward[11]. Whilst the methodology to determine the ratios is rigid, the application can be adjusted according to patient acuity. Consistent with the Victorian legislated ratios, this may result in fewer or more patients being assigned to nursing/midwifery staff than is prescribed by the ratio.

The legislation supports the *Business Planning Framework (BPF): a tool for nursing and midwifery workload management, 2016.* The BPF is an industrially mandated tool designed to support business planning for managing nursing and midwifery resources and workload management in the Queensland public health care sector. It is used to determine the nursing and midwifery staffing and skill mix levels that are needed to provide appropriate and safe care in different types of clinical settings. It operates in conjunction with professional standards and expert professional judgement and is calculated annually on the basis of patient acuity and complexity of care[12]. The BPF methodology has been incorporated into the nurse-to-patient ratio legislation by way of the *Nursing and Midwifery Workload Management Standard, Hospital and Health Boards Act, 2011.*[11]

[7] Victorian State Government, 2015
[8] Victorian State Government, 2019
[9] Victorian State Government, 2020
[10] Queensland Government, 2011a
[11] Queensland Government, 2011b
[12] Queensland Health, 2016a

Process

Project Background

During the 2018 EBA negotiations, the parties agreed to establish a working group to review workload management models, leading to the formation of the WA Nursing and Midwifery Workload Models PCG. In accordance with the EBA, the working group, led by the CNM Officer, included representation from the system manager, all HSPs, the ANFIUWP and the WA United Workers Union.

The purpose of the group was to research and evaluate the potential impact on the WA health system if the nurse/midwife-to-patient ratio legislation currently operating in Queensland and Victoria (and any other state that introduced workload legislation) were to be introduced into WA.

The PCG was formally convened in August 2019, with initiation of the WA Nursing and Midwifery Workload Models Project commencing at this time.

Project scope and agreed deliverables

In October 2019, the PCG endorsed the project scope and agreed deliverables which supported the overarching project objective.

The project scope outlined the high-level approach to determine the potential impact on the WA health system if nurse/midwife-to-patient ratio legislation were to be implemented in this State. The PCG determined that development of a framework, workload methodology tools and implementation of preferred future workload management model/s were not within the scope of the project.

To meet the project objective, the following deliverables were agreed:

- A systematic review comparing patient and workforce outcomes following implementation of either NHpPD or nurse/midwife-to-patient ratio workload management models
- A review of measures of impact, inclusive of;
    - patient safety and quality performance metrics
    - patient satisfaction data
    - workforce data
- A review of workload management models for the nursing and midwifery workforce, providing comparison of nursing/midwifery;
    - daily staffing numbers
    - projected annual expenditure
- A final project report.

In addition to the above, the PCG agreed to consider a body of work commissioned by the CNM Office prior to the commencement of this project. The report; *'Nursing hours per patient day (NHpPD) in Western Australia: stakeholder views and the evidence base. Background review for the Chief Nursing and Midwifery Office, Department of Health, Western Australia'*[13] provides a contextual review to inform the future direction of nurse/midwife staffing approaches in WA. The background review and each of the project deliverables are subsequently described in this paper.

[13] Buchan, 2019

Findings

1. Review of Measures of Impact

In October 2019, the PCG agreed to review a series of measures of impact to determine the potential effect on the WA health system if the nurse/midwife-to-patient ratio legislation, currently operating in Queensland and Victoria, were to be introduced into WA.

The measures of impact agreed for consideration included:

- Patient safety and quality performance metrics
- Patient satisfaction data
- Workforce data.

A variety of sources were accessed to obtain data relevant to this review, including:

- The impact of nurse staffing methodologies on nurse and patient outcomes: A systematic review, 2020[14]
- Nurse Workforce Methodology Review: WA Health Hospital Benchmarks and Performance Indicators, 2020[15]
- Patient Satisfaction Data 2018-19[16]
- Restrictive Practices 2017-2018 and 2018-2019[17,18]
- WA Minister for Health Employment Engagement Survey 2020[19].

It is important to note that for any of the measures of impact reviewed, nursing and midwifery workload management models are only one aspect of a multitude of factors that may influence outcomes. Results should be considered within this context.

Findings from the review of measures of impact were presented to the WA Nursing and Midwifery Workload Models PCG in the interim report titled *'WA Nursing and Midwifery Workload Models Project: Review of Measures of Impact, August 2020'*. The PCG endorsed this report and all findings on the 24th September 2020.

1a. Patient Outcomes

Systematic Review

In 2019, the CNM Office commissioned Edith Cowan University to conduct a systematic review on the impact of nurse staffing methodologies on nursing workforce and patient outcomes. Finalised in 2020, the *'Impact of nurse staffing methodologies on nurse and patient outcomes: A systematic review'*[14] reviewed 22 studies that assessed nurse to patient ratios and one which assessed the impact of implementing NHpPD. The 23 studies were conducted in a range of settings including general medical, general surgical, combined medical/surgical, step down units, emergency departments, intensive care and nursing homes/aged care. Twenty-two studies were

[14] Twigg, Whitehead, Doleman, Emery, & El-Zaemey, 2020
[15] Health Roundtable, 2020
[16] Australian Government Productivity Commission, 2020
[17] Australian Institute of Health and Welfare, 2019
[18] Australian Institute of Health and Welfare, 2020
[19] WA Health, 2020

conducted in the United States of America (USA), (mostly California), while one was conducted in WA.

The systematic review identified several studies that reported on measures of impact, of which 17 related to patient outcomes (detailed in Table 1), and six that related to workforce outcomes.

Table 1: Patient outcomes identified in systematic review

Patient outcomes identified in systematic review	
Infection wait time	Mortality (and 30-day mortality)
Care time and left without being seen	Medication errors
Sepsis	Detection in anxiety or mood disorder
Respiratory failure	Deep vein thrombosis
Falls	Pressure ulcers
Use of restraint	Contracture
Medication use	Failure to rescue
Secondary complications	Physiologic/metabolic derangement
Shock/cardiac arrest	Length of stay
Use of urinary catheters	

The systematic review found that evidence related to patient outcomes, associated with the implementation of minimum nurse-to-patient ratios, was inconclusive. Similarly, patient outcomes following the implementation of NHpPD were mixed, reporting a statistically significant decrease (p-values < 0.05) in the rates of nine outcomes (mortality, central nervous system complications, pressure ulcers, deep vein thrombosis, sepsis, ulcer/gastritis/upper gastrointestinal bleed, shock/cardiac arrest, pneumonia and average length of stay) but no difference for wound infections, pulmonary failure, physiologic/metabolic derangement or failure to rescue[20]. A detailed discussion on these findings are provided within the systematic review.

Six studies assessed nursing workforce outcomes, all of which demonstrated an improvement associated with the implementation of minimum nurse-to-patient ratios. A discussion on these findings is discussed later in this report.

[20] Twig et al., 2020

Summary

The authors note that whilst there is an extensive body of work that identifies that higher staffing levels are associated with improved nursing workforce and patient outcomes, there is limited and inconsistent evidence that a specific staffing methodology impacts either of these outcomes. The authors state;

'Despite the importance of the question and the large volume of publications on nurse staffing, evidence on the impact of adopting a specific nurse staffing methodology to identify the required nurse staffing level and the subsequent impact on patient and nurse outcomes remains highly limited. The current evidence regarding staffing methodologies cannot point to any methodology as being better than another. Rather, while the review supports improvements in nurse staffing results in improved nurse and patient outcomes, it cannot necessarily attribute these changes to the staffing method'[21].

Health Roundtable Report

In June 2020, the CNM Office commissioned Health Roundtable to conduct an analysis to determine variances in hospital performance between WA, Victoria and Queensland that may be influenced by nursing/midwifery workload management models. Health Roundtable is an independent membership-based organisation that provides aggregated and linked data from disparate hospital systems to enable benchmarking, collaboration and performance improvement opportunities.

The comparative analysis focused on six sets of indicators:

1. Hospital admission rates
2. Readmission rates
3. Complexity adjusted length of stay
4. Hospital acquired infections
5. Hospital acquired complications, and
6. Nurse sensitive indicators.

Results for WA, Victorian and Queensland hospitals were de-identified, aggregated and categorised according to the *'Australian Institute of Health and Welfare (AIHW): Australian Hospital Peer Groups, 2015'*[22].

Women's hospitals were excluded as data was not available from all jurisdictions. Children's and psychiatric hospitals were also excluded due to the possibility of individual hospital identification. However, maternity, paediatric and mental health data was included within the AIHW principal referral, and public group A, B and C hospital peer groups.

Analysis focused on the top ten (by bed-day volume) diagnosis related group results for the clinical specialties of:

- General medical
- General surgical
- Mental health
- Paediatrics
- Oncology and haematology

[21] Twigg et al., 2020, p. 26
[22] Australian Institute of Health and Welfare, 2015

- Maternity.

In total, 26 separate performance criteria related to patient safety and quality outcomes are detailed in the report: *Nurse Workforce Methodology Review: WA Health Hospital Benchmarks and Performance Indicators 2020*[23].

Heath Roundtable recommend caution when interpreting benchmark data, particularly when attempting to link safety and quality performance indicators with nursing workload management models, noting that careful consideration of the many inputs, processes and factors that affect results is required.

Summary

Health Roundtable found there was '*no commonality or pattern of results that indicate one states' performance is consistently or materially different to the other*'[24] and as a result found it highly unlikely that variances in hospital performance between the three states could be attributed to nursing workload management models. The report further states; *'notwithstanding their critical importance, the model of nursing workforce is one of multiple factors that influence dynamic hospital performance results. These include a myriad of contextual elements, such as jurisdictional regulation, hospital operations and care pathways, patient casemix and data, or administrative sources that underpin analysis'*[25].

Patient satisfaction data

Patient satisfaction data was sourced from the *Australian Government Productivity Commission - Report on Government Services (RoGS) 2020*. Table 12A.50 of the RoGS report describes the proportion of people (by state and territory), who were admitted to hospital for their own health in the last 12 months (2018-2019), who reported that hospital nurses always or often:

- listened carefully to them
- showed respect to them and
- spent enough time with them[26].

For the purposes of this review, the raw data from Table 12A.50 of the Australian Government Productivity Commission - Report on Government Services 2020 (https://www.pc.gov.au/research/ongoing/report-on-government-services/2020/health/public-hospitals) has been converted to into graph format to enable ease of comparison.

[23] Health Roundtable, 2020
[24] Health Roundtable, 2020, p. 36
[25] Health Roundtable, 2020, p. 3
[26] Australian Government Productivity Commission, 2020

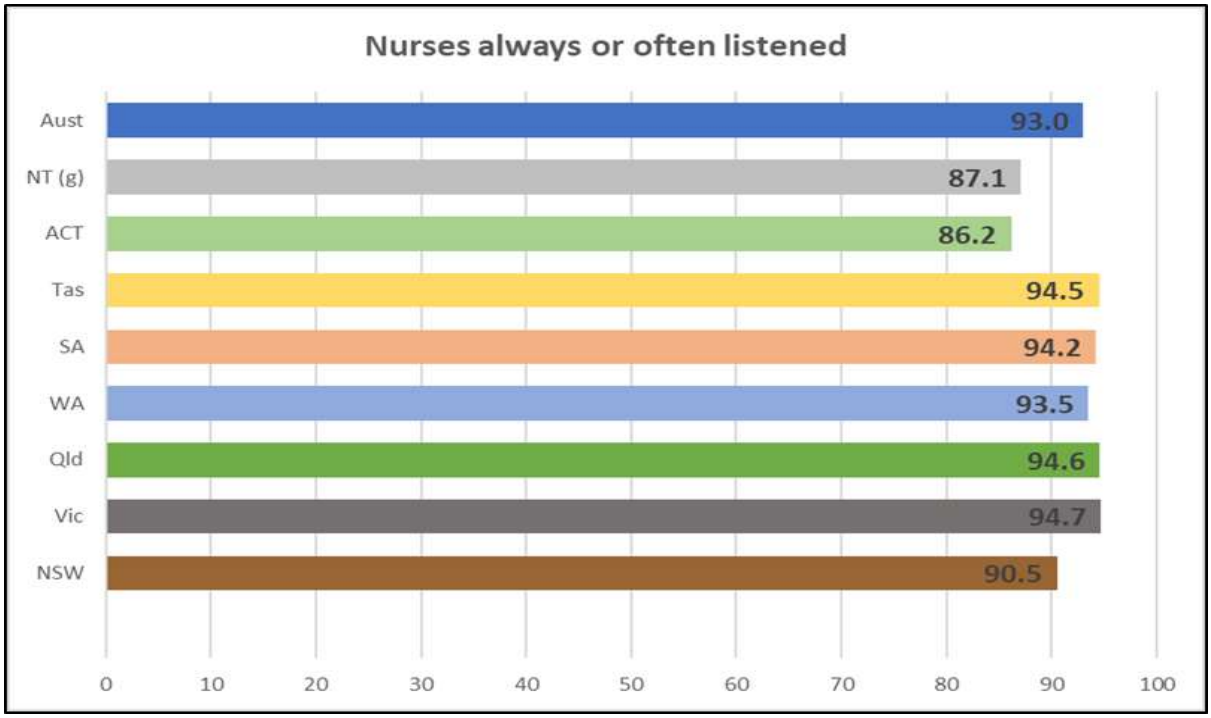

Figure 1: Proportion of people who reported that the hospital nurses always or often listened carefully to them (2018-2019). Adapted from the Australian Government Productivity Commission - Report on Government Services 2020.

Figure 1 demonstrates that in 2018-2019, WA had a lower proportion of people who reported that nurses always or often listened to them, in comparison to Victoria and Queensland. It must be noted however, that the difference between WA and Victoria was 1.2%, while the difference between WA and Queensland was 1.1%.

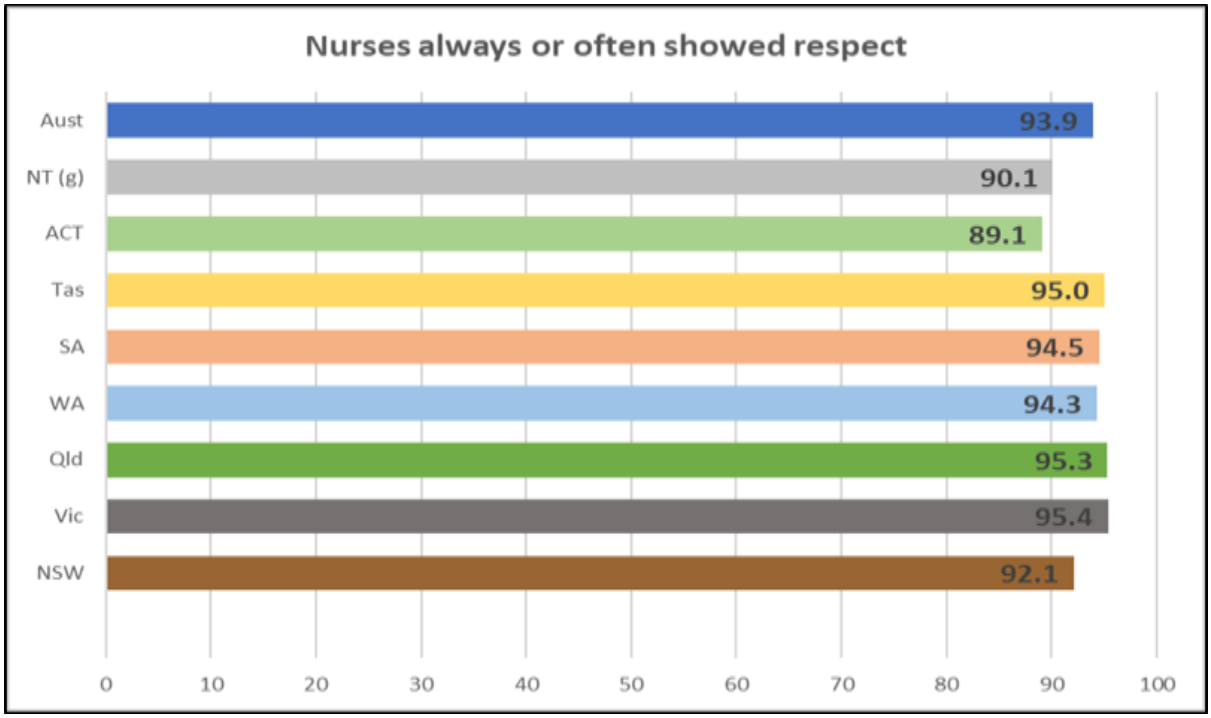

Figure 2: Proportion of people reported that the hospital nurses always or often showed respect to them (2018-2019). Adapted from the Australian Government Productivity Commission - Report on Government Services 2020.

Figure 2 demonstrates that in 2018-2019, WA had a lower proportion of people who reported that nurses always or often showed respect to them, in comparison to Victoria and Queensland. It must be noted however, that the difference between WA and Victoria was 1.1%, while the difference between WA and Queensland was 1.0%.

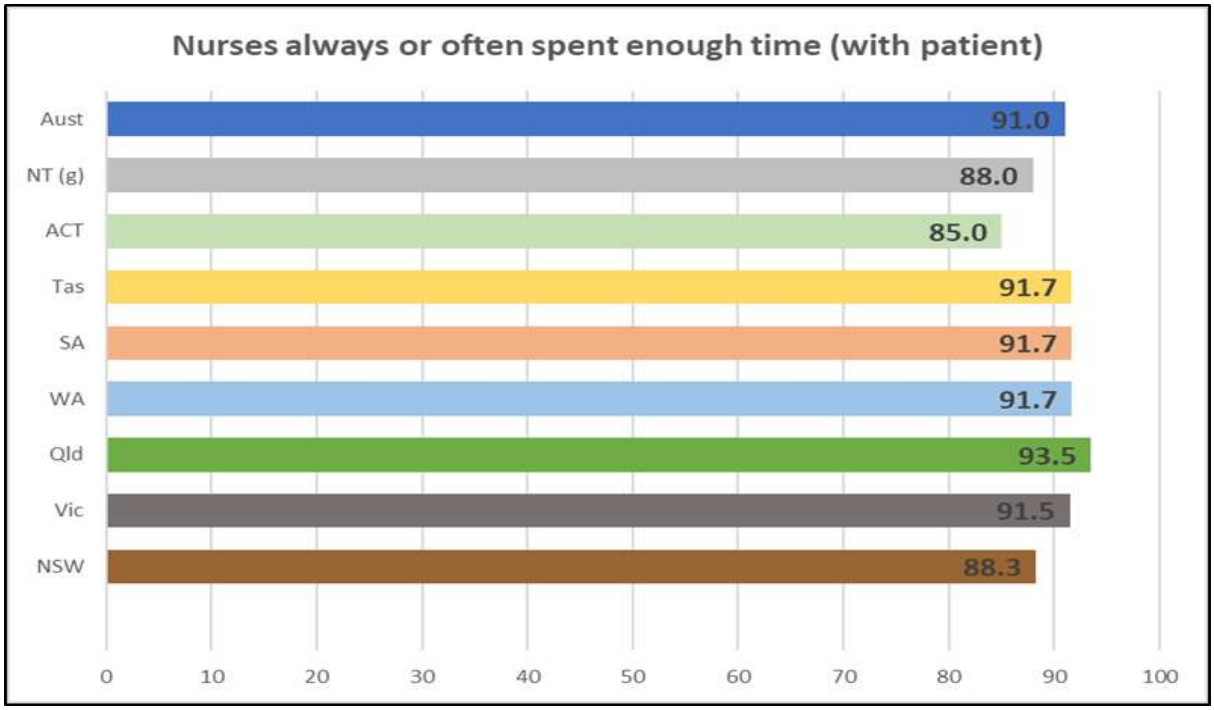

Figure 3: Proportion of people who reported that the hospital nurses always or often spent enough time with them (2018-2019). Adapted from the Australian Government Productivity Commission - Report on Government Services 2020.

Figure 3 demonstrates that in 2018-2019, WA had a lower proportion of people who reported that nurses always or often spent enough time with them, in comparison to Queensland (1.8% difference), but a higher proportion in comparison to Victoria (0.2% difference).

It is important to note the following caveats cited within the Australian Government Productivity Commission - Report on Government Services (2020) in relation to the data presented above:

- *'Data are comparable (subject to caveats) across jurisdictions and over time.*
- *Data are complete (subject to caveats) for the current reporting period.*
- *Persons aged 15 years and over who were admitted to hospital in the last 12 months (excluding persons aged 15-17 years who were interviewed by proxy) reporting the hospital nurses always or often: listened carefully, showed respect, and/or spent enough time with them. Excludes those who responded don't know.*
- *Data are crude rates and may differ from data in previous reports in which rates were age standardised.*
- *Caution should be taken when comparing across ABS surveys and with administrative by-product data that address the access and use of health services.*
- *Data for the NT should be interpreted with caution as the Patient Experience Survey excluded persons resident in the Indigenous Community Strata (ICS). For the 2018-19 reporting period, this comprised about 20 per cent of the estimated resident population of the NT.*
- *Includes inner and outer regional, remote and very remote areas'.*

Summary

Of the three metrics sourced from the RoGS 2020[27] report, the amount of time nurses spend with patients may have the closest association with the workload methodology used to inform minimum workforce staffing. However, it is not possible to determine, or validate, if these results are directly correlated to the nursing workload methodology used to determine minimum staffing numbers in these states.

Restrictive practices

The term 'restrictive practices' is used to refer to interventions that may be used in mental health facilities, with the intent to manage a person's behavior. These include involuntary treatment and the use of seclusion and restraint practices[28].

Working towards reducing, and where possible eliminating, the use of seclusion and restraint is a priority policy area in Australia, which has been supported by changes to legislation, policy and clinical practice, with designated processes for reporting and review.

The AIHW Mental Health Services in Australia report on the national response of the health and welfare service system related to the mental health care needs of Australians.

The *'AIHW Mental Health Services in Australia, 2020 web report'* and the companion publication *'AIHW Mental Health Services in Australia: in brief 2019'*, were accessed to provide comparison data on the use of seclusion and restraint within Australian jurisdictions[28,29], noting that Victorian mental health services are not included within the scope of the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act, 2015*[30].

The Australian Institute of Health and Welfare is attributed as the copyright holder of this data.

Seclusion

Seclusion is defined as '*the confinement of a patient at any time of the day or night, alone in a room or area, from which free exit is prevented'*[31]

[27] Australian Government Productivity Commission, 2020
[28] Australian Institute of Health and Welfare, 2019
[29] Australian Institute of Health and Welfare, 2020
[30] Victorian State Government, 2015
[31] Australian Institute of Health and Welfare, 2019, p.19

Rates of seclusion

The AIHW Mental Health Services in Australia, 2020 (web report) provides the following data and notation in relation to rates of seclusion events in Australia for 2009-2010 to 2018-2019:

'In 2018–19, the Northern Territory had the highest rate of seclusion in public sector acute mental health hospital services with 13.6 seclusion events per 1,000 bed days, compared with New South Wales, which had the lowest (6.0). Seclusion rates have fallen for three of the states and territories, and risen for four jurisdictions between 2017–18 and 2018–19 (Fig 4)*. However, data for smaller jurisdictions should be interpreted with caution as small changes in the number of seclusion events can have a marked impact on their overall seclusion rate.*

Notes: High numbers of seclusion events for a few individuals can have a disproportional effect on the rate of seclusion reported. The increases in the state-wide Tasmanian seclusion rate for 2012–13 and 2013–14 data, and for the ACT in 2017–18 and 2018–19 are due to a small number of clients having an above average number of seclusion events. Victoria's service delivery model produces a higher threshold for acute admission and the seclusion and restraint metrics may be inflated compared to other jurisdictions. Due to the low ratio of beds per person in the NT compared with other jurisdictions, the apparent rate of seclusion is inflated when reporting seclusion per bed day compared with reporting on a population basis'.

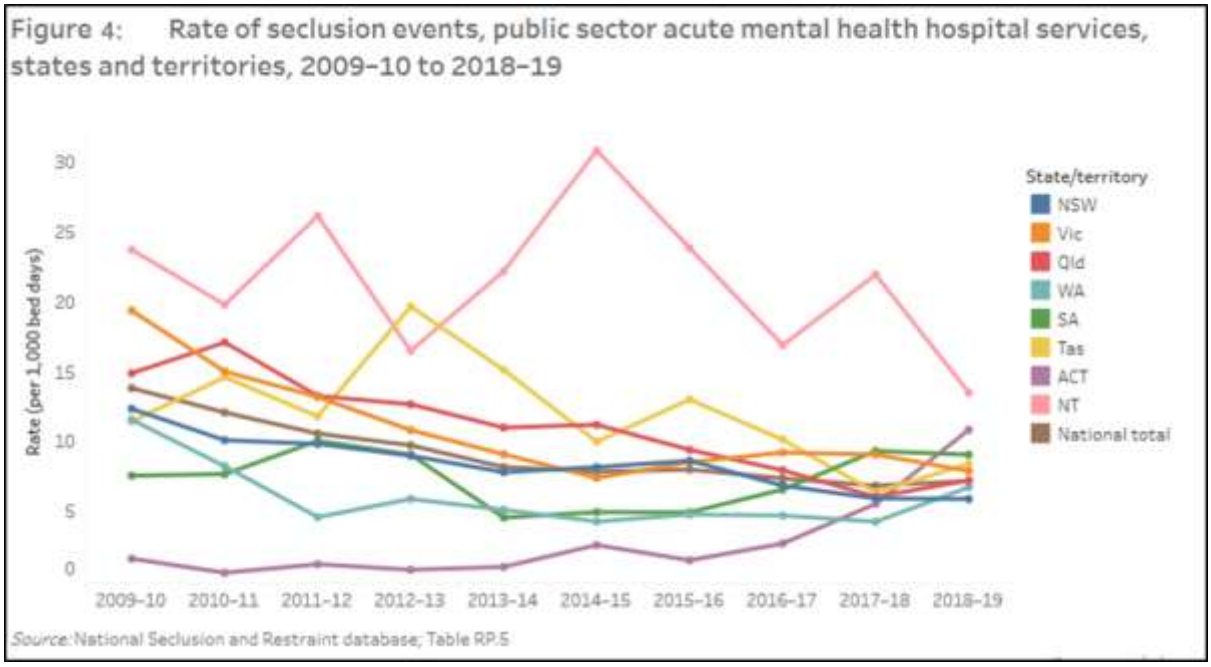

Figure 4: Rates of seclusion events in public acute mental health hospital services by state/territory (2009-10 to 2018-19). Source: Australian Institute of Health and Welfare, Mental Health Services in Australia (Figure RP:2), 2020.

As seen in Figure 4, since 2009, WA has had lower rates of seclusion events per 1,000 bed days compared to Queensland and Victoria.

Frequency and duration of seclusion

The AIHW Mental Health Services in Australia, 2020 (web report) provides the following data and notation in relation to frequency and duration of seclusion events in Australia for 2013-2014 to 2018-2019:

'The average duration of a seclusion event excluding Forensic *services, was 4.2 hours in 2018–19, down from 6.0 hours in 2013–14.* Forensic *service data has been excluded as forensic seclusion events are typically of longer duration, and substantially skew the overall duration average. Victoria reported the longest average seclusion duration of 5.9 hours per seclusion event in 2018–19, compared with South Australia (1.8 hours) which had the shortest* (Fig 5).

Notes:

- *South Australia reported seclusion duration in 4-hour blocks prior to 2018–19; therefore, average duration could not be calculated for South Australia. South Australia is excluded from the national average seclusion duration from 2013–14 to 2017–18 and included in national average seclusion duration for 2018–19. Comparisons of the national average seclusion duration across time should be made with care.*
- *Victoria's service delivery model produces a higher threshold for acute admission and the seclusion and restraint metrics may be inflated compared to other jurisdictions. Higher acuity on admission may be reflected in an inflated average duration for seclusion events compared to other jurisdictions.'*

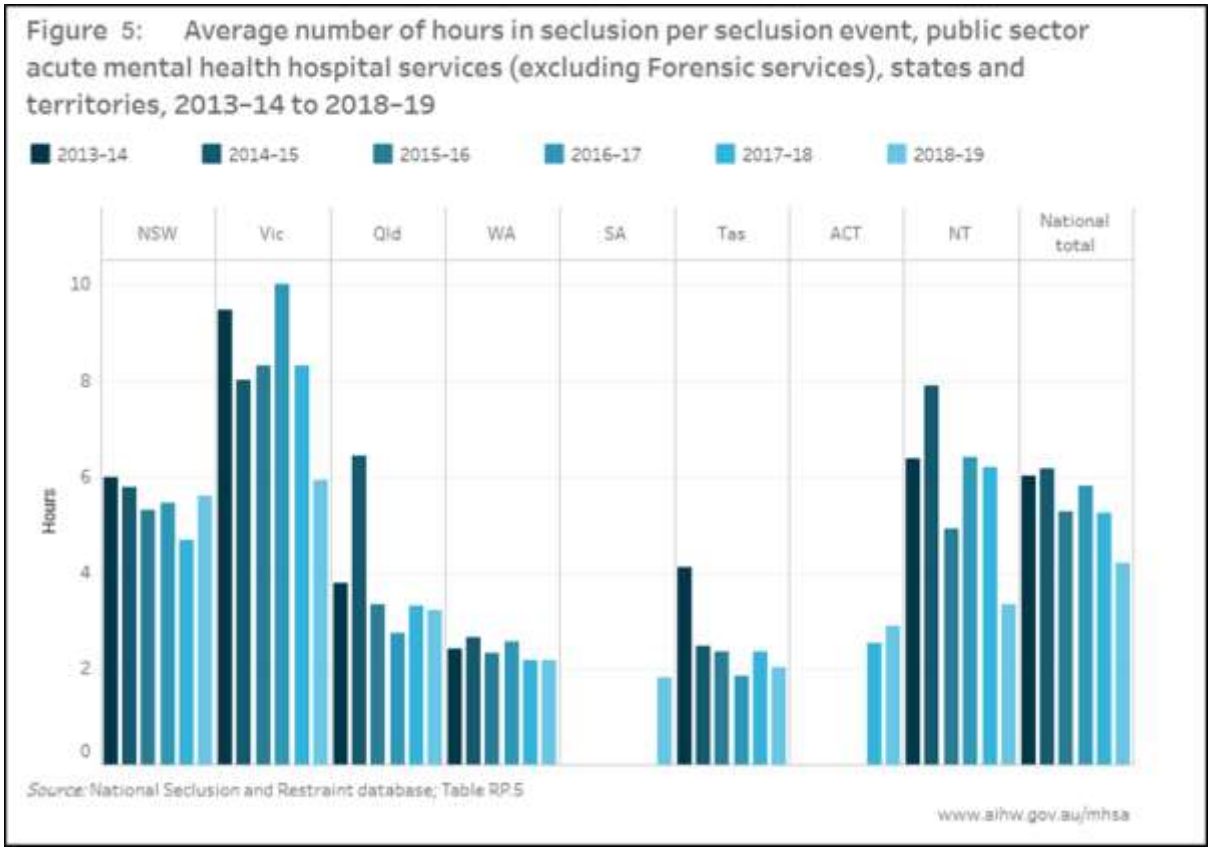

Figure 5: Average number of hours in seclusion per event (2013-2014 to 2018-2019). Source: Australian Institute of Health and Welfare, Mental Health Services in Australia (Figure RP:3), 2020.

As seen in Figure 5, since 2013, WA has had lower average number of hours in seclusion per seclusion event compared to Queensland and Victoria.

Restraint

Restraint is defined as *'the restriction of an individual's freedom of movement by physical or mechanical means'*[32].

The AIHW Mental Health Services in Australia, 2020 (web report) provides the following data and notation in relation to restraint events in Australia for 2018-2019:

'States and territories have different policy and legislative requirements regarding restraint practices and therefore different systems in place for collecting data, and differences in the types of restraint that are reported. In addition, the reporting of restraint data is still a novel exercise, with the first release of data occurring in May 2017. It is expected that data quality will improve over time as information systems are refined and definitions are better understood by the sector. As such, caution should be exercised when interpreting this data and comparing results between states and territories and over time.

In 2018–19, there were 18,690 physical restraint events nationally, which represents 11.3 physical restraint events per 1,000 bed days; mechanical restraint was less common (991 events, representing 0.6 events per 1,000 bed days), (Fig 6)*. Victoria had the highest rate of physical restraint events (24.1 events per 1,000 bed days) and mechanical restraint events (1.3 events per 1,000 bed days). This may be the result of Victoria's service delivery model producing a higher threshold for acute admission and inflating restraint metrics compared to other jurisdictions.*

Notes: *Victoria's service delivery model produces a higher threshold for acute admission and the seclusion and restraint metrics may be inflated compared to other jurisdictions. Victoria uses a specific methodology to derive the total number of restraint events. Queensland's Mental Health Act 2016 came into effect in March 2017. For the 2017–18 collection,* Physical restraint *events were recorded for the first time. However, as a new collection, caution is required when interpreting comparisons over time as these may be reflecting differences in business processes for recording data rather than a true variation in the use of physical restraint'.*

Restraint data 2018-2019

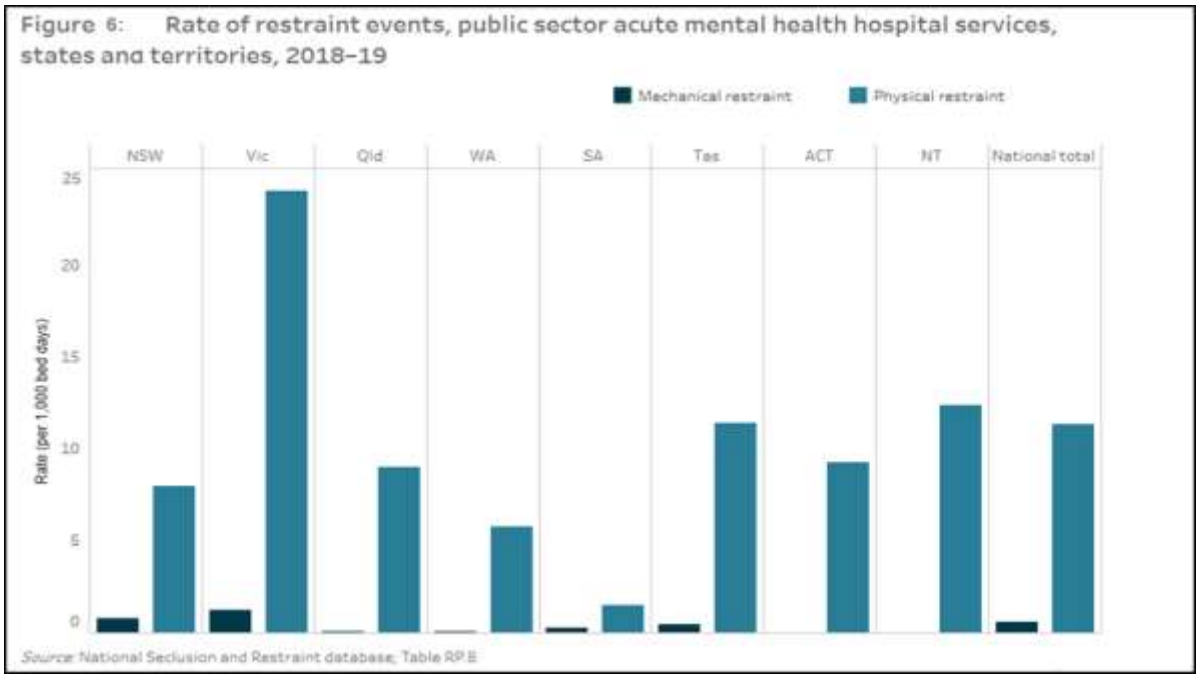

Figure 6: Rate of restraint events in public acute mental health services (2018-2019). Source: Australian Institute of Health and Welfare, Mental Health Services in Australia (Figure RP:6), 2020.

[32] Australian Health Ministers' Advisory Council, 2016

For the 2018-2019 period, WA had lower rates of restraint events per 1,000 bed days compared to Queensland and Victoria (Fig 6).

Seclusion and restraint data 2017-2018

The AIHW Mental Health Services in Australia: in brief report (2019) provides the following information related to seclusion and restraint events, relevant to the 2017-2018 data;

'Nationally, there were 11,315 seclusion events (6 .9 seclusion events per 1,000 bed days) in public sector acute mental health hospital services in 2017–18. The Northern Territory (22 .0 events per 1,000 bed days) had the highest rate of seclusion and Western Australia had the lowest (4 .3)' (page 20), (Fig 7).

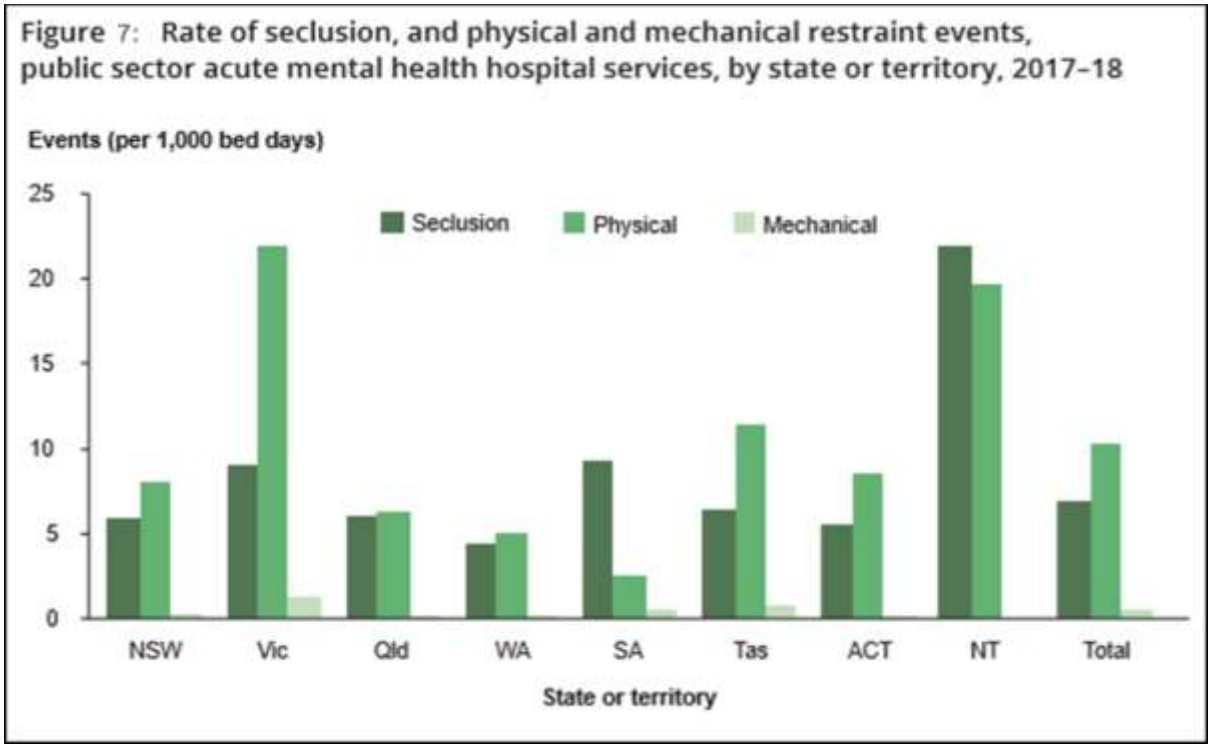

Figure 7: Rate of seclusion, and physical and mechanical restraint events per 1,000 bed days (2017-2018). Source: Australian Institute of Health and Welfare, Mental Health Services in Australia (Figure 12), 2019.

For the 2017-2018 period, WA had lower rates of seclusion and restraint events per 1,000 bed days compared to Queensland and Victoria (Fig 7).

Summary

From the data provided by the AIHW Mental Health Services in Australia, it can be interpreted that compared to Victoria and Queensland, WA had:

- Lower rates of seclusion events per 1,000 bed days (2017-2018 and 2018-2019)
- Lower average number of hours in seclusion per seclusion event (2017-2018 and 2018-2019), and
- Lower rates of restraint events per 1,000 bed days (2017-2018 and 2018-2019).

Although WA performs better than Victoria and Queensland in these performance indicators, is not possible to determine whether these results are in any way related to

the nursing workload methodologies used to determine minimum staffing numbers in these states.

1b. Workforce outcomes

Measures of impact related to nursing/midwifery workforce data was obtained from sources that were either publicly available and/or could be sourced at a system-wide level.

Systematic Review

As previously discussed, the systematic review undertaken by Twigg et al., (2020)[33] reviewed the impact of nurse workload methodologies on nursing workforce (and patient) outcomes.

Six studies assessed nursing workforce outcomes following the implementation of legislated workforce ratios in the USA. Workforce outcomes were measured in relation to staff satisfaction, intent to stay, complaints and verbal abuse, burn out, staff illness and occupational injury. All six studies demonstrated an improvement when associated with the implementation of minimum nurse-to-patient ratios.

The study that reported on the impact following implementation of NHpPD into the WA public health care sector did not examine workforce outcomes. As a result, comparison between the two workload management models was not possible for this metric.

Minister for Health Employment Engagement Survey

Workforce data relevant to the WA public health care sector was obtained from the Minister for Health Employment Engagement Survey, WA Health System Results Report[34].

In 2019 the first of these surveys was conducted in WA to provide a platform for employees to share their opinions about their workplace, with the intent of improving the health system for patients, employees and the community. Repeated in 2020, the results for nursing and midwifery demonstrated an Employee Engagement Index (EEI) of 64%, an increase from the 2019 survey. The EEI is used to measure the positive attitude held by the employee towards the organisation and its values.

Consistent with other health care professions, nursing and midwifery respondents were provided the opportunity to submit qualitative feedback. The 2020 results demonstrated that nurses and midwives in the WA public health care sector identify workload and staffing matters as an area of concern under the theme related to wellbeing.

In line with the intent of the survey, it is imperative that where themes are identified, actions to explore and address them are undertaken. The work undertaken as part of the WA Nursing and Midwifery Workload Models Project, to examine staffing levels and workload methodologies, will provide an opportunity to acknowledge and address these concerns.

[33] Twigg et al., 2020
[34] WA Health, 2020

2. Benchmarking Model

In November 2019, the PCG agreed to undertake a comparison of daily staffing profile numbers and projected annual expenditure to determine the potential outcome variance in WA should nurse/midwife-to-patient ratios, currently operating in Queensland and Victoria, be implemented into this State. The process for benchmarking, and the WA hospitals and wards to be included within scope, were also endorsed at this time.

Methodology

Determination of WA wards within scope

Initially, a total of 41 wards were endorsed, however upon review, several of these wards were unable to be used for benchmarking as they either were not within scope or could not be benchmarked against similar hospitals/wards within Queensland or Victoria. Upon request of the HSPs, and with agreement from the CNM Officer, additional wards were subsequently included within the benchmarking model.

In total, 36 wards, spanning all HSPs, and relevant clinical specialty areas were included within the benchmarking model (Tables 2 and 3).

Table 2: WA wards used for benchmarking per Health Service Provider

Heath Service Provider	**Number of wards used for benchmarking**
Child & Adolescent Health Service	4
East Metropolitan Health Service	7
North Metropolitan Health Service	9
South Metropolitan Health Service	10
WA Country Health Service	6
Total	**36**

Table 3: WA wards used for benchmarking per clinical specialty group

Clinical Specialty Group	**Number of wards used for benchmarking**
General Medical / Surgical	12
Mental Health	5
Maternity	5
Paediatrics	7
Specialty Wards	7
Total	**36**

Process to determine benchmarking against comparable Victorian and Queensland services

The following process was undertaken to determine which Victorian and Queensland services were comparable to those identified in WA, and could therefore be included within the benchmarking model:

- Applying the *Clinical Services Framework (CSF) 2014-2024*[35] to determine the nominated level of service for WA sites
- Reviewing the hospital peer groupings, as per the *AIHW Australian Hospital Peer Groups (2015)*[36*] to determine comparable hospitals across jurisdictions
- Applying the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015*[37] to determine the Victorian Hospital Level
- Applying the *Hospital and Health Boards Regulation 2012*[38] and the *Hospital and Health Boards Amendment Regulation 2016 (No.2)*[39] to determine the Queensland wards subject to minimum nurse-to-patient and midwife-to-patient ratios.

Schedule 1 of the *Safe Patient Care Act 2015* nominates the Victorian public hospitals into Level 1, 2, 3, or 4 hospitals[37]. The application of ratios is dependent on the nominated level of a hospital; e.g. Level 1 hospitals have more nurses/midwives per patient compared to Level 4 hospitals. Using this and the *AIHW Australian Hospital Peer Groups 2015*[36] as a guide, the nominated ratio according to the Victorian Hospital Level could be applied, allowing equitable benchmarking between the WA and Victorian hospitals within scope.

To enable benchmarking with Queensland, the comparable Queensland hospitals, (identified from the *AIHW Australian Hospital Peer Groups 2015*[36]), were cross referenced against the *Hospital and Health Boards Amendment Regulation 2016 (No.2),*[39] which provides a list of wards and facilities in scope for ratios. Unlike the Victorian model, the application of ratios within Queensland is not dependent on the category or level of service provided.

As a result of this process, Victorian and Queensland wards were either included or excluded from the scope of the benchmarking model.

*Note: The *AIHW Australian Hospital Peer Groups* was last revised in 2015, and is used across jurisdictions to group hospitals into peer groups when reporting hospital data, to allow public hospitals to be compared with other public hospitals with similar characteristics. Comparisons with WA hospitals have only been made with the closest matched and current peer groups. Hospitals within the *AIHW Australian Hospital Peer Groups 2015* may no longer be adequately represented, or may not have been included, for example; 'Perth Children's Hospital'. Where this has occurred, the HSPs were consulted to confirm, or nominate the peer grouping.

Process to enable benchmarking of NHpPD against legislated ratios

A process was developed to enable comparison of estimated daily staffing profile numbers and projected annual expenditure should the legislated ratio models, currently operating in Victoria and Queensland, be applied into 36 wards in WA. To

[35] Western Australian Department of Health, 2015
[36] Australian Institute of Health and Welfare, 2015
[37] Victorian State Government, 2015
[38] Queensland Government, 2012
[39] Queensland Government, 2016

enable contemporary and equitable comparison between all jurisdictions, only current legislation, implemented as of 1st March 2020, was used to inform benchmarking.

The process to enable comparison included the following steps:

1. Determine the WA hospital peer grouping (as previously described) and where relevant, apply the Victorian Hospital Level
2. Determine the WA ward bed number and NHpPD profile. Shift staffing profile numbers for each ward were provided by the respective HSPs, as determined using NHpPD methodology
3. Determine the estimated annual expenditure for each WA ward as per the *WA Health System – Australian Nursing Federation - Registered Nurses, Midwives, Enrolled (Mental Health) and Enrolled (Mothercraft) Nurses – Industrial Agreement 2018*
4. If Victoria within scope, determine the staffing profile number using the bed number in accordance with the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015*[40], noting the application of rounding, mixed ward and clinical specialty ratios
5. Determine the projected annual staffing expenditure for the Victorian ward (see 'Assumptions' on page 30)
6. If Queensland within scope, determine the staffing profile number using the bed number in accordance with the *Hospital and Health Boards Regulation, 2012*[41]
7. Determine the projected annual staffing expenditure for the Queensland ward (see 'Assumptions' on page 30)
8. Provide a comparison between estimated daily staffing profile numbers and projected annual expenditure for the WA ward, should either the Victorian or Queensland model be introduced into WA.

To enable more meaningful comparison, the WA wards were grouped into the clinical specialty areas of:

- General medical / surgical
- Mental health
- Maternity
- Paediatrics
- Specialty wards [encompassing acute stroke, haematology, orthopaedics, oncology and rehabilitation (<65 years)].

Further grouping was undertaken to compare all Victorian wards within scope against WA, and all Queensland wards within scope against WA.

In total, 36 wards, representing a cross section of specialities within WA, were used to inform the benchmarking model. Of these, 32 wards were able to be benchmarked against Victorian facilities, and 23 wards were benchmarked against Queensland. This resulted in the review of 55 separate comparisons, the results of which were used to inform the collated and aggregated findings.

[40] Victorian State Government, 2015
[41] Queensland Government, 2012

Assumptions to enable equitable benchmarking

To enable the benchmarking of daily staffing profile numbers and estimated annual expenditure across the three jurisdictions, several assumptions were required to create a logical and equitable baseline:

General Assumptions:

- Benchmarking is reflective of current implemented legislation and practice within each jurisdiction (effective as of 1st March 2020).
- All shifts, across all jurisdictions, are assumed to be paid as a WA Registered Nurse Level 1.8, inclusive of relevant shift penalties as per the *WA Health System – Australian Nursing Federation - Registered Nurses, Midwives, Enrolled (Mental Health) and Enrolled (Mothercraft) Nurses – Industrial Agreement 2018.*
- Coordinators were included for all morning and afternoon shifts, noting:
    - In WA, some night shifts may include coordinators as determined by the individual NHpPD profile for that ward.
    - Allocation of coordinators has been applied according to the *Safe Patient Care Act 2015*[42] *to* reflect current staffing profiles in Victoria.
    - In Queensland, coordinators are applied according to the *Nurse-to-Patient Ratio Compliance Team Leader / Shift Coordinator Principles*[43].
- Shifts do not consider any allowances, overtime or on-call rates.
- Bed numbers are assumed to be the same when comparing individual WA wards with Victoria and Queensland.

WA Assumptions:

- All shift lengths are considered to be: eight hours for the morning shift, eight hours for the afternoon shift and ten hours for the night shift (or 8/8/10). This equates to a 26-hour working day and is reflective of usual operational practice in most WA public facilities. [The overlap of two hours is quarantined by many services to enable uninterrupted nursing/midwifery activity, such as clinical handover, the completion of clinical documentation, professional development, mentoring, interdisciplinary meetings and the provision of patient care that may involve more than one nurse/midwife (for example; high-risk patient escorts, complex clinical procedures, family meetings)].
- For those WA wards where 12-hour shifts operate as standard practice (creating a 24-hour working day), the staffing profile has been adjusted to an 8/8/10 hour roster pattern, to create a 26-hour working day. For example, Ward A operates a 12-hour shift pattern of seven midwives in the day and six overnight. This is equivalent (in terms of staff profile only) of seven staff on the morning shift, seven on the afternoon shift and six on the night shift. Projected annual expenditure was calculated using the 8/8/10 roster pattern (using relevant shift penalties), noting the additional cost of two hours on the night shift.

[42] Victorian State Government, 2015
[43] Queensland Health, 2016b

- NHpPD is a flexible methodology used to determine the number of direct nursing and/or midwifery hours required to meet patient care needs in a specific clinical area. This allows hours to be averaged over rosters to enable greater hours to be provided at periods of higher acuity and fewer hours during periods of lower acuity: as a result, there can be variations in shift patterns across days of the week. Where variations have occurred, the shifts have been averaged to determine a daily staffing profile. The projected annual expenditure is based on the averaged daily staffing profile for these wards.

Victorian Assumptions:

- All shifts in the benchmarking model are inclusive of the 'rounding principle' as per the *Guide to Implementation of the Safe Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Act 2019*[44] (noting this has not been implemented in all facilities in Victoria). Where the number of patients in a ward is not evenly divisible by the number of nurses or midwives following the application of the relevant ratio, one additional nurse or midwife is included to comply with the ratio.
- The application of ratios in Victoria is dependent on several factors, including the hospital level to which they have been applied, the proportion of specialty beds within a ward, and the clinical area to which the ratios are being applied. These clinical areas include, but are not limited to; general medical/surgical wards, palliative care, rehabilitation, acute stroke, oncology, haematology, maternity services (including birthing suites) and emergency departments.
- Where relevant, clinical specialty and mixed ward ratios have been applied as per the *Guide to Implementation of the Safe Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Act 2019*[44].
- All shifts are considered to be eight hours on the morning shift, eight hours on the afternoon shift and ten hours on the night shift (8/8/10), which equates to a 26-hour working day.

Queensland Assumptions:

- Common operational practice in Queensland public health facilities is to staff wards using three equal shift lengths per day of eight hours each, equating to a 24-hour working day (or 8/8/8). As previously discussed, WA operates on a 26-hour working day (8/8/10). This difference makes the comparison of projected annual expenditure between WA and Queensland challenging, as it is difficult to interpret whether any variation is due to the application of the ratio model into WA, or as a result of the reduced night shift lengths in the Queensland model. To enable equitable comparison between WA and Queensland, the Queensland model has been extrapolated to a 26-hour working day model; eight hours on the morning shift, eight hours on the afternoon shift and ten hours on the night shift (8/8/10) to align with WA. Both the 24-hour and 26-hour working day models for Queensland have been presented for review.

[44] Victorian Health and Huma Services, 2019

- Minimum staff ratios, based on the number of beds in each ward have been applied in accordance with the *Hospital and Health Boards Regulation, 2012*[45].
- Application of the *Business Planning Framework*[46] could not be considered in the benchmarking model.

Limitations

The benchmarking model used a high-level approach to determine potential variances in staffing profile numbers and projected annual expenditure if legislated nurse/midwife-to-patient ratio models, currently operating in Victoria and Queensland, were to be introduced into WA. A total of 36 inpatient wards, representing a broad cross section of the WA public health care system was used to inform benchmarking, however it is noted that limitations in interpreting data may occur when using relatively small sample sizes.

Implemented legislation (effective as of 1st March 2020) was used to inform current benchmarking with Victoria and Queensland. Future legislative amendments were not used in the analysis of benchmarking data.

Wards have been grouped to provide aggregated results, allowing for more meaningful comparison between jurisdictions. It is noted that grouping data may have the effect of flattening individual results.

It must be noted that the high-level approach used to undertake benchmarking, and the underpinning assumptions, provide an **estimate only** of staffing variance and projected annual expenditure, should either of the currently implemented legislated nurse/midwife-to-patient ratio models operating in Victoria and Queensland be introduced into WA.

As a result of the above limitations, caution must be exercised when interpreting all data provided from the benchmarking model.

Reliability

All care and due process was exercised when undertaking the benchmark modelling to endeavour equitable and impartial comparison between the wards and jurisdictions within scope.

The HSPs were consulted throughout the benchmarking process to ensure an equitable cross-representation of wards, clinical areas and hospital types reflective of the current WA public health care environment. The HSPs provided assurance on the reliability of ward types, ward bed numbers (and average occupancy), NHpPD data, and daily staffing profile (reflective of morning, afternoon and night shifts) for each ward. The HSPs were also regularly consulted to provide comment and feedback on the methodology used to determine estimated annual expenditure and variance between the jurisdictions.

Considerable consultation occurred with key stakeholders from Queensland and Victoria, most notably from the Queensland Office of the Chief Nursing and Midwifery Officer and the Health and Wellbeing Division within the Victorian Department of

[45] Queensland Government, 2012
[46] Queensland Health, 2016a

Health and Human Services. Although unable to provide formal advice, both the Queensland and Victorian stakeholders were able to confirm:

- The use and application of the *AIHW Australian Hospital Peer Groups (2015)*[47] as the most reliable and current mechanism to support valid comparison between hospitals
- That the nominated WA wards were reflective of comparable wards within the Queensland and Victorian public health care systems
- The methodology used to determine estimated staffing profile was logical and sound
- For Queensland, assurance on the application of the ratios in accordance with the *Hospital and Health Boards Act 2011*[48], the *Hospital and Health Boards Regulation 2012*[49] and the *Hospital and Health Boards (Nursing and Midwifery Workload Management Standard) Notice 2016*[50] noting the assumptions and limitations previously described
- For Victoria, assurance on the application of the ratios in accordance with the *Safe Patient Care Act 2015*[51], the *Safe Patient Care Amendment Act 2019*[52] and the *Safe Patient Care Amendment Bill 2020*[53] noting the assumptions and limitations previously described.

The logic, methodology and calculations used within the benchmarking model to determine the estimated staffing profile numbers and projected annual expenditure for all wards (and ward groupings) was verified by the WA Department of Health Information and System Performance Directorate in July 2020.

2a. Results

The benchmarking process enabled comparison of estimated daily staffing profiles and projected annual expenditure should either of the legislated ratio models be applied into WA. Legislation implemented in Victoria and Queensland as of 1st March 2020 was used to enable contemporary and equitable comparison between all jurisdictions.

In total, 36 wards, representing a cross section of specialities within WA, were used to inform the benchmarking model. Of these, 32 wards were able to be benchmarked against Victorian facilities, and 23 wards were benchmarked against Queensland. This resulted in the review of 55 separate comparisons, the results of which were used to inform the collated and aggregated findings.

When reviewing the results, it is important to note that decimal figures may appear in some WA staffing profile data due to the application of NHpPD in individual wards/units. As previously discussed, NHpPD methodology is inherently flexible, allowing hours to be averaged over rosters, enabling staffing to be adjusted according to patient activity and acuity. To enable benchmarking for some wards, WA weekly hours were required to be averaged to provide a daily figure, which may not have

[47] Australian Institute of Health and Welfare, 2015
[48] Queensland Government, 2011a
[49] Queensland Government, 2012
[50] Queensland Government, 2016
[51] Victorian State Government, 2015
[52] Victorian State Government, 2019
[53] Victorian State Government, 2020

produced a whole number. The calculations for expenditure were derived from the averaged staffing profile for that ward.

Findings from the benchmarking model were presented to the WA Nursing and Midwifery Workload Models PCG in the interim report titled *'WA Nursing and Midwifery Workload Models Project: WA Benchmarking Model - Comparison of WA Nursing Hours per Patient Day against Queensland and Victorian Legislated Ratios, August 2020'.* The PCG endorsed this report and all findings on the 24th September 2020.

2b. Comparison of WA and Victorian wards

There was a total of 32 WA wards which were able to be benchmarked against comparable wards in Victoria. These included general medical/surgical, maternity, paediatric and specialty wards. Mental health wards were unable to be benchmarked against Victoria, as mental health services are not included in the *Safe Patient Care Act 2015*[54].

These wards have been grouped to provide an aggregated comparison between WA (NHpPD) and Victoria (legislated ratios) (Fig 8):

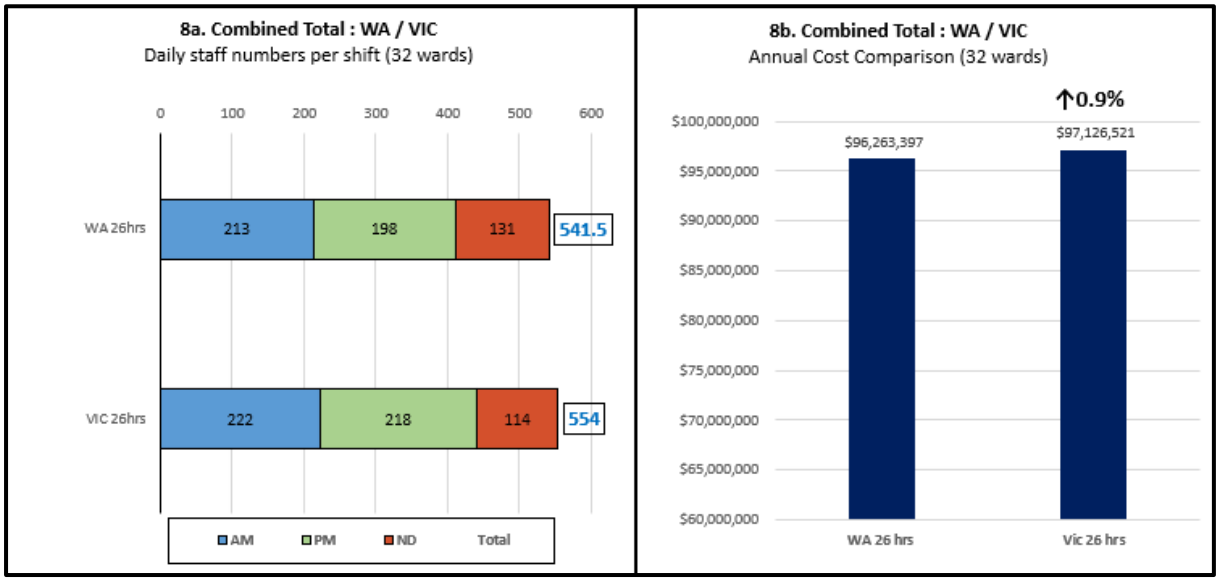

Figure 8: Aggregated comparison of staffing profiles and projected expenditure between 32 wards in WA (NHpPD) and Victoria (legislated ratios)

Across the 32 wards there was a total number of 541.5 nurses/midwives in WA and 554 in Victoria per day.

[54] Victorian State Government, 2015

Applying the ratio model currently implemented in Victoria, into 32 wards in WA would result in:

- A projected increase of 12.5 nursing/midwifery staff, averaged across all three shift types, within the 32 wards in scope. This is in addition to the 541.5 staff currently included in the WA NHpPD model.
    - This equates to an additional 0.13 nurse per shift [12.5 ÷ (32 wards x 3 shifts)]
- An upward variance in annual expenditure of a projected $863,124 (0.9%).

The Victorian model results in increased staffing numbers on the morning and afternoon shifts (nine and 20 respectively), but there is a reduction of 17 staff on the night shift compared to the WA model. As night shift attracts the highest shift penalties, decreasing the number of nurses/midwives rostered onto these shifts would result in a corresponding reduction in expenditure.

2c. Comparison of WA and Queensland wards

There was a total of 23 WA wards which were able to be benchmarked against comparable wards in Queensland. These included general medical/surgical, mental health and specialty wards. Maternity and paediatric wards were unable to be benchmarked against Queensland, as these services are not within the current scope of the *Hospital and Health Boards Regulation 2012*[55].

These wards have been grouped to provide an aggregated comparison between WA (NHpPD) and Queensland (legislated ratios) (Fig 9):

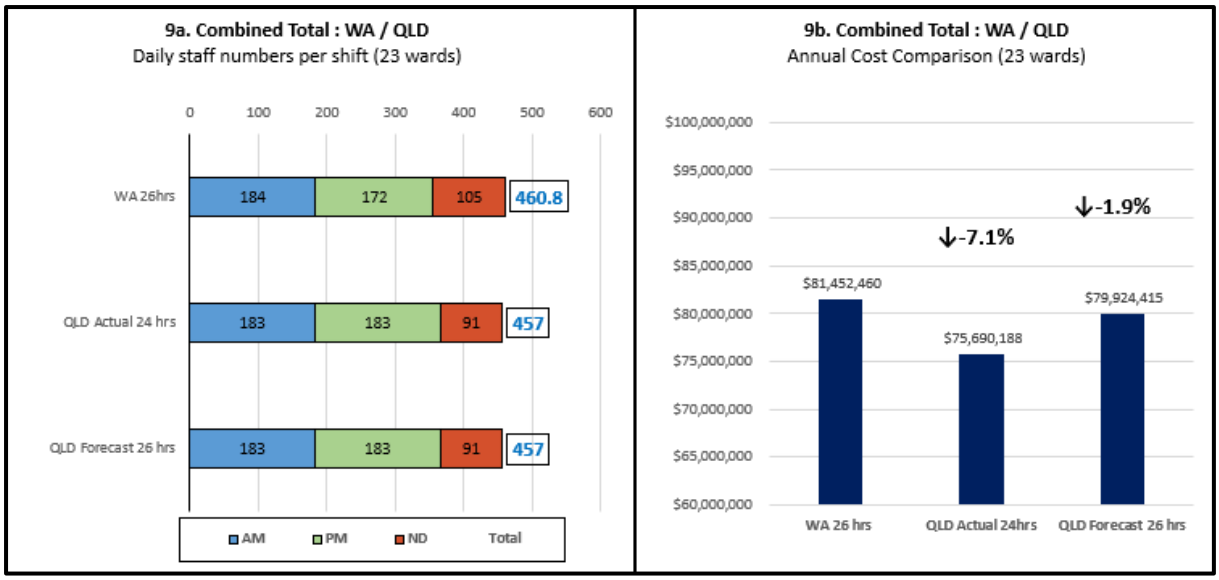

Figure 9: Aggregated comparison of staffing profiles and projected expenditure between 23 wards in WA (NHpPD) and Queensland (legislated ratios)

Across the 23 wards there was a total number of 460.8 nurses/midwives in WA and 457 in Queensland per day.

The majority of Queensland wards operate using a 24-hour working day, whereas most WA wards operate on a 26-hour working day. To enable equitable benchmarking,

[55] Queensland Government, 2012

the Queensland model was extrapolated to a 26-hour model. Expanding the Queensland working day does not impact upon staffing profiles but does impact projected expenditure. When benchmarking the Queensland 26-hour working day model against WA, a clearer reflection of cost variation, due solely to the application of a ratio model, can be seen.

Applying the ratio model currently implemented in Queensland, into 23 wards in WA would result in:

- A projected decrease of 3.8 nursing/midwifery staff per day, averaged across all three shift types, within the 23 wards in scope. This is a reduction from the 460.8 staff currently included in the WA NHpPD model.
    - This equates to a reduction of 0.06 nurse per shift [3.8 ÷ (23 wards x 3 shifts)]
- A downward variance in projected annual expenditure for both Queensland models;
    - 24-hour working day = $5,762,272 (-7.1%) variance
    - 26-hour working day = $1,528,045 (-1.9%) variance, noting this provides a more accurate forecast.

As demonstrated, application of the Queensland ratio model into WA would result in a projected staff decrease of one nurse/midwife on the morning shift, and an increase of 11 staff on the afternoon shift. Of note, however, is the reduction of night shift staff within the Queensland model - a total reduction of 14 staff compared to the WA model. As night shift attracts the highest shift penalties, decreasing the number of nurses/midwives rostered on these shifts would result in a corresponding reduction in staffing expenditure.

2d. Comparison of WA, Victorian and Queensland general medical / surgical wards

There was a total of 12 WA general medical/surgical wards which were able to be benchmarked against comparable wards in both Victoria and Queensland.

These wards have been grouped to provide an aggregated comparison between WA (using NHpPD), Victoria and Queensland (using legislated ratios) (Fig 10):

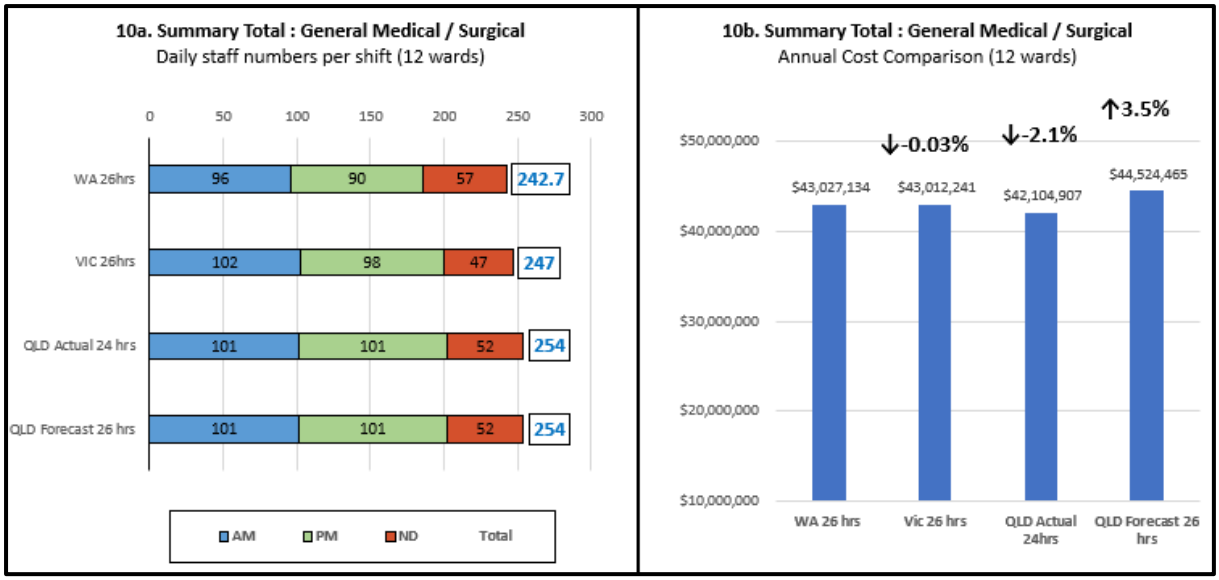

Figure 10: Aggregated comparison of staffing profiles and projected expenditure of twelve general medical/surgical wards in WA (NHpPD), Victoria and Queensland (legislated ratios)

Across the 12 wards there was a total number of 242.7 nurses/midwives in WA, 247 in Victoria and 254 in Queensland per day.

Application of the ratio model currently implemented in Victoria, into 12 general medical/surgical wards in WA, would result in:

- A projected increase of 4.3 nursing/midwifery staff per day, averaged across all three shift types, within the 12 wards in scope. This is in addition to the 242.7 staff currently included in the WA NHpPD model.
    - This equates to an additional 0.12 nurse per shift [4.3 ÷ (12 wards x 3 shifts)]
- A downward variance in annual expenditure of a projected $14,893 (-0.03%).

Application of the Victorian ratio model results in an increase of six staff on the morning shift and eight staff on the afternoon shift. However, there is a reduction of ten night shift staff compared with the WA model.

However, instead of an anticipated corresponding upward variance in expenditure, the projected annual expenditure decreases. The is due to the reduction of night shift staffing, which attracts a higher shift penalty, in comparison to WA.

Application of the ratio model currently implemented in Queensland, into 12 general medical/surgical wards in WA, would result in:

- A projected increase of 11.3 nursing/midwifery staff per day, averaged across all three shift types, within the 12 wards in scope. This is in addition to the 242.7 staff currently included in the WA NHpPD model.
    - This equates to an additional 0.31 nurse per shift [11.3 ÷ (12 wards x 3 shifts)]
- A downward variance in projected annual expenditure for the 24-hour working day model of $922,227 (-2.1%)
- An upward variance in projected annual expenditure for the 26-hour working day model of $1,497,331 (3.5%).

Application of the Queensland ratio model results in increased staffing numbers on the morning and afternoon shifts (five and 11 respectively), but a reduction of five staff on the night shift.

The projected staffing expenditure varies dependent on the application of a 24-hour or the 26-hour working day. The projected 3.5% upward variance provides a more accurate forecast as the 26-hour day Queensland model aligns with WA rostering practice.

2e. Comparison of WA and Queensland mental health wards

There was a total of five WA mental health wards which were able to be benchmarked against comparable wards in Queensland. Benchmarking against Victoria was not possible as mental health services are not included in the *Safe Patient Care Act 2015*[56].

These wards have been grouped to provide an aggregated comparison between WA (NHpPD) and Queensland (legislated ratios) (Fig 11):

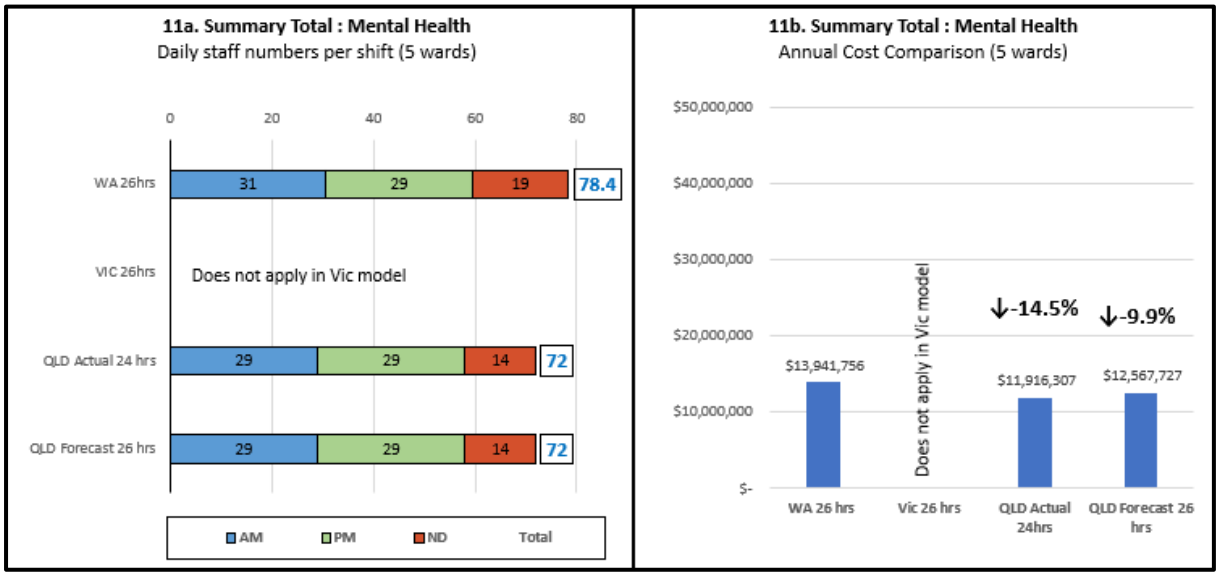

Figure 11: Aggregated comparison of staffing profiles and projected expenditure of five mental health wards in WA (NHpPD) and Queensland (legislated ratios)

[56] Victorian State Government, 2015

Across the five wards there was a total number of 78.4 nurses/midwives in WA and 72 in Queensland per day.

Application of the ratio model currently implemented in Queensland, into 5 mental health wards in WA, would result in:

- A projected decrease of 6.4 nursing/midwifery staff per day, averaged across all three shift types, within the five wards in scope. This is a reduction from the 78.4 staff currently included in the WA NHpPD model.
    - This equates to a reduction of 0.43 nurse per shift [6.4 ÷ (5 wards x 3 shifts)]
- A downward variance in projected annual expenditure for both Queensland models;
    - 24-hour working day = $2,025,449 (-14.5%) variance
    - 26-hour working day = $1,374,029 (-9.9%) variance.

Application of the Queensland ratio model into WA results in a reduction of two staff members on the morning shift and five on the night shift, with equal staff numbers on the afternoon shift in comparison to the WA model.

As application of the Queensland model into WA would result in a projected reduction in staffing, there is a corresponding reduction in expenditure compared to the WA model. The projected reduction varies depending on whether the 24-hour or the 26-hour working day model is applied. As the 26-hour day working model more closely aligns with current WA rostering practice, the projected annual downward variance of 9.9% should be considered a more reliable forecast.

2f. Comparison of WA and Victorian maternity wards

There was a total of five WA maternity wards which were able to be benchmarked against comparable wards in Victoria. Benchmarking against Queensland was not possible as maternity services are not within the current scope of the *Hospital and Health Boards Regulation 2012*[57].

These wards have been grouped to provide an aggregated comparison between WA (NHpPD) and Victoria (legislated ratios) (Fig 12):

[57] Queensland Government, 2012

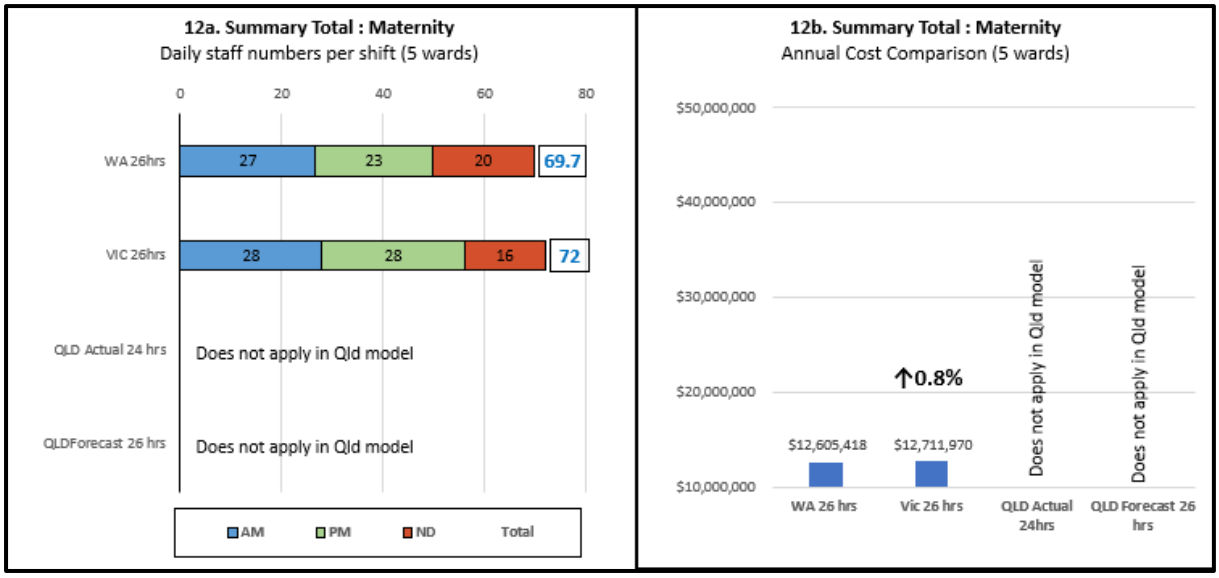

Figure 12: Aggregated comparison of staffing profiles and projected expenditure of five maternity wards in WA (NHpPD) and Victoria (legislated ratios)

Across the 5 wards there was a total number of 69.7 nurses/midwives in WA and 72 in Victoria per day.

Application of the ratio model currently implemented in Victoria, into 5 maternity wards in WA, would result in:

- A projected increase of 2.3 nursing/midwifery staff per day, averaged across all three shift types, within the five wards in scope. This is in addition to the 69.7 staff currently included in the WA NHpPD model.
    - This equates to an additional 0.15 nurse/midwife per shift [2.3 ÷ (5 wards x 3 shifts)]
- An upward variance in annual expenditure of a projected $106,552 (0.8%).

Application of the Victorian ratio model results in an increase of one staff member on the morning shift, five on the afternoon shift, and a reduction of four staff on night shift in comparison to the WA model.

As application of the Victorian model into WA would result in a projected increase in staffing, there is a corresponding projected upward variance in expenditure (0.8% per annum) compared to the WA model.

2g. Comparison of WA and Victorian paediatric wards

There was a total of seven WA paediatric wards which were able to be benchmarked against comparable wards in Victoria. Benchmarking against Queensland was not possible as paediatric services are not within the current scope of the *Hospital and Health Boards Regulation 2012*[58].

These wards have been grouped to provide an aggregated comparison between WA (NHpPD) and Victoria (legislated ratios) (Fig 13):

[58] Queensland Government, 2012

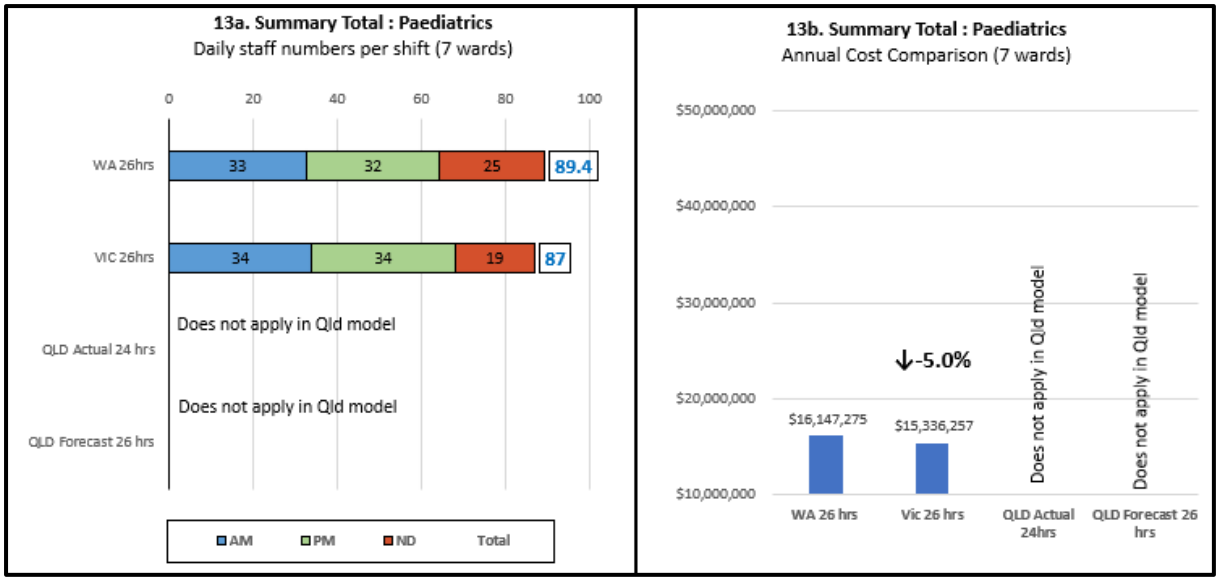

Figure 13: Aggregated comparison of staffing profiles and projected expenditure of seven paediatric wards in WA (NHpPD) and Victoria (legislated ratios)

Across the seven wards there was a total number of 89.4 nurses/midwives in WA and 87 in Victoria per day.

Application of the ratio model currently implemented in Victoria, into 7 paediatric wards in WA, would result in:

- A projected decrease of 2.4 nursing/midwifery staff per day, averaged across all three shift types, within the seven wards in scope. This is a reduction from the 89.4 staff currently included in the WA NHpPD model.
    - This equates to a reduction of 0.11 nurse per shift [2.4 ÷ (7 wards x 3 shifts)]
- A downward variance in annual expenditure of a projected $811,018 (-5.0%).

Application of the Victorian ratio model results in one more staff member on the morning shift and two more on the afternoon shift, however, there is a reduction of six night shift staff in comparison to the WA model.

As application of the Victorian model into WA results in a projected decrease in staffing, there is a corresponding projected downward variance in expenditure (5.0% per annum) compared to the WA model.

2h. Comparison of WA, Victorian and Queensland specialty wards

There was a total of seven WA specialty wards which could be benchmarked against comparable wards in both Victoria and Queensland. The specialty wards in review consisted of haematology, oncology, mixed haematology/oncology, orthopaedics, adult rehabilitation (< 65 years) and acute stroke wards.

These wards have been grouped to provide an aggregated comparison between WA (NHpPD), Victoria and Queensland (legislated ratios) (Fig 14):

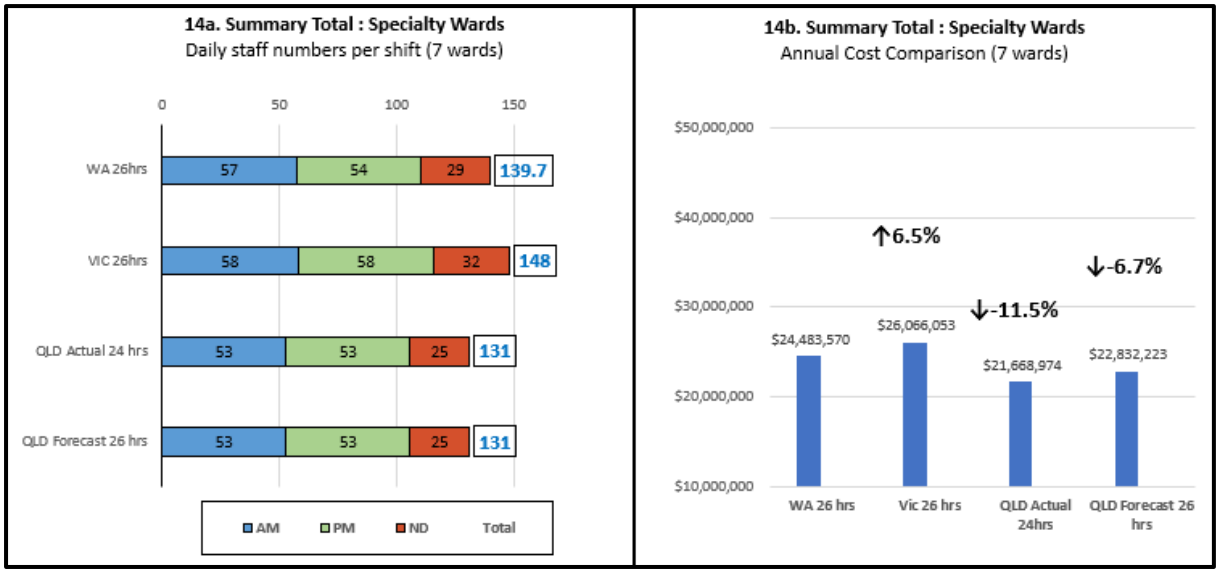

Figure 14: Aggregated comparison of staffing profiles and projected expenditure of seven speciality wards in WA (NHpPD), Victoria and Queensland (legislated ratios)

Across the seven wards there was a total number of 139.7 nurses/midwives in WA, 148 in Victoria and 131 in Queensland per day.

Application of the ratio model currently implemented in Victoria, into 7 specialty wards in WA, would result in:

- A projected increase of 8.3 nursing/midwifery staff per day, averaged across all three shift types, within the seven wards in scope. This is in addition to the 139.7 staff currently included in the WA NHpPD model.
    - This equates to an additional 0.40 nurse/midwife per shift [8.3 ÷ (7 wards x 3 shifts)]
- An upward variance in annual expenditure of a projected $1,582,483 (6.5%).

The application of ratios in Victoria is dependent on several factors, including the proportion of specialty beds within a ward, and the clinical area to which the ratios are being applied. The *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Act 2019*[59], and the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Bill 2020*[60], has resulted in an expansion of nurse/midwife-to-patient ratios in various clinical specialty wards.

Compared to WA, application of the Victorian model for speciality wards results in an increase in staff across all shift types - one on the morning shift, four on the afternoon shift and three on the night shift, across the seven wards in scope. Of note, the specialty wards have been the only area where the Victorian legislated ratios have resulted in more night shift staff compared to the WA NHpPD model.

[59] Victorian State Government, 2019
[60] Victorian State Government, 2020

Application of the ratio model currently implemented in Queensland, into 7 specialty wards in WA, would result in:

- A projected decrease of 8.7 nursing/midwifery staff per day, averaged across all three shift types, within the seven wards in scope. This is a reduction from the 139.7 staff currently included in the WA NHpPD model.
    - This equates to a reduction of 0.41 nurse per shift [8.7 ÷ (7 wards x 3 shifts)]
- A downward variance in projected annual expenditure for both Queensland models;
    - 24-hour working day = $2,814,596 (-11.5%) variance
    - 26-hour working day = $1,651,347 (-6.7%) variance.

Application of the Queensland model would result in a reduction of four staff on morning shift, one on afternoon shift and four on night shift.

The application of the Queensland model into WA results in an overall projected reduction in staffing, however the projected expenditure varies depending on whether the 24-hour or the 26-hour working day model is applied. As the 26-hour day working model more closely aligns with WA current practice, the projected 6.7% reduction in expenditure per annum is considered a more accurate forecast.

3. Background review

Professor James Buchan was engaged by the CNM Office in June 2018 to undertake a review of local and 'front line' experiences with the current approach to nurse and midwife staffing in WA. Titled *'Nursing hours per patient day (NHpPD) in Western Australia: stakeholder views and the evidence base. Background review for the Chief Nursing and Midwifery Office, Department of Health, Western Australia'*[61], the paper provides a synopsis of NHpPD in WA by exploring local experiences and the broader contextual background. The PCG agreed to consider the findings of this report in the context of informing the WA Nursing and Midwifery Workload Models Project.

In the report, Buchan (2019) discussed outcomes based on the synthesis of information obtained through feedback from stakeholder meetings, where approximately 90 individuals from across the WA health system were interviewed one-to-one, or as participants in focus groups. This was underpinned by a review of the published evidence on different approaches to determining nurse/midwife staffing, with an emphasis on NHpPD.

Participants identified key strengths of the NHpPD methodology as; the flexibility of design, which allows predictive roster and shift planning, and the ability to benchmark with other services.

The review also identified a range of issues which were reported as limitations of the NHpPD model and reflect the limitations previously discussed in this project report.

The review of evidence undertaken by Buchan (2019) highlighted a relatively strong body of evidence which focuses on the early years of implementation of NHpPD in WA. The review also gave consideration to the evidence base on nursing and

[61] Buchan, 2019

midwifery staffing in other jurisdictions, identifying the main approaches used to determine nursing and/or midwifery staffing in high income countries similar to Australia. These include:

- Fixed / mandatory nurse to patient (or nurse to bed) ratios
- Calculating the number of staff per occupied bed, or by patient day
- Calculating the number of nursing hours per patient day (NHpPD); and/or based on estimates of patient acuity or dependency
- Determining a skill / staff mix (usually expressed as a percentage requirement for registered nurses), using timed-task / activity approaches
- Data regression-based systems
- Professional judgement or expert opinion-based approaches.

Buchan (2019) noted that that there are no recent national or international studies that provide a comprehensive report on the frequency of use of these different approaches in determining nursing or midwifery staffing levels in any jurisdiction. Nor were there any comparative studies that detailed the relative strengths and weaknesses of different methodologies. Buchan (2019) noted weak and fragmented international evidence base on the relationship between staffing levels, costs, patient care activities, and outcomes. Furthermore, many factors that act on local staffing levels are context specific, and can vary site by site, and country to country (e.g. staffing profiles and skills levels, work practice environment, healthcare system, funding and organisation, culture, legislation and regulation). This restricts the scope for comparing across jurisdictions and countries, as there will always be a need to take account of, and control for context[62].

Of note, it was found that most approaches to determine staffing had been developed for use in general, acute healthcare settings. Although many models, such as NHpPD, have been expanded to encompass other nursing or midwifery settings, application in these contexts may have limitations. There has been progress in developing methods or prototypes for use in other care environments, for example mental health, community settings, maternity services and for application in nursing homes. Buchan (2019) noted that adopting specific methodology to support defined clinical services may warrant further exploration in the WA public health context, particularly for maternity services, where NHpPD has been shown to have limitations in relation to adaptability and application.

The findings of the review by Buchan (2019) found three possible options for determining the optimal nurse/midwife staffing methodology in WA:

1. Maintain the existing NHpPD methodology, making some minor adjustments to the approach. This would have the benefit of limited disruption, however, would be unlikely to meet staff expectations, nor would it address the identified limitations of the methodology.

2. Determine that the current NHpPD approach is unfit for purpose to the extent that an alternative approach would need to be developed and implemented. It is noted that this would be a major undertaking, with significant resource and time implications. Furthermore, the evidence review undertaken by Buchan (2019) did not point to a single clear working alternative that would necessarily

[62] Buchan, 2019

be more effective; nor would this option match the expressed views of the majority of staff interviewed as part of the review.

3. Maintain the existing NHpPD methodology, making significant amendments to ensure it is fit-for-purpose, and reflective of patient acuity and contemporary models of care. This would have the benefit of building upon the existing strengths of the current approach and would meet the preference of the majority of staff involved in the engagement process. Additionally, reviewing and updating the existing NHpPD methodology would cause the least amount of disruption to the WA public health system.

Irrespective of which of the three options is to be pursued, workforce methodology models must align to the principles of evidence-based safe staffing, to support WA nurses and midwives in delivering safe, high-quality and sustainable health care.

Considerations

Undertaking the WA Nursing and Midwifery Workload Models Project has highlighted several aspects of workforce staffing, which must be considered separately from the formal project results. These include application of NHpPD in maternity services, reporting NHpPD for rural and remote services within WACHS, and consideration of other factors which influence safe staffing decisions.

Maternity services

During the course of this project it became apparent that NHpPD methodology does not support the unique breadth and complexity of maternity services. Indeed, articulating the nursing and midwifery hours required to care for an infant and mother, and to support the diverse models of care within maternity services, is recognised nationwide as an area of concern[63].

Consultation and engagement with senior midwives from WA highlighted the disparity of workload in maternity services in relation to the lack of inclusion of unqualified babies in determining NHpPD. Although often requiring care and intervention, in most cases newborn babies are categorized as unqualified and therefore are not included as a patient in the bed numbers. This often results in the allocated midwife caring for two 'patients' (the mother and baby), although staffing numbers as determined by NHpPD, only provide equivalent midwifery hours to provide care for one.

In 2015, Victoria was the first state to legislate minimum nurse/midwife-to-patient ratios with the introduction of the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015*[64]*.* The Act prescribes mandatory minimum requirements for nursing and midwifery staffing levels in specified clinical settings.

In the report by Buchan[65], adequacy of the Victorian legislated ratio model to provide sufficient midwifery hours to enable provision of care to both mothers and infants, was highlighted as an issue. It must be noted however that recent amendments to the *Safe Patient Care Act 2015*[66]*,* namely the *Safe Patient Care (Nurse to Patient and Midwife*

[63] Queensland Health, 2018
[64] Victorian State Government, 2015
[65] Buchan 2019
[66] Victorian State Government, 2015

to Patient Ratios) Amendment Act 2019[67] and the *Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Amendment Bill 2020*[68]*,* will result in the expansion of nurse/midwife-to-patient ratios in various clinical wards and settings.

In 2016, the Queensland Government legislated minimum nurse/midwife-to-patient ratios in the state's public acute adult medical and surgical inpatient wards, which has been subsequently expanded to include acute adult mental health and residential aged care services in prescribed facilities. Although the *Nursing and Midwifery Workload Management Standard, Hospital and Health Boards Act, 2011*[69] provides notional ratios for the minimum numbers of nurses or midwives for a ward, maternity services are currently not included within the scope of the Queensland nurse/midwife-to-patient ratios.

In 2018, Queensland Health published an addendum to the BPF specific for maternity services. The *'Business Planning Framework: a tool for nursing and midwifery workload management. Maternity Services Addendum'* was developed in recognition of the unique challenges for midwives and nurses working in maternity services in that State*[70]*. The Addendum states that for the Queensland public health sector, *'application of Midwifery/Nursing Hours per Patient Day (NHPPD) or Midwifery/Nursing Hours per Occasions of Service (NHPOS) or Midwifery/Nursing Hours per Unit of Activity (NHPUA) does not provide an adequate representation of the full scope of activity and or/acuity demands upon the midwifery and nursing workforce in the maternity setting'*[71]*.*

The Addendum articulates the requirement to calculate the number of nursing/midwifery productive hours, incorporating both direct and indirect activities, that may not regularly occur in other health settings. In conjunction with the BPF, these requirements further emphasise the importance of professional judgement in the calculation of productive midwifery/nursing hours.

In 2011, the Health Department of New South Wales (NSW) and the NSW Nurses and Midwives Association committed to the adoption of Birthrate Plus® (BR+) as the preferred tool for calculating the required midwifery workforce in NSW maternity services[72].

Specific for maternity services, BR+ is a widely used workload methodology with enhanced application tailored for maternity services. BR+ measures the workload for midwives arising from the needs of women, from initial contact in pregnancy until final discharge from midwifery care. It measures the demand for midwifery care through the retrospective allocation of women and babies to five outcome categories, which are based on a composite of clinical factors of process and outcome. It then calculates the number of hospital and community midwives required to meet this demand[73]. BR+ is based on the total activity, not just the number of births per unit, needed to meet the needs of women including:

- All antenatal and postnatal care

[67] Victorian State Government, 2019
[68] Victorian State Government, 2020
[69] Queensland Government, 2011b
[70] Queensland Health, 2018
[71] Queensland Health, 2018, p. 4
[72] NSW Ministry of Health, 2012
[73] Birthrateplus, n.d.

- Antenatal outpatient activity
- Antenatal inpatient activity and ward attenders
- Delivery in all settings
- All postnatal care in hospital[74].

BR+ is widely used in the United Kingdom. Endorsed by the National Institute for Health and Care Excellence (NICE), it supports the majority of components within the NICE guideline on *'Safe midwifery staffing for maternity settings'*, necessary for the determination of maternity staffing requirements[75].

Regardless of the outcomes from this project, the unique context of maternity services in WA must be considered and an appropriate methodology implemented, which best supports WA nurses and midwives to provide optimum care, in alignment with the principles of evidence-based safe staffing.

Rural and remote services

All WACHS sites are expected to comply with the principles of evidence-based safe staffing to deliver high quality and safe patient care, and meet anticipated service demands, in alignment with relevant regulatory frameworks and industrial agreements[76]. However, it is acknowledged that anticipating the minimum number of nurses and/or midwives required, and ensuring the availability of this workforce provide unique challenges, particularly for rural and remote services.

As previously discussed, state-wide NHpPD data is collated centrally through a reporting tool supported through HSS, which provides an overview of NHpPD across WA Health. Although useful for metropolitan hospitals, the HSS tool has limited functionality in rural and remote services within WACHS as it is unable to consistently report NHpPD. This is due to several factors, including:

- Varied configuration arrangements, including cost centre numbers aligned to multiple WebPAS locations
- Small wards, or work environments where NHpPD may not accurately reflect;
    - high patient turnover
    - mixed specialties (with variable patient acuity)
    - unpredictable workflow, or
    - small numbers of staff.

It is noted that these issues may not be isolated to rural and remote services. Small wards within metropolitan hospitals can face similar challenges, whereby NHpPD may not accurately reflect minimum staff numbers required to maintain patient safety.

To accurately report the number of nursing/midwifery hours used, WACHS sites are required to manually enter NHpPD data into the Nursing Workload Monitoring System Program. Regional Resource Centres, Integrated District Health Services and nominated Small Hospitals, report NHpPD through a manual upload process each month. A total of 42 small hospital sites within WACHS (where staffing is based on the principles of safe staffing, and not directly correlated to the number of inpatients), report directly to the WACHS Central Office each month. The report details the hours

[74] Birthrateplus, n.d.
[75] National Institute for Health and Care Excellence, 2015
[76] WA Country Health Service, 2017

used and any events or circumstances which may have impacted upon the number of nurses/midwives used within that time period.

Regardless of the outcomes from this project, the unique context of rural and remote services in WA must be taken into account. Ongoing workload management planning must take into consideration bespoke workload methodology models, which best support the delivery of safe, high quality and sustainable health care for rural and remote communities in this State.

Decisions affecting safe staffing

Although using different methodology, both the NHpPD and legislated ratio models provide a systematic process to identify and report the minimum number of direct nursing and/or midwifery hours required to meet patient care needs in specific clinical areas. While both of these models provide the *minimum* number of nursing/midwifery hours required, it is well recognised that calculating minimum workforce numbers is just one of many critical factors which influence the provision of safe and effective care.

There is a growing body of evidence that links nurse and/or midwife staffing decisions to the prevention and reduction of a range of hospital acquired patient conditions, with significant impact on patient morbidity and mortality, length of stay, cost of consumables and the overall cost of care[77].

One of the most important responsibilities of the nurse/midwife leader is to use professional judgement and clinical decision-making when planning and allocating nurses/midwives to deliver patient care. This is undertaken in alignment with the principles of evidence-based safe staffing and in consideration of the available resources, including the skill, knowledge and experience of the workforce.

Along with minimum workforce numbers there are a number of important factors which must be considered in staffing decisions. These include:

- skill mix of rostered nurses and midwives
- ratio of clinical nurses/midwives or registered nurses/midwives to enrolled nurses
- ratio of novice, experienced and expert nurses/midwives
- acuity of patients, exceptional patient safety or management considerations
- ward activity information, such as predicted occupancy
- supervision requirements of novice staff and students
- appropriate shift coordination and management.

Of significance, when determining the most suitable workload methodology, the calculation of workforce numbers must not be considered in isolation. The provision of safe, efficient and effective nursing and midwifery care must take into account the complexity of clinical care and most appropriate use of available resources, including the expertise, knowledge and skill of the workforce.

[77] Twigg, Duffield, Brenner, Rapley, & Finn, 2010

Discussion

Central to the WA Nursing and Midwifery Workload Models Project was the consideration of a range of impact measures, to determine if variances in performance between WA, Victoria and Queensland could be attributed to the underpinning nursing/midwifery workload management models used to determine minimum staffing numbers in these states. To inform this review, an analysis of patient safety and quality metrics, and workforce data, was undertaken across the jurisdictions. Likewise, a comparison of daily staffing profile numbers and projected annual expenditure was undertaken to determine the potential outcome variance in WA, should either of the nurse/midwife-to-patient ratio models be implemented.

Measures of Impact

There is a large body of evidence which supports that increases in nursing and midwifery staffing results in improved outcomes, both for patients and for the nursing/midwifery workforce. There is however, a paucity of evidence which compares the impact of nursing/midwifery workload management models on patient and workforce outcomes.

The systematic review by Twigg et al., (2020)[78] found both limited and inconsistent evidence that a specific nursing/midwifery workload methodology impacts upon patient or workforce outcomes. It found that whilst the evidence supports that improvements in nursing/midwifery staffing results in improved patient and workforce outcomes, these improvements could not be attributed to the type of workload methodology used.

The authors found that *'the current evidence regarding staffing methodologies cannot point to any methodology as being better than another'*[79]*.* They further suggest that comparative studies between staffing methodologies, using robust research methodology and clearly defined parameters, are needed to better understand how workload methodologies impact upon patient or nurse outcomes - and how best to achieve appropriate staffing in the interests of safe, high-quality and sustainable health care.

Health Roundtable was commissioned to conduct an analysis to determine variances in hospital performance (between WA, Victoria and Queensland) that may be influenced by nursing/midwifery workload management models. A comparative analysis was performed on 26 clinical indicators related to patient safety and quality outcomes, with aggregated and de-identified results provided for the WA, Victorian and Queensland hospitals.

In their report; *Nurse Workforce Methodology Review: WA Health - Hospital Benchmarks and Performance Indicators 2020*, Health Roundtable found there was '*no commonality or pattern of results that indicate one states' performance is consistently or materially different to the other*'[80] and as a result found it highly unlikely that variances in hospital performance between the three states could be attributed solely to nursing workload management models.

Patient satisfaction data, sourced from the *Australian Government Productivity Commission - Report on Government Services 2020*, shows that in 2018-2019, WA

[78] Twigg et al., 2020
[79] Twigg et al., 2020, p. 26
[80] Health Roundtable, 2020, p. 36

had a lower proportion of people who reported that nurses listened and showed respect to them, in comparison to Victoria and Queensland. It must be noted however, that the variance in results related to listening was less than 1.3% across all jurisdictions, whilst the variance in results related to showing respect was less than 1.2%[81].

For the criteria related to the amount of time spent with patients; in 2018-2019, WA had a lower proportion of people who reported that nurses spent enough time with them compared to Queensland (1.8% difference), but a higher proportion compared to Victoria (0.2% difference)[81]. It can be argued that of the three patient satisfaction metrics reviewed, the amount of time nurses spend with patients may have the closest association with the workload management methodology used to inform minimum workforce staffing. However, it is not possible to substantiate if any of these results can be solely attributed to the nursing workload management models used in these states.

Performance outcomes on seclusion and restraint obtained from the AIHW Mental Health Services in Australia demonstrated that in 2017-2018 and 2018-2019, WA had lower rates of seclusion and restraint (per 1,000 bed days), and fewer average hours in seclusion, compared to data for the same periods in both Victoria and Queensland[82,83]. Although these results are favorable for WA, caution is advised in attributing these improvements in outcomes solely to the nursing workload management methodology used to determine minimum staffing numbers.

Measures of impact related to workforce were also examined, from both the systematic review[84] and the *WA Health, Minister for Health Employment Engagement Survey 2020*[85].

The systematic review examined six studies that demonstrated improvement in nursing workforce outcomes, which were associated with implementation of minimum nurse-to-patient ratios in the USA. However, as there are no comparison studies which review workforce outcomes following implementation of NHpPD, caution should be applied when interpreting these results. While the systematic review supports that improvements in staffing levels result in improved patient and nursing/midwifery outcomes, changes in performance outcomes could not necessarily be attributed to the workload methodology used to determine minimum staffing numbers[84].

Results from the *WA Health, Minister for Health Employment Engagement Survey 2020*, identified that workload management and staffing matters is an issue of concern for WA nurses and midwives[85]. The outcomes of the WA Nursing and Midwifery Workload Models Project will provide an opportunity to acknowledge and address these concerns.

Benchmarking Model

Benchmarking was undertaken to determine variances in daily staffing profile numbers and projected annual expenditure should nurse/midwife-to-patient ratios, currently operating in Queensland and Victoria, be implemented into WA. Legislation

[81] Australian Government Productivity Commission, 2020
[82] Australian Institute of Health and Welfare, 2019
[83] Australian Institute of Health and Welfare, 2020
[84] Twigg et al., 2020
[85] WA Health, 2020

implemented as of 1st March 2020 was used to enable contemporary and equitable comparison between all jurisdictions.

The methodology used to enable benchmarking with Victoria and Queensland was supported during consultation with these jurisdictions. The logic and reliability of the benchmarking model was confirmed by the WA Department of Health Information and System Performance Directorate.

A total of 36 wards, representing general medical/surgical, mental health, maternity, paediatrics and clinical specialty wards were used to inform the benchmarking model. Of these, 32 wards were able to be benchmarked against Victorian facilities, and 23 wards were benchmarked against Queensland. This resulted in the review of 55 separate comparisons, the results of which were used to inform the collated and aggregated findings.

Comparison with current Victorian legislated ratios

There was a total of 32 WA wards which could be benchmarked against comparable wards in Victoria. These included general medical/surgical, maternity, paediatric and clinical specialty wards.

On review of the overall state results, the findings demonstrate that if WA were to introduce the nurse/midwife-to-patient ratio legislation currently operating in Victoria into 32 inpatient wards, an estimated 12.5 additional staff per day would be required. This equates to an additional 0.13 nurse per shift and would result in an upward 0.9% variance in projected annual expenditure (Fig 8).

When comparing the results for the ward groupings between WA and Victoria, some variances can be observed, most noticeably for the paediatric and clinical specialty areas.

There was a total of seven WA paediatric wards which were able to be benchmarked against comparable wards in Victoria. If the Victorian legislated ratio model were to be introduced into these paediatric inpatient wards, WA would realise an estimated reduction of 2.4 staff per day (averaged across 7 wards). This equates to a reduction of 0.11 nurse per shift, with a projected downward variance in annual expenditure of 5.0% (Fig 13).

There was a total of seven WA specialty wards which could be benchmarked against comparable wards in both Victoria. The specialty wards in review consisted of haematology, oncology, mixed haematology/oncology, orthopaedics, adult rehabilitation (< 65 years) and acute stroke wards. When applying the Victorian legislated ratios into these specialty wards in WA, an estimated 8.3 additional staff per day (averaged across 7 wards) would be required. This equates to an additional 0.40 nurse/midwife per shift and a 6.5% upward variance in projected annual expenditure (Fig 14). Of note, the specialty wards were the only area where the Victorian legislated ratios resulted in more night shift staff compared to the WA NHpPD model.

Minor variance between Victoria and WA was demonstrated for the grouped areas of general medical/surgical and maternity.

There was a total of 12 WA general medical/surgical wards which were able to be benchmarked against comparable wards in Victoria. Application of the Victorian ratio model into the grouped medical/surgical wards in WA would result in an estimated

increase of 4.3 staff per day (averaged over 12 wards), equating to an additional 0.12 nurse per shift. However due to the reduced number of night shift staff in the Victorian model, projected expenditure would decrease by 0.03% (Fig 10).

There was a total of five WA maternity wards which were able to be benchmarked against comparable wards in Victoria. Results for these wards demonstrate that implementing the Victorian model into WA would result in an estimated increase of 2.3 staff per day (averaged across 5 wards). This equates to an additional 0.15 nurse/midwife per shift and would realise a projected upward variance in expenditure of 0.8% per annum (Fig 12).

Comparison with current Queensland legislated ratios

There was a total of 23 WA wards which were able to be benchmarked against comparable wards in Queensland. These included general medical/surgical, mental health and specialty wards.

On review of the overall state results, if WA were to introduce the nurse/midwife-to-patient ratio legislation currently operating in Queensland, an estimated reduction of 3.8 staff per day (averaged across 23 wards) would be required, equating to a reduction of 0.06 nurse per shift. This would result in a downward variance in projected annual expenditure for both Queensland models [24-hour working day (7.1%); 26-hour working day (1.9%)] (Fig 9). The projected 1.9% downward variance provides a more accurate forecast as the 26-hour working day model aligns with current WA rostering practice.

When comparing the results for the ward groupings between WA and Queensland, variances can be observed in the general medical /surgical, mental health and clinical specialty groupings.

There was a total of 12 WA general medical/surgical wards which were able to be benchmarked against comparable wards in Queensland. If the current Queensland legislated ratio model were to be introduced into these wards, WA would require an additional 11.3 staff per day (averaged across 12 wards), equating to an increase of 0.31 nurse/midwife per shift. Application of the 24-hour working day model would see a projected downward variance of 2.1%, however the projected annual 3.5% upward variance in the 26-hour working day model provides a more accurate forecast (Fig 10).

There was a total of five WA mental health wards which were able to be benchmarked against comparable wards in Queensland. When comparing results for these wards, application of the Queensland legislated ratio model would see an estimated reduction of 6.4 staff per day (averaged over five wards). This equates to a reduction of 0.43 nurse per shift, with a corresponding reduction in projected annual expenditure. The projected cost reduction varies depending on whether the 24-hour or the 26-hour working day model is applied (14.5% and 9.9% respectively). As the 26-hour working day model more closely aligns with WA current practice, the annual projected downward variance of 9.9% is considered a more accurate forecast (Fig 11).

There was a total of seven WA specialty wards which could be benchmarked against comparable wards in Queensland. On review of these wards, application of the Queensland model would result in a reduction of 8.7 staff per day (averaged over 12 wards), equating to a reduction of 0.41 nurse per shift. This results in a corresponding projected downward variance in annual expenditure for both the 24-hour and 26-hour

working day models (11.5% and 6.7% respectively). As the 26-hour day working model more closely aligns with WA current practice, the annual projected downward variance of 6.7% is considered a more accurate forecast (Fig 14).

Summary

Of the measures of impact related to patient and workforce outcomes, no discernable difference was demonstrated in any of the performance indicators that would suggest benefit of one nursing/midwifery workload management model over another. It was noted however, that in the *Minister for Health Employment Engagement Survey 2020*, workload management was identified as an issue of concern for WA nurses and midwives[86]. Moving forward, it is imperative that the State's nurses and midwives are consulted and engaged to collaboratively explore actions to acknowledge and address these concerns.

The benchmarking process demonstrated some variance in daily staffing profile numbers and projected annual expenditure across the clinical groupings; most significantly for the mental health and specialty ward groups. However, there was no identifiable pattern or trend that would indicate one workload management model as substantially different – or beneficial – over another in regard to providing minimum nursing/midwifery workforce numbers. In some groupings, the WA NHpPD model resulted in more staff when compared to legislated ratio models, and in other cases, a reduction in staff. Furthermore, when the data was collated to provide an overview comparison between the states, there was a reduction in variance for both the estimated daily staffing profile numbers and projected annual expenditure.

Of significance, the WA NHpPD model currently results in more night shift staff for all groupings compared to Queensland, and all but the specialty ward groupings when compared to Victoria. As night shift attracts the highest shift penalties, any fluctuations in the number of rostered night shift staff can significantly impact forecasted annual expenditure. It is noted that implementation of the amended Victorian legislation will result in a phased expansion of nurse/midwife-to-patient ratios in various clinical wards and settings in that State.

Further findings from the WA Nursing and Midwifery Workload Models Project highlighted that NHpPD is not suited to support the breadth and complexity of maternity services. The unique context of maternity services in WA must be considered separately, and an appropriate methodology identified and implemented which best supports delivery of contemporary and evidence-based midwifery care.

Likewise, the geographical size and complexity of WACHS services requires the careful consideration of bespoke workload methodology models, to best support the delivery of safe, high quality and sustainable health care for rural and remote communities in this State.

Furthermore, it must be noted that when determining the most suitable workload methodology, the calculation of workforce numbers must not be considered in isolation. The provision of safe, efficient and effective nursing and midwifery care must take into account the complexity of clinical care and most appropriate use of available resources, including the expertise, knowledge and skill of the workforce.

[86] WA Health, 2020

In light of all project findings, careful consideration must be given on the likely disruption to the WA public health sector, and potential impact on the provision of safe and quality care, should WA align with either of the legislated nurse/midwife-to-patient ratio models currently operating in Victoria and Queensland. In this context, retaining the existing NHpPD workload management model in WA is advised, noting that significant amendments are required to ensure it is reflective of contemporary models of care, patient acuity and aligns with the principles of evidence-based safe staffing.

Conclusion

Despite the existence of numerous nursing/midwifery workload management models, there is currently no consensus internationally, or within Australia, on the most appropriate and effective method to determine optimal staffing.

In this context, the WA CNM Office has led the WA Nursing and Midwifery Workload Models Project to review nursing and midwifery workload management models. The objective of the project was to research and evaluate the potential impact on the WA health system if the nurse/midwife-to-patient ratio legislation currently operating in Queensland and Victoria were to be introduced into WA.

Central to this project has been the consideration of a range of impact measures, to determine if variances in performance between WA, Victoria and Queensland could be attributed to the underpinning nursing/midwifery workload management model. Analysis of patient safety and quality metrics, patient satisfaction data and workforce outcome data was undertaken across the jurisdictions. The findings demonstrated that whilst there were no discernable differences in any of the performance indicators that would suggest benefit of one workload management model over another, workload management was identified as an issue of concern for WA nurses and midwives. Further consultation and engagement with the State's nurses and midwives is required to collaboratively identify actions which will acknowledge and address these concerns.

A significant undertaking of this project was the comparison of daily staffing profile numbers and projected annual expenditure to determine the potential outcome variance in WA, should nurse/midwife-to-patient ratios be implemented into this State. Comparison between the jurisdictions was performed using a benchmarking model, verified by the WA Department of Health Information and System Performance Directorate. A total of thirty-six wards, representing a cross section of specialities within WA, was used to inform the benchmarking model. Of these, thirty-two wards were able to be benchmarked against Victorian facilities, and twenty-three wards were benchmarked against Queensland. This resulted in the review of fifty-five separate comparisons, the results of which were used to inform the collated and aggregated findings.

Applying the benchmarking process demonstrated some variance in daily staffing profile numbers and projected annual expenditure across the clinical groupings, most significantly for the mental health and specialty ward groups. However, when the data was collated to provide an overview comparison of the states, the variance between jurisdictions diminished significantly. Furthermore, there was no pattern or commonality from the results that would indicate one state's performance was consistently or materially different to the others. It must be noted however, that

implementation of the amended Victorian legislation will result in a phased expansion of nurse/midwife-to-patient ratios in various clinical wards and settings in that State.

Further findings from the WA Nursing and Midwifery Workload Models Project have highlighted that the breadth and complexity of maternity services requires consideration of a targeted workload management model. Likewise, the geographical size and complexity of WACHS services requires the careful consideration of a bespoke workload management model, to best support the delivery of nursing and midwifery care in rural and remote communities.

In the context of all project findings, careful consideration must be given on the likely disruption to the WA public health sector, and potential impact on the provision of safe and quality care, should WA align with either of the legislated nurse/midwife-to-patient ratio models reviewed. With due consideration, retaining the existing NHpPD workload management model in WA is recommended, noting the following caveats:

- significant amendments are required to ensure the NHpPD model is relevant, contemporary and fit-for-purpose,
- the education, expertise and skill of nurses and midwives are taken into account when determining an optimal workforce, and
- a bespoke workload management model is required, which best support the provision of maternity services.

It is imperative that the workload management model utilised in WA strongly aligns with the principles of evidence-based safe staffing, to achieve optimal staffing which best supports the State's nurses and midwives in providing safe, high-quality and sustainable health care for all Western Australians.

Recommendations

In view of the outcomes from the WA Nursing and Midwifery Workload Models Project, it is recommended that:

1. Nursing Hours per Patient Day is retained as the primary workload management model to determine minimum nursing hours in the WA health sector, with a commitment to undertake significant amendments to ensure it is fit-for-purpose, and reflective of patient acuity and contemporary models of care. This would include:

    a. A review of NHpPD governance to enable transparent reporting, monitoring and reclassification processes
    b. Triennial reviews on the NHpPD category definitions, to ensure contemporary alignment to patient acuity, patient complexity, and models of care, across all specialties
    c. The development of a contemporary and standardised tool for reporting and monitoring, in alignment with the WA Digital Health Strategy
    d. The development of staff training and education packages/tools to support novice nursing/midwifery managers to consistently apply, monitor and report NHpPD
    e. Consideration of the unique needs of the WA Country Health Service, to best support the provision of safe, high quality and sustainable health care within rural and remote services.

2. As it is recognised that determining minimum workforce numbers are only one of many factors which influence safe, high quality and sustainable health care, it is recommended that a body of work is undertaken to identify the most appropriate composite of nurses and/or midwives, which take into consideration the expertise, education and skill of the workforce.

3. Further work is undertaken to identify and implement a workload management methodology which would best support the delivery of contemporary and evidence-based maternity services.

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