



Nursing Safe Staffing Review

Report on the Review of the
Care Capacity Demand
Management (CCDM)
Programme

Nursing Advisory Group

February 2022



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Hīkoitia te ara haumaru, kia ora ai te tangata

Follow the path of safety, so that
we may be well

Foreword by Hilary Graham-Smith, Chair of the Nursing Advisory Group

Achieving safe staffing for nurses and for the people we care for in our hospitals has been a journey in the making for a very long time. It started with the District Health Board (DHB) Multi Employer Collective Agreement (MECA) negotiations when a Committee of Inquiry comprising DHB and New Zealand Nurses Organisation (NZNO) representatives was convened to identify the essential components of safe staffing and healthy workplaces. The aim was to establish a system that delivered the right number of nurses or midwives with the right competencies to provide the right care in the right place at the right time.

Almost 20 years on we are still struggling to meet that goal; we have a programme and we have the tools but somehow bringing those two things together to accomplish something so fundamental to who we are and what we do as nurses - safe patient care, has been lost in a myriad of variables and complexities.

This report is the culmination of bringing together the voices of nurses and other stakeholders and data to tell a story. Importantly, in bringing those two elements together we have a match – the qualitative data and the quantitative data say the same thing – we have not achieved safe staffing or healthy workplaces in our hospitals and we have some way to go. The review team are hopeful that the findings and recommendations in this report provide some insights and some solutions as to how we can move forward with the implementation of Safe Staffing and Healthy Workplaces (CCDM).

I want to thank those who gave precious time to the survey and interviews on which the report is built, but most of all I want to thank frontline nurses for persisting in their critical work in the face of what for many are truly adverse circumstances

I also want to thank KPMG and the Ministry of Health for their tremendous support in undertaking this review and my fellow Nursing Advisory Group (NAG) members for their work which was performed in addition to their usual full-time roles.

Ka kite,

Hilary Graham-Smith

Chair, Nursing Advisory Group

On behalf of the Nursing Advisory Group

Dr Jill Clendon - Associate Director of Nursing and Operations Manager for Ambulatory Care at Nelson Marlborough District Health Board

Dr Rhonda McKelvie – Senior Lecturer at Massey University School of Nursing

Kapua Quinn - Clinical Nurse Manager, Integrated Operations Centre, Capital and Coast DHB



Members of the Nursing Advisory Group

This review was led by the Nursing Advisory Group (NAG), shown below, which is comprised of four representatives from nursing stakeholder groups including the public health system and the nursing academic and research community. Each member of the NAG has an expert understanding of the CCDM programme. The NAG was appointed by the Minister of Health as an independent group of subject matter experts to conduct this review, supported by Ministry of Health and KPMG as their project manager and secretariat.



**Hilary
Graham-Smith**

Hilary is the Chair of the Nursing Advisory Group. She is the former Associate Professional Services Manager at NZNO, an organisation she was a part of for almost 8 years. In this role Hilary worked on both the CCDM Programme and the NZNO strategy for nursing. Hilary is also the former Co-Chair of the Safe Staffing Healthy Workplaces Governance Group.



**Dr Jill
Clendon**

Jill has held the roles of Chief Advisor and Acting Chief Nursing Officer at the Ministry of Health in 2017 and 2018 respectively. Prior to this Jill was the Nursing Policy Advisor and Researcher at NZNO for almost 7 years. Jill has an academic role at the Victoria University of Wellington in the Graduate School of Nursing and Midwifery. She is currently Associate Director of Nursing and Operations Manager for Ambulatory Care at Nelson Marlborough DHB and Chair of the College of Primary Health Care Nurses, NZNO.



**Dr Rhonda
McKelvie**

Rhonda was a Programme Consultant for the Safe Staffing Healthy Workplaces Unit from 2009 - 2017. Rhonda completed a Doctor of Philosophy with Massey University using institutional ethnography to investigate the Nurse Safe Staffing Project and CCDM in New Zealand and is currently a Senior Lecturer for the School of Nursing there.



**Kapua
Quinn**

Kapua has spent the last 15 years at CCDHB moving through the ranks as a registered nurse, Charge Nurse Manager and then the Nurse Manager of the Integrated Operations Manager. Kapua has frontline and operational experience in the implementation phases and use of CCDM at an operational and ward level. Kapua is the Māori/Pasifika representative for this review.

Foreword by Lorraine Hetaraka, Chief Nursing Officer

Tākiri te hāeata, ka pua te ata, ka hura te rā, toitu te kupu, toitu te wananga, Tīhei Mauri ora.

The Minister's Review of Safe Staffing and Care Capacity Demand Management (CCDM) is timely, and I welcome this report. As Chief Nursing Officer the safety of frontline nurses is of the highest importance to me.

The CCDM programme was developed as a result of the Safe Staffing Healthy Workplaces Committee of Inquiry Report (2006). It was viewed as a comprehensive long-term approach to achieving safe staffing and healthy workplaces in Aotearoa.

The current review of safe staffing is an important step in reviewing why CCDM has not achieved this outcome and looking at ways the objectives can still be met.

Fifteen years on in 2021, nurses are understandably frustrated with the slow pace and scale of CCDM implementation. I acknowledge that nurses are now under considerable pressure with growing demand for health services, increasing patient acuity and the COVID-19 response. There are significant shortages of nurses across Aotearoa.

It is evident that Aotearoa has not been producing enough nurses to meet health care needs. Greater representation within the health workforce has been identified as a key strategy to improve the health and the lives of Māori and Pacific peoples.

Investment in nursing recruitment, re-employment and retention are all important to increase the number of nurses and improve the safety of the health care environment for patients.

I would like to acknowledge Hilary, Jill, Kapua and Rhonda, the Nursing Advisory Group who have led this Review providing expert nursing knowledge and diversity of experience also, Jane Bodkin, Clinical Chief Advisor Nursing Ministry of Health for overseeing the report.

I also acknowledge the Māori Health Directorate at the Ministry of Health for gifting the beautiful whakatauki "Hīkoitia te ara haumarū, kia ora ai te tangata".

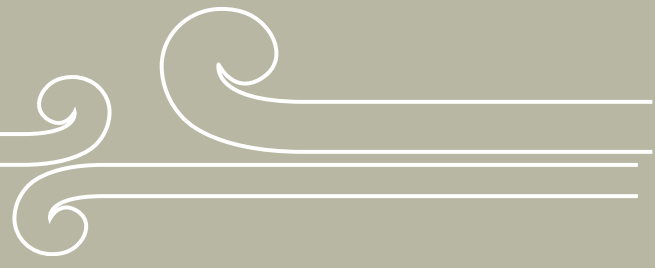
No reira kei te piringa karangamaha

Tēnā koutou, tēnā koutou katoa.



Lorraine Hetaraka

Tapuhi Rangatira | Chief Nursing Officer



1

Executive Summary



Executive Summary

It is important when reading this report to consider that CCDM is designed to determine staffing requirements for DHBs and support the development of safety strategies and reporting. These things are achievable when there are sufficient nurses to operate TrendCare (TC software tool used to support CCDM), to implement CCDM and recruit to identified staffing vacancies. The COVID-19 global pandemic has exacerbated the existing nursing shortfall in Aotearoa New Zealand. 30% of New Zealand's nurses are Internationally Qualified Nurses (IQN) and border closures have dramatically impacted on this pipeline. Nurses are also being needed for COVID-19 screening, vaccination and patient care. Had CCDM been comprehensively implemented over the last decade we may not be facing a staffing crisis on the scale we currently are. In this review we recognise that CCDM was not designed for and cannot be expected to succeed under current conditions. This review identifies some improvements that can be made to CCDM and TC to enhance both their performance and potential.

Background and purpose of the Nursing Safe Staffing Review

CCDM was inconsistently implemented across DHBs and the pace and scale of implementation has been slow and variable. Due to this, New Zealand Nurses Organisation (NZNO) members and nurses have expressed frustration at CCDM's inability to provide safe staffing.

In view of the significant time and resources invested into CCDM, the Nursing Safe Staffing Review was commissioned by the Minister of Health to:

- Review implementation of CCDM, including programme components and success factors;
- Compare outcomes in DHBs where CCDM is fully implemented with those that are at early stages of CCDM implementation;
- Examine the impact of CCDM on safe staffing, patient care and work environments in DHBs where it is fully implemented; and
- Make recommendations for the next steps of this national programme.

The detailed Terms of Reference of the review are in Appendix B. The review focused on nursing within the context of DHB inpatient wards and units, including mental health and Emergency Departments (ED). Midwifery, aged care, primary care, community care and allied health were excluded from the scope of the review.

Approach and methodology

This review analysed qualitative data from interviews, focus groups and site visits and quantitative data from the Core Data Set (CDS) and a national survey targeting frontline nurses and those who operate the programme. 19 focus groups, 16 interviews and two site visits were conducted with 196 participants. Participants were from all DHBs, with varying levels of seniority and different ward/unit types, including mental health and emergency departments. A total of 3992 responses to the survey were captured. It was open to all nursing staff, nursing leadership, healthcare assistants, and DHB leadership for 8 days from 9am Tuesday the 26th of October until 9am of Wednesday the 3rd of November 2021 (survey results reflect the survey was taken during the August – December 2021 pandemic outbreak). Data for four CDS measures were received from DHBs and two were analysed Care Hours Variance (CHV) and Shifts Below Target (SBT). This data was from the period October 2018 – September 2021 and focused on the Medical; Surgical; Adult Acute Mental Health (AAMH); and Assessment, Treatment and Rehabilitation (AT&R) wards. For analysis, DHBs were grouped into three groups of CCDM Implementation status: fully implemented (seven), mostly implemented (seven) and least implemented (six).

How the report is structured

The report is split into nine sections as follows:

1. Executive summary
2. Background and context to CCDM
3. Overview of the approach and methodology
4. Assessment of the impact of CCDM on Safe Staffing, Patient Care and Work Environments
5. Analysis of the impact of implementation progress of DHBs on CCDM outcomes
6. Findings regarding the extent to which CCDM is fit for purpose
7. Findings regarding the suitability of CCDM for Emergency Departments
8. Learnings from international practice
9. The way forward and recommendations arising from the review.

Supplementary information is provided in the appendices section at the back of the report.

What is the size of the problem?



83%

of staff said that patients in understaffed shifts are not receiving complete care

43%

of day shifts in DHBs in which CCDM is fully implemented were Shifts Below Target* in 2021

18%

across all shifts in the 4 ward types we examined were in the "red zone"*** (critical care capacity deficit)



23%

of all shifts over Aotearoa New Zealand were Shifts Below Target in 2021



53%

of frontline nurses reported being in a poor or very poor mental state on understaffed shifts

70%

of frontline staff said that staff are not available when they are needed for Variance Response***

62%

of frontline staff reported that half or more of their last 10 shifts were understaffed



41%

of frontline staff reported being asked to take extra shifts weekly

*A Shift Below Target indicates higher demand for care than nurses available to provide it.

** Red zones (the critical zone in VRM) were calculated from Care Hours Variance. We considered a red zone shift, any shift below -12.5% variance. This is the definition from TrendCare. It means that the full 12.5% buffer has been used and all time set aside for unplanned work and staff breaks has been utilised. We should note that in NZ "red zones" are not strictly defined and charge nurses need to answer a set of questions to determine the zone status. (refer to Table 3 page 40)

*** Variance Response Management is a tool and processes which helps to match patient demand with capacity.

Executive Summary

What is the impact of CCDM on Safe Staffing, Quality Patient Care and Work Environments?

CCDM makes visible the work of nursing. It has highlighted the significance of the nurse staffing shortage in Aotearoa New Zealand, however it has not led to any demonstrable improvements in Safe Staffing. One of the key reasons for this is the severe nationwide staffing shortage (vacancy data from 14 DHBs shows ~1,650 full time equivalent (FTE) vacancies between July and September 2021). Without sufficient numbers of nurses to recruit, CCDM cannot achieve its intended Safe Staffing outcomes. A nursing shortage was predicted over ten years ago, but little has been done to address it. The COVID-19 pandemic has compounded this issue.

The CCDM programme has brought to the fore the everyday reality and experience of frontline nurses, providing visibility to senior leaders of the scale of the issue. Due to the lack of available nurses to recruit, we have not seen any evidence of an improvement in the work environment, with nurses remaining exhausted and overworked. See pages 30-34 for further information.

There is also limited evidence to suggest that CCDM has had a direct impact on patient outcomes. The Core Data Set of measures collected as part of CCDM does not have a clear link to patient outcomes, and additional measures are needed to demonstrate any link between CCDM and patient outcomes. Nurses surveyed for this review rejected the statement "TrendCare has had a positive impact on patient care at my workplace" (31% of frontline nurses strongly disagreed with the statement, and 31% disagreed). See page 35 for further information.

CCDM Financial Analysis

Whilst additional, ring-fenced, funding is required to ensure CCDM is fit-for-purpose, discontinuing CCDM or investing into another safe staffing tool is expected to cost significantly more than making adaptations to the existing tool. Throughout this report it is highlighted how CCDM has strengthened the voice of nurses and a number of safe staffing challenges across Aotearoa.

Continued investment in CCDM remains the most prudent financial and outcomes-focused option. Since 2005 when the decision was made to pursue acuity-based staffing the Ministry of Health has invested significantly into CCDM, including \$48 million of funding as a new appropriation through Vote Health in 2018/19. No additional allocated funding has been secured to support additional FTE calculations since this time, and DHBs have been required to self-fund additional staff, including spreading staffing allocations across multiple years.

Further information on financial analysis can be found on page 54.

Does the level of implementation affect outcomes in DHBs?

There is no consistently agreed definition of 'implementation' of CCDM across DHBs. For the purposes of this review we have referred to 'installation' of CCDM, defined as DHBs having access to the core components of CCDM (TC, Variance Indicator Screen (VIS), Capacity at a Glance (CaaG) screens and templates), and 'implementation' of CCDM, defined as the output of these tools being used to inform and drive decision-making.

Implementation of CCDM has had more mixed results, with evidence of less variability in CHV in DHBs where CCDM is fully implemented (see page 44), but no correlation between implementation status and the number of SBT (see page 43).

It is important to note that we encountered significant issues with data quality, and extraction of data for CDS measures across DHBs. This ultimately impacted our ability to robustly analyse the link between level of implementation and outcomes (see page 37).

Is CCDM fit-for-purpose?

This review has found that CCDM can deliver meaningful outcomes, provided it is appropriately configured, supported and funded, and that there are sufficient nurses in the pipeline to recruit to identified vacancies. In its current form however CCDM is not fit-for-purpose and is unable to deliver on its intended outcomes. The prevailing sentiment from our wide ranging focus groups and interviews was that CCDM should be continued, but with significant improvement as identified below.

Key elements of CCDM need to be reviewed and re-designed to make the programme fit-for-purpose for the future. This includes:

- Reviewing TC and CCDM design, advisory and governance to align with Te Tiriti responsibilities.
- Simplifying and agreeing standardised definitions of Core Data Set (CDS) measures.
- Agreeing a set of patient outcome measures which are directly linked to CCDM.
- Revising the requirement to collect 12 months of data prior to performing FTE calculations.
- Adapting TC to ensure it accurately reflects the Aotearoa New Zealand nursing context.
- Simplifying and automating TC data entry; and
- Reviewing the TC buffer included within shifts.

Further information on the changes required to CCDM to ensure it is fit-for-purpose can be found in the recommendations section (page 66).

Executive Summary

In addition to these key elements, work is needed to provide the required support to the CCDM programme across all DHBs, including:

- Ensuring appropriate buy-in from DHB Executive Leadership and staff, including encouraging active participation in CCDM Councils by DHB Executive Leadership.
- Strengthening partnerships between DHBs and Unions to jointly deliver outcomes.
- Streamlining the process for approving FTE calculations, and ensuring there is sufficient funding to recruit to identified vacancies immediately rather than waiting for the budgeting round.
- Explore the use of legislation and mandates to strengthen the delivery and outcomes of the programme (e.g Health and Safety at Work Act 2015).
- Resourcing the programme on an ongoing basis, including CCDM and TC Coordinators, data analysts and data storytellers, and Safe Staffing Health Workplaces Unit (SSHW) support.
- Designing and launching data literacy programmes across DHBs to ensure staff at all levels to understand and can use data to make decisions.
- Investing in standardised and robust IT and data infrastructure for DHBs in line with Health NZ's wider IT and data strategy.

Decision-making process

The decision-making process for recruiting calculated FTE from CCDM varies at each DHB. There are several processes to gather and analyse the appropriate TrendCare data and seek approval for FTE calculations from CCDM Councils and Executive leadership. Generally these processes are lengthy requiring 12 months of TrendCare data to feed into calculations, thereby delaying the implementation of calculated FTEs, where approved. CCDM is a validated acuity tool which continues to be questioned by executive leadership and boards at DHBs.

In very few DHBs does the Director of Nursing have sufficient decision-making power to approve additional calculated FTE. Anecdotally we understand the process for seeking approval often involves significant re-work and re-calculation, approval via different governance channels and decision-making authorities, and frequently does not result in an agreement to recruit additional FTE.

Is CCDM fit for purpose for Emergency Department Nursing?

Implementation of CCDM in Emergency Departments (ED) is significantly behind implementation in Medical, Surgical, Adult Acute Mental Health and Assessment, Treatment and Rehabilitation (AT&R) wards: the majority of EDs in New Zealand do not have TC available or working. Whilst an ED specific TC module is available, it has not been appropriately configured to reflect the care delivered within an Aotearoa New Zealand ED setting.

Engagement with ED nurses and nursing leadership highlighted many similar issues to other medical areas included in the scope of this review, including limited data and IT infrastructure to support CCDM, lack of available nurses to recruit to identified vacancies, and insufficient staff available to implement Variance Response Management (VRM) protocols where significant gaps in care hours are identified. ED survey participants also highlighted low staff morale, compounded by a lack of communication and feedback about how information from TC (where available) is being used and what decisions it is driving (see pages 57-59 for more information).

What Can We Learn from International Safe Staffing Practices?

Research on approaches to determining optimal nurse resourcing levels has highlighted a wide variety of approaches in use across different jurisdictions. This includes mandated nurse/midwife to patient ratios (in use in Victoria and Queensland, Australia, the United States and parts of Europe), Nursing Hours per Patient Day models (in use in New South Wales, Australia), and use of professional judgement. There is limited evidence to suggest that legislated minimum staffing numbers has a direct positive impact on outcomes for staff and patients.

Recommendations

We have made eight key recommendations, each supported by a range of short and long-term interventions to deliver meaningful change and enable CCDM to achieve its stated outcomes of safe staffing, quality patient care and quality work environment. A summary of our recommendations is shown on the following page.

Executive Summary

1. Review the design, operation, implementation and governance of TrendCare and CCDM to recognise and uphold the articles of Te Tiriti

A fundamental review of the tools of CCDM and TC along with ongoing operational advisory and kaitiakitanga is required.

2. Re-design key components of the CCDM programme to ensure it is fit-for-purpose

Significant changes are needed to components of CCDM and the processes which underpin it. Key changes include re-defining, simplifying and standardising measures and reporting, linking CCDM tools to patient outcomes, and ensuring the programme encompasses Te Tiriti responsibilities.

3. Strengthen leadership and accountability for the CCDM programme

Commitment to CCDM is currently varied across DHBs, with differing levels of engagement, ownership and buy-in across the Executive Leadership Team of different organisations. Having strong support from the top is critical to the success of CCDM, and we recommend clarifying the expectations of organisations and individuals pre and post the creation of Health NZ in respect of CCDM, stipulating what DHBs and Health NZ are accountable for in respect to CCDM, and outlining the consequences of failing to deliver against these expectations.

4. Invest in the infrastructure which enables and underpins CCDM

The success of the CCDM programme is dependent on a number of external factors, including: funding, resourcing, legislation, governance, leadership, data literacy, and IT infrastructure. We recommend that changes are made to these key enablers so that CCDM can perform to its fullest and deliver against its stated outcomes.

5. Increase nursing supply immediately, and in the longer-term

CCDM will not be able to deliver its intended outcomes if there are insufficient nurses in the pipeline to recruit to vacancies. We recommend that existing plans to recruit additional nurses are expedited, and that the longer-term workforce strategy is reviewed to ensure it accurately reflects the expected increase in nurses required to meet care needs.

6. Review the role of the Safe Staffing Healthy Workplaces Unit

The Safe Staffing Healthy Workplaces Unit (SSHW) was initially established to develop CCDM and support and coordinate implementation at DHBs, however its role, purpose and the outcomes against which it is assessed are no longer clear. We recommend reviewing the role, structure, governance and accountabilities of the unit to ensure it is appropriately supporting DHBs and the new entities with CCDM implementation.

7. Establish a national work programme and office to oversee delivery of changes to CCDM

Significant work will be required to enhance CCDM and enable it to deliver meaningful outcomes. We recommend establishing a national work programme and office to plan, coordinate and deliver key initiatives across DHBs, reporting on progress and achievement to the Minister and the Ministry of Health. The national work programme and office should be stood up rapidly to begin delivering immediately on the recommendations, and arrangements should be made to integrate this workplan with the priority programmes led by Health New Zealand from July 2022.

8. Emergency Department Nursing

The majority of EDs in Aotearoa New Zealand do not have TC available or working. We recommend development work be completed on the ED module. Once completed, then the ED TC module should be implemented nation wide to enable additional data to be collected at a national level. This will provide information to DHBs on current staffing shortages to inform FTE calculations.



2

Background and Context

About the Nursing Safe Staffing Review

Background and context

The Care Capacity Demand Management (CCDM) programme was established following the Committee of Inquiry (COI) for Safe Staffing Healthy Workplaces in 2006. The programme provides a set of tools and processes that aim to help DHBs achieve quality patient care, quality work environments and the best use of health resources. CCDM was designed to safely and consistently match the demand for services (care required by patients) with the resources required to provide services (staff, knowledge, IT infrastructure). The timeline of CCDM is shown in Figure 1 on page 16.

As a result of the Safe Staffing Accord, brokered in the wake of the 2018 national nurses strike, all DHBs were required to implement CCDM across nursing in public hospitals by 30 June 2021. The pace and scale of implementation has been variable from DHB to DHB. This has resulted in NZNO members and nurses expressing frustration at CCDM's inability to provide safe staffing.

In view of the significant time and resources invested into CCDM, the Nursing Safe Staffing Review was commissioned by the Minister of Health to:

- Review implementation of CCDM, including programme components and success factors;
- Compare outcomes in DHBs where CCDM is fully implemented with those that are at early stages of CCDM implementation;
- Examine the impact of CCDM on safe staffing, patient outcomes and work environments in DHBs where it is fully implemented; and
- Make recommendations for the next steps of this national programme.

Details of the Review

The review was undertaken between September and December 2021 and was led by the Nursing Advisory Group (NAG), which is comprised of four representatives from nursing stakeholder groups including the public health system and the nursing academic and research community. Each member of the NAG has an expert understanding of the CCDM programme.

The focus of the review was on nursing within the context of DHB inpatient wards and units, including mental health wards. Midwifery, aged care, primary care, community care, allied health and medicine were excluded from the scope of the review.

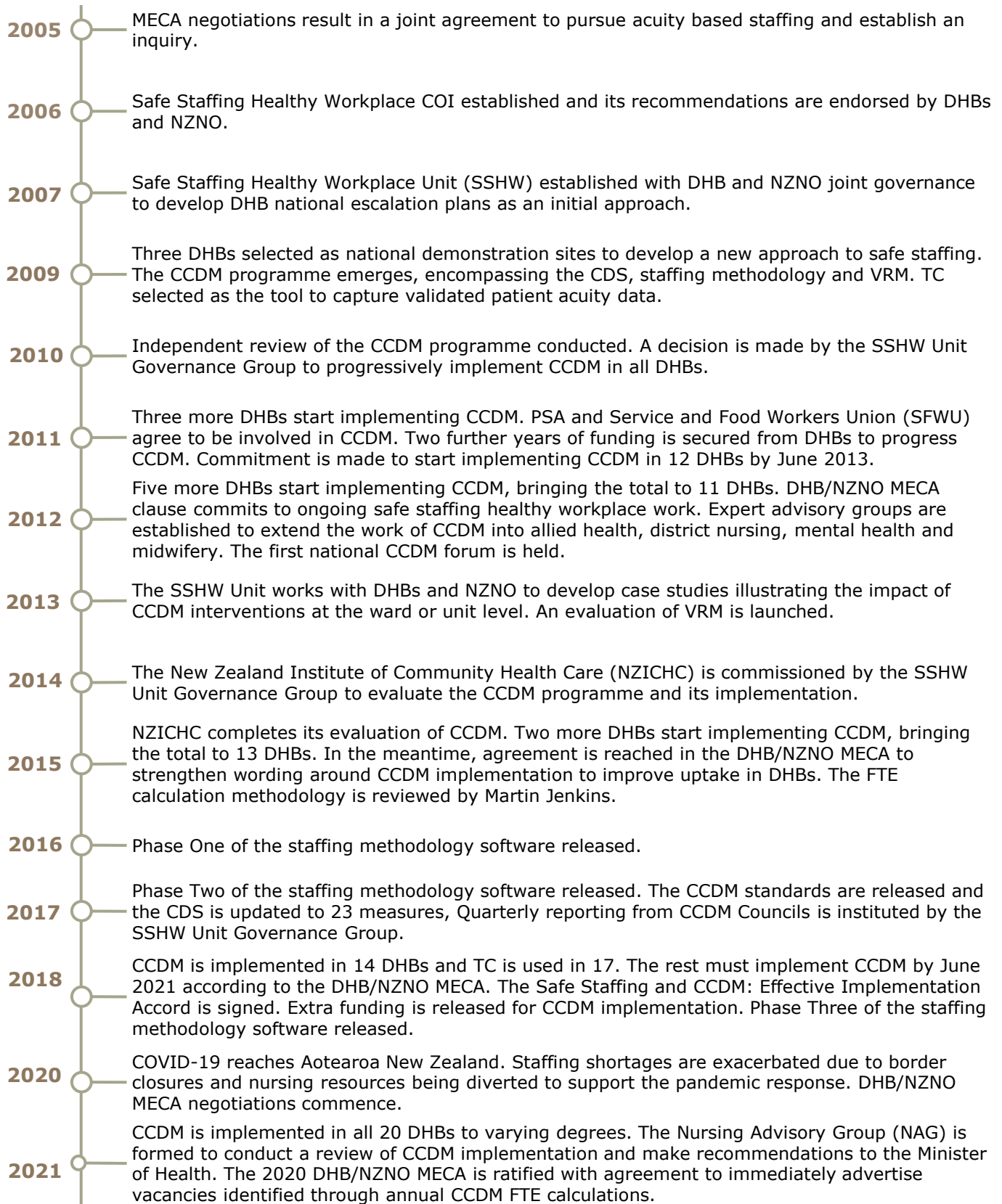
The full Terms of Reference of the review can be found in Appendix B.

About this Report

This report captures the approach and methodology of the review, as well as its findings on whether CCDM is still fit-for-purpose. The report also discusses whether mandated patient ratios are suitable as an alternative safe staffing strategy and makes recommendations for improvements to the CCDM Programme. The recommendations are accompanied by immediate actions (timeframe of 0-6 months) and post reform actions (from July 2022) that will support the implementation of our recommendations. It is proposed that a National Programme be developed to address our recommendations and be driven by the National Programme Management Office (NPMO) set up for this purpose.

The CCDM Timeline from 2005 to 2021

Figure 1: The timeline of CCDM



About the CCDM Programme

The CCDM programme is built on the three foundations of Governance, Patient Acuity and Partnership, and has three main components; the CDS, Staffing Methodology and Variance Response Management (VRM). The outcomes the programme should achieve are as follows: a good working partnership (between DHBs and Unions), better staff engagement, shared goals, increased transparency, increased visibility and accountability, and right staffing for every shift on every day and the right budget.

There are also five standards by which implementation is evaluated against, these are Governance, Validated Patient Acuity, CDS, Staffing Methodology and VRM. These are outlined in more detail below.

Foundations of the CCDM Programme

Governance^{1, 2, 3, 4, 5}

CCDM governance is an operational structure, with processes and tools that support the implementation of CCDM. It is intended to enable effective planning, coordination of resources, accountability for actions and ongoing monitoring and improvement.

The top layer of CCDM governance in DHBs is the CCDM Council which endorses and authorises decisions on CCDM and is tasked with developing the strategy for implementing CCDM. This structure is comprised of leadership from the DHBs (e.g. CEO, COO, Director of Nursing (DoN)), Union representatives, representatives from multi-disciplinary teams, nursing leaders, TC and CCDM Coordinators, SSHW Unit programme consultants and others as required.

Below the CCDM Council are the TC committee, directorates/services and working groups which are responsible for directing and delegating CCDM activities and developing workplans. These are comprised of operational leadership (e.g. operations/service managers), nursing and clinical leadership (e.g. Duty Nurse Managers), Union representatives, TC and CCDM Coordinators, SSHW Unit programme consultants and others as required. The TC committee also includes the DoN or the COO.

At the ward level is the Local Data Council (LDC) which implements and monitors CCDM activities and identifies opportunities for quality improvements through CDS data. These are comprised of floor staff (e.g. ward/unit nurses, health care assistants), Union representatives, nursing leadership, quality management, data analysts and others as required.

Patient Acuity^{6, 7, 8}

Patient acuity is the measurement of the number of clinical hours of nursing care required for a patient. In CCDM, accurately capturing patient acuity forms the foundation of determining the right number of nurses required on a shift to meet the patients' need for care. Patient acuity data is currently captured using TC, a third party workforce planning and workload management software, developed by Trend Care Systems Pty Ltd that is based in Australia.

**Superscript number references can be found in Appendix J on page 97-98*

TC comes with pre-loaded patient types with standard acuity indicators and category timings for tasks involved in each type of care. At the beginning of the shift, nurses enter predicted patient acuity data into TC for each patient assigned to them. At the end of each shift, nurses will then confirm (actualise) the care delivered to their patients. CCDM uses patient acuity data to inform FTE calculations that determine required staffing levels, the need for VRM and the appropriate measures, and in the CDS to monitor staffing and patient outcomes.

Partnership¹

The CCDM programme is designed to be implemented through a strong partnership model between DHBs and unions (mainly NZNO and PSA). At the beginning of implementation, when the CCDM Council is set up, a partnership evaluation is recommended to determine the current state of partnership, identify areas for improvement and determine actions to be taken.

Components of the CCDM Programme

Core Data Set^{9, 10, 11, 12}

The CDS is a range of 23 measures, each focusing on either quality patient care (nine measures), quality work environment (eight measures) and best use of health resources (six measures). The intent of the CDS is to provide a systematic framework to monitor the performance and implementation of CCDM, guide decision-making and support implementation and monitoring of quality improvement initiatives in a DHB.

The CDS is designed to monitor CCDM, reflect progress over time and identify trends, demonstrate relationships between measures, and integrate with existing DHB reporting (e.g. sick leave). It is also used to provide structure, focus and discipline for quality improvement activities. It places equal priority on quality patient care, a quality work environment and best use of health resources to provide a complete picture of the environment. The CDS measures should be reviewed annually as part of the quality assurance process.

Each CDS measure has a description, rationale for collection and recommended methods of calculation, unit of measure, frequency of collection and data source. The 23 measures are a recommended minimum set, but DHBs have the freedom to add additional measures as required. The CDS is designed to be used across different levels of the DHB, including at the ward level, directorate/service level and CCDM Council level.

Staffing Methodology^{13, 14, 15}

Also known as FTE calculation, the staffing methodology is a systematic, validated process for determining staffing levels required to meet the demands of patient acuity. It is used to establish and budget for staffing FTE levels, and skill mix for each ward.

FTE calculations make use of TC data from each ward from the past 12 months together with available staffing information and roster testing to generate a recommended roster and required FTE staffing levels. This process happens annually before setting the budget for each year. Once the FTE numbers are obtained, they are endorsed by the CCDM Council and are submitted for approval through the DHB's approval process (with executive leadership and Board). This decision-making process for recruiting calculated FTE from CCDM varies at each DHB. The process can be lengthy which delays the implementation of the calculated FTE. In very few DHBs does the Director of Nursing have sufficient decision-making power to approve additional calculated FTE. Without these decision-making powers there is significant re-work and re-litigation.

Previously, vacancies shown through the FTE calculations would be recruited in the subsequent financial year. In the 2020 DHB / NZNO MECA it was agreed that DHBs will now immediately establish and advertise positions identified by the annual FTE calculations, instead of in the subsequent financial year.

**Superscript number references can be found in Appendix J on page 97-98*

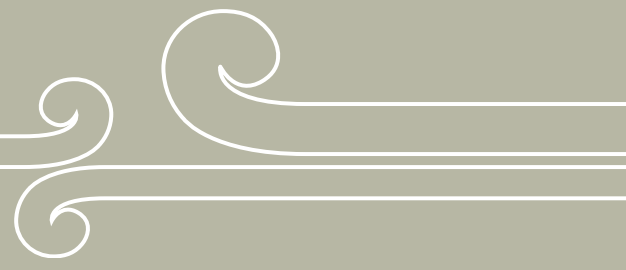
Variance Response Management^{16, 17, 18}

VRM is a set of tools and processes that allows operational decision makers to match demand for patient care hours with available staff in real time. This typically happens by moving nursing staff from wards where there is less demand (i.e. positive variance in care hours available) to wards that are experiencing higher demand (i.e. negative variance in care hours available). Key components are the Integrated Operations Centre (IOC), CaaG screens and Standard Operating Procedures (SOP). These components are all interdependent.

The IOC is the hub with visibility across the entire hospital and provides whole of hospital, patient and staff coordination and is where decisions are made to activate variance response by moving staff between wards. Within the IOC are CaaG screens that display real time information on patient numbers, care hours required and staff care hours available across the hospital. CaaG screens are also often located in each ward, allowing all staff to see which areas have the highest variance. The screens show the status of each unit/ward using the VIS, which is also referred to as a 'traffic light' system, with each colour indicating a variance situation and corresponding variance response required. The colours are purple (excess care capacity), green (demand met), yellow (early variance), amber (significant care capacity deficit) and red (critical care capacity deficit).

SOPs are used when patient demand is higher than care hours available. When a ward is in amber or red, the intention is that the essential care guideline is activated. This determines which care is essential and which is not, informing staff to focus only on essential care. However, these essential care guidelines have not been agreed.

**Superscript number references can be found in Appendix J on page 97-98*



3

Approach and Methodology for the Review



Approach and Methodology for the Review

This review focused on analysis of qualitative data in the form of interviews, focus groups and site visits, and quantitative data in the form of a survey of nurses and other DHB staff and selected CDS data. All quotes used in this report have been left anonymous.

Approach to Collecting Qualitative Data

The review team gathered qualitative data from the following sources:

- 19 focus groups comprising 167 individuals
- 13 interviews
- 18 Directors of Nursing (through interviews or focus group discussions)
- 2 site visits to CCDHB and HVDHB

ED scope:

- 3 focus groups comprising 12 individuals
- 3 interviews.

Focus groups and interviews with engaged stakeholders with experience of CCDM implementation, including frontline nursing staff, Directors of Nursing, Union Representatives and CCDM Coordinators.

A full list of focus group participants is captured in Appendices C and D. The list of individuals interviewed can be found in Appendix E. The list of DoNs engaged can be found in Appendix G.

Approach to Collecting Quantitative Data

The review team gathered quantitative data from a national survey and data from selected measures from the CDS from each DHB.

The survey included a mix of quantitative questions and free-text responses. It was open to all nursing staff, nursing leadership, healthcare assistants, and DHB leadership for 8 days from 9am Tuesday the 26th of October until 9am of Wednesday the 3rd of November 2021 (survey results reflect the survey was taken during the August – December 2021 pandemic outbreak). A total of 3,992 responses to the survey were captured. The detailed survey methodology can be found in Appendix 2 and survey questions are listed in Appendices 3 to 6.

Data from the CDS included care hours variance and shifts below target from October 2018 – September 2021. Pre and post pandemic data are highlighted in the plots throughout the report. Analysis focused on four ward types: Medical, Surgical, Adult Acute Mental Health (AAMH), and Assessment, Treatment and Rehabilitation (AT&R). Any subsets or specialisations with these categories were included (e.g. Surgical High Dependency (HD) was included in the Surgical Ward).

Data was obtained from all DHBs. Waikato DHB was unable to provide data beyond the period October 2019 – May 2021 due to the recent cyber attack and because TC was not in place before October 2019. The summary of data received from each DHB is detailed in Appendix 27.

The 20 DHBs have been divided into three groups based on the status of their CCDM implementation as captured in the Quarter 1 2021-22 National Reporting Framework:

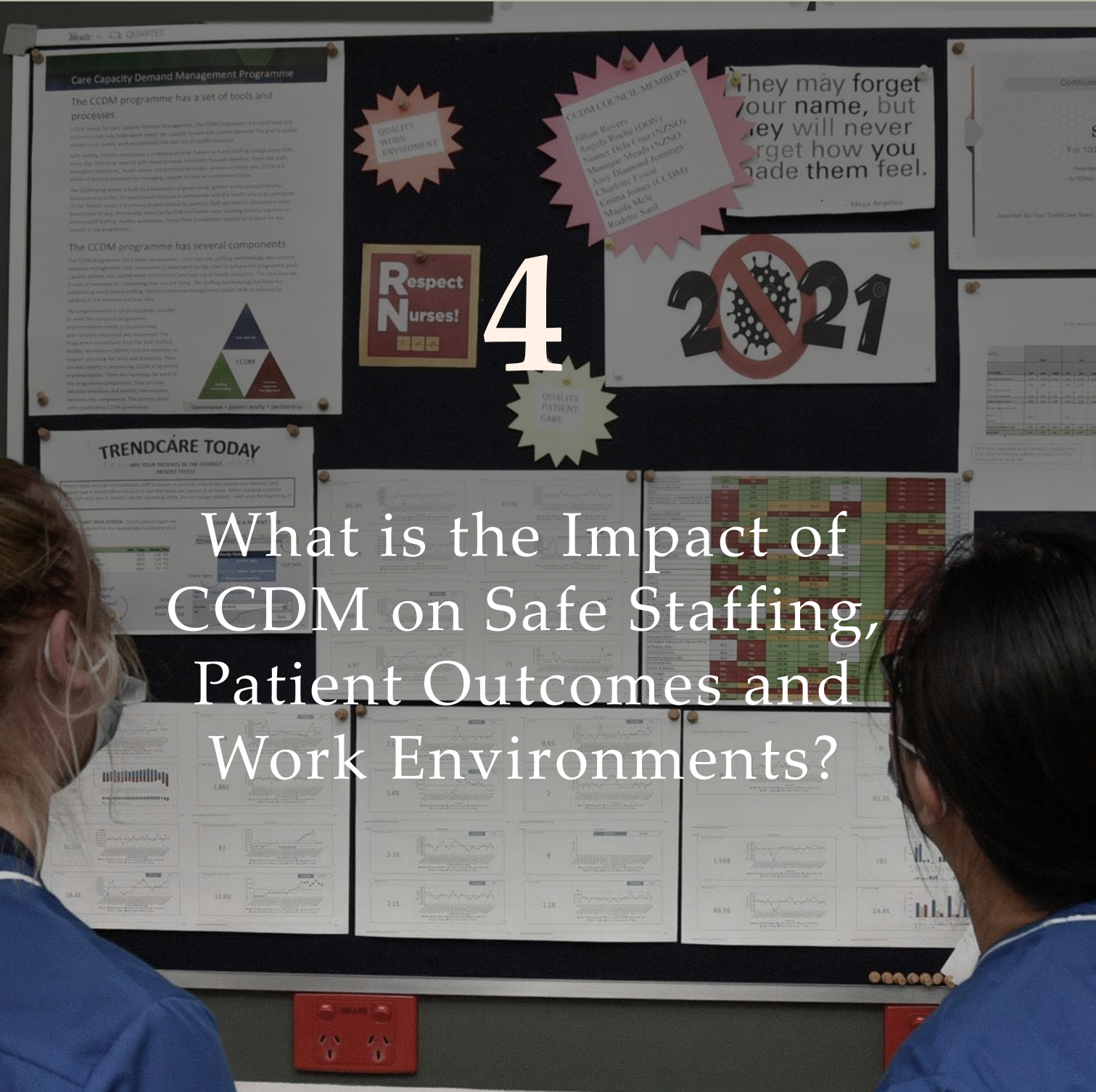
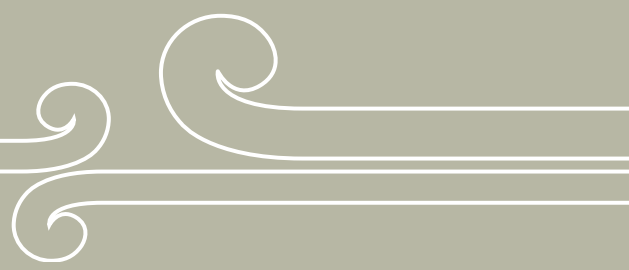
- Fully Implemented (seven DHBs)
- Mostly Implemented (seven DHBs)
- Least Implemented (six DHBs).

Details of these groupings and status of DHB implementation is visualised in Table 1 the following page.

For the purposes of our review DHBs have been categorised by 'Fully', 'Mostly' and 'Least' Implemented. This is based on the Quarter 1 2021-22 National Reporting Framework produced by the SSHW Unit. The National Reporting Framework is based on 'self-assessment'.

Grouping	DHB	Implementation Rate	Year Implementation Began
Fully implemented	Hawke's Bay	100%	November 2015
	Northland	100%	2011
	Auckland	99%	2017
	Bay of Plenty	95%	2009
	Nelson-Marlborough	93%	2011
	Waitematā	93%	2012
	Hutt Valley	92%	2013
Mostly implemented	Whanganui	92%	September 2013
	Lakes	90%	2017
	Midcentral	87%	2011
	Capital Coast	86%	2017
	Tairāwhiti	82%	2011
	Southern	81%	2012
	South Canterbury	80%	2014
Least implemented	Taranaki	72%	2009
	Counties Manukau	71%	2019
	Wairarapa	69%	2018
	West Coast	69%	2013
	Canterbury	42%	2019
	Waikato	42%	2019

Table 1: Grouping of DHBs by Implementation Rate as of Quarter 1 2021-22



What is the Impact of CCDM on Safe Staffing, Patient Outcomes and Work Environments?

QUALITY WORK ENVIRONMENT

CCDM COUNCIL MEMBERS
Jillian Rovers (DON)
Angela Roche (NZNO)
Nonnie Dela Cruz (NZNO)
Monique Meads (NZNO)
Amy Diamond Jennings
Charlotte Fyson
Emma Jones (CCDM)
Magda Mele
Rodette Savel

They may forget your name, but they will never forget how you made them feel.
- Maya Angelou

Respect Nurses!

4

2021

QUALITY PATIENT CARE

Care Capacity Demand Management Programme

The CCDM programme has a set of tools and processes

CCDM stands for Care Capacity Demand Management. The CCDM Programme is a set of tools and processes that help the health sector match the capacity to care with patient demand. The goal is quality patient care, quality work environments and best use of health resources.

Safe staffing, healthy workplaces is a national priority. Patient care and staffing change every day, every day. Matching capacity with demand needs, consistently. Forward attention. Thank the staff, managers, supervisors, health and professional students all have a role to play. CCDM is a whole of hospital approach for managing capacity for care on a permanent basis.

The CCDM programme is built on a foundation of governance, patient safety and partnership. Governance provides the operational structure in partnership with the health sector to coordinate CCDM. Patient safety is the focus of care needed by patients. Staff care then be obtained to meet these needs of care. Partnership refers to the DHB and health sector working jointly together to achieve safe staffing, healthy workplaces. These three foundations need to be in place for the success of the programme.

The CCDM programme has several components

The CCDM programme has 3 main components: core data, staffing methodology and various regional management. Each component is dependent on the other to achieve the programme goals: quality patient care, healthy work environment and best use of health resources. The core data will be a set of measures for monitoring how well we are doing. The staffing methodology has been developed to ensure we have enough staff. Various regional management tools will be required to support us in the moment and over time.



TREND CARE TODAY

ARE YOUR PATIENTS IN THE CORRECT PATIENT TYPE?

Patients appear for treatment with different reasons. It correctly reflects the patient care history. Each patient type is based on different criteria to ensure that these are correct at all times. When a patient is admitted to hospital, staff must ensure the patient is in the correct patient type, and the beginning of the patient's stay.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

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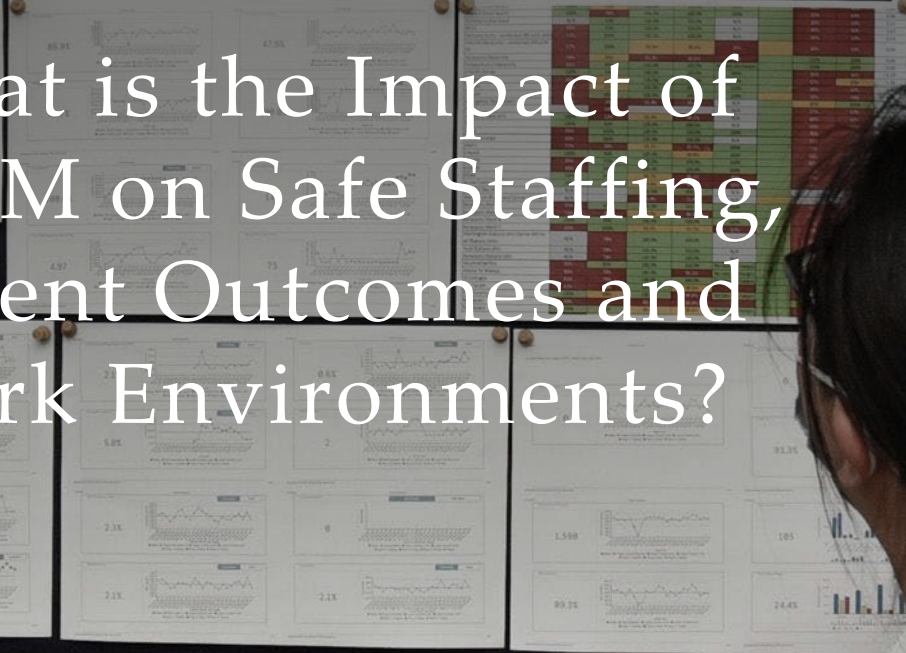
Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.

Check patient type and ensure it is correct for the appropriate treatment and a patient type.



CCDM has brought transparency to the daily reality of frontline nurses

CCDM has made the work of nurses and the effect of the historic underinvestment into the nursing workforce more visible. Prior to the CCDM programme there was no visibility or transparency of the staffing level issues that frontline nurses were experiencing. While nurses understood that they were understaffed, there was no way to gather data and make visible the extent of the problem.

This visibility is most evident through the TC data and Capacity at a Glance (CaaG) screens which provide a transparent hospital wide overview of the staffing situation at any given time. TC data shows what is happening on a shift-by-shift basis and provides a data-driven approach to determining FTE numbers. The CaaG screens provide a live view of staff shortages across the hospital by ward and are displayed on the wards.

Together the TC data and CaaG Screens provide the evidence of what nurses have been consistently saying, that there are not enough nurses to provide safe patient care.

CCDM alone cannot overcome the fundamental shortage of nurses in the health system

When CCDM was launched it was intended to be the solution to ensuring safe staffing. CCDM was only designed to operate within the parameters of sufficient numbers of nurses, and without enough nurses the levers that CCDM has for achieving safe staffing become ineffective. Nurses are the fuel that keeps the CCDM machine running.

In 2021, demand for care far exceeded the nurses available to provide it. Across all shifts in Aotearoa New Zealand in 2021 almost a quarter (23%) were found to be Shifts Below Target. A Shift Below Target indicates higher demand for care than the number of nurses available to provide it. On day shifts this number goes up to 43% in wards where CCDM is fully implemented (refer to table 2).

Vacancies identified in FTE calculations are not being filled quickly enough to keep up with demand and VRM is not able to operate under the current staffing conditions. Nurses have had to work longer hours and extra shifts. External pressures brought about by COVID-19 has deteriorated work environments, leading to a significant and lasting toll on the wellbeing of nurses and their whānau.

If the number of nurses in the workforce are not increased, it is impossible to achieve safe staffing and positive work environments with the current demand for care. Nurses will remain overworked and exhausted.

Vacancies identified in FTE calculations are not being filled

Data on vacancies and average time to recruit staff to fill these vacancies indicates that, even if FTE calculations are approved and funding is provided for additional staffing, there are not enough nurses in Aotearoa New Zealand to meet staffing demand.

There are significant numbers of vacancies reported across the country, with vacancy data showing approximately 1,650 FTE vacancies spread across 14 DHBs between July and September 2021.

Data obtained across eight DHBs in the same time period indicates that it takes on average 55 days to fill nursing vacancies. Counties Manukau DHB reported the longest time to recruit in September 2021 of 105 days.

VRM cannot function as intended

VRM works optimally if the base staffing design is adequate. With most wards understaffed, there are no extra staff to redeploy. 63% of frontline nurses and 74% of leadership surveyed reported that 5 or more of nurses last 10 shifts were understaffed (Figure 2).

"I am sad everyday at work because my patients deserve better. There is no more staff to come and help when we need it. Every ward is suffering."

This has resulted in VIS scores of yellow (early variance) and amber (significant care capacity deficit) becoming the norm in many instances and often ignored. Survey and focus group participants also reported their wards frequently being in red (critical care capacity deficit) with no support available. From our focus group discussions participants also noted that many of the DHBs do not have dedicated variance response teams to be able to support wards if they are in yellow or amber. Results from the survey showed 32% of frontline nurses reported that no help came following a request.

"We are often in the yellow orange or red on VIS and nothing is done. No help is sent, we continue to receive patients from ED and post op. We regularly ask for extra staff to cover our shifts and are told there is no one to help."

Understaffing is especially acute in specialised wards such as ICU and Mental Health. Participants communicated that these wards could only be supported by nurses with specific skills, as nurses who do not have these skills could not provide meaningful support to alleviate workloads. Given the shortage of nurses with these specific skills, this meant VRM is usually not possible in these areas.

Nurses are working longer hours and taking extra shifts to cover staffing shortages

The existing nursing workforce have been forced to make up the deficit in available care hours through working additional hours and shifts, because there is often no extra help available. 51% of frontline nurses reported going home late on understaffed shifts, while 83% of leadership reported that nurses went home late.

In terms of extra shifts, 67% of frontline nurses surveyed said that they were asked to take extra shifts at least several times a month, and 30% of them were asked to take on extra shifts several times a week.

The statistics for leadership are worse. 93% of them reported that nurses were being asked to take on extra shifts at least several times a month, and 62% of them reported nurses were being asked to take on extra shifts several times a week. Refer to Figure 3 for more details.

The situation is worse for MH as participants reported frequently taking on back-to-back shifts and working for 14-18 hours straight.

"Nurses sign up to work in hospitals not factories."

The cost of understaffing is severe for nurses and their whānau.

Understaffed shifts negatively affect the wellbeing of nurses and their whānau. 53% of frontline nurses reported being in a poor or very poor mental state on understaffed shifts (1-4 on Figure 8), while nursing leadership reported a higher proportion (81%) of nurses being in a poor or very poor mental state.

When they were on an understaffed shift 57% of frontline nurses reported feeling that the workload was unmanageable and 65% felt stressed. 70% of leadership reported that workloads for nurses were unmanageable for nurses and 88% reported that nurses were stressed. 74% of frontline nurses reported going home exhausted with no energy left for their commitments and/or loved ones. Participants highlighted how the stress was causing deterioration in their mental and physical health, how it was affecting their personal and family life and that compassion fatigue had become normal.

Focus group participants reported frequently going without meal breaks for the entire shift. This was echoed in the survey where 49% of frontline nurses reported going without breaks.

Participants also reported cancelling their leave plans in order to help alleviate the workloads of their colleagues, to the further detriment of their wellbeing.

Refer to Figures 4-8 for more details.

"...my work is killing me...but I stay as I love my work and hope things will change soon for the better. "

COVID-19 has increased pressure on an already stretched workforce^{15,19,20}

Between 2018 and 2021 DHBs have reported an increase of 3,000 employed nurses, funded through their own budgets rather than through Ministry funding. However, nursing vacancies remain high, and it is therefore difficult to distinguish vacancies which relate to hospital churn compared to calculated required CCDM FTE. Data obtained from TAS shows an increase in FTE across several different areas at DHBs due to the additional 3,000 nurses*. We are not sure of the accuracy of the data received. The distribution across DHBs shows an increase in nursing staff but does not consider the churn rate for the same period. There is no data on the roles or skill mix which the additional staff were hired into. The gaps in the information provided means that it is not possible to conduct cross analysis of the additional 3,000 staff against appointing additional calculated FTEs.

DHB nurse staffing has also been impacted by other factors since 2018, most significantly relocation of parts of the nursing workforce due to Covid-19 support at Managed Isolation and Quarantine MIQ or as part of the vaccination roll out or testing sites. In some regions a significant number of nursing staff have been reprioritised. Approximately 285 FTE in Auckland DHB and 360 FTE in Canterbury DHB are supporting the COVID-19 response.

The expected increase in cases of COVID-19 in the community following the introduction of the COVID-19 Protection Framework is expected to add additional demands on the healthcare system and nurses.

DHBs have historically recruited nurses internationally to help fill vacancies. The closure of the border on 20th March 2020 has significantly reduced the number of nurses that can be recruited from overseas to fill vacancies. Further, IQNs from the Philippines have been prevented by their government from coming to New Zealand and IQNs from India were prevented from coming into New Zealand as they were coming from a high-risk country. Although this limitation has now been removed for nurses coming from India, anecdotally many are choosing to go to other countries due to the easier process of entry into these countries and, in some cases, funded isolation. The ring fencing of 300 MIQ spots per month for health and disability sector workers may help increase the flow of nurses into the country but these spots will be shared with other health professionals. Further, the requirement to secure a job offer before arrival is a barrier to securing one of these placements.

* Data has been supplied by TAS from the Health Workforce Information Programme database, however this has not been independently verified by either KPMG or the Nursing Advisory Group and we therefore make no representations as to its accuracy.

Data and survey results show that the nursing shortage is extensive

Our qualitative and quantitative analyses both show this staffing shortage as a significant area of risk for the Aotearoa New Zealand health system, that needs to be addressed immediately. Both for patients and nurses. Here is an overview of the size of the problem.

Core Data Set

In 2021 across all shifts in the 4 ward types we examined, **23%** were **shifts below target**.

That goes up to **36%** for day shifts, and to **43%** for day shifts in DHBs where CCDM is fully implemented and potentially captures data better. **42%** of day shifts in medical wards were shifts below target while there were **38%** in surgical wards and **34%** in MH wards.

18% across all shifts in the 4 ward types we examined in 2021 were in the “**red zone**”*, i.e., critical care capacity deficit.

This has gone up from **13%** in 2020 and 17% in 2019.

29% of day shifts are marked in the red zone and that number goes up **34%** of shifts in DHBs that CCDM is fully implemented.

Data from 260 wards (4 ward types) over 3 years (Oct 2018 – Sep 2021) were used.

Survey

62% of frontline nurses reported half or more of their last 10 shifts as understaffed.

For leaderships this increases to **74%**.

53% frontline nurses reported being in a poor or very poor mental state on understaffed shifts.

80% of nursing leadership reported nurses being in a poor or very poor mental state.

41% of frontline staff are being asked to take extra shifts weekly.

And a further **35%** of frontline nurses who participated in the survey said they were asked to take extra shifts every month.

74% of leadership reported asking nurses to take on extra shifts weekly, and a further **23%** asking nurses to take extra shifts monthly

70% frontline nurses said that staff are not available when needed for Variance Response.

81% of leadership said the same.

83% frontline nurses said that patients in understaffed shifts are not receiving complete care.

86% of leadership responded the same.

74% of nurses responded that they went home exhausted with no energy if the shift was understaffed.

Survey responses were received from 3,366 frontline staff and 626 leadership staff.

* Red zones (the critical zone in VRM) were calculated from Care Hours Variance. We considered a red zone shift, any shift with below -12.5% variance. This is the definition from TrendCare. It means that the full 12.5% buffer has been used and all time set aside for unplanned work and staff breaks has been utilised. We should note that in NZ “red zones” are not strictly defined and charge nurses need to answer a set of questions to determine the zone status.

The 2020 MECA and Nursing Pipeline work may alleviate some of the shortages

Nationwide staffing shortages are severe and expected to persist in the short term at least. The Nursing Pre-Registration Pipeline Working Group should have an impact in the medium to long term.

The 2020 DHB/NZNO MECA²⁰

DHBs and NZNO committed in the 2012 Multi Employer Collective Agreement (MECA) to ongoing safe staffing healthy workplaces initiatives through the implementation of CCDM in DHBs. In 2015 parties agreed to strengthen the wording in the MECA document relating to healthy workplaces and CCDM, to encourage better uptake of the CCDM programme across DHBs. In the 2018 MECA DHBs committed to fully implement CCDM by June 2021.

In the current 2020 – October 2022 MECA, DHBs commit to immediately establishing budget provision and activity to recruit for nursing staff where the annual CCDM FTE calculations recommend that additional positions are required. DHBs also commit to offering all new graduate nurses permanent employment.

The Nursing Pre-Registration Pipeline Working Group ^{21,22,23,24}

The Nursing Pre-Registration Pipeline Working Group (NPPWG) is a DHB Director of Nursing (DoN) led programme of work established in 2019. The NPPWG will progress improvements to the nursing pre-registration pipeline and support the nursing workforce's ability to meet current and future challenges. The NPPWG partners with MoH, NZNO, Nursing Council, education providers, Aged Residential Care and nursing leaders from across the sector.

The work of the NPPWG is intended to increase the supply of nurses and also offers an independent view on demand against which CCDM FTE calculations may be compared.

The NPPWG are operating within Māori data sovereignty principles to ensure Māori are integral to kōrero and decision-making around programmes. The aim is to attract and retain Māori students and improve the progression and retention of Māori nurses. The NPPWG has released the first report on the Nursing Pipeline which found that students needed robust support to reduce attrition, and that there is a need to increase the number of Māori and Pasifika students.

Other key initiatives that the NPPWG is considering are options for a staircase pathway for Enrolled Nurses to complete bachelor level nursing programmes, options for a pathway to Enrolled Nursing for those who exit the Bachelor of Nursing programme, revisiting the requirement for the clinical hours required as part of the Bachelor's degree and a national review of consistent processes around clinical placements.

CCDM has provided limited impact on patient outcomes

The Core Data Set does not have clear links to patient outcomes

The 23 CDS measures include quality patient care measures (nine), quality work environment measures (eight) and best use of health resources measures (six). These measures enable each DHB to tell a story regarding the quality of patient care and the work environment in any given ward, shift or period.

There is no overt link between CCDM and patient outcomes. CCDM provides visibility of staffing levels and care hours per patient required. There is little evidence of CDS measures being used to inform quality improvement initiatives across DHBs. In addition, DHBs report that collection, analysis and reporting on 23 measures is time consuming, burdensome and hampers the effectiveness of the CDS as a tool.

The quality patient care metrics which the CDS measures are:

- Patient incidents
- Patient experience
- Care rationing
- Staff mix
- Patient acuity
- Bed utilisation
- Care hours variance
- Shifts below target

These measures are not directly linked to patient outcomes. They need to be linked with other data including measures that are essential to nurse indicators, as well as those evaluated by nurse staffing research. They are also not being consistently reported on or included in quality analysis for DHBs.

Nurses do not think CCDM has improved patient outcomes

Many nurses, both in the survey and focus group sessions, said that they have not see any improvements in patient outcomes since the introduction of CCDM.

In the survey, 31% of front line nurses strongly disagreed and 31% disagreed that "TrendCare is having a positive impact on patient care at my workplace". Similarly, there was a disagreement that CCDM has had a positive impact on patient care. 25% of front line nurses strongly disagreed and 29% disagreed that CCDM has had a positive impact on patient outcomes. Refer to Figure 9 for more details.

In the nursing focus groups, participants noted that TC and CCDM should be aimed at supporting quality care for their patients. Staffing shortages affect the ability of nurses to engage in quality improvements as many nursing staff are already working over time or are severely impacted by being short staffed. There is also an increasing risk to patients as nurses are more prone to make mistakes in care when they are overworked and exhausted.

The following pages include supporting visuals and diagrams about the impact of CCDM on safe staffing, patient outcomes and work environments. These visuals are from the survey that frontline nurses and leadership participated in.

Most shifts are understaffed

62% of frontline nurses reported half or more of their last 10 shifts as understaffed. Only 4% reported no understaffed shifts.

This was 74% for leadership and only 7% reported no understaffed shifts.

Question asked

Frontline question: Of your last 10 shifts, how many were understaffed?

Leadership question: Out of the last 10 shifts, how many shifts are negative variance?

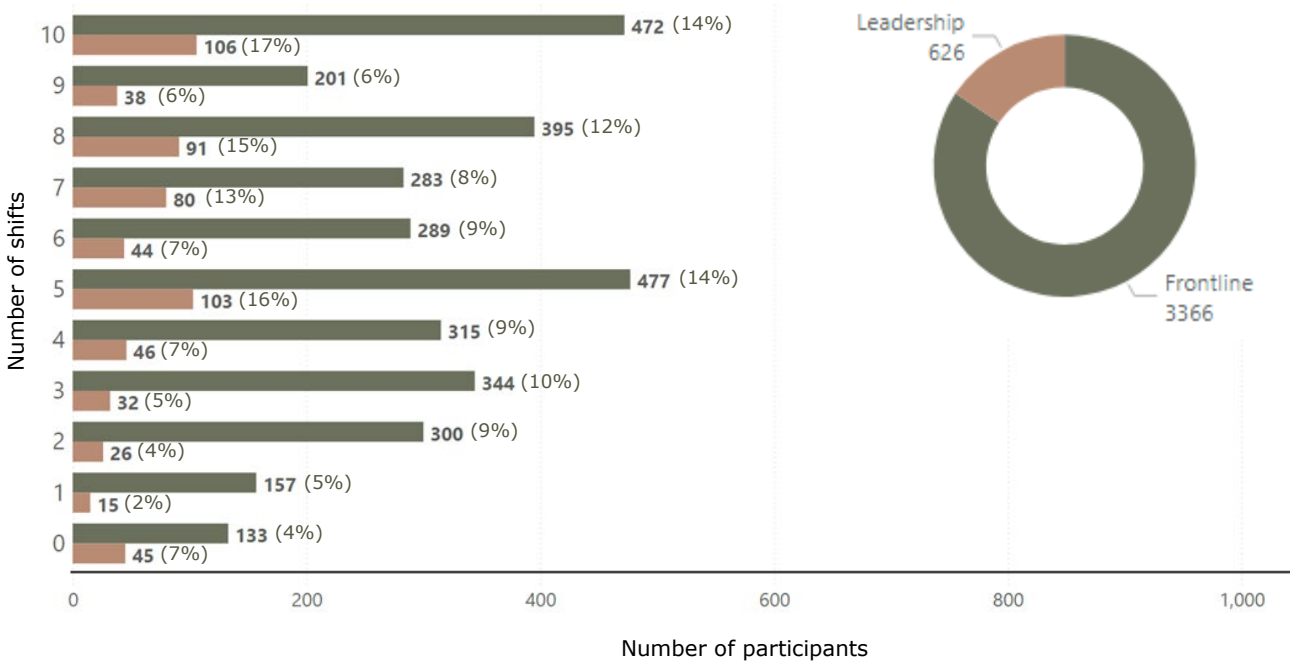


Figure 2: Number of shifts from the last 10 shifts which were understaffed

Nurses are frequently asked to work extra shifts

67% of frontline nurses surveyed said that they were asked to take extra shifts at least several times a month, and 30% were asked to take on extra shifts several times a week. Only 15% reported being asked a few times a year, and less than 10% reported never being asked to work extra shifts.

For leadership, 93% reported that nurses are asked to take on extra shifts at least several times a month, and 62% were asked to take on extra shifts several times a week. 3% reported nurses being asked a few times a year and almost none reported that nurses were never being asked to take on extra shifts.

Question asked

Frontline question: How often are you asked to work extra shifts?

Leadership question: How often do nurses get asked to work extra shifts?

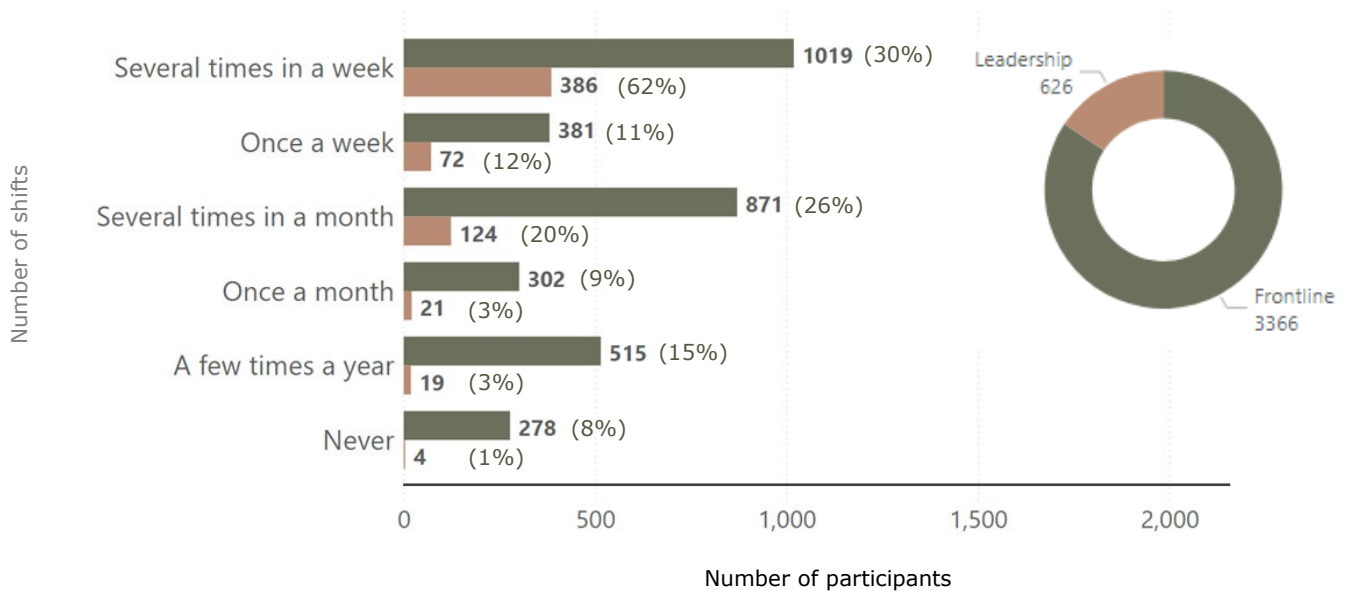


Figure 3: How frequently nurses were asked to work extra shifts

Frontline nurses and leadership used similar indicators to tell that a shift was understaffed

Both nurses and leadership agreed that understaffed shifts were characterised by nurses spending less time than they needed with their patients, unmanageable nurse workloads, going home late and missing breaks.

Question asked

Frontline question: How did you know the shifts were understaffed?

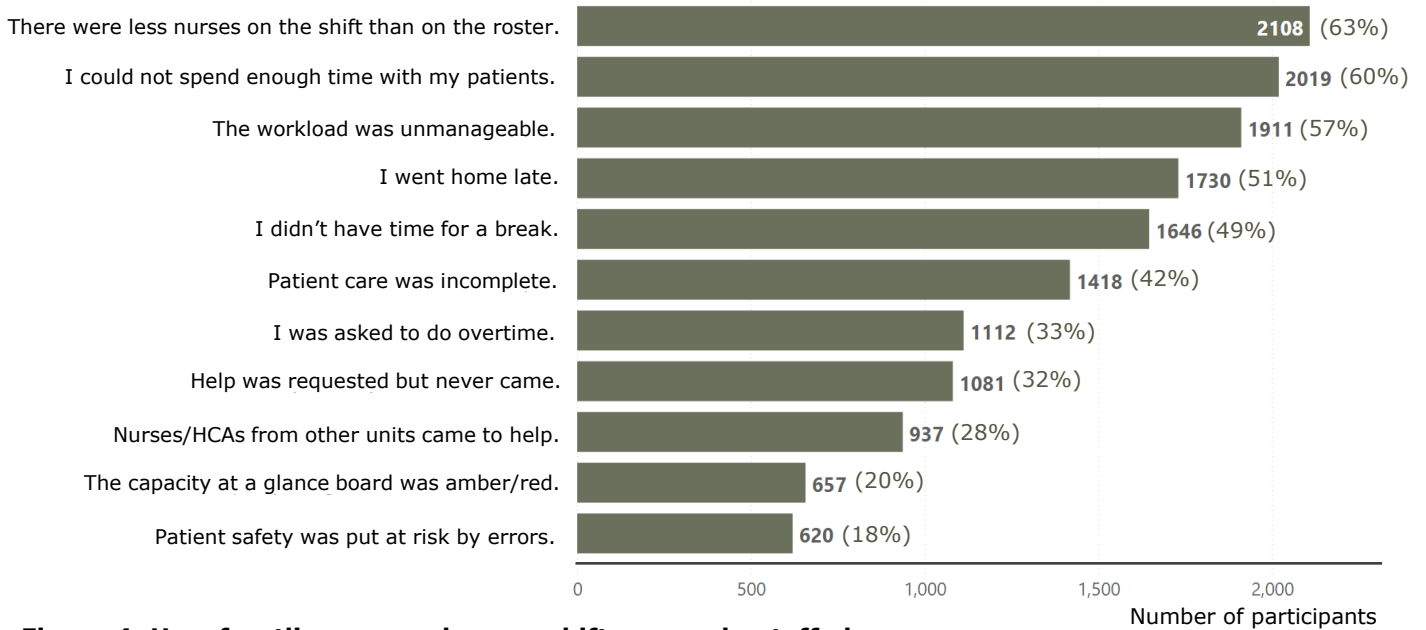


Figure 4: How frontline nurses knew a shift was understaffed

Question asked

Leadership question: How do nurses know that shifts are understaffed?

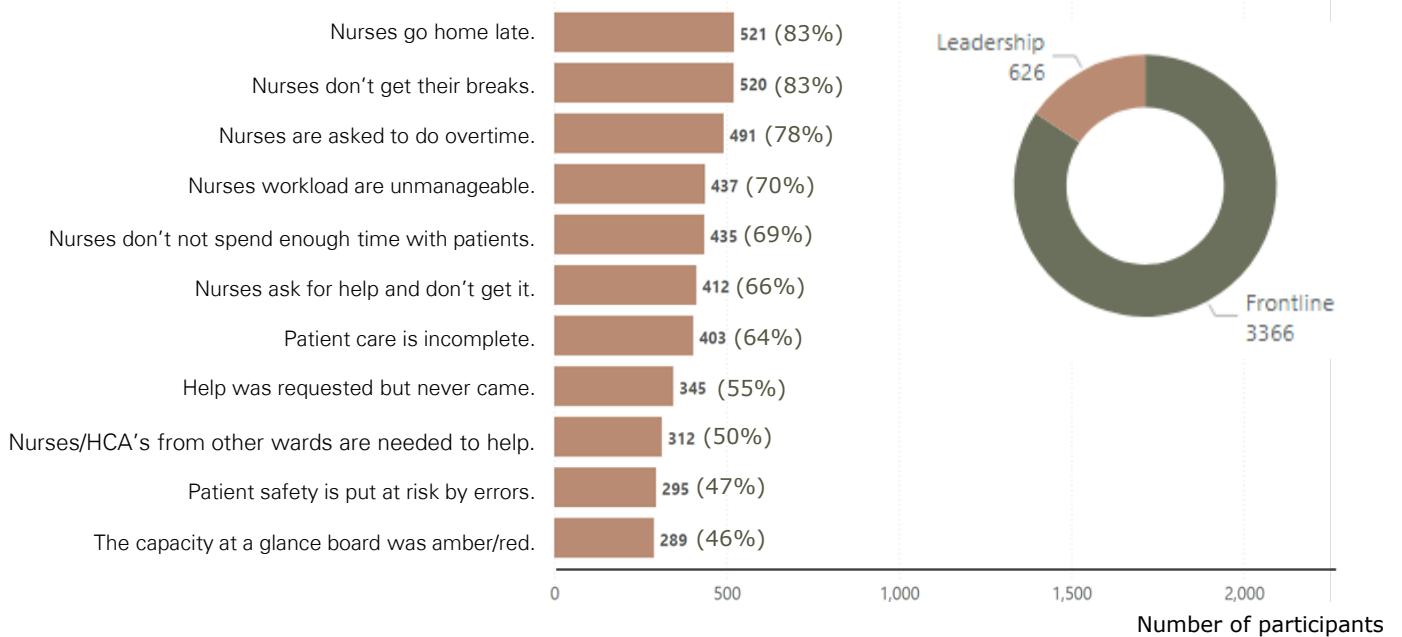


Figure 5: How leadership knew a shift was understaffed

Understaffed shifts have strong negative effects on nurses and their whānau

Both nurses and leadership report concerning negative effects on nurses and their whānau. Nurses experienced stress, missed breaks or went home late, exhausted, with no energy left for their commitments and/or loved ones.

Question asked

Frontline question: What happened to you in those understaffed shifts?

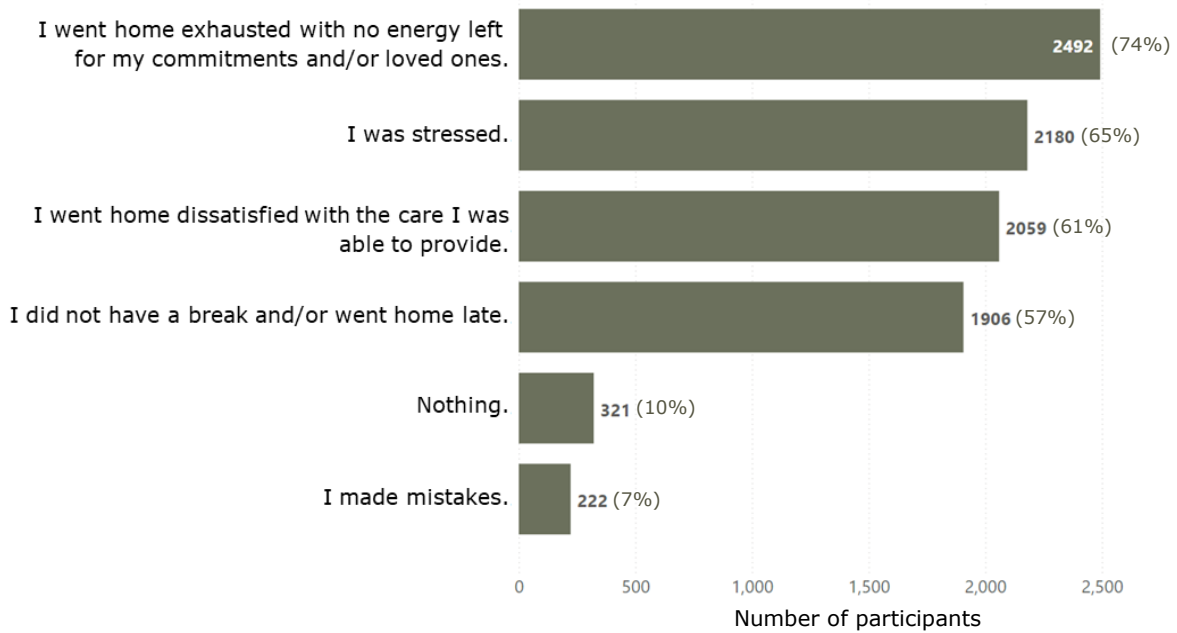


Figure 6: The effect of understaffed shifts on frontline nurses

Question asked

Leadership question: What happens to the nurses in the understaffed shifts?

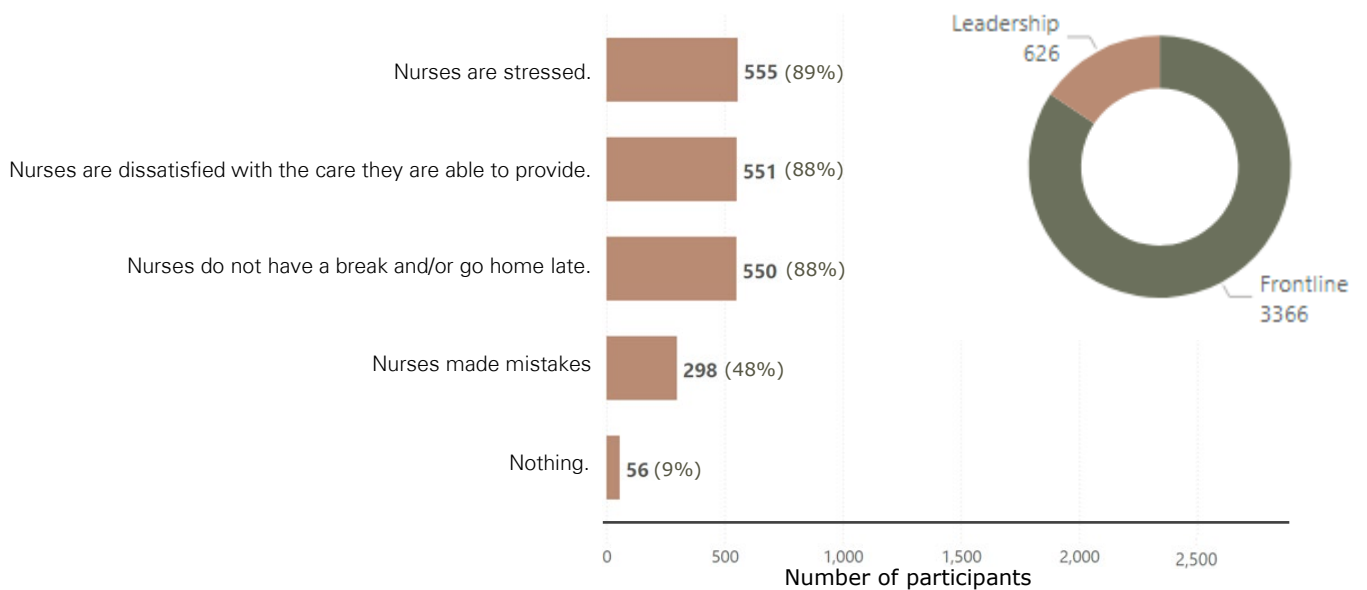


Figure 7: Leadership perceptions of the effect of understaffed shifts on nurses

Nurses experience poor mental health in understaffed shifts

53% of frontline nurses reported being in a poor or very poor mental state (1-4) on understaffed shifts, while nursing leadership reported a higher proportion (81%) of nurses being in a poor or very poor mental state. Very few respondents (18% for frontline nurses and 3% for leadership) indicated nurses were in healthy or very healthy mental states (7-10).

Questions asked

Frontline question: How would you rate your mental state in those understaffed shifts? (1 for "Very Poor" to 10 for "Very Healthy")

Leadership question: What do you think the nurses' mental state is in those understaffed shifts? (1 for "Very Poor" to 10 for "Very Healthy")

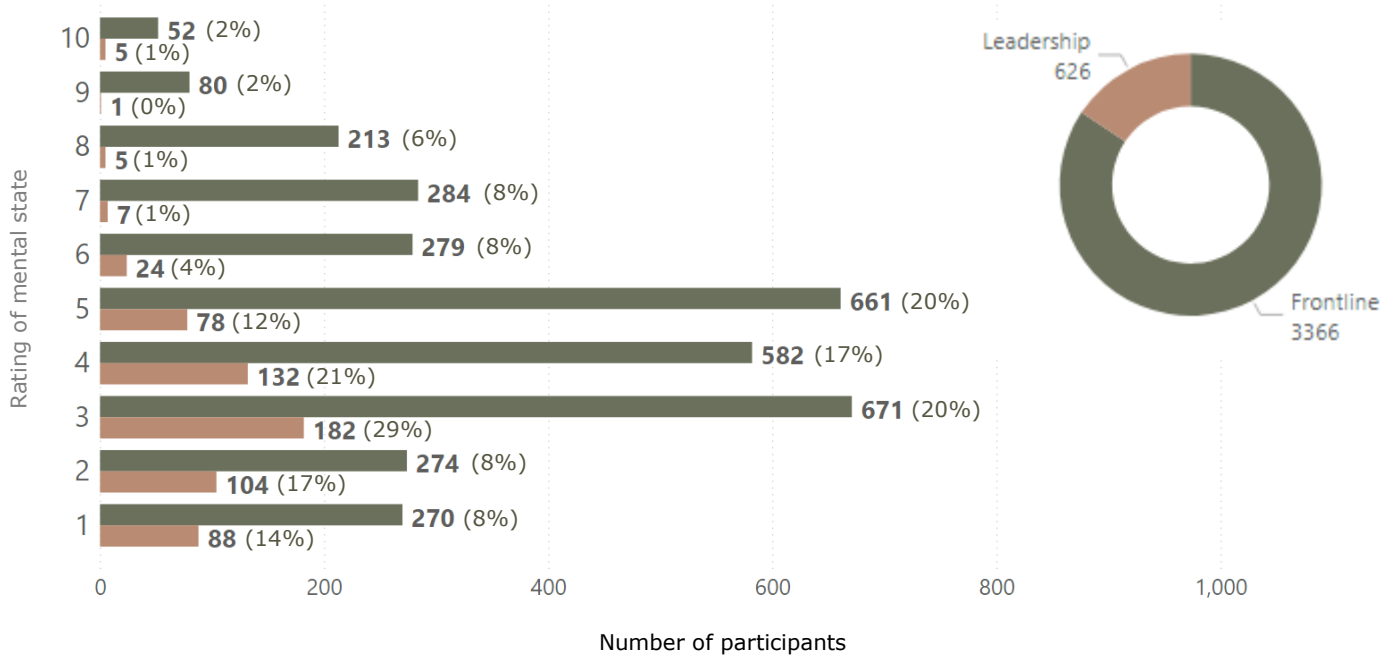


Figure 8: Frontline nursing and leadership ratings of nurse mental health in understaffed shifts

Nurses do not think CCDM or TrendCare has had positive impacts on safe staffing, patient outcomes or work environments

Most frontline nurses and leadership disagreed or strongly disagreed with CCDM or TC having a positive impact on safe staffing, patient care and work environments. Refer to pages 100-123 in the appendices for further survey results.

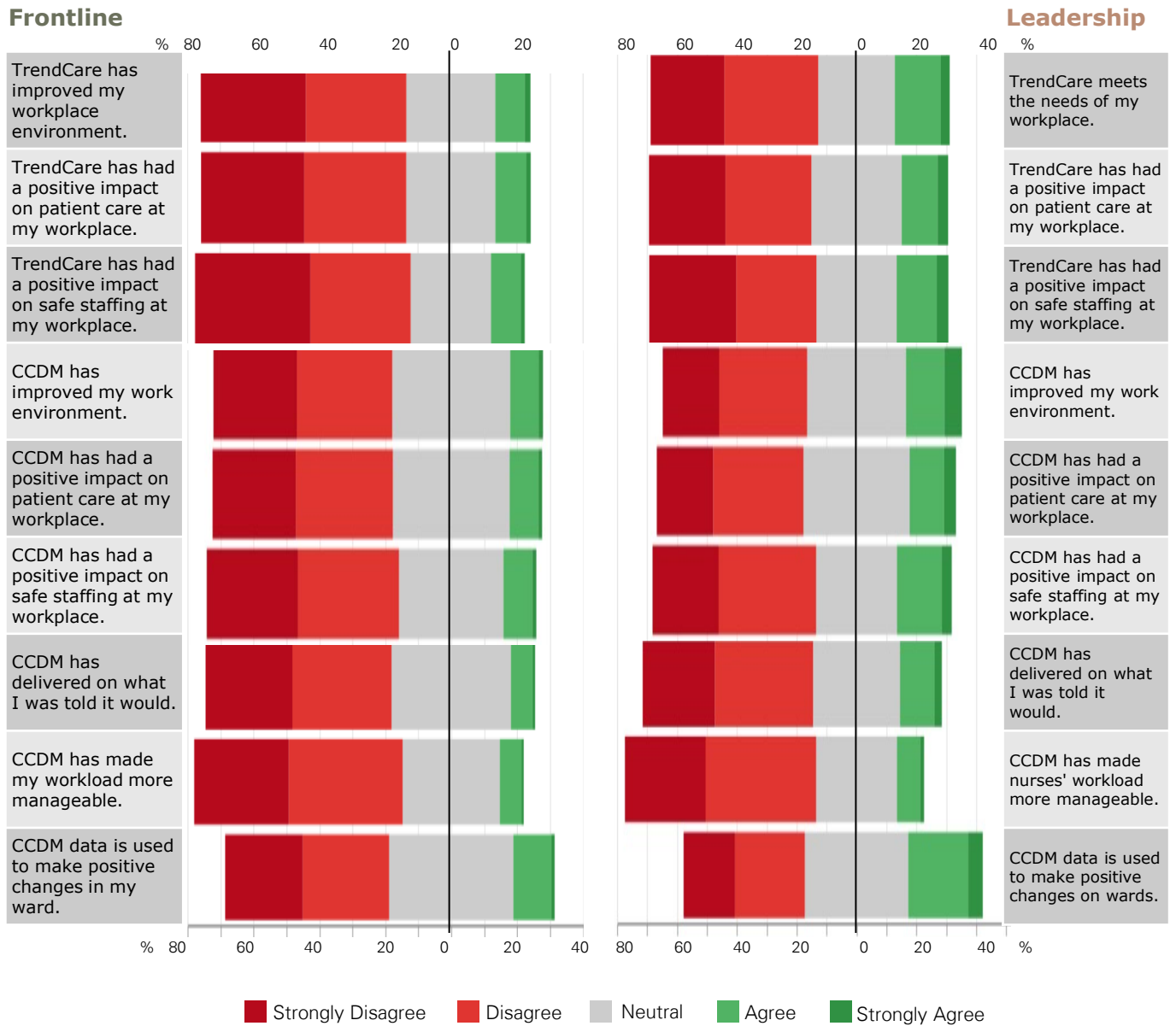


Figure 9: Survey Results: Feedback on CCDM and TrendCare Likert scale questions



5

Does the level of implementation affect outcomes in DHBs?

There is a difference between installation of CCDM versus implementation of CCDM

The phrase “installation versus implementation” captured what participants understood about programme progress. While participants knew that the tools (TC, VIS, CaaG screens and templates) had been installed in their DHBs, almost all of them were unclear on how implementation of CCDM was defined. Thus, they were unable to tell us how far along their DHBs were on implementing CCDM. Many participants also noted that while CCDM was installed, it was not used in all wards at DHBs and the output (e.g. FTE calculations) was not implemented.

We found that installation had limited effect on outcomes such as Care Hours Variance (CHV) and Shifts Below Target (SBT). It is clear that there are other factors in play that strongly limit CCDM’s impact on outcomes in DHBs, which we discuss in Chapter 6, and supports our findings in Chapter 4.

DHBs could not extract the requested data

Our initial data request to DHBs was for data for all 23 CDS measures for as many years as possible. This request was met with concern and we received feedback from the DHBs that the data we requested was not easily obtainable and had to be manually extracted. Additionally, many DHBs were currently undergoing evaluations of their CCDM implementation in that period. Since the same staff were involved, they were unable to provide the data.

We had to scale down the data request and focus on data that should be easily exportable from the system, TC data. We requested Patient Acuity, CHV, SBT, Staff Mix and Inter-Rater Reliability scores for all sites, broken down by ward, and in Excel or CSV formats. We also requested the definitions used for each of their CDS measures, FTE calculation reports for the past three years. We asked DHBs to answer specific questions about how they used their CDS, such as the level of visibility of the CDS, what platform data visualisations/dashboards are built on and examples.

Data from the DHBs was difficult to analyse due to data being defined differently, and thus being incomparable. For example, patient acuity differed in the way it was presented in the data provided. We also received files in PDF format or screenshots of the data, which rendered them unusable.

We had to focus our analysis on the most useful data that we could obtain

As described in Chapter 3, the final request for data focused on CHV, SBT, Patient Acuity and Staff Mix for the last three years (1/10/2018 – 30/09/2021) and in four wards: Medical, Surgical, Adult Acute Mental Health (AAMH), and Assessment, Treatment and Rehabilitation (AT&R).

Data was received in various formats, without explanations and required significant effort to clean, organise and analyse. Ultimately, due to the complexity and timing of when the data was received, the review was only able to complete analysis on CHV and SBT.

How we categorised DHBs

The Quarterly Milestone Reports from the SSHW Unit show that CCDM tools are installed across all DHBs and they are at different stages of implementation. Due to the impact of staffing shortages (discussed in Chapter 6), we could not fully evaluate the impact of CCDM on outcomes in DHBs at different stages of implementation.

Instead, we investigated if the impact of CCDM on CHV and SBT varied for DHBs at different stages of implementation. As discussed in Chapter 3, the 20 DHBs were been divided into fully Implemented (7), mostly Implemented (7) and least Implemented (6).

How we analysed Care Hours Variance

CHV is the difference between the clinical hours (actual hours delivered by nurses on their shift) and required hours (nurses' estimate of what patients require). It can be represented as a percentage value which allows for easier comparison. The VRM "green zone" is a range (TC defines it as "between 2 hours positive and a -4% variance"). It is important to consider that clinical hours include overtime hours and VRM hours.

Our analysis followed the example calculation provided in the "Core data set directory"¹² where the variance hours is clinical hours minus required hours (patients needed hours), and variance hours % is defined as variance hours divided by clinical hours.

Variability in Care Hours Variance is lower in DHBs where CCDM is fully implemented

Implementation status appeared to be linked to lower variability in CHV. The range of CHV in DHBs that were fully implemented was typically smaller, while DHBs that have mostly implemented and least implemented CCDM showed larger positive and negative spikes in CHV.

This was true across Medical, Surgical and Assessment, Treatment and Rehabilitation (AT&R) wards, although variability was generally higher for AT&R. This was less applicable for AAMH as all DHBs showed large spikes in positive and negative CHV.

This finding is likely due to the increased visibility that CCDM and TC provides to DHBs through VRM and the CaaG screens, allowing them to be more effective at mobilising additional nurses and move nurses between wards. DHBs that had fully implemented CCDM were also typically larger and had more nurses available for VRM. AAMH wards were unlikely to receive VRM support due to the limited number of nurses available. An illustration of this analysis is shown in Figure 11, and the full analysis can be found in Appendix 40-44.

How we analysed Shifts Below Target

A shift is considered below target if the difference in the care hours provided and the care hours required exceeded negative 8.5% (i.e. there were deficits of over 40 minutes per FTE, i.e. an 8 hour shift). It is calculated on a monthly level by dividing the number of shifts below target by the total number of shifts in that month. The higher value means more shifts in that month were understaffed, which shows a negative trend. SBT reflects the effectiveness of the base roster and VRM. We analysed the number of SBT across the same month across multiple years (2019-2021) and split them by three shifts (day, evening, night).

There is no clear link between implementation status and number of Shifts Below Target

DHBs showed wide variations in the number of SBT, regardless of implementation status or ward. For example, Lakes (mostly implemented) showed the highest SBT followed by Hutt Valley DHB (fully implemented) and Taranaki DHB (least implemented) which had very few SBT (refer to Figure 10). This is likely because DHBs face similar staffing shortages which is reflected in the high SBT, and visibility is lower in DHBs with CCDM least implemented.

Analyses for Care Hours Variance and Shifts Below Target

We concentrated on two metrics for making comparisons across DHBs with different level of implementation and across the 4 types of wards we focused on.

<p>Data Period</p> <p>We received data from each DHB for the period: 1/10/2018 – 30/09/2021</p> <p>Not all DHBs could provide data for the full period.</p>	<p>Wards Types</p> <p>We concentrated on 4 ward types:</p> <ul style="list-style-type: none"> - Medical - Surgical - Adult Acute Mental Health - Rehab (AT & R) 	<p>Metrics</p> <p>Care Hours Variance</p> <p>is the difference between the clinical hours (actual provided hours) and required hours (patients needed hours). It is recorded per shift. It can be represented as a percentage value which allows for easier comparison.</p> <p>The ideal zone (green) is between 2 hours positive and a -4% variance.</p> <p>Shifts Below Target</p> <p>A shift is considered below target if the difference in the care hours provided and the care hours required was smaller than negative 8.5% (or more than 40 minutes per FTE). It is calculated on a monthly level by dividing the number of shifts below target by the total number of shifts in that month.</p> <p>Ideally, 0% of shifts are below target.</p>
<p>DHBs</p> <p>We analysed data from 19 out of 20 DHBs. All except for Waikato, who was a victim of a recent cyber attack and no data was available before October 2019 as they do not have TrendCare in place.</p>	<p>Ward Number</p> <p>In total, we receive data for 260 wards.</p> <p>Some wards merged or split our during the period of considered data. We analysed the number as they were at the time. 260 is the most recent number after all changes.</p>	

Our analysis grouped the DHBs per level of implementation (see Table 1). We also broke down the analysis per ward type. We were able to provide an overview across NZ in terms of Care Hours Variance and Shifts Below Target. Please see "Care Hours Variance Analysis Method" and "Shifts Below Target Analysis Method" in the appendices to understand the analyses and visualisations.

Please, also see the relevant appendix sections for the complete analysis.

Ward Types	Average clinical hours (provided) vs. patient acuity hours (needed) per ward type per shift	Care Hours Variance percentage difference per shift across the 3 years.	Shifts Below Target
Medical	Appendix Section 36	Appendix Section 40	Appendix Section 45
Surgical	Appendix Section 37	Appendix Section 42	Appendix Section 46
Adult Acute Mental Health	Appendix Section 38	Appendix Section 43	Appendix Section 47
Assessment, Treatment and Rehabilitation	Appendix Section 39	Appendix Section 44	Appendix Section 48

Shifts Below Target and Shifts in Red Zone Analysis – National Overview

To gain a better understanding of the number of Shifts Below Target or shifts in the “red zone” and how this number changes year by year, we normalised ward level data and calculated monthly average shifts per ward by year. We used the TrendCare definition of a red zone shift, which is any shift with lower than -12.5% variance in Care Hours¹. In practice this means that the full 12.5% buffer in Care Hours, set aside for unplanned work and staff breaks, has been used to deliver care. It is important to note that there is no strict definition of a red zone shift in New Zealand, and charge nurses are required to answer a set of questions to determine zone status.

Our analysis covers the period 1/10/2018 – 30/09/2021 for four ward types:

1. Medical
2. Surgical
3. Adult Acute Mental Health
4. Rehab (AT & R)

How the values in the tables were calculated

Data was normalised at ward level as follows:

1. Data was collated for all 260 wards across all DHBS for 3 years, from October 2018 until September 2021.
2. The total number of Shifts Below Target (-8.5% threshold), or red zone shifts (-12.5% threshold) was calculated for each ward, for each month using Care Hours Variance data.
3. The total SBTs and red zone shifts were divided by the number of wards included in the grouping (e.g. 260 wards for all of NZ figures, or 66 wards for the DHBS mostly implemented grouping), and by number of months for which data was provided.

How to interpret the numbers

The tables on the following page show the total percentage of Shifts Below Target and red zone shifts for October, November and December 2018, January to December 2019 and 2020, and January to September 2021. Each table shows the monthly average Shifts Below Target or red zone shifts for Day shifts (column D), evening shifts (column E) and night shifts (column N), in addition to the overall average (column O).

Each row represents a different grouping of DHBS or wards, including (from top to bottom): all 260 wards analysed for this review, 106 wards in DHBS which have fully implemented CCDM, 66 wards in DHBS which have mostly implemented CCDM, 88 wards in DHBS which have least implemented CCDM, 91 medical wards (8 combined wards with medical, surgical and rehab care), 91 surgical wards, 51 AAMH wards, and 36 rehab wards.

Key figures and observations

The percentage of Shifts Below Target and red zone shifts (see tables on the following page) has increased between 2018 and 2021 for all shift types (day, evening and night). The most significant increase is in DHBS which have least implemented CCDM, and in medical wards. Key figures include:

- Almost one third (32%) of day shifts across New Zealand below target staffing levels in 2018. By 2021 this figure had increased to over a third (36%).
- A quarter (25%) of day shifts across New Zealand in the red zone in 2018, increasing to 29% by September 2021. This is a significant proportion of SBTs in the red zone, suggesting that there are often significant gaps in the number of care hours available.
- 6% of shifts in DHBS which have least implemented CCDM in the red zone in 2018, rising to 13% by 2021.
- 21% of medical wards with Shifts Below Target in 2018, rising to 28% in 2021 (17% in the red zone in 2018, rising to 22% by 2021).

These figures are a significant concern as they represent serious staffing issues which have a material negative impact on patient outcomes and safe work environments . See the tables on the following page.

¹ Shifts Below Target use a -8.5% threshold, compared to the TrendCare -12.5% threshold.

* D: Day E: Evening N: Night O: Overall

Shift Below Target	2018 Month Ave (%)				2019 Month Ave (%)				2020 Month Ave (%)				2021 Month Ave (%)			
	D	E	N	O	D	E	N	O	D	E	N	O	D	E	N	O
All NZ	32	16	11	20	34	18	12	21	28	15	11	18	36	19	14	23
Fully Implemented DHBs	38	20	12	23	40	20	13	24	30	16	11	19	43	23	15	27
Mostly Implemented DHBs	27	13	11	17	36	19	14	23	32	16	11	20	35	19	15	23
Least Implemented DHBs	12	8	5	8	9	5	4	6	17	10	9	12	27	13	11	17
Medical wards	32	19	13	21	37	21	16	25	29	16	12	19	42	23	18	28
Surgical wards	37	15	9	20	40	18	11	23	32	15	9	19	38	18	13	23
AAMH wards	30	16	8	18	25	11	6	14	27	14	10	17	34	14	7	18
Rehab (AT & R) wards	16	11	9	12	17	13	10	13	12	11	8	10	17	13	11	14

Table 2 : Shifts Below Target across NZ

Red Zone Shifts	2018 Month Ave (%)				2019 Month Ave (%)				2020 Month Ave (%)				2021 Month Ave (%)			
	D	E	N	O	D	E	N	O	D	E	N	O	D	E	N	O
All NZ	25	13	9	16	27	13	10	17	21	11	8	13	29	14	11	18
Fully Implemented DHBs	31	15	10	19	31	15	10	19	23	12	8	14	34	17	12	21
Mostly Implemented DHBs	21	10	9	13	28	14	11	18	25	12	9	15	28	14	12	18
Least Implemented DHBs	8	6	4	6	6	4	3	4	14	9	8	10	21	10	9	13
Medical wards	25	14	11	17	28	15	13	19	21	12	10	14	33	18	14	22
Surgical wards	29	11	7	16	31	13	8	17	25	11	7	14	30	13	10	18
AAMH wards	26	14	8	16	21	9	6	12	23	13	9	15	28	11	6	15
Rehab (AT & R) wards	11	7	7	8	12	9	8	10	8	8	6	7	12	9	9	10

Table 3 : Shifts in VRM's Red Zone across NZ

Shifts Below Target & DHB based Care Hours Variance – National View

From the data we have collated directly from DHBs, we have provided below for the first time, visibility of the national picture regarding the Care Hours Variance and Shift Below Target across wards.

We have used microplots to enable us to see the patterns to detect the trends across the country and across different levels of implementation (fully, mostly and least implemented).

The DHBs have been grouped together based on the level of CCDM implementation. By way of example, the set of microplots on figures 10 & 11 (the next 2 figures) are for the medical wards only, for the other ward types, please see the appendix 40, 42 - 48.

Shifts Below Target & DHB based Care Hours Variance Microplots

These visuals group the DHBs per implementation level to allow for trend comparisons across the levels. The number next to DHB names are the count of medical wards within DHBs considered. Day, evening and night shifts are considered separately.

For example, looking at the microplots on the next 2 pages, we see that Hutt Valley DHB is considered to have fully implemented CCDM. It has 3 medical wards.

How to read the Shifts Below Target microplots visualisation

SBT analysis reflects the effectiveness of the base roster and VRM. The higher value means more shifts in that month were understaffed, which shows a negative trend.

The x axis shows the dates. One point per month, the first 3 points are for the last 3 months of 2018 and so on. One can see how SBT improve or decline over time.

For example, Hutt Valley DHB (see microplots on the next page) , until early 2021 they managed to keep the SBT to less than 25% (most below 10%), and relatively stable. Around April 2021, their day and evening shifts moved up to almost 50% SBT and a few months later they managed to bring the number down again.

How to read the DHB based Care Hours Variance microplots visualisation

For the purposes of this analysis, all wards of the same type have been aggregated per DHB. For example, all Medical wards for Auckland DHB are shown as a single line. This analysis should be read in conjunction with the Shifts Below Target analysis (table 2 in page 41) which considers each individual ward.

The **graphs** on Figure 11 show the care hours variance % trend over the last three years. Each line represents a shift (day, evening, or night) across all wards in the respective DHB. Each point represents the Care Hours Variance % for a particular shift (day, evening, night) on a particular date. The variance % has been calculated using the difference of clinical (available) and acuity (needed) hours across all wards on that particular shift. According to TrendCare, the ideal zone (green) is between 2 hours positive and a -4% variance.

The plot shows how Care Hours Variance has changed over the period from October 2018 to September 2021 on DHB wide level. For example, the aggregated 3 medical wards of Hutt Valley DHB (third row, first column on Figure 11) show little difference in Care Hours Variance during this period, with all lines showing a similar length in the middle of the plot. In contrast, South Canterbury has seen significant changes in Care Hours Variance, shown by the peaks and troughs on the plot. Lines closer to the top of the plot area indicate overstaffing, and lines approaching the bottom of the plot indicate understaffing.

As the analysis has been completed using aggregated ward information, it can have the effect of smoothing out extremes of variability across a DHB. We took a closer look at Auckland DHBs' 16 medical wards, and plotted individually the size of each ward, in terms of care hours acuity and clinical availability to highlight how different the demand is in different wards within a DHB (See appendix 41: Clinical (provided) vs Patient Acuity (needed to provide greater visibility of) hours - DHB range example: Auckland). This visualisation shows greater variability in Care Hours Variance at an individual ward level than the aggregated picture on page 44 suggests.

Shifts Below Target – National View of the medical wards

This set of microplots are for the medical wards.

Main Observations

1. Day shifts consistently have the highest number of Shifts Below Target.
2. The level of CCDM implementation does not seem to have an impact on SBT.

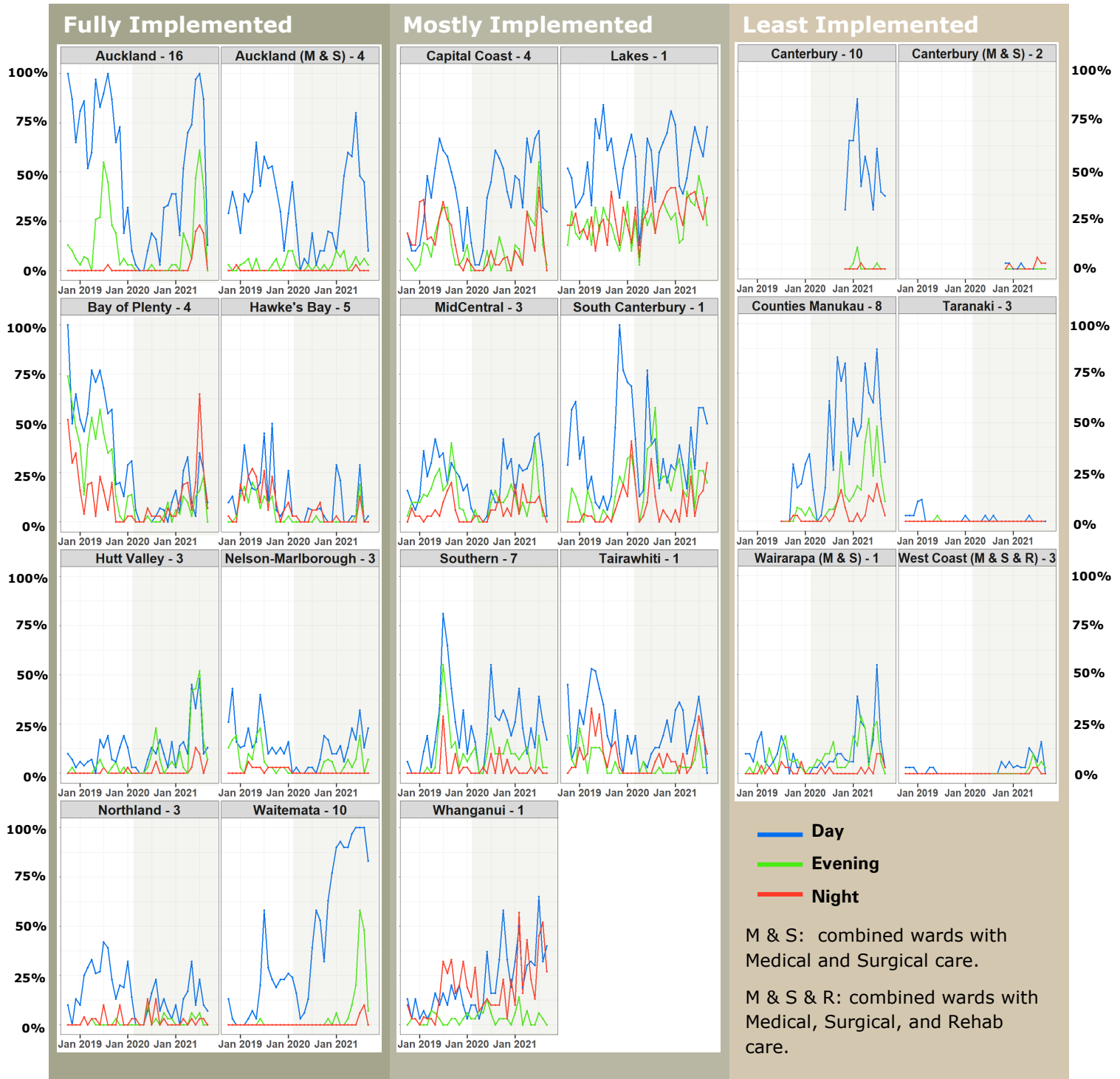


Figure 10 : Shifts Below Target analysis for medical wards across Aotearoa New Zealand

*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020 , which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

DHB based Care Hours Variance – National View of the medical wards

This set of microplots are for the medical wards.

Main Observation

The pattern tells us that there appears to be a link between CCDM implementation level and stability achieved to manage the Care Hours Variance. This may have an impact on patient care levels and outcomes.

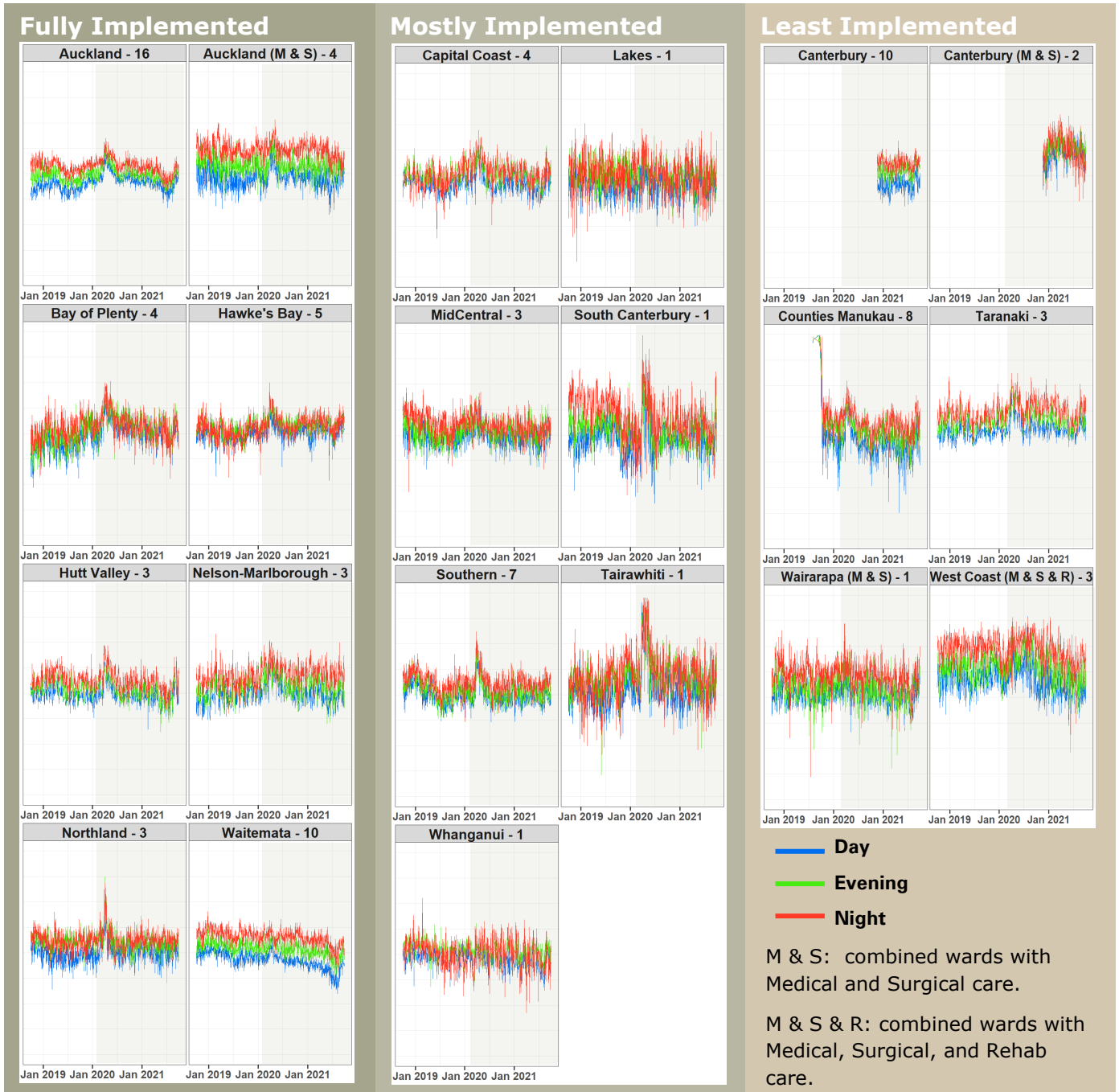


Figure 11 : Care Hours Variance analysis for medical wards across Aotearoa New Zealand

*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020 , which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

Observations from the Shifts Below Target – National View Analysis:

There are a higher number of Day Shifts Below Target in all DHBs excluding Whanganui, than any other shift type. This is true regardless of the status of CCDM implementation. Four DHBs experienced almost 100% of Day Shifts Below Target during the period January 2019 to January 2021 (Auckland, Bay of Plenty, South Canterbury and Waitemata). The DHBs with the fewest Day Shifts Below Target are Canterbury M&S, Taranaki, and West Coast all of which are in the 'least implemented' category. This may be a reflection of the amount and quality of data being collected by these DHBs rather than showing that they have fewer Day Shifts Below Target.

Individual DHBs showed wide variations in the number of Day Shifts Below Target, regardless of implementation status. Auckland DHB experienced some months with no Day Shifts Below Target, and others with 100% of Day Shifts Below Target. The variation is similarly pronounced for evening shifts across almost all DHBs, and less pronounced for night shifts.

The fact that DHBs at all stages of CCDM implementation are consistently showing wide variation in the number of Shifts Below Target suggests that number of Shifts Below Target is more heavily influenced by widespread staffing shortages than by CCDM implementation, i.e. that implementing CCDM has had little impact on reducing the number of Shifts Below Target.

Observations from the DHB based Care Hours Variance – National View Analysis:

Care Hours Variance (CHV) is displayed by DHB, and cannot be broken down to ward level. The data is therefore unable to show variation between wards within a single DHB.

Analysis suggests that CCDM implementation status is linked to lower CHV: DHBs which have fully implemented CCDM have lower CHV than DHBs where CCDM is mostly implemented, and even lower CHV than DHBs where CCDM is least implemented. This applies equally across Medical, Surgical and Assessment, Treatment and Rehabilitation (AT&R) wards, although variability was generally higher for AT&R.

For AAMH wards all DHBs showed significant positive and negative CHV spikes (see Appendix 43), with little to no difference in variation based on CCDM implementation status. Hutt Valley DHB AAMH ward has been included in the Capital and Coast DHB figures due to the 3 DHBs (CCDHB, HVDHB, and WRDHB) approach to mental health specialist services.

A large number of DHBs show similar CHV patterns between January 2019 and January 2021, with the occasional spike. Bay of Plenty DHB has made small improvements to the scale of CHV between January 2018 and May 2020, with a small decline since this time. Waitemata DHB is showing a declining CHV trend, with fewer positive variances and a greater number of negative CHVs since 2018 for Medical, Surgical and AAMH wards.



6

Is CCDM
Fit-for-Purpose?



Is CCDM fit-for-purpose?

CCDM has the potential to deliver Safe Staffing, Quality Patient Care and Quality Work Environment. It is not currently delivering these outcomes because in its current state it is not fit-for-purpose. Fundamental issues exist with the current configuration of CCDM tools, creating unnecessary complexity and difficulty for stakeholders in understanding the programme, communicating its benefits, and implementing meaningful change.

CCDM has not been adapted for the specific context of Aotearoa New Zealand: it was designed based on the assumption that a Western model of care is applicable to all cultures. It therefore fails to take into consideration the cultural needs of staff, patients and whānau from Aotearoa New Zealand.

CCDM does not recognise Te Tiriti o Waitangi responsibilities toward Māori in its design, implementation or outcomes

CCDM was built on extensive international research dominated by American and British approaches to safe staffing. None of this research recognises indigenous world views, concepts of care or safety. CCDM has been designed and implemented in hospital contexts in Aotearoa, but the fundamental principles underpinning TrendCare and the CCDM tools originate from overseas. They fail to account for Māori world views and essential concepts such as Mātauranga and Tikanga.

In the course of our evaluation we found a DHB that has added an icon to the CaaG screen that indicates patients who identify as Māori. This supports the Māori health gains team to deploy staff to clinical settings where demand is high and staffing low, among other functions. These are not clinical intervention staff like RN's. Rather, they support patients and whānau with needs associated with Tikanga, Mātauranga and Rongoā to improve the care experience. Utilising CCDM tools for identification and support for patients and whānau in this DHB stands on the solid foundation of an Iwi led Māori health gains and healthy futures strategy - Te Toi Ahorangi.

Our Te Tiriti partnership in Aotearoa New Zealand necessitates that the design, intentions, implementation and outcomes of health sector projects and interventions specifically recognise, honour and uphold the articles and principles of Te Tiriti. In its current form, CCDM does not serve the interests of Māori because it does not account for how Māori patients and whānau conceive of patient safety and safe care, nor what Māori nurses consider to be safe staffing. There is significant work to be done at both the operational and governance level of CCDM to address this fundamental flaw.

Key components of CCDM are overly complex and difficult to understand

Survey participants highlighted that key CCDM components (notably CDS, TrendCare and VRM) are overly complex and difficult to understand. This makes it challenging to communicate the vision and purpose of the programme to DHB leadership, Boards and front line nursing staff.

Core Data Set

In particular DHBs highlighted concerns about the number of metrics included within the CDS: a total of 23 measures across the CCDM triangle (see Appendix 25). DHBs noted during the course of this review that not all CDS measures are relevant for their context, and that they often struggle to gather insights from CDS data.

In addition to the sheer number of measures, this review found significant inconsistencies in how measures are defined, collected and reported on. This is driven by the lack of an agreed, standardised definition of measures, and the ability to customise some measures including the nine measures captured in TrendCare (staff unplanned leave, staff mix, patient acuity, bed utilisation, care hours variance, shifts below target, casual use, total staff hours, and late discharges). The variability in how DHBs define and collect data limits the ability of the programme to analyse and compare data at a national level, thus limiting the impact of CCDM.

CCDM is heavily dependent on data: information on the level of resources needed and FTE calculations are fundamentally driven by data. The inconsistencies and issues with how data is collected, captured and reported on are significant issues which have informed our assessment that CCDM is not currently fit-for-purpose.

It is important to note however that despite data issues, CCDM has made the current staffing shortage more visible and led to some action being taken by DHBs to address nursing shortages.

Frontline nurses also highlighted issues with understanding of the CDS: in our survey 30% of frontline nurses responded that they 'Disagree' or 'Strongly Disagree' with the statement 'The Core Data Set is easy to understand' (see below).

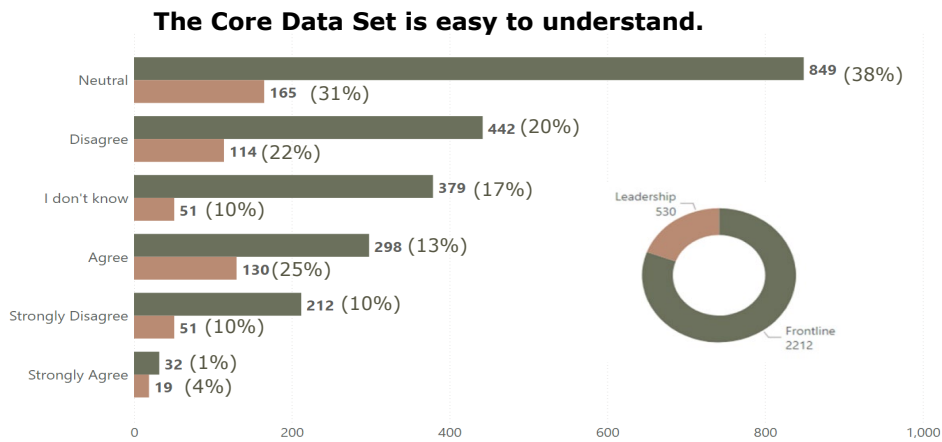


Figure 12: Participants' agreement on whether the CDS is easy to understand

It is perhaps not surprising that frontline nurses do not find CDS easy to understand; some of the CDS metrics are complex and when shown in isolation do not tell a clear and easy-to-understand story. This review found generally low levels of data literacy in DHBs across all levels, with many DHBs struggling to provide us with CDS data and some providing data in PDF or screenshot format. Data literacy programmes launched by CCDM Coordinators in some DHBs targeting staff from frontline nurses to leadership, have been extremely well received, and we believe such programmes have contributed significantly to these DHBs' understanding and use of the CDS.

The data that is captured within CCDM and presented to DHB leadership is frequently not understood or used to its full potential. For example, reporting and communication relating to Care Hours Variance can be misleading. The graph below is used by one DHB to represent the variance in care hours across its 20 wards, however the way the data is presented (due to poor understanding) means that it tells a misleading story.

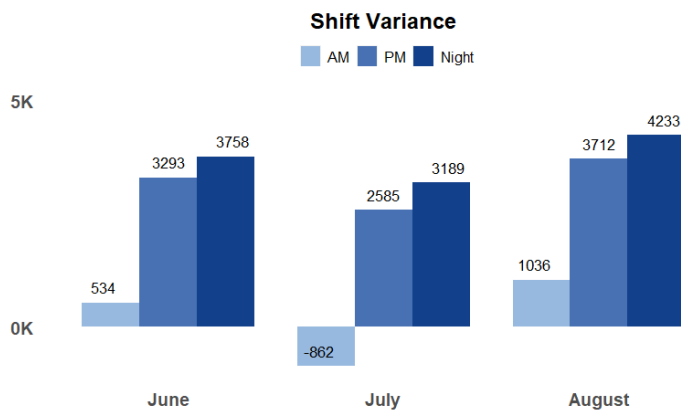


Figure 13: Monthly care hours variance in a 20 wards DHB from June-August

This visualisation is misleading in the following ways:

1. It makes it appear that the wards are overstaffed

The graph appears to show 4,233 excess clinical hours on night shifts in the month of August. This provides an initial impression that wards are overstaffed, rather than understaffed.

The data presented in this graph is an average across 20 wards and 31 days (within the month of August). When the figures are divided it shows 6.8 hours excess clinical hours per shift. This is less than one FTE, and is not an indication of overstaffing as the 6.8 'excess' hours will be utilised by nurses on shift to complete other, non-clinical responsibilities outside direct patient care.

2. It hides the variability from ward to ward and from shift to shift.

This graph hides the variability from ward to ward and from one night shift to another night shift. By aggregating and averaging the data it is not possible to see whether individual shifts were understaffed. Reporting by ranges would provide more granular detail and enable greater insight into patterns of staffing.

3. It does not take into account required resource staffing requirements.

There is limited variance response available during night shifts. Accordingly night shifts are staffed to ensure there is sufficient resource to complete the anticipated workload, and to account for unanticipated changes (e.g. changes in patient acuity). As a result, some shifts will show higher clinical hours available due to sufficient staffing. This information is lost when the data is aggregated this way.

4. It does not recognise how any extra clinical hours were gained.

While a shift may start with negative clinical hours available, it may end with positive clinical hours available due to the shift being repaired by the activation of VRM, missed breaks, staff overtime and/or staff working extra shifts. The clinical hours captured here only reflect the sum total available and do not accurately reflect the reality on the frontline.

Another example of poor understanding of the data leading to visualisations which present a misleading story, is how CHV is presented. CHV data is complex. Understanding the right message from the visuals at a glance is paramount to allow for actionable insights. The information displayed needs to be simple, unambiguous, clearly labelled and complete. Measures should be combined instead of needing to be looked at concurrently with additional graphs in different places.

Two examples are provided below to illustrate how CHV can be visualised more effectively to accurately convey the reality for frontline staff. Note that both Example 1 and Example 2 still aggregate data over a period together. They both ideally need to be integrated with another graph or a visual cue illustrating the range across shifts.

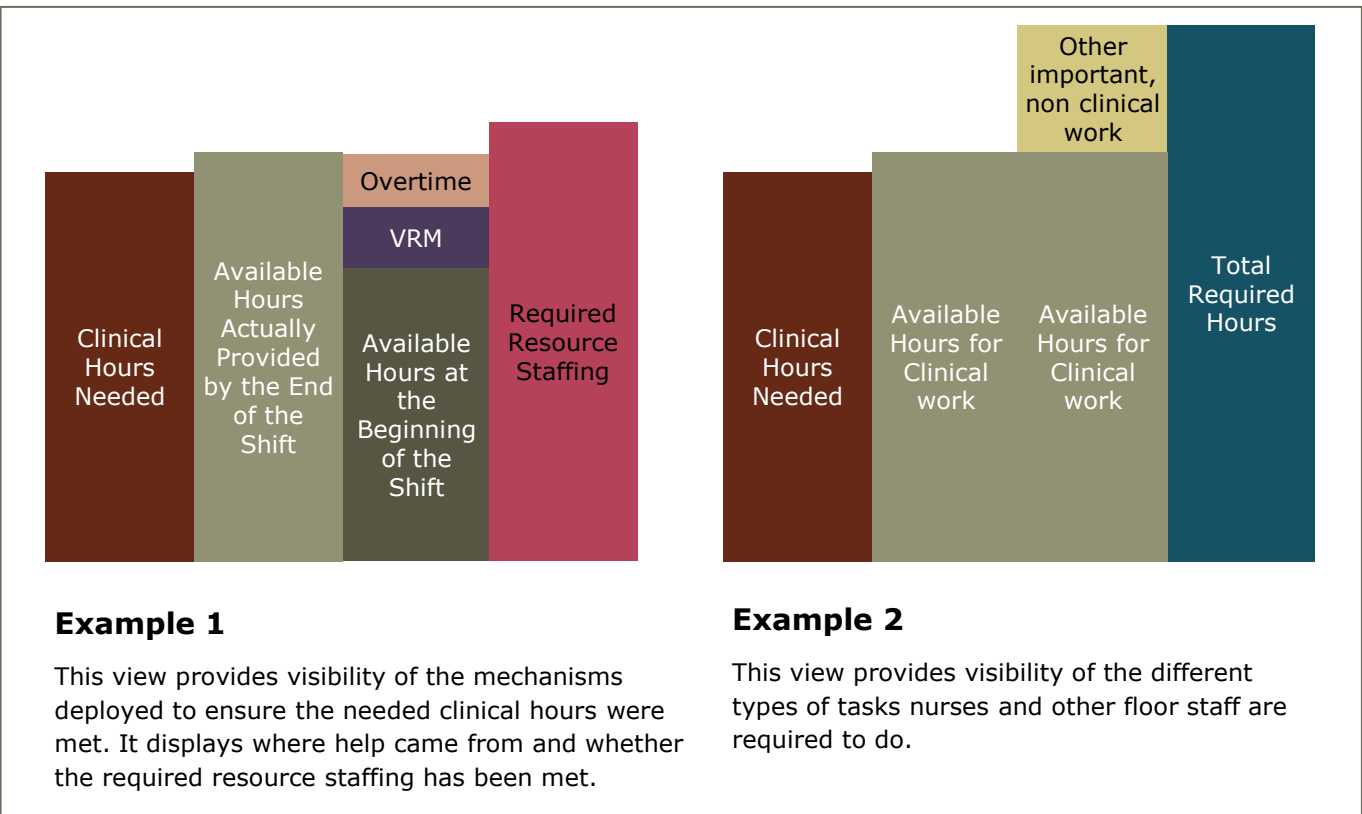


Figure 14: Two examples of how Care Hours Variance can be visualised more effectively

TrendCare

Data entry for TC places significant demands on nurses’ time, creating an additional burden for already overworked staff, and leading to disengagement with the programme by frontline nurses. The graph below shows estimates made by nurses and leadership of the time spent inputting TC data per shift. It shows that 25% of frontline nurses and 30% of nursing leadership spent at least 1.6 hours (20% of their time) of their shift entering data into TC. At an average of 10-19% of nursing time per shift nurses are spending 48 – 96 minutes per shift on manual data entry, at a significant cost to the DHB. For this reason we have concluded that CCDM in its current state is not fit-for-purpose, and will not be until data entry can be simplified and /or automated.

Question asked

Frontline question: What proportion of time in your shift is usually spent on inputting data at TrendCare?

Leadership question: What proportion of time do you think nurses spend on inputting data at TrendCare?

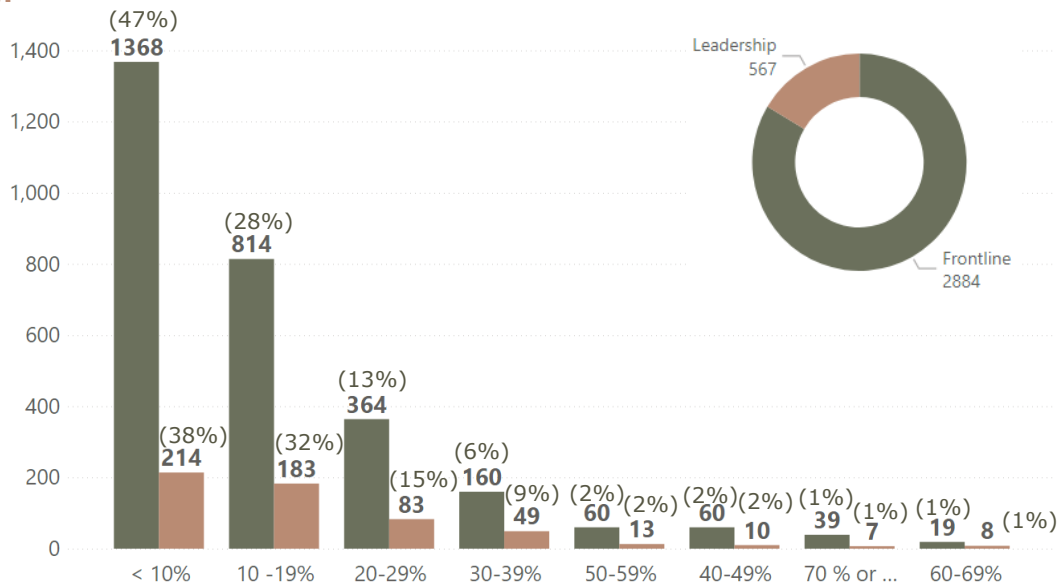


Figure 15: Proportion of time in a shift spent on data entry for TrendCare

There are other limitations to TC in addition to the time taken to manually enter data. The most significant of these is that the configuration of TC is not well suited to specialised wards (e.g. including Mental Health wards who have significant 1-on-1 care needs or required resource staffing requirements). These additional staff are reflected as excess clinical hours in the system and appear to be overstaffed however this is highly inaccurate.

Variance Response Management

Nurses expressed significant concern during focus groups about VRM. This primarily stems from hesitancy to support different wards for fear of being in an unfamiliar working environment and that they might inadvertently cause patient harm.

"as an RN, being 'sent away' from your home ward to other areas to assist with staffing is stressful for many reasons: a lot of patient care time taken up with finding your way around another ward, where things are, even the layout of the drug rooms, the drugs used in different areas, everything takes more time, often other staff too busy to help you, unfamiliar patient scenarios and treatments, never enough time to read notes on patients to get full history, time consuming trying to find enough staff to help with transfers of heavy patients."

"Staff come back in tears from other work areas as they felt unsafe"

We have recommended re-designing the key components of CCDM (CDS, TC and VRM) to ensure they are fit-for-purpose (see pages 69-70). In addition to these findings, this review also found issues with the wider CCDM programme, including key enablers which underpin CCDM. We identified eight key success factors for CCDM implementation, summarised in the table below along with our perspective of how widespread these success factors are among DHBs.

Key success factor	Limited	Variable	Widespread
1 Strong buy-in from DHB Executive Leadership	✓		
2 Active participation in CCDM Councils by DHB Executive Leadership	✓		
3 Mutual understanding and trust between DHBs and Unions		✓	
4 Data literacy programmes aimed at different levels across the DHB	✓		
5 Supporting IT and data infrastructure that is fit-for-purpose		✓	
6 Data analyst support to produce visualisations that allow actionable insights to be drawn easily	✓		
7 Sufficient funding and resourcing of CCDM teams		✓	
8 Visible actions are taken as a result of CCDM	✓		

1. Strong buy-in from DHB Executive Leadership

Sponsorship and buy-in are essential for implementation to progress. DHBs where this was present had faster and smoother implementation. For example, adequately resourcing CCDM with supporting staff and quicker approval of FTE calculations.

Currently there is a clear disconnect between DHB Executive Leadership and frontline nurses. For example, frontline nurses report that they are facing increasingly demanding workloads and are facing worse staffing shortages than ever before. DHB Executive Leadership on the other hand report a lack of confidence in the accuracy of FTE calculations and have little trust that CCDM is presenting an accurate picture of the level of resourcing needed to meet demand. This has delayed implementation of FTE calculations and recruitment of additional nurses, in turn leading to nurses feeling that they have not been heard about the risks, harm and compromises being made on understaffed shifts.

During the focus groups it was evident that Executive buy-in for CCDM is low. This manifests in poor attendance at CCDM councils and significant delays in approving and implementing FTE calculations. Participants reported being required to re-do the FTE calculations multiple times before they were endorsed and having to provide business cases to support the data. At times, endorsed FTE calculations would sit with the Chief Financial Officer (CFO) or Board for long periods of time, resulting in delays of 6-18 months in recruiting additional staff. This meant that by the time approvals were obtained the next round of FTE calculations was already overdue.

The data collected through CCDM provides a transparent picture of the reality that frontline nursing staff face. Participants have reported pushback for “airing dirty laundry” when providing reports on the realities of the frontline, and risks of harm to patients to leadership.

Participants also reported that changes in leadership slowed progress and the momentum of CCDM. With leadership changes came re-litigation of the CCDM programme, FTE calculations and further delays. This caused frustration for DHBs that had been trying to move forward with the implementation and drastically reduced momentum.

Poor engagement and buy-in to CCDM at the Executive level may be, at least in part, driven by the fact there is limited accountability at this level for achieving Safe Staffing and other CCDM target outcomes. There are no measures of performance tied to the rate at which FTE calculations are implemented and recruited to, and none tied to achieving safe staffing and safe work environments for nursing.

Should the lack of buy-in from DHB EL and Boards for CCDM and the CDS continue, implementation is unlikely to succeed.

2. Active participation in CCDM Councils by DHB Executive Leadership

The current construct of governance in CCDM has had varying levels of success in enabling effective planning, coordination of resources, accountability for actions and ongoing monitoring and improvements.

Local Data Councils have been established to monitor performance at ward level, and CCDM Councils to monitor performance at hospital level. Attendance at LDCs is typically low, with nursing staff reporting being unable to leave the ward to attend. Consequently, LDCs have resulted in a limited number of quality improvements and nursing staff lack awareness of their LDC. Survey results showed that 67% of frontline nurses did not know whether there was an active LDC at their DHB (Figure 16) and 89% of frontline nurses did not know how often their LDCs met (Appendix 22).

Question asked

Frontline question: There is an active local data council in my ward.

Leadership question: There is an active local data council in my DHB.

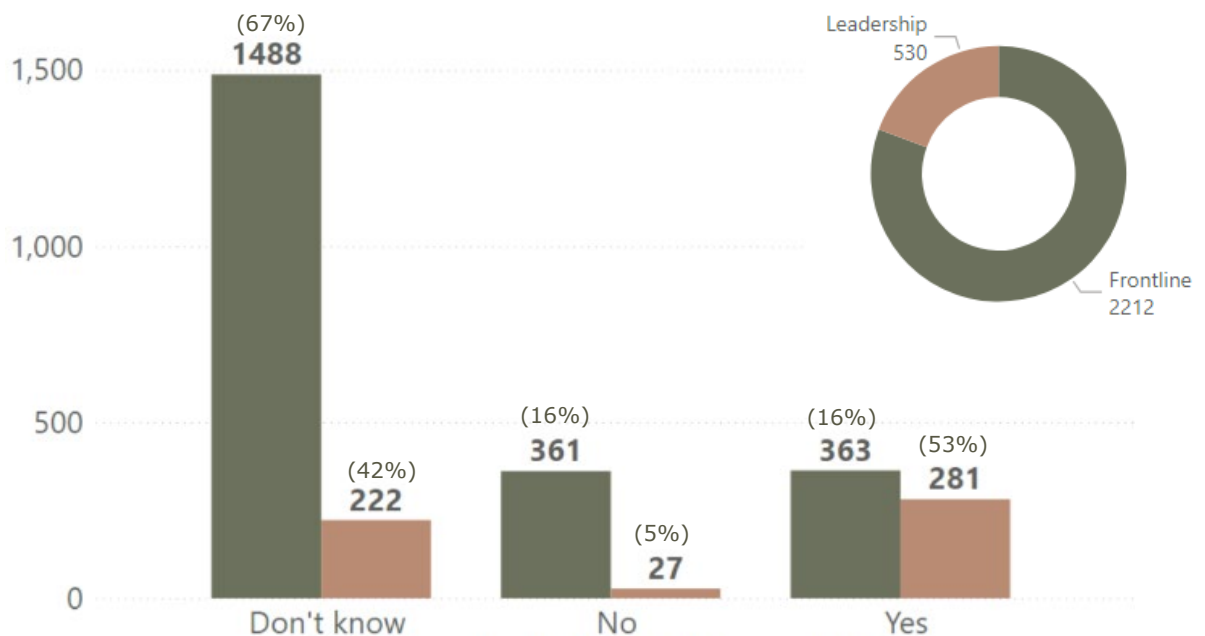


Figure 16: Awareness of Local Data Councils

Knowledge and awareness of CCDM Councils is also variable, with 64% of frontline nurses and 31% of leadership reporting that they did not know whether there was an active CCDM Council at their DHB.

Question asked

Is there an active CCDM council in your DHB?

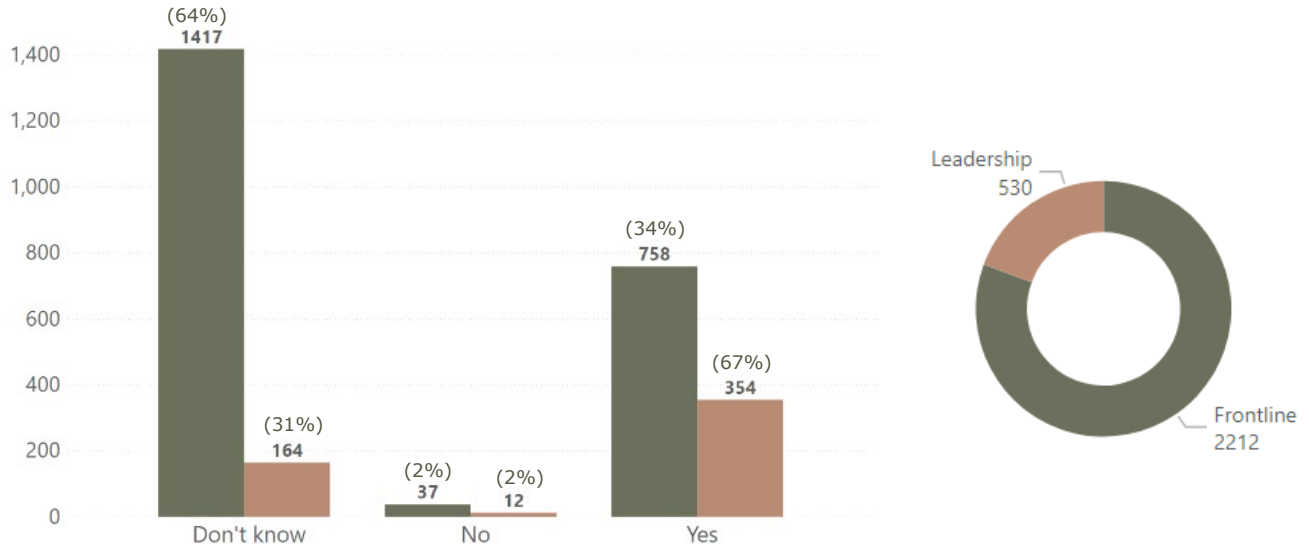


Figure 17: Awareness of CCDM councils

Where CCDM Councils and LDCs have been more visible they have been able to drive quality improvements. For example, through one LDC CCDM analysts have used visualisation software to develop dashboards of the data that allow actionable insights to be drawn easily. This enables nursing staff to have a better understanding of their environment.

3. Mutual understanding and trust between DHBs and Unions

A successful partnership relationship between the Unions and DHBs is an important success factor. For such a partnership to succeed they need to work together and have a mutual interest in the implementation of CCDM.

Partnerships between DHBs and Unions have varied between strong and effective, to weak, and at times, adversarial. In some cases, either parties’ suspicions about the other limited the effectiveness of working relationships. For example, participants reported a case where different versions of a report would be issued to DHBs and to Unions after CCDM Council meetings, causing an erosion of trust.

When DHBs engaged in partnership training, the working relationships between DHBs and Unions was stronger, had higher mutual trust and was more productive. There was limited uptake of partnership training, largely due to lack of capacity to attend. Participants also reported better working relationships with Unions when the representatives had worked with them throughout. This enabled them to build strong relationships over time and provided the length of time required to understand the complexity of CCDM.

4. Data literacy programmes aimed at different levels across the DHB

At DHBs where data literacy programmes were implemented, staff were better able to understand and appreciate the value of CCDM and data. Appendix 26 shows the complexity of CDS data, and some of the challenges DHBs have experienced in interpreting and making use of data.

As part of our review we requested data from all 20 DHBs. Our initial data request to DHBs requested data from all of the 23 CDS measures for as many years as possible. DHBs provided feedback that this data was not easily obtainable, required significant manual effort and could not be provided to us by the review deadline. This review found specific data issues including:

- Varying ways/formats of recording data;
- A (semi) manual process for extracting and exporting data (13 DHBs complete this process manually); and
- Inefficient ways of visualising data which inhibit easy comprehension of the situation.

A large number of DHBs also reported that data literacy within their organisation is low, and that there is limited data analysis and visualisation capability. This has resulted in issues where data is presented to CCDM Councils that is inconsistent with the experience of nurses on the frontline, leading to confusion and lack of trust in CCDM and the CDS.

5. Supporting IT and data infrastructure that is fit-for-purpose (and allows for automation)

When IT and data infrastructure allows for automated extraction and visualisation of data, DHBs report having additional time available to focus on how they could understand and use the data. Staff in smaller DHBs report difficulty in extracting CDS data and are less likely to have automated systems and processes to enable this, resulting in them spending a greater proportion of time manually extracting and analysing data.

DHBs are currently using a range of different systems and platforms to capture, analyse and visualise their data. The most common platform that DHBs use to view their CDS is Power BI (10), followed by Qlik (4). Other DHBs use Tableau, Sisense and Excel to visualise their data. This inconsistency between DHBs (compounded by inconsistent CDS measure definitions, for example how DHBs calculate the number of extra shifts or use of casual staff) has meant that it is difficult to benchmark CCDM performance across DHBs, or to provide national reporting on Safe Staffing, Quality Patient Care and Quality Work Environment measures.

6. Data analyst support to produce visualisations that allow actionable insights to be drawn easily

DHBs that have invested in data analyst support to produce useful dashboards and visualisations are able to draw actionable insights from the data and implement improvements. Without such support, DHBs struggle to understand and use the data.

7. Sufficient funding and resourcing of CCDM team

Implementation is more successful in DHBs that have dedicated CCDM and TC staff. Implementation suffers when staff hold dual roles (i.e. providing nursing care and being a CCDM and/or TC Coordinator) as they are unable to focus on supporting CCDM unless they work additional discretionary hours.

In 2018 one year of additional funding outside of baseline was provided to DHBs to implement CCDM. This funding was provided as a one-off to fund a CCDM or TC coordinator at each DHB for 1:600 FTE staff members. The initial funding helped drive momentum and enabled DHBs to recruit a CCDM or TC coordinator dedicated to implementing CCDM. After the first year of additional funding, DHBs were required to fund CCDM resources out of their baseline.

Perhaps unsurprisingly, smaller DHBs with lower FTE numbers have been disadvantaged by this approach as they do not have the dedicated CCDM resources larger DHBs have.

Continued investment in CCDM remains the most prudent financial and outcomes-focused option. Since 2005 when the decision was made to pursue acuity-based staffing the Ministry of Health has invested significantly into CCDM, including \$48 million of funding as a new appropriation through Vote Health in 2018/19. No additional allocated funding has been secured to support additional FTE calculations since this time, and DHBs have been required to self-fund additional staff, including spreading staffing allocations across multiple years.

Whilst additional, ring-fenced, funding is required to ensure CCDM is fit-for-purpose, discontinuing CCDM or investing into another safe staffing tool is expected to cost significantly more than making adaptations to the existing tool. As highlighted in this report, CCDM has strengthened the voice of nurses and been successful in highlighting a number of safe staffing challenges across Aotearoa.

In practice, existing staff in smaller DHBs have taken on dual roles as a CCDM and TC coordinator, in some cases in addition to their regular duties. This has proven to be less effective than the equivalent full time coordinator roles in larger DHBs. In the absence of committed or ringfenced funding DHBs are unlikely to be able to recruit or fund dedicated CCDM or TC coordinators.

8. Visible actions have been taken as a result of CCDM

Staffing shortages have been persistent: a recent sample of FTE deficit data across seven DHBs between July and September 2021 showed an average deficit of 84.6 FTEs per month. Waitematā reported the highest instance of vacant positions, with a current total of 365.6 FTE vacancies. Notably, outside of Auckland, Southern DHB reported a current total of 245 FTE vacancies.

Despite these shortages, survey and focus group participants reported that limited actions have been taken to recruit additional nurses. We heard that DHB Executive Leadership has historically shown a reluctance to fund recruitment to the additional staff identified through FTE calculations, including in years prior to 2020 and COVID-19 appearing on New Zealand shores. Participants reported long delays in recruiting additional nurses, despite the time and effort taken by nurses to enter TC data. Participants also reported that in some cases DHBs split the approval of additional FTEs across multiple financial years. For example, if 30 additional FTEs were identified, a DHB might approve 6 FTE for recruitment in the current financial year, 10 FTE for the next financial year and the remaining 14 FTE for the following financial year. This has resulted in the deficits in required FTE growing larger and larger each year.

DHBs that have funded calculated FTEs have been able to initiate recruitment faster, and onboard new nurses (subject to availability in the market), with fewer delays. Staff in DHBs where this has happened reported much higher engagement and satisfaction with CCDM, as a result of being able to see that direct action has been taken based on the information provided through TC and the FTE calculations.

Safe Staffing Healthy Workplaces Unit

Finally, we have considered the role of the Safe Staffing Healthy Workplaces Unit (SSHW) and its role in supporting the implementation of CCDM. SSHW Unit is a function of Central Region Technical Advisory Services (TAS) and is funded by the DHBs. When the SSHW Unit was formed their role was to develop CCDM and to support and coordinate the implementation at DHBs. Following implementation there was potential for the SSHW Unit to become redundant because CCDM was in business as usual (BAU), however implementation has taken longer than intended. The SSHW Unit has achieved their expected outcomes by developing the CCDM programme and facilitating implementation at DHBs.

The ongoing role and mandate of the SSHW Unit has not been formally defined, however over the last few years it has evolved to focus on tracking and evaluating DHBs progress and reporting. While some DHBs share their visualisations, the SSHW Unit has no access to raw data from DHBs, and no visibility over the actual quality of the data collected. Without access to this data the SSHW Unit has relied on DHBs self-reports and evaluations of progress which they collate to provide quarterly reports for TAS.

The SSHW Unit is also playing a key role in evaluating DHB progress towards safe staffing healthy workplace outcomes. They provide quarterly milestone reports tracking overall implementation by DHB at a Site, Ward and Team level, in addition to progress against annual FTE calculations. Milestone reports also include progress towards CCDM implementation for Allied Health, Maternity, and Mental Health & Addictions. The SSHW Unit does not report on national CCDM outcomes. This report will be the first time the size of the safe staffing problem has been defined.

Participants noted that SSHW Unit consultants often provide inconsistent advice and support to DHBs, and that there have been issues with key messages being passed directly to DHB leadership and bypassing CCDM staff. This has contributed to the perception by Unions and DHBs that the SSHW Unit is biased and non-independent, and is expected to have contributed to the inconsistencies in programme implementation which we have observed.



7

Is CCDM fit-for-purpose in Emergency Departments?

trendCare,
ed Benchmark
s for 2021/2022
England, Scotland, Singapore, England and
Wales
for each Patient Type

CCDM and Emergency Department Nursing

Inclusion of Emergency Department Nursing into the Review

ED nursing was initially excluded from the scope of this review. On 15 October 2021 a letter was received from the College of Emergency Nurses New Zealand (CENNZ) outlining their concerns about the current state of nursing in EDs, including safe staffing, across Aotearoa New Zealand. A copy of this letter can be found as Appendix I. The NAG agreed to expand the scope of this review to include ED nursing.

Our Approach

Stakeholders across ED were engaged through:

- 3 focus groups (12 participants)
- 3 interviews
- A survey of ED nurses (561 participants out of 3,992 ED nurses)

The list of interviewees, identified as experts on the use of TC and aspects of CCDM in ED nursing, can be found in Appendix F and the list of participants for focus groups can be found in Appendix H. This section is compiled of a combination of the experiences of these individuals and those who participated in the national survey.

Overview of Findings

TC is a key part of the CCDM programme, and has ED and community acuity modules available. Some DHB EDs are in various stages of implementing and using the ED module, with the majority of EDs not having TC available or working. The main barrier to implementation is resourcing and capacity challenges, and access to IT infrastructure.

EDs are facing high FTE vacancies and face significant issues in their day to day jobs. For example, the letter from CENNZ outlined inadequate baseline staffing levels, increasing numbers of ED presentations, bed block leading to overcrowded EDs, poor patient flow and increased surge demand.

EDs constantly have yellow, amber and often red variance indicators. When flexi/surge staff are available these indicators are helpful, but due to under-resourcing, the standard operating procedures intended to mitigate variances and negative care hours are often not able to be actioned. In this instance, emergency nurses can see that they are understaffed but cannot do anything to change this. This has a negative effect on staff morale and trust in the system.

ED nurses feel that CCDM is a useful tool to validate the difficulties nurses face in their jobs. However, without action and available resource to cover variances and negative care hours, the tool cannot successfully mitigate the issues they are facing – it was indicated in the survey that:

"Since CCDM was introduced nothing has changed" and;

"Under staffing is the new normal."

The future of TrendCare

TC New Zealand has been engaged as part of this review, to better understand the Community and ED modules. TC staff indicated:

- Some DHBs have not resourced TC sufficiently, and do not use it to its full potential. It is important all nurses are able to accurately use the Community and ED modules to ensure the benefits are fully realised. Regular Inter-Rater Reliability testing is undertaken in DHBs to ensure the accuracy of data underpinning and enabling FTE calculations.
- Community and ED modules are available on TC and these have been endorsed by the SSHW Unit. Nurses require training to set up these modules, particularly the community modules as they are different to inpatient modules. TC New Zealand expressed its availability for support and mentoring.
- A number of DHBs are using the TC ED module, and various levels of training have been provided for this.
- There has been an increase in interest in the TC ED module following SSHW Unit endorsement. However, the success of the module depends on whether the DHB has the resource to support it.

The trend observed in DHBs that use the ED module is that workload does not necessarily relate to the number of patients coming through the ED. Identifying ways to better capture this workload (invisible work, relational work, translational work for different cultures and the increasing demands on nurses) in TC is necessary to realise its benefits.

TC is not configured to work successfully in Emergency Departments

TC does not have the functionality needed to triage patients. TC logs care hours once a patient has been fully triaged, therefore does not capture the initial triage or waiting time (which can involve care hours).

Focus groups identified that: ***"TrendCare can't adequately capture emergency nursing data in a timely manner."*** This is also because EDs are a fast paced environment that experiences surges in demand. Both TC and VRM do not work well in this environment due to the lag between inputting data and obtaining results. This means that even if TC is being used in an ED, it may not accurately reflect the situation for patients and staff.

Similar issues with data and IT infrastructure are prevalent in Emergency Departments

The difficulties with using TC successfully in an ED are exacerbated by the difficulty experienced by nurses with inputting data. Inputting data increases nurses workload which reduces the likelihood of it being completed. Charge Nurse Manager/Nurse Manager (CNM/NM) identified in focus groups that they often do not ask staff to complete this task, for this reason.

Anecdotally we understand that EDs have limited computers, and what is available is constantly in use. This makes it difficult to input the data needed to successfully use TC, resulting in issues around patient and staffing levels not being identified in real time.

There is an insufficient feedback loop to Emergency Department nurses about CCDM

There is a lack of communication and feedback to ED nurses about the purpose of using TC and how this contributes to safe staffing in EDs. In Eds where TC is available, ED nurses spend a significant amount of time and effort inputting data with limited explanation, results or feedback as to why they should do this or what the benefits are. This lack of communication negatively affects staff morale.

Inputting data was identified in focus groups as just "another job" for nurses to complete with little support. This results in an increased workload which can increase stress, and negatively impact staff satisfaction and engagement with the CCDM programme. Nurses raised in focus groups that ***"data cannot quantify the stress Emergency Nurses are experiencing"***. For morale and staff satisfaction, DHBs should better articulate to nurses what this data is used for and what it achieves for them.

Further resources are required for Emergency Departments

The VIS screens in ED are constantly showing yellow and orange variances for EDs. VRM does not help in this scenario, as resources are not available to assist. This was reflected in the survey through quotes such as, *"how does being at red at 3am help my current situation"*. This results in the common perception among ED staff that they are under resourced and working in unsafe conditions, but unable to do anything to address it. These negative variances can be made worse when wards are at capacity and are not able to accept patients. EDs nationally can not rely on community services such as Accident and Medical centres being open at 3am. Experiencing both of these aspects combined, from 11pm onwards is common and regularly leads to patients being held in the ED for longer than necessary.

Staff from EDs that do have TC implemented stated that due to the nurses' workload it is common for negative variances to be identified significantly after the variance has occurred.

Some DHBs wanted surge teams or support, such as senior staff that can make decisions and reprioritise resources, when there is surge demand for EDs. Some DHBs have existing 'integrated operations teams' or similar, but it was identified in focus groups that these in their current state are not working. Decisions need to be made and communicated around resourcing for EDs to mitigate these issues.

Survey findings indicate ED nurses are very stretched

ED participants expressed the greatest dissatisfaction in the survey across all questions:

- Only 82 out of 561 (15%) thought their work environment allowed them to provide complete care to patients.
- 289 out of 561 (52%) said that out of their last 10 shifts, at least 8 were understaffed (with 10 as the most frequent answer).
- 324 out of 561 (58%) said they were asked to do extra shifts several times a week.

Recommendations

- Complete development on the ED module. Once completed, implement the ED TC module nation wide to enable additional data to be collected at a national level.
- Develop a feedback loop to ensure nurses understand how the data they provide is used.
- Commission work to adapt the ED module in TC and VRM to better reflect the ED context.
- Ensure ED is included in funding for FTE calculations.

The CENNZ also noted the following recommendations – these have been endorsed by the NAG:

- Increase senior nurse support for ED nurses including increasing the number of nurse educators, clinical coaches and nurse preceptors with ring-fenced time.
- Increase nursing leadership positions and involvement in clinical governance of EDs.



8

What Can We Learn
from International Safe
Staffing Practices?

International Practices on Safe Staffing

As part of this review, research was conducted on safe staffing approaches employed internationally. Our research focused on the approaches used in comparative countries selected for review such as Australia, the United Kingdom and the United States.

Research was conducted on staff to patient ratios, and the countries that utilise these in their approach to safe staffing. Mandated ratios were initially considered in NZ but the decision was taken by the partners of the Safe Staffing Healthy Workplaces agreement (DHBs and NZNO) to develop something more nuanced and context specific. Whilst it is not recommended to adopt a legislated nurse/midwife to patient ratio in Aotearoa New Zealand, there are learnings which can be taken from other jurisdictions. An overview of findings from the international research is below.

Main Findings

There is No One-Size-Fits-All Approach to Safe Staffing Internationally

There is no one-size-fits-all approach for determining optimal resourcing levels to best support staff and patient needs in healthcare systems worldwide. Factors that inform resourcing requirements include a number of service level and patient specific considerations, such as patient acuity and complexity, the models of care provided, the nature/speciality of the ward or unit and the size and location of the health service itself. Health services, governments, unions and key bodies are some of the stakeholder groups typically involved in defining approaches and methodologies for supporting workload management decisions.

Over the last decade, increasing patient complexities and shortages of nursing and midwifery staff has placed considerable pressure on healthcare systems. This has had significant implications for patients and staff and has accelerated conversations around improving workforce planning and resourcing approaches.

Legislation of Mandatory Nurse-to-Patient Ratios has Become More Prevalent

The most commonly employed approach to safe staffing is the nurse/midwife-to-patient ratio, which sets requirements for the minimum number of staff working on a particular ward, unit or department relative to the number of patients. Legislated ratios have been introduced in a number of jurisdictions across the world including Australia, the United States and Europe. In Victoria the legislation of ratios caused an influx of nurses back into the public system, demonstrating this method does have the ability to attract and retain nurses.

Research indicates that nurse/midwife patient ratios typically range from 1:4 – 1:7. This varies according to shift type (i.e. morning, afternoon or night) as it affects the demand for services and ward/unit type (e.g. general or mixed specialty), as well as the nature of the services and care that needs to be provided.

Opinions on legislated ratios are mixed with proponents believing they have been imperative for providing nursing and midwifery staff with clarity and confidence around workload demands, while detractors believe such models lack the flexibility to readily respond to changing patient needs and complexities.

There is Limited Evidence for the Effectiveness of Nurse-to-Patient Ratios

Evidence which directly aligns outcomes for nurses and patients when using ratios is limited. Further research and investigation is needed to understand the effect of legislated ratios, particularly in relation to:

- Patient health, safety and experience outcomes; and
- Staff safety and wellbeing.

Summary of Practices in Australia

We reviewed safe staffing approaches in Australia (Victoria, New South Wales, and Queensland), the United Kingdom and the United States. As our closest neighbor we felt lessons learned from Australia were the most relevant to this review. We have provided a summary of some of the approaches utilised in Australia below:

Victoria

In 2015 Victoria legislated minimum nurse and midwife staffing, through minimum nurse to patient ratios. This was done through the Safe Patient Care Act 2015 and was in response to increasing patient complexities, changing models of care and a growing demand for health services in public hospitals. To ensure the system had the capacity to absorb and embed changes resulting from the legislation, a staged approach was adopted to incrementally deliver improvements.

Health services established bespoke approaches for implementing the legislation, which included specific approaches to technology, data and analytics, dispute negotiation management, reporting and compliance requirements, and implementation support and staff guidance.

There is flexibility in the system to implement staffing changes in response to increases in workload demands and inpatient complexities. It was found that whilst ratios appear to be rigid in legislation, provisions exist to vary staffing locally in response to specific circumstances. It is worth noting that there is some disagreement at the system level in regards to hospital level classifications, but Victoria is currently undertaking a review of this. There is no clear baseline measure that defines optimal staffing levels, and further research and assessment is required to understand which ratio is optimal for a given service or condition.

Legislated ratios caused an influx of nurses back into the public system, which demonstrates that it does have the ability to attract and retain nurses. While ratios are not preferred for the Aotearoa New Zealand system, it does suggest that legislating minimum staffing levels can be effective in attracting and retaining nurses.

New South Wales

New South Wales (NSW) introduced a Nursing Hours per Patient Day (NHPPD) model in 2013 to manage safe staffing levels. The health system uses this model to guide their approach to nursing workload management. The NHPPD model does not apply to specialised wards – alternate models and tools must be employed to support these areas (e.g. BirthRate Plus for midwifery staffing).

NHPPD is informed by the category of the hospital, which is determined by criteria which measure the diversity and complexity of tasks which need to be performed. In NSW the NHPPD method applies to various public hospitals and health service providers. It differs from CCDM in that nursing hours per patient day is seen as a guide only and does not substitute for clinical judgement.

The Nursing Unit Manager is responsible for overseeing application of the NHPPD model at the local level, and benchmarks are considered the minimum hours required to provide safe care for patients in that specific setting. The baseline hours per patient required across each ward are:

- General inpatient wards in Peer Group A1 and A3 facilities: 6
- General inpatient wards Peer Group B facilities: 5.5
- General inpatient wards Peer Group C facilities: 5
- Palliative care: 6
- General rehabilitation: 6
- Adult acute mental health wards (general hospitals): 6
- Inpatient acute mental health wards (specialised facilities) : 6

Peer groups A, B and C are general inpatient wards.

These hours can be averaged over rosters to enable greater hours to be provided at times of higher acuity and fewer hours during times of lower acuity or activity.

Unlike CCDM, there are a number of supports used by NSW health services to effectively calculate, implement and monitor NHPPD application. These supports include enabling technology and data, guiding principles and implementation guidelines that define roles and responsibilities, and compliance and monitoring. The NHPPD model allows for significant flexibility and relies heavily on clinical judgement to determine appropriate staffing levels.

NSW is a working example of enrolled nurses being factored into staffing plans. NSW utilises ENs and assistants to support care delivery and increase nursing hours. Hospital staff (in addition to RNs) are important in helping manage increased demands for clinical services. This exemplifies how calling on additional roles can free up registered nursing staff to allow them to focus on providing direct patient care.

Staffing levels and workload decisions are managed locally across mixed and speciality wards. For mixed wards, variations in workload are managed by the ward. Trust in Nursing Managers is required to make decisions around staffing levels, and Nurse Unit Managers are empowered to make decisions around staffing levels based on their understanding of patient complexity and skill required.

Initial rollout of the NHPPD did not consider how it would be supported by technology and systems, and reporting difficulties have been experienced as a result. CCDM has seen a similar issue with 20 DHBs each having their own reporting mechanisms. Despite a large volume of nursing data being captured for the NHPPD model, there is limited collation of information to definitively understand the outcomes of this. Further research is required to understand these outcomes.

Queensland

In 2016, following a campaign led by the Queensland Nurses and Midwives Union, the Queensland Government legislated minimum nurse/midwife-to-patient ratios across prescribed wards and facilities of public health services. 27 hospitals now operate under legislated nurse-to-patient and midwife-to-patient ratios. The nurse-to-patient ratios are applied consistently throughout morning (1:4), afternoon (1:4) and night (1:7) shifts. ENs, RNs and registered midwives who are providing direct care and have an allocation of one or more patients are counted in the ratio.

The Business Planning Framework (BPF) underpins approaches to nursing and midwifery workload management across all Queensland health services. The BPF follows three steps:

1. Developing a service profile (demand)
2. Resource allocation (supply)
3. Evaluate performance

Prior to the introduction of legislated ratios, Queensland Health Services leveraged the industrially mandated BPF (developed in 2001) to assist in determining appropriate nursing and midwifery staffing levels. The introduction of ratios does not change the role of the BPF – it sets a minimum legislated staffing level of RNs and ENs on prescribed wards. Legislated ratios (where applied) and the BPF are used in conjunction, alongside professional standards, judgement, critical thinking and teamwork to underpin the delivery of safe and high quality patient care in all wards and units.

Evaluation of nurse-to-patient ratios in Queensland did identify positive outcomes for patients and staff. The Queensland Government sought support from the University of Pennsylvania to conduct an evaluation in terms of outcomes for nurses, patients and the Queensland public health system. The review concluded that:

"minimum nurse-to-patient ratio policies were a feasible approach for improving nurse staffing and patient outcomes with good return on investment".

Emergency Department Nursing

The research conducted on ED Nursing focuses largely on the approach taken in Victoria, Australia. The Victorian Safe Patient Care Act 2015 identifies specific staffing requirements for EDs to support bespoke models of care and patient acuity.

Specific ratios are also in place for short-stay units which are often co-located with EDs across Victoria. These are 1:3 across morning, afternoon and night shifts. The number of nurses in charge is 1 across each shift, but the number of triage nurses is 1 for morning and night shifts, but increases to 2 for the afternoon shift.

Improvements in the supply of trained nurses and a rapid capability uplift of the existing workforce has been leveraged to manage the implementation of legislated ED staffing requirements in Australia. This includes:

- Completing extensive forward planning work to meet the requirements of legislated nurse staffing levels.
- Adapting ED models of care to manage the associated demand and service impacts of COVID-19.

Staffing decision making requires clear guidance and support around what an ED is – no definition currently exists within the Act.

Conclusions²⁵

Different approaches are used to inform, guide and monitor safe nurse and midwifery staffing levels in health systems across the world and there is no one-size-fits-all approach to determining safe staffing. Learnings can be taken from this research to inform Aotearoa New Zealand's approach to safe staffing, but this needs to consider Aotearoa New Zealand's unique setting.

Increasing patient complexities and shortages of nursing and midwifery staff has placed pressure on healthcare systems, and has had implications for patients and staff. This issue is prevalent in Aotearoa New Zealand. Legislating mandatory staffing levels across health services has become increasingly common worldwide.

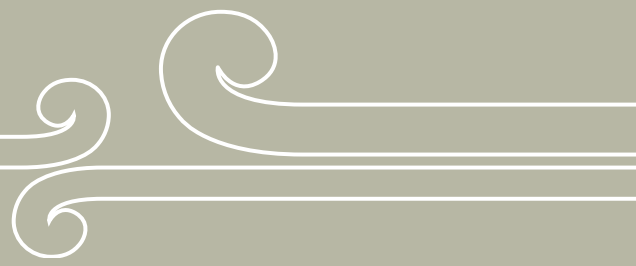
Recent research conducted by Linda Aiken and colleagues in Queensland, Australia (McHugh, Aiken, Sloane, Windsor, Douglas and Yates, 2021)²⁶ reports on the addition of patient acuity to nurse-patient ratios to overcome some of the criticisms and inflexibility of nurse-patient ratios alone. Nurse-patient ratios were described as an intervention in the Queensland study which conducted baseline, concurrent and post-intervention evaluations. Claims include reductions in mortality, Length of Stay (LOS) and readmission rates, and that the health dollars saved were double that of the investment in staffing (McHugh, et al, 2021)²⁶. In Aotearoa improvements in these measures could also be expected in hospitals where CCDM FTE calculations are fully recruited, shift hours variance is within 12.5%, there are few if any shifts below target and VRM is required only for the repair of short-notice sick leave gaps on the day of care.

Outcomes such as those described by Aiken and colleagues are the result of a fully and comprehensively implemented intervention. These types of results are just as likely with fully implemented CCDM as they are with fully implemented nurse-patient ratios. The only major difference between the strategies is legislation which in most examples of nurse-to-patient ratios takes years to achieve and is constantly relitigated during industrial negotiation.

There is no data that indicates that nurse-patient ratios as a nurse staffing strategy yields better outcomes than CCDM has been designed to produce. Current circumstances (pandemic and workforce pipeline) handicap both approaches. Once it is possible to comprehensively implement CCDM to the level described above, compelling outcomes for patients and for nurses are just as likely as they are with nurse-patient ratios.

The most common of the legislated approaches is the nurse/midwife-to-patient ratio. Evidence outlining outcomes for nurses and patients with the introduction of ratios is limited, despite the increasing popularity of this approach. There is limited evidence which aligns outcomes for patients.

In Aotearoa New Zealand, significant time and resources have been invested into CCDM. Learnings can be taken from international approaches to improve and optimise CCDM to ensure it is fit-for-purpose for Aotearoa New Zealand's healthcare workforce and patients.



9

The Way Forward



We recommend retaining CCDM and redesigning it to be fit-for-purpose

We have made eight key recommendations, each supported by a range of short and long-term interventions to deliver meaningful change and enable CCDM to achieve its stated outcomes of safe staffing, quality patient care and quality work environment. A summary of these recommendations is set out below, with additional detail on the following pages.

1. Review of the programme design, operation, implementation and governance of TrendCare and CCDM to recognise and uphold our Te Tiriti responsibilities

The SSHW Unit needs to partner with appropriate Te Tiriti subject matter experts. We recommend using this partnership to review the needs to examine and redevelop TrendCare to recognise our Te Tiriti responsibilities. Work with TrendCare to develop specific patient type indicators for Māori and Pasifika and use their findings to drive continued development of CCDM, the CDS and a Māori health authority with a Te Tiriti lens. From July 2022, align with the Māori Health Authorities strategic direction and reporting requirements to uphold our responsibilities to Te Tiriti.

2. Re-design key components of the CCDM programme to ensure it is fit-for-purpose

Significant changes are needed to components of CCDM and the processes which underpin it. Key changes include re-defining, simplifying and standardising measures and reporting, linking CCDM tools to patient outcomes, and ensuring the programme is culturally safe.

3. Strengthen leadership and accountability for the CCDM programme

Commitment to CCDM is currently varied across DHBs, with differing levels of engagement, ownership and buy-in across the Executive Leadership Team of different organisations. Having strong support from the top is critical to the success of CCDM, and we recommend clarifying the expectations of organisations and individuals pre and post the creation of Health NZ in respect of CCDM, stipulating what DHBs and Health NZ are accountable for in respect of CCDM, and outlining the consequences of failing to deliver against these expectations.

4. Invest in the infrastructure which enables and underpins CCDM

The success of the CCDM programme is dependent on a number of external factors, including: funding, resourcing, legislation, governance, leadership, data literacy, and IT infrastructure. We recommend that changes are made to these key enablers so that CCDM can perform to its fullest and deliver against its stated outcomes.

5. Increase nursing supply immediately, and in the longer-term

CCDM will not be able to deliver its intended outcomes if there are insufficient nurses in the pipeline to recruit to vacancies. We recommend that existing plans to recruit additional nurses are expedited, and that the longer-term workforce strategy is reviewed to ensure it accurately reflects the expected increase in nurses required to meet care needs.

6. Review the role of the Safe Staffing Healthy Workplaces Unit

The Safe Staffing Healthy Workplaces Unit (SSHW) was initially established to develop CCDM and support and coordinate implementation at DHBs, however its role, purpose and the outcomes against which it is assessed are no longer clear. We recommend reviewing the role, structure, governance and accountabilities of the unit to ensure it is appropriately supporting DHBs and the new entities with CCDM implementation.

We recommend retaining CCDM and redesigning it to be fit-for-purpose

7. Establish a national work programme and office to oversee delivery of changes to CCDM

Significant work will be required to enhance CCDM and enable it to deliver meaningful outcomes. We recommend establishing a national work programme and office to plan, coordinate and deliver key initiatives across DHBs. The national work programme and office should be stood up rapidly to begin delivering immediate term recommendations, and arrangements should be made to integrate this workplan with the priority programmes led by Health New Zealand from July 2022.

8. Emergency Department Nursing

The majority of EDs in Aotearoa New Zealand do not have TC available or working. We recommend completing development on the ED module. Once completed, implement the ED TC module nationwide to enable additional data to be collected at a national level, to provide information to DHBs on current staffing shortages to inform FTE calculations.

1. Review the design, operation, implementation and governance of TrendCare and CCDM to recognise and uphold the articles of Te Tiriti

The SSHW Unit needs to partner with appropriate Te Tiriti subject matter experts. We recommend using this partnership to review Trendcare and the CCDM programme to develop existing or new tools to manaaki our Te Tiriti responsibilities. The SSHW Unit requires an operational Māori Pasifika advisory group who would work congruently with all parties to develop and evolve a CCDM programme, a CDS and a health authority that embodies Te Tiriti. A complete examination of the whole CCDM programme with a Te Tiriti lens to encompass the following is required:

Short-term recommendations within the first 12 months

- a) **Partnering with Te Tiriti subject matter experts.** Review the CCDM programme and TrendCare and develop existing and new tools to manaaki our Te Tiriti responsibilities. The SSHW Unit requires an operational Māori & Pasifika advisory group. This group should work with TrendCare and use their findings to drive continued development of the system to ensure it recognises the treaty partnership, as well as ensuring it appropriately informs CCDM tools.
- b) **Partnering with DHB operational teams who are developing programme capability to consider Māori and Pasifika patients.** This requires all services of the DHB infrastructure to work with their Māori and Pasifika Health Units to optimize the CCDM Standards to a Te Ao Māori and Pasifika world view. Learnings from Bay of Plenty DHB should be explored for optimisation.
- c) **Engage with TrendCare on an in principle agreement that TrendCare in NZ needs to reflect our partnership with Tangata Whenua.** Use this engagement to begin system improvement such as work on timing studies in highly populated urban and rural Māori and Pasifika communities. The Māori Pasifika advisory group should work with TC to develop specific patient type indicators and perform timing studies for Māori and Pasifika and use their findings to drive continued development of the system to ensure it recognises the Treaty partnership as well as ensuring it appropriately informs CCDM tools.
- d) **Learn from existing good practice.** Collaborate with DHBs such as Counties Manukau and Bay of Plenty who have existing good practice associated with recognising and responding to specific needs of Māori and Pasifika patients and whanau and are beginning to use using TC and CCDM tools to support this practice.
- e) **Identify and develop specific measures in CDS.** The CDS should also be guided by the work of the Māori and Pasifika advisory group.
- f) **Ensure SSHW Unit governance includes Māori and Pasifika advisors.** Inclusion of Māori and Pasifika advisors at governance level will be introduced and will support the SSHW Unit in ensuring CCDM is reflecting our Te Tiriti responsibilities.

Longer-term recommendations

- a) **Aligning with the Māori Health Authority's strategic direction and reporting requirements to uphold our responsibilities to Te Tiriti.** Perform continuing and ongoing reviews of CCDM in conjunction with the Māori Health Authority to ensure the programme is designed to deliver equitable outcomes for patients of all cultures, and ensure it does not perpetuate systemic and institutional bias.

2. Re-design key components of the CCDM programme to ensure it is fit-for-purpose

Internationally different strategies have been employed to deliver safe staffing outcomes, including legislated nurse to patient ratios, frameworks, staffing committees, national guidelines and use of professional judgement. This review has found limited evidence to link legislated ratios to patient outcomes. It has also found that CCDM can deliver meaningful outcomes, provided it is appropriately configured, supported and funded, and that there are sufficient nurses in the pipeline to recruit to identified vacancies.

There is no compelling evidence to support a change from our current model, therefore our recommendation is to retain CCDM, but to re-design key elements of the programme to ensure it is fit-for-purpose, and can deliver against its intended outcomes. The suggested re-design encompasses each of the three key components of CCDM (Core Data Set, Staffing Methodology, and Variance Response Management), TrendCare and changes to other aspects of the wider programme and enablers which underpin CCDM.

Immediate changes which can be delivered prior to the transition to Health NZ are outlined below, with longer-term post-reform changes shown on the following page.

Short-term recommendations within the first 12 months

- a) **Identify the key 5-10 Core Data Set measures** which should be reported against at Board / Executive Level. Measures should provide visibility across safe staffing, patient outcomes and quality work environment.
- b) **Agree a set of patient outcome measures which are directly linked to CCDM** and could be included within the Core Data Set, for example nurse sensitive indicators such as falls, nosocomial infections, and pressure areas. Review the elements that make up CCDM to identify the essentials for safe staffing for nursing and simplify the programme. Consider aligning patient outcome measures with the Health Safety and Quality Commission Quality and Safety Markers such as falls, medication safety, opioids and perioperative harm, and/or using patient outcome measures for CCDM developed internationally, such as the Magnet Hospital principles in the United States.^{27,28,29,30,31}
- c) **Consider adaptations to how CDS measures are presented to enable interpretation and action by decision makers.** This may include presenting information on "Repaired Shifts"⁷ to show final care hours broken up by initial care hours available and components missed to make up for the initial shortfall in care hours available (e.g. overtime, missed breaks, cancelled leave and additional shifts). Reporting should also move away from presentation of aggregate and average values which fail to show the nuances of the data, and may drive inappropriate decisions.
- d) **Revise the requirement to collect 12 months of data prior to performing FTE calculations.** The current Staffing Methodology requires 12 months of TC data, however the requirement to collect this data results in significant delays to recruiting nurses to identified vacancies. ADHB has used 6 months of TC data to develop interim FTE calculations, revised once additional data is available. This has proven to be an effective Staffing Methodology and we recommend this is adopted across all DHBs.
- e) **Commission work to understand the care needs of patients, and what safe staffing means for nurses, who are Māori or from non-Western cultures.** Learnings can be taken from DHBs which have already implemented culturally responsive programmes of work, such as the Bay of Plenty DHB which has introduced Capacity-at-a-Glance screens to indicate the location of Māori patients within the hospital. Adaptations can then be made to CCDM tools to ensure they capture and reflect the different care needs of Māori patients, and capture what safe staffing means for Māori nurses.
- f) **Embed Quality teams in CCDM councils** to ensure improvements identified through CCDM are integrated into wider hospital quality improvement programmes. The Terms of Reference and membership of CCDM councils should be updated to reflect the role of hospital quality teams, and how they will integrate CCDM data into quality improvement work.

2. Re-design key components of the CCDM programme to ensure it is fit-for-purpose

A number of the recommended changes to CCDM programme components will take longer than six months to implement, and we recommend these are included in the Health NZ workplan for July 2022 onwards. These are shown below.

Longer-term recommendations

- a) **Develop standard definitions for all Core Data Set measures**, and develop an agreed reporting template and framework. This will enable comparison of performance across DHBs (or regions), benchmarking of data, and development of national information relating to safe staffing, patient outcomes and quality work environments. Reporting should include a combination of quantitative CDS measures, and qualitative information including patient stories which highlight the human cost of unsafe staffing.
- b) **Expand CCDM to include nursing care delivered outside of hospital**, including community and primary care settings, to provide a picture of nurse safe staffing across the entire health system. We recommend Health NZ consider how to deliver this within the locality network construct within its first year.
- c) **Implement learnings from TrendCare internationally**. There are a number of countries, such as Singapore who have successfully implemented and are using at least aspects of TC. Aotearoa New Zealand should examine and learn from these countries, and implement these lesson into the Aotearoa New Zealand context.
- d) **Work with TC to review the buffer included in shifts**. The current buffer for an 8-hour shift is 12.5%, however many nurses feel this does not accurately reflect work undertaken by nurses which is not currently captured in TC such as clerical, administrative and logistical duties, and engaging patients and whānau. We recommend conducting additional research (e.g. time and motion studies) to determine what an appropriate buffer for Aotearoa New Zealand would be, and updating the standard TC buffer to reflect this.
- e) **Simplify and automate data entry to TC where possible**. This could include developing, in conjunction with TC where possible, pre-populated information for particular patient types or acuities, in order to reduce nursing time spent on manual data entry.

3. Strengthen leadership and accountability for the CCDM programme

Senior and executive level buy-in and ownership of change is critical to the success of that change. We have seen during the course of this review the importance of DHB Executive Leadership and Boards championing CCDM within their own organisations. However, we have also seen that leadership of the programme, and accountability for its outcomes, varies significantly by DHB.

We recommend taking measures to gain buy-in from DHB EL teams, to secure commitment to drive implementation of the programme, to actively sponsor and participate in the programme (e.g. in CCDM Councils) and to build strong working relationships with the Unions.

Short-term recommendations within the first 12 months

- a) **Align leadership of DHBs and Unions to build stronger working relationships.** Evidence from DHBs which have successfully implemented CCDM has shown the importance of working in partnership with Unions. These DHBs can provide learnings to help strengthen relationships in DHBs which do not have an existing partnership way of working. This could be delivered by agreeing common ways of working, outcomes, targets, and re-instating partnership training.
- b) **Implement stronger accountability mechanisms to hold DHB Executive Leadership and Boards to account (through Health NZ) when safe levels of staffing are not achieved.** One example of this is the Margin of Error metric used in Capital and Coast District Health Board (CCDHB) which is a fiscal risk assessment should patient data sit outside of TC benchmarking. While sitting outside of benchmark can be completely acceptable (e.g. a patient with multiple complexities), if there is a unit/ward that was outside the Margin of Error (>5%) then a decision to progress with FTE calculations is made based on the pressures seen through the CDS. This is where the CDS is used to provide context to support taking a ward/unit through to FTE calculations. DHB Executive Leadership and Boards must accept accountability for these pressures to ensure safer patient outcomes.
- c) **Develop and implement accountability measures for DHB Executive Leadership and Boards for implementing FTE calculations.** Once TC data has been collected and FTE calculations performed, senior leaders need to be responsible for actively recruiting to identified vacancies within a specified timeframe. We recommend engaging with senior leadership to determine an appropriate timeframe, and what the appropriate consequences are for DHBs which fail to comply with this requirement.
- d) **Move accountability for tracking and reporting on CCDM outcomes and progress of the national work programme to the appropriate Directorate at the Ministry of Health.** Independent oversight of the national work programme (see recommendation 7) will be important to ensure it remains on track, and is seen to be delivering. We recommend this oversight is provided by the DHB Performance and Support Directorate at the Ministry of Health.

Longer-term recommendations

- a) **Ensure Health NZ leaders and DHB / Equivalent leaders understand and actively support CCDM.** It is critical that the leadership of Health NZ and regional leadership in the new structure understand the importance of CCDM and actively support the programme. Without their buy-in it will not be possible for CCDM to receive the support it needs to achieve its intended outcomes. We recommend officials consider how best to engage incoming leadership and achieve buy-in.
- b) **Link achievement of CCDM outcomes and safe staffing to DHB / Equivalent performance.** Establishing links with the performance of a DHB / Equivalent will drive increased focus on implementing CCDM, achieving its outcomes and achieving safe staffing. We recommend Health NZ incorporate achievement of CCDM outcomes and safe staffing as one of the performance measures that the DHB / Equivalents will be tracked against.

4. Invest in the infrastructure which enables and underpins CCDM

The CCDM programme is dependent on a number of key enablers to achieve its stated outcomes. This includes funding, resourcing, legislation, data literacy, governance, leadership, and IT infrastructure. Changes to the components of CCDM (see recommendation two) are critical to the future success of the programme, however these must be undertaken in conjunction with changes to the key enablers.

Short-term recommendations within the first 12 months

- a) Streamline the process for approving FTE calculations.** The 2020 DHB/NZNO MECA stipulates that identified nursing vacancies should be recruited to without delay. Current processes are introducing significant delays (e.g. production of business cases to support FTE increases, re-calculation of FTE numbers). We recommend officials initiate work to design a consistent process and guidelines to improve compliance to the agreement in the MECA to approve and implement FTE calculations without delay.
- b) Determine the resourcing required to support CCDM on an on-going basis** (including Union, CCDM Coordinator and TC Coordinator resource). DHBs believe the current resourcing provided by DHBs is insufficient, and that the ratio of 1 CCDM Coordinator or TC Coordinator to 600 FTE disadvantages smaller DHBs. We recommend reviewing the resourcing required to effectively support CCDM on an on-going basis, and including this within the agreed funding for CCDM.
- c) Invest in Data Analysts and Data Storytellers within DHBs.** CCDM is a complex programme that produces a significant amount of nuanced data requiring analysis and interpretation. Experienced data analysts and data storytellers in each DHB or across the region would be able to communicate data to key stakeholders in a way which enables them to see the full picture and take appropriate actions. The national program requires an experienced Data Storyteller (with User Experience and a Healthcare background) to design appropriate visualisations for the CCDM data.
- d) Design and launch data literacy programmes across DHBs.** Improving the data literacy at all levels and roles is paramount for the success of the programme. Even with supporting data and analytics infrastructure and increased automation, staff will need to be able to understand and use data at a sufficient level to deal with the constant human-computer interaction. We recommend working with DHBs that have established data literacy programmes such as CCDHB to determine how this can be scaled up and rolled out rapidly to the rest of the other DHBs.

4. Invest in the infrastructure which enables and underpins CCDM

Longer-term recommendations

- a) **Review on-going funding for the CCDM programme, including funding to enable DHBs to recruit to identified vacancies.** One-off funding was provided for CCDM. As a result, DHBs had to fund subsequent years through alternative means which has hampered the implementation of CCDM in some areas. Furthermore, funding to increase nursing staff numbers in line with FTE calculations is limited. We recommend reviewing the funding model for CCDM, including programme funding and dedicated funding to enable DHBs to recruit additional nurses as required. This should also include provisions for DHBs to fund out-of-cycle increases in FTEs to avoid delays of six or more months in recruiting to known staffing shortages.
- b) **Consider legislative change to strengthen mandates for implementing FTE calculations.** Despite agreement through the 2018 Safe Staffing and Care Capacity Demand Management: Effective Implementation Accord and 2018 DHB/NZNO MECA to implement FTE calculations, there remain significant delays. To ensure there is rapid and continued progress towards achieving safe staffing levels we recommend officials review existing legislation and consider whether there are opportunities to amend or strengthen it to require FTE calculations to be implemented without delay.
- c) **Invest in standardised and robust IT and data infrastructure for DHBs / Equivalents in line with Health NZ's wider IT and data strategy.** Standardising the IT and data infrastructure will allow for obsolete systems to be disestablished, enable automation and ensure the right support is put in place for CCDM, removing the disadvantage faced by smaller DHBs in obtaining the hardware, software and staff required to support CCDM effectively. At a minimum, systems must support automation and run smoothly. Standardisation will also enable better data governance and facilitate national benchmarking. We recommend Health NZ review the existing IT and data infrastructure in use in each hospital and develop plans to implement standardised, modern systems, in line with its wider IT and data strategy.
- d) **Develop a centralised data warehouse that allows all captured data to be stored in a uniform way across DHBs.** Centralisation and standardisation of data capture would allow for centralised governance, benchmarking and advanced analytics to be conducted at a national level, in addition to enabling immediate access to data by relevant parties.
- e) **Invest in advanced predictive analytics.** The current system (TC) allows nurses to enter their predictions of care needed at the beginning of the shift and also allows them to adjust those predictions with the actual care delivered at the end of the shift. This process creates a goldmine of data ideal for using Artificial Intelligence to create predictive models. Such models can reduce the time spent by nurses interacting with TC by automatically populating some fields. These models can also provide longer term predictions that enable planning at ward or hospital level, for example by providing forward-looking FTE calculations to enable recruitment ahead of demand. We recommend Health NZ work with TC and data science teams to explore and develop predictive models for TC data. This recommendation ensures powerful predictive models specific to Aotearoa New Zealand can be developed. Given that TC is an independent software company, Health NZ should ensure that all intellectual property rights that emerge from this be retained within the government.
- f) **Consider negotiating Master Contracts with a list of approved technology, analytics and visualisation software providers.** National Master Contracts would provide Health NZ with greater leverage to implement localisations (if required), secure cost savings and dedicated support.
- g) **Invest in flexible, modern, mobile data entry interfaces.** CCDM relies on data entry, data captioning and decision-making based on data. Data quality and data entry is currently negatively impacted by the lack of computers and mobile devices available for nurses to enter TC data without having to return to fixed work stations. We recommend that officials work with DHBs to determine options for procuring additional mobile devices compatible with CCDM tools.

5. Increase nursing supply in the immediate future, and in the longer-term

CCDM can provide visibility of staffing shortages and help inform staffing requirements, however DHBs can only recruit additional nurses to meet their demand if there is a strong supply of nurses in the pipeline. A key finding highlighted by this review is the lack of available nurses to recruit, and concerns about the nursing pipeline for the coming years.

To enable DHBs to meet their staffing requirements we recommend implementing measures to accelerate the growth of the supply of nurses and equip them to work across disciplines.

Short-term recommendations within the first 12 months

- a) **Continue existing work on increasing the nursing pipeline and growing the workforce in advance of demand.** The Nursing Pipeline Project Working Group is currently developing a model to predict the future demand for nurses and partnering with tertiary education providers to ensure the future supply of nurses meets the projected demand. This is key to ensuring that the future supply of nurses is able to meet demand. We recommend officials explore ways to support and accelerate the work of the NPPWG.
- b) **Factor Enrolled Nurses into staffing plans.** DHBs currently have limited positions available for Enrolled Nurses (ENs) and they are typically not factored into staffing plans. ENs are able to contribute to patient care, and can therefore play a valuable role in reducing pressure on RNs. By incorporating ENs into staffing plans DHBs may be able to reduce the burden on RNs and alleviate some of the immediate-term staffing pressures they face.
- c) **Reduce barriers to recruiting Internationally Qualified Nurses (IQNs).** There are a number of barriers to recruiting IQNs in the short-term which we recommend are reviewed. This includes a lack of spaces in Managed Isolation and Quarantine as the 300 spaces currently available are shared across all healthcare professionals, prohibitively expensive fees and a short window of eligibility to apply for the Competency Assessment Programme (CAP), and limited CAP placements. We recommend officials work with MIQ (while this is still a mandatory requirement to enter Aotearoa New Zealand) to reserve spaces for nurses and their families, and consider how they can be supported with relocation and housing support. Ministers should also consider this in their decision making in regards to MIQ. Officials should also review the CAP and work with DHBs to participate in CAP, increase the number of placements available and offer appropriate clinical placements.
- d) **Increase flexibility around working hours and shift patterns.** There is currently a minimum 0.6 FTE requirement for one nurse, and limited flexibility around shift patterns and working hours. This has led to an exodus of nurses from the workforce, many of whom may be persuaded to return if there were increased flexibility of working hours. In particular we believe nurses with young families, approaching retirement and at retirement age are leaving the workforce due to a lack of flexibility in working hours and shift patterns. We recommend officials work with Unions and DHBs to review shift patterns, including the potential to introduce swing shifts (shifts in between traditional morning, afternoon and evening shifts), and shorter shifts to entice nurses back into the workforce. It will be important to carefully manage the introduction of any new shifts or working patterns, including the introduction of a greater number of part time nurses, to ensure the optimal balance of collective workforce development, individual personal development, management capability and productivity can be maintained.

Longer-term recommendations

- a) **Work at a systemic level to remove specialisation silos within nursing.** While nursing specialisation has achieved many benefits, one of the issues uncovered in this review is the reluctance of nurses to move between wards to support VRM due to apprehension about performing tasks outside their experience. In order for VRM to be more effective, it is important to create a workforce that has sufficient specialisation and is also equipped to work across various wards. We recommend officials work with Health NZ and tertiary educational institutions to resource a more comprehensive orientation programme for new graduates that includes mental health, primary health and physical health care experiences.

6. Review the role of the Safe Staffing Healthy Workplaces Unit

The SSHW Unit was established for a specific purpose: to develop and implement a programme of work to deliver a validated patient acuity system (CCDM) and embed this across the 20 DHBs in Aotearoa New Zealand. This purpose has now been largely achieved, and with upcoming health reforms it is timely to review and clarify the ongoing role and purpose of the SSHW Unit. We recommend a wide ranging review which considers the role and mandate of the SSHW Unit, their accountabilities, objectives, structure, resourcing and engagement mechanisms.

Short-term recommendations within the first 12 months

- a) **Define the long-term vision, purpose and outcomes of the SSHW Unit.** The SSHW Unit has now achieved the purpose for which it was established, and we recommend engaging with key stakeholders to determine the ongoing role and purpose of the SSHW Unit, including following the health reforms. This may include, but is not limited to, a data stewardship role including conducting national monitoring and auditing of CDS data, benchmarking CCDM performance (e.g. number of shifts below target, time taken to implement FTE calculations, adherence to VRM procedures), and identifying and leading continuous improvement initiatives at a national level. We also recommend that the Māori Health Authority have oversight of the SSHW Unit to provide direction and governance over the work undertaken to ensure CCDM meets its Te Tiriti responsibilities.
- b) **Review SSHW Unit resourcing and capability requirements.** Once the purpose and outcomes of the SSHW Unit have been determined, it will be important to review and determine the skillsets and level of resourcing required to deliver against these outcomes. This should include Māori advisors who can support the SSHW Unit in ensuring CCDM is recognising its Te Tiriti o Waitangi responsibilities (see page 68). The future resourcing and capability needs will also inform any training or development activity which is required to enable the unit to meet its future purpose.
- c) **Standardise ways of working and communication provided by the SSHW Unit to key stakeholders.** DHBs currently receive different information from SSHW Unit programme consultants which results in confusion and variation of practice at a national level. We recommend the SSHW Unit defines national standards of practice for its programme consultants, and considers centralising some communications to ensure all key stakeholders receive the information they require in a timely way.
- d) **Reframe the messaging and narrative surrounding SSHW Unit.** There is currently a perception of SSHW Unit non-independence held by DHBs and Unions. We recommend engaging key stakeholders to determine the root causes of this perception, implementing strategies to mitigate any concerns and “re-launching” the SSHW Unit to highlight its revised role, purpose and outcomes.

Longer-term recommendations

- a) **Review the reporting structure of SSHW Unit within Health NZ.** The SSHW Unit is currently placed within the Technical Advisory Services group. We recommend changing its reporting structure to minimise the perception or actual risk of the SSHW Unit being unduly influenced by any party.
- b) **Empower the SSHW Unit to commission formal programmatic research around CCDM and its impact on health outcomes.** This review has been unable to determine what impact CCDM has had on patient outcomes, due in part to a lack of data and poor linkages between CDS measures and patient outcomes. Once new measures have been agreed (see recommendation 2b, page 69), we recommend SSHW Unit support Health NZ in partnering with tertiary education institutions or InterRAI to commission formal programmatic research to understand the impact of CCDM on health outcomes and enable continuous improvement.

7. Establish a national work programme and office to oversee delivery of changes to CCDM

To date CCDM has been implemented at a local level, with individual DHBs leading their own programmes of work. The pace of implementation has been varied, and DHBs have had limited opportunity to share learnings, with the MoH unable to fully realise potential economies of scale. We recommend that a National Programme Management Office (NPMO) is quickly established to plan, oversee and drive the consistent implementation of the recommendations in this report, working with the key stakeholders pre and post reform.

Once established, we recommend the NPMO focuses on the priorities outlined below.

Short-term recommendations within the first 12 months

- a) **Reframe the messaging and narrative surrounding CCDM.** We recommend a “re-launch” of CCDM to communicate the outcomes and impact that CCDM can and will make for nurses in the future. This will need to be championed by senior leaders within the sector, and presents an opportunity to re-set expectations relating to CCDM.
- b) **Create a platform to enable and encourage sharing of good practice amongst DHBs.** Many DHBs have experienced similar challenges with CCDM implementation, and the creation of a shared space to innovate and discuss good practice is likely to provide a mechanism for collective problem solving. This platform would provide visibility of good practice which can then be shared and replicated in other parts of the country. A good example of this are measures taken to alleviate fears and resistance in nurses being deployed to support VRM in other wards such as reference guides of tasks that these nurses can help perform.
- c) **Commission research to investigate minimum staffing levels for nursing.** It is not currently clear whether existing minimum staffing legislation can be applied to nursing. We recommend conducting research to establish what existing legislation, such as the Health and Safety at Work Act 2015, may be linked to CCDM, and thus inform staffing decisions and Variance Response Management activity.

Longer-term recommendations

- a) **Institute robust and standardised data and information management processes.** Data maturity and information management practices vary widely across DHBs. To enable comparison and benchmarking of data it will be critical to embed robust and standardised information management practices. We recommend that the proposed NPMO develop and support providers to implement these processes.
- b) **Negotiate a master contract for Aotearoa New Zealand to enable greater leverage with TC.** Currently each individual DHB has a separate contract with TC. This weakens the bargaining power of DHBs, and their ability to influence TC to make changes needed for the Aotearoa New Zealand context. We therefore recommend that Health NZ negotiate a national master contract with TC.
- c) **Develop training material to support staff at different levels to use and maximise the impact of CCDM.** Some frontline nurses have received limited training on how to use TC (e.g. inputting data accurately and efficiently), and the training that is currently available is largely unsuitable for nurses work environments as it is primarily online. Once amendments have been made to CCDM components (see following page), we recommend refreshing existing training material, tailoring it to the needs of different audiences (e.g. DHB leadership, frontline nurses, nursing leadership, CCDM coordinators, and TC coordinators) and delivering training in new and more impactful ways. We also recommend investing in a national programme of leadership training for frontline nursing leadership, providing Charge Nurse Managers and Duty Nurse Managers with the tools to create quality work environments.

8. Emergency Department Nursing

Implementation of CCDM in ED is significantly behind implementation in Medical, Surgical, AAMH and AT&R wards. The majority of EDs in Aotearoa New Zealand do not have TC available or working. The recommendations outlined in pages 57- 59 apply equally to ED, and are supplemented by ED specific recommendations as shown below.

Short-term recommendations within the first 12 months

- a) **Complete development of the ED TC module and implement this across EDs nation wide.** The majority of EDs in Aotearoa New Zealand do not have TC available or working. We recommend completing development on the ED module. Once completed, implement CCDM tools, specifically the TC module, nationwide in EDs. This will enable additional data to be collected at a national level, to provide information to DHBs on current staffing shortages to inform FTE calculations. To enable successful implementation it will be critical to reduce the time required from nurses to enter data in TC.
- b) **Develop a feedback loop to ensure nurses understand how the data they provide is used.** Nurses spend a significant amount of time and effort inputting data into TC (where it has been implemented) but receive limited communication or follow-up regarding where this information has gone, how it has been used, or what actions have been taken as a result of the information provided. We recommend developing a communication and feedback process that will provide nurses with visibility of the decisions made using this data.

Longer-term recommendations

- a) **Commission work to adapt the ED module in TC and VRM to better reflect the ED context.** Whilst TC has an ED module, it does not currently enable nurses to capture all the patient care activity which is performed in an ED setting (e.g. triage activity). This results in data which is not truly reflective of the care hours required to meet demand. We recommend the CENNZ, supported by the SSHW Unit, engage with TC to agree adaptations to the TC ED module to ensure it is fit-for-purpose for the ED context.
- b) **Ensure ED is included in funding for FTE calculations.** In line with recommendations 4a and 4b (page 71) we recommend that nursing shortages identified through CCDM are included in FTE calculations, and are recruited to without delay.

CENNZ Recommendations

In addition to the findings and recommendations included in this review, CENNZ has also made recommendations relating to ED staffing that have been endorsed by the NAG, notably to:

- Increase senior nurse support for ED nurses including increasing the number of nurse educators, clinical coaches and nurse preceptors with ring-fenced time to support frontline nurses.
- Increase nursing leadership positions and involvement in clinical governance of EDs.

Implementation timeline for short-term recommendations within the first 12 months

We have made recommendations for implementation in the next 12 months. Of these we believe the following will have the most significant, immediate, impact on Safe Staffing, Patient Outcomes, and Work Environment. We suggest work begins on these recommendations immediately, and we have provided an indicative timeline and prioritised order to enable rapid implementation (see below).

Theme		Quarter One	Quarter Two	Quarter Three	Quarter Four
Immediate and Direct Impact on Safe Staffing Outcomes					
Review TrendCare and CCDM to recognise and uphold the articles of Te Tiriti	Complete work to ensure CCDM and TrendCare recognise and uphold the articles of Te Tiriti				
Increase the supply of nurses to fill identified vacancies	Reduce barriers to recruiting Internationally Qualified Nurses (IQNs)				
	Increase flexibility around working hours and shift patterns				
Accelerate the recruitment of nurses to meet demand	Revise the requirement to collect 12 months of data prior to performing FTE calculations				
	Streamline the process for approving FTE calculations				
	Factor Enrolled Nurses into staffing plans				
Refine CDS measures	Identify the key 5-10 Core Data Set measures nationally for reporting				
	Agree a set of patient outcome measures which are directly linked to CCDM				
Grow the nursing pipeline	Continue existing work on increasing the nursing pipeline and growing the workforce in advance of demand				
Setup NPMO and a national work programme to address review recommendations with agreed roles, responsibilities and resources					

Table 4: Implementation timeline for short-term recommendations within the first 12 months

Implementation timeline for short-term recommendations within the first 12 months

The following recommendations will have an indirect impact on Safe Staffing, Patient Outcomes, and Work Environment. We have provided an indicative timeline and prioritised order to enable rapid implementation (see below).

Theme		Quarter One	Quarter Two	Quarter Three	Quarter Four
Indirect Impact on Safe Staffing Outcomes					
Increase visibility of nursing demand in ED	Complete development of the ED TC module and implement this across EDs				
	Consider adaptations to how CDS measures are presented to enable interpretation and action by decision makers				
	Develop and implement accountability measures for DHB Executive Leadership and Boards for implementing FTE calculations				
Ensure CCDM data is used to meaningful inform decision-making	Design and launch data literacy programmes across DHBs				
	Commission research to investigate minimum staffing levels for nursing				
Exploration of relationships between CCDM and existing H&S legislation					
Enhance communications relating to CCDM	Develop a feedback loop to ensure nurses understand how the data they provide is used				
	Re-frame the messaging and narrative surrounding CCDM				

Table 4: Implementation timeline for short-term recommendations within the first 12 months

Implementation timeline for short-term recommendations within the first 12 months

The below are key enablers to the ongoing delivery of Safe Staffing, Patient Outcomes, and Work Environment. We have provided an indicative timeline and prioritised order to enable rapid implementation (see below).

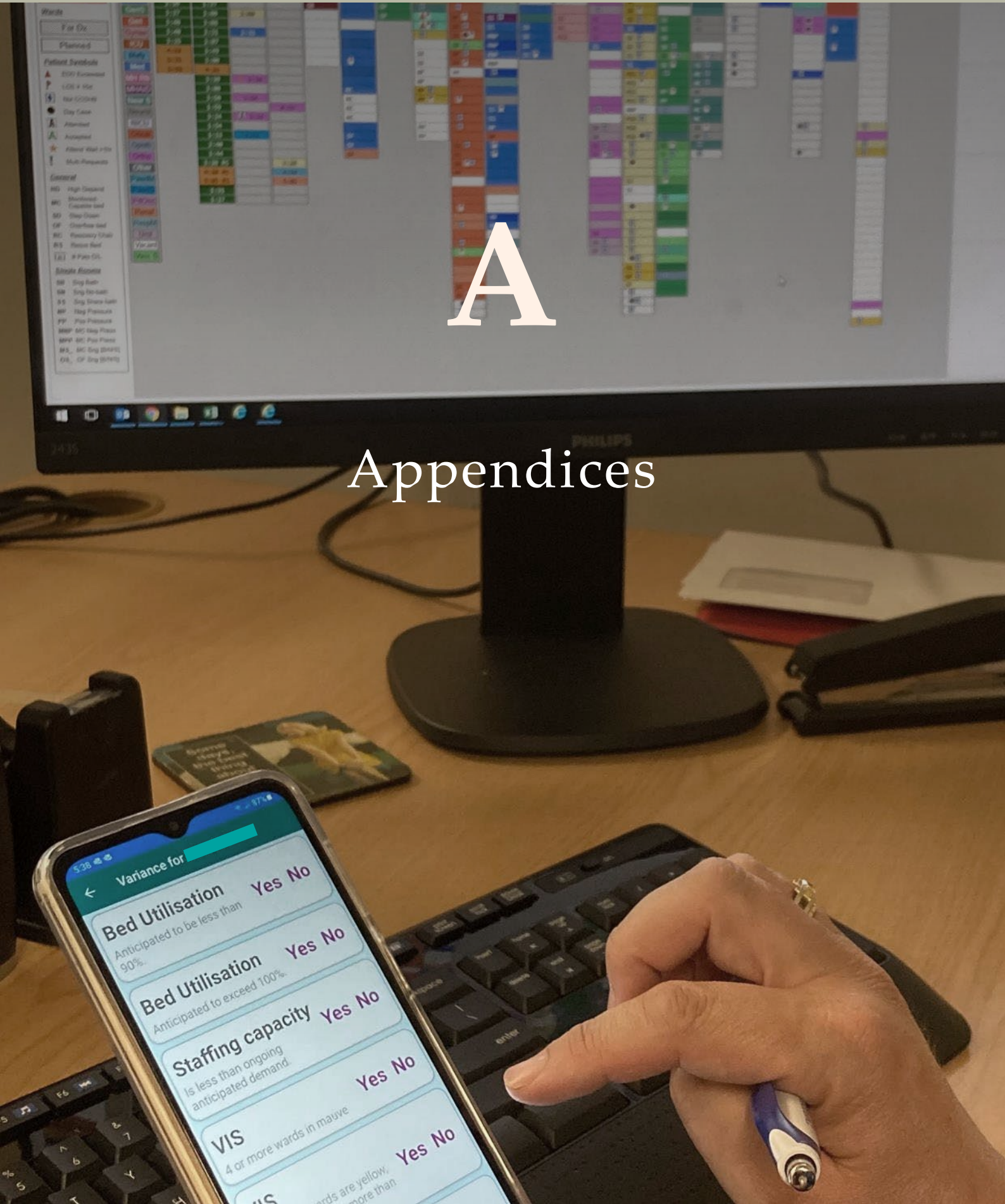
Theme		Quarter One	Quarter Two	Quarter Three	Quarter Four
Key Enablers for Ongoing Delivery of Safe Staffing Outcomes					
Leadership and Governance of CCDM	Align leadership of DHBs and Unions to build stronger working relationships				
	Implement stronger accountability mechanisms to hold DHB Executive Leadership and Boards to account (through Health NZ) when safe levels of staffing are not achieved.				
	Move accountability for tracking and reporting on CCDM outcomes and progress of the national work programme to the DHB Performance and Support and Directorate at the Ministry of Health				
	Embed Quality teams in CCDM councils				
Resourcing for CCDM	Invest in Data Analysts and Data Storytellers within DHBs				
	Determine the resourcing required to support CCDM on an on-going basis				
Sharing of good practice	Create a platform to enable and encourage sharing of good practice amongst DHBs				
Safe Staffing Healthy Workplaces Unit	Define the long-term vision, purpose and outcomes of the SSHW Unit				
	Review SSHW Unit resourcing and capability requirements				
	Standardise ways of working and communication provided by the SSHW Unit to key stakeholders				
	Reframe the messaging and narrative surrounding SSHW Unit				

Table 4: Implementation timeline for short-term recommendations within the first 12 months



A

Appendices



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Appendix A:

Glossary of Abbreviations

Term	Definition
AAMH	Adult Acute Mental Health
AT&R	Assessment, Treatment and Rehabilitation
BPF	Business Planning Framework (Queensland)
CaaG	Capacity at a Glance
CCDM	Care Capacity Demand Management
CDS	Core Data Set
CENNZ	College of Emergency Nurses New Zealand
CHV	Care Hours Variance
COI	Committee of Inquiry
DHB	District Health Board
ED	Emergency Department
EL	Executive Leadership
FTE	Full Time Equivalent
ICU	Intensive Care Unit
IRR	Inter-Rater Reliability
IOC	Integrated Operations Centre
IT	Information Technology
LDC	Local Data Council
MECA	Multi-Employer Collective Agreement
MoH	Ministry of Health
NAG	Nursing Advisory Group
NHPPD	Nursing Hours per Patient Day (Australia)
NHS	National Health Service (England)
NPPWG	Nursing Pre-Registration Pipeline Working Group
NZICHC	New Zealand Institute of Community Health Care
NZNO	New Zealand Nurses Organisation
PSA	Public Service Association
SBT	Shifts Below Target
SFWU	Service and food Workers Union
SOP	Standard Operating Procedures
SSHW	Safe Staffing Healthy Workplaces Unit
Surgical HD	Surgical High Dependency
TAS	Technical Advisory Services
TC	TrendCare
VIS	Variance Indicator Systems
VRM	Variance Response Management

Term	Definition
Nursing positions	
CNM	Charge Nurse Manager
DNM	Duty Nurse Manager
DoN	Director of Nursing
EN	Enrolled Nurse
HCA	Health Care Assistant
RN	Registered Nurse
DHBs	
CMDHB	Counties Manukau
HBDHB	Hawkes Bay
HVDHB	Hutt Valley District Health Board
LDHB	Lakes
MDHB	MidCentral
NMDHB	Nelson-Marlborough
NDHB	Northland
SCDHB	South Canterbury
SDHB	Southern
TDHB	Taranaki
WCDHB	West Coast
WRDHB	Wairarapa

Appendix B:

Nursing Safe Staffing Review (CCDM)

Terms of Reference

Background/Context

The CCDM programme was designed to safely and consistently match the demand for services (care required by patients) with the resources required to provide services (staff, knowledge, equipment and facilities). The three aims of CCDM are to deliver quality outcomes for patients, a quality environment for staff, and the best use of resources.

District Health Boards (DHBs) were required to fully implement CCDM across nursing in public hospitals as part of the 2018 DHB and New Zealand Nurses Organisation Multi-Employer Collective Agreement.

The pace and scale of implementation has been slow and variable. NZNO members and nurses have expressed frustration at CCDM's ability to provide safe staffing.

Given the years of investment in CCDM, it is timely to evaluate its effectiveness. This review of nursing safe staffing (CCDM) has been commissioned by the Minister of Health.

Purpose

The Nursing Safe Staffing Review will review DHB implementation of CCDM and its impact on safe staffing in order to make recommendations to either strengthen the approach or recommend that another safe staffing strategy is required.

Objectives

The objectives of the review are:

- to review implementation of CCDM, including programme components and success factors
- to compare outcomes in DHBs where CCDM is fully implemented with those that are at early stages of CCDM implementation
- to examine the impact of CCDM on safe staffing, patient outcomes and work environments in DHBs where it is fully implemented
- to make recommendations for the next steps of this national programme, for the Minister's review.

Review details

There are several DHBs which have achieved full implementation and some DHBs are using their data to drive quality improvement activity. The review will investigate the impact CCDM has made in DHBs where CCDM has been fully implemented and has become business as usual. This will identify whether full implementation has made positive or limited impacts on safe staffing and the reasons why.

The review will use information collected through the CDS on staff satisfaction and patient outcomes as one measure of impact. It will also seek and reflect the views and concerns expressed by nurses.

The results of the seven DHBs nearing completion and the three DHBs who are still in an early stage of implementation will be compared to those who have fully implemented CCDM.

The review will examine the following components of the CCDM programme:

- a) governance (partnership between health Unions and DHBs)
- b) VRM capacity and processes and procedures in place and their responsiveness to acute staffing shortage in real time
- c) CDS – implementation of the measures and effectiveness of using these measures to improve the use of resources, patient care and work environment
- d) Patient Acuity data – management and quality of data
- e) FTE calculations, approval processes, budgeting and recruitment.

The review will also cover:

- f) investigation of how effectively CCDM can mitigate unsafe staffing
- g) review of whether the CCDM programme remains fit-for-purpose and, if not, consideration of other safe staffing methodology (e.g. mandated nurse-patient ratios)
- h) recommendations for improvements to the CCDM programme
- i) evaluation of ongoing costs of maintaining CCDM (e.g. resources, nurses time, investment in TC)
- j) evaluation of the impact of shortages of nurses on implementation and nurses' satisfaction.
- k) is CCDM an effective tool for mental health inpatient services in determining staffing shortages in real time and allowing actions to be taken to provide the staff required

The review will make recommendations for improvements to the CCDM programme while considering if CCDM is still fit-for-purpose. This will include an evaluation of mandated patient ratios as an alternative safe staffing strategy bearing in mind the findings of the 2006 Safe Staffing Healthy Workplaces COI.

In scope

In scope of the review are:

- safe staffing for nurses within DHBs.
- DHB wards and units that meet criteria for CCDM methodology (e.g. outpatient units do not meet criteria).

Out of scope

Out of scope of the review are:

- Safe staffing for midwives within DHBs
- safe staffing for nurses in aged care and primary and community care
- safe staffing for allied health and medicine.

Timeframes

The review will be conducted over three months as follows:

1. gather information and review the current progress of implementation of CCDM in the first month
2. analyse impacts on safe staffing, patient outcomes and work environment, and undertake engagement with nurses in the second month
3. confirm the findings and make recommendations for improvements to achieve safe staffing in the third month.

Role of the Nursing Advisory Group

The NAG has been established to provide expert advice and to review the implementation and effectiveness of CCDM on safe staffing.

The NAG will lead the review and endorse the methodology, review documentation and endorse the final Report and recommendations. The NAG may attend engagements with nurses such as interviews, meetings and workshops as required.

Membership of the Nursing Advisory Group

The NAG is comprised of four representatives from nursing stakeholder groups including the public health system, along with the nursing academic and research community and will reflect diversity. Members will have expert understanding of the CCDM programme.

Role of the Consultancy

A consultancy will be engaged to provide secretariat and operational support for the NAG. The consultancy will draft the methodology for the review and provide appropriate resources to support delivery. The consultancy will draft the report and recommendations under the direction of the NAG.

Senior Responsible Officer

The Director-General of Health is accountable for the delivery of the review. He will endorse the report and its recommendations for the Minister of Health's approval.

Appendix C:

Breakdown of Focus Group Participants

DHB	Total
ADHB	16
CCDHB	18
CDHB	10
CMDHB	8
BOPDHB	10
HBDHB	7
HVDHB	6
Lakes	6
Midcentral	9
NMDHB	10
Northland	2
SCDHB	12
SDHB	6
Tairāwhiti	4
TDHB	13
Waikato	12
Waitematā	11
WCDHB	5
WRDHB	5
Other	15
Total	185

We spoke with a range of people in various positions at the above DHBs.

Appendix D: Breakdown of Emergency Department Focus Group Participants

Organisation

Southern DHB

Lakes DHB

Bay of Plenty DHB

Wairarapa DHB

Mid Central DHB

Canterbury DHB

CENNZ

Auckland DHB

NZNO

Southern DHB

Hawkes Bay DHB

South Canterbury DHB

We spoke with a range of people in various positions at the above DHBs.

Appendix E:

Interview Participants – Programme and Implementation Advisors

Interviewee	Bio
Ailsa Claire	Ailsa has been the Chief Executive Officer of ADHB since 2012. Ailsa is the Lead DHB Chief Executive for the Health Workforce Advisory Board. Ailsa's experience includes 2 years as the Acting National Director at the NHS in England.
Colette Breton	From 2015-2021 Colette was a Programme Consultant for the Safe Staffing Healthy Workplaces Unit. Colette's work in the SSHW Unit included putting systems and processes in place, writing the standards for the programme, creating the FTE calculation software, developing the CDS, national reporting framework and CCDM website.
Glenda Alexander	Glenda has a long association with the NZ Nurses Association, working for the Union for 31 years. Glenda was part of the first MECA where the Committee of Inquiry was formed.
Lisa Adamson	Lisa Adamson was part of the SSHW Unit from 2013 - 2018. During her time with the SSHW Unit she was a programme consultant and director of the unit.
Maree Jones	Maree joined the SSHW Unit from 2008 to 2018 as an Associate Director and worked extensively to develop the CCDM programme. More recently, Maree has become the CCDM Project Implementation Coordinator for NZNO.
Matt Whitehead	Matt is currently the Business Services Manager for the CCDHB. He is a member of the CCDM Council for 2020/21 in his capacity in this role. Matt has experience in a wide range of roles at the DHB, including Financial Planner, Management Accountant, HRMIS Systems & Reporting Analyst, Payroll Analyst and Advisor.
Sandy Blake	Sandy was DoN at Whanganui, where CCDM was implemented with great success. Sandy then moved to Capital and Coast as Executive Director for Quality, Innovation and Performance. In this role Sandy was instrumental in the development of a national nursing assessment tool (covering fall risks, pressure areas, cognitive skills, etc.).
Sarah Mortimer	Sarah previously spent 20 years working as a full-time nurse. She has been an Operations Manager at Wellington Blood and Cancer Centre, Renal, Pharmacy, and Palliative Care. Sarah works for CCDHB, representing them as a member of the reference group established by Health Quality & Safety NZ for their trigger tool programme.

Interviewee	Bio
Suzanne Rolls	Suzanne advises on behalf of NZNO to the Perioperative Nurses’ College of New Zealand. In her role she provides strategic leadership - including guidance on progressing projects for perioperative nurses, making submissions to governmental departments, and managing communication within NZNO and with external stakeholders. Suzanne has a clinical background in emergency nursing, critical care and general medicine.
Marama Tauranga	Marama is the Manukura-Executive Director of the Bay of Plenty District Health Board. Marama’s past experience includes the role of Equity Manager for the DHB and the role of Clinical Nurse Manager in Tauranga Hospital ED. Marama has strong clinical experience and a passion for improving Māori outcomes. Marama will be instrumental in the implementation of the Toi Ora Strategy in the Bay of Plenty. <i>*Marama also helped as an ED advisor to this report.</i>
Linda Chalmers	Dr Linda Chalmers has over 40 years of experience in health care and nursing in Aotearoa New Zealand. She has practised in a range of clinical settings including emergency, medical, primary health care, and surgical and intensive care in New Zealand, Australia and Saudi Arabia. Linda has practiced as a nursing manager, educator and clinician, including 3 years as ADHBs Associate Nurse Director. She has previously worked in tertiary education in nursing and health science, and was a Senior Advisor at the MoH. Linda’s focus is Māori health, ensuring that Te Tiriti o Waitangi is embedded in nursing and health care, and promoting the development of the Māori nursing workforce to enable gains in Māori health outcomes. Linda is currently Pou Haumanu (Clinical Director) at Te Pare o Toi (Māori Health Gains & Development) Bay of Plenty DHB.

We also spoke with an additional two individuals who have played key roles in implementation of CCDM. They requested to remain anonymous for the published report.

Appendix F:

Interview Participants – Advisors on TrendCare and Aspects of CCDM in the ED

Interviewee	Bio
<p>Cherrie Lowe</p>	<p>Cherrie is the Co-owner and Chief Executive Officer of Trend Care Systems Pty Ltd and Trend Care Systems NZ Limited. She was a Senior Quality Surveyor for the Australian Council on Healthcare Standards for 25 years and is an experienced executive health service manager having been Director of Nursing and Director of Clinical Services in numerous Australian hospitals for over two decades. She has worked closely with health departments and DHBs in Aotearoa New Zealand providing national and local-level leadership to improve nursing workforce planning and resource strategies, focusing on patient nursing care requirements as being central to; improved staffing management, nurse resource planning, care outcomes for patients, staff retention and organisational productivity and efficiency.</p>
<p>Rebecca Fergusson</p>	<p>Rebecca has worked as a Nurse Consultant for TC as a part of the New Zealand/Australia team for the last 2 years. Previously, Rebecca worked with SSHW Unit for four years in a dual-role as the National Acuity Consultant and CCDM Consultant. Rebecca’s experience includes leading, coaching and implementing TC and CCDM in DHBs from 2012-2019.</p>
<p>Rosalie Wright</p>	<p>Rosalie has worked as a Nurse Consultant for TC as a part of the New Zealand/Australia team for the last 2 years. Rosalie’s experience extends to the national level, as a National Acuity Consultant with the SSHW Unit, as well as the role of project implementation, management and training of TC at SDHB from 2011-2019.</p>

Appendix G: Letter from the College of Emergency Nurses New Zealand

Ms Hilary Graham-Smith Chairperson
Nurse Safe Staffing Review (CCDM) Nursing Advisory Group
c/- KPMG Secretariat Manager
cc. Ms Kate Weston

Tēnā koe Ms Graham-Smith

We are writing on behalf of the College of Emergency Nurses New Zealand - NZNO (CENNZ) membership to highlight our concerns about the long-standing unsafe staffing in Emergency Departments.

Emergency Departments (EDs) have suffered nursing shortages for decades. The lack of adequate nursing capacity to meet demand has reached crisis levels, and we note that work to date in the CCDM programme has failed to mitigate the dilemmas that emergency nurses face daily. We continue to receive reports from members regarding their distress with the level of care rationing and patient care that is able to be provided. The majority of indicators in the Ministry of Health Quality Framework and Quality Measures Suite for EDs as well as nurse sensitive patient outcomes are unachievable without adequate nursing levels.

Contributing factors to unsafe staffing include inadequate baseline staffing levels, increasing numbers of ED presentations, access block that leads to overcrowded EDs and poor patient flow, increased surge demand, and an increasingly co-morbid and aging population. The inability to achieve 6-hour health targets have a significant impact on the ED nursing workforce. It is not uncommon for patients to remain in EDs for up to 36 hours, requiring emergency nurses to provide inpatient care, in addition to acute assessment and intervention for the undifferentiated, complex and at-times unstable patients who continue to arrive. EDs also face increasing demand for mental health patient assessments, with community services overwhelmed by need. Provision of care in ED whilst patients await scarce mental health beds is often challenging and resource-intensive, and occurs in an environment poorly-suited for people experiencing mental health crises. Efforts to improve equity in emergency care for Māori, and for other vulnerable groups are much more difficult in the current state of EDs, particularly with regard to very long waiting times.

CENNZ has engaged with the Safe Staffing Healthy Workplace Unit for over five years, sounding the alarm, but this has not yet led to any improvement. EDs are the acute care interface between primary and hospital resources with unique demands compared to inpatient areas. Bed utilisation and occupancy rates do not clearly represent the churn of patient movement to accommodate overcrowding and surge demand.

Variance Response Management (VRM) has provided limited or ineffective measures to support EDs facing sustained and predictable periods of extreme demand. VRM response is not a solution for long-standing ED Nurse shortages. Nurses who are already experiencing burnout feel morally obligated to cover the shortfall, driven by a desire to help colleagues in dire need. Nurses are picking up extra shifts out of genuine concern for patient safety. On days off, nurses receive multiple urgent text messages highlighting dire staff shortages and begging them to come in for extra shifts.

Nursing shortages in New Zealand have already had a measurable effect on nurse turnover, vacancies, job satisfaction and burnout, with work-related burnout highest amongst ED nurses¹. Key stakeholders in the College of Emergency Nurses NZ can make available additional data that tells the human story of challenges faced by Charge Nurse Managers and emergency nursing teams.

We are aware of early information from those New Zealand EDs using TC that provides compelling evidence of the urgent need for increased Full Time Equivalent (FTE) positions. There is a significant delay from the collection and collation of TC data to achieving the necessary increase in funded FTE. Departments with identified FTE deficits have faced lengthy implementation processes through approval, budgeting and recruitment. Currently there are notably fewer applications for advertised ED nursing vacancies and a steady stream of resignations from experienced emergency nurses.

The metrics of the Core Dataset provide quantifiable evidence of the reduction in quality of patient care, lack of safe work environment and poor use of health resources in EDs. These represent alarming deficits in ED nursing levels. The Care Hours Variance reported in two NZ EDs for July 2021 were negative 1400 and negative 1500 hours respectively. We recommend the following:

- The CCDM programme is improved by the rapid introduction of TC into NZ EDs, with support for implementation to achieve 95% actualisation, and calculation of required FTE
- When a clinical risk is identified that is associated with nursing shortfall, the Minister should direct nursing resources and FTE to EDs, immediately
- EDs will require a significant staffing funding increase over the next three years.
- ED nurses require a dedicated transition plan (including increase in nurse educators, clinical coaches and nurse preceptors with ring-fenced time).
- Funded support to address the current poor wellbeing of nurses
- Increased nursing leadership positions and involvement in clinical governance of EDs.

The College of Emergency Nurses NZ committee members would be happy to provide further information, and would be interested in participating in work going forward to improve CCDM in our Emergency Departments. If alternative staffing methodologies are considered in EDs following your review, we offer our resources and expertise to contribute to that project.

Ngā mihi nui / Yours sincerely,

Sue Stebbeings, CENNZ Chairperson, MN, Nurse Practitioner
 On behalf of the CENNZ Committee
 Dr Natalie Anderson, PhD, Emergency Nurse, Senior Lecturer,
 Anna-Marie Grace, MN, Nurse Unit Manager
 Kaidee Hesford, PGCert, Nurse Manager
 Amy Button, PGDip, Emergency Nurse
 Kathryn Wadsworth, MN, Clinical Nurse Manager / Clinical Nursing Director
 Katie Smith, MN, Nurse Practitioner
 Keziah Jones, BN, Emergency Nurse
 Tanya Meldrum, PGCert, Associate Charge Nurse Manager
 Tina Konia, PGCert, Emergency Nurse

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Appendix I: INDEX OF SURVEY & CDS ANALYSIS

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1. What is the size of the problem?

The staffing shortage across Aotearoa New Zealand is very extensive

Our qualitative and quantitative analyses are in agreement. This staffing shortage is a huge problem that needs to be addressed immediately. Both nurses and patients are at high risk in the current state. Here is an overview of the size of the problem.

Core Data Set	<p>In 2021 across all shifts in the 4 ward types we examined, 23% were shifts below target.</p> <p>That goes up to 36% for day shifts, and to 43% for day shifts in DHBs where CCDM is fully implemented and potentially captures data better. 42% of day shifts in medical wards were shifts below target while there were 38% in surgical wards and 34% in MH wards.</p>	<p>18% across all shifts in the 4 ward types we examined in 2021 were in the “red zone”*, i.e., critical care capacity deficit.</p> <p>This has gone up from 13% in 2020 and 17% in 2019.</p> <p>29% of day shifts are marked in the red zone and that number goes up 34% of shifts in DHBs that CCDM is fully implemented.</p>
	Data from 260 wards (4 ward types) over 3 years (Oct 2018 – Sep 2021) were used.	
Survey	<p>62% of frontline nurses reported half or more of their last 10 shifts as understaffed.</p> <p>For leaderships this increases to 74%.</p>	<p>53% frontline nurses reported being in a poor or very poor mental state on understaffed shifts.</p> <p>80% of nursing leadership reported nurses being in a poor or very poor mental state.</p>
	<p>41% of frontline staff are being asked to take extra shifts weekly.</p> <p>And a further 35% of frontline nurses who participated in the survey said they were asked to take extra shifts every month.</p> <p>74% of leadership reported asking nurses to take on extra shifts weekly, and a further 23% asking nurses to take extra shifts monthly</p>	<p>70% frontline nurses said that staff are not available when needed for Variance Response.</p> <p>81% of leadership said the same.</p>
	<p>83% frontline nurses said that patients in understaffed shifts are not receiving complete care.</p> <p>86% of leadership responded the same.</p>	<p>74% of nurses responded that they went home exhausted with no energy if the shift was understaffed.</p>
	Survey responses were received from 3,366 frontline staff and 626 leadership staff.	

* Red zones (the critical zone in the VRM) were calculated from Care Hours Variance. We considered as red zone shift any shift below - 12.5% variance. This is the definition from TrendCare. It means that the full 12.5% buffer has been used and all time set aside for unplanned work and staff breaks has been utilized. We should note that in NZ “red zones” are not strictly defined and charge nurses need to answer a set of questions to determine the zone status.

2. Survey Methodology

Topics/Structure

This was an online survey. The aim of the survey was to be concise, yet address the main topics of interest.

Having conducted a couple of interviews and run a couple of focus groups prior to finalising the design of the survey, allowed us to focus on some aspects we wanted to know the wider community's opinions.

The survey was broken down to 4 sections.

1. Collecting demographic information that would allow us to make some comparisons
2. Understanding the quality work environment
3. Understanding aspects of TC
4. Understanding aspects of CCDM.

The survey collected input from the participants in the form of:

- Structured questions with pre-populated answers for the participants to select from. The options for "other" was also provided when appropriate and participants could specify what the "other" entails.
- Statements, where participants were invited to let us know how much they agree with (Likert-scale).
- Free-text sections for comments at the ends of sections 2, 3, and 4.

The questions and statements were worded slightly different when aiming at participants of leadership or frontline roles. The survey was split when participants selected their role in the first section.

The full script of the survey is available in this Report Appendices.

Distribution, Duration, Target

Duration

The survey was open for 8 days from 9am Tuesday the 26th of October until 9am of Wednesday the 3rd of November 2021.

Distribution:

The survey was online and the link was distributed by: PSA & NZNO to their members working in DHBs.

Target participants

DHB frontline and leadership roles were invited to complete the survey.

Community nurses and midwives were out of scope.

Analysis

3992 participants responded to the survey.

There was good representation from all DHBs, ranging from about 4% (503 participants in Auckland) to 13% (312 participants in Counties Manukau).

Full demographic analysis is listed within this section.

Analysis was conducted with the aim of providing an overall picture across Aotearoa New Zealand but to also identify differences in the responses of participants from DHBs that CCDM is at a different stage of implementation and also from participants from the following 3 departments:

- Emergency Department
- Maternity Service
- Mental Health

The responses of all structured questions are visualised with appropriate graphs.

Topic analysis and linguistic (sentiment & emotional/tone) analysis were conducted on the free text comments.

3. The Survey Questions - Section 1

Section 1:

General Information

1. Which DHB(s) do you work in? (You can choose more than one answer.)
2. What is your primary role within the DHB? (Single selection.) *
3. What are your secondary roles within DHBs? (You can choose more than one answer.)
4. Which department(s) do you work with? (You can choose more than one answer.)
5. How many working hours do you work in direct patient care?
6. Do you work full time or part time?
7. What is your employment type?
8. How long have you been in your current role?
9. How long have you been working in the health sector?

Table 1: Primary roles selection for question 2

Frontline role	Leadership roles
Clinical Resource Nurse	Associate Charge Nurse Manager / Associate Clinical Nurse Manager
Enrolled Nurse	Associate Director of Nursing / Director of Nursing
Healthcare assistant / Hospital Aide	CCDM Co-ordinator
Mental Healthcare assistant	CEO / COO / GM HR
Nurse Educator / Simulation Nurse Educator	Charge Nurse Manager / Clinical Nurse Manager
Nurse Practitioner	Clinical Nurse Specialist (CNS)
Registered Nurse / Staff Nurse	Duty Nurse Manager / Nurse Manager
Registered Obstetric Nurse	NETP / NESP Coordinator
Specialty Clinical Nurse (SCN)	Nurse Co-ordinator / Other Co-ordinator
Other frontline role	Operations Managers
	Patient flow Co-ordinator
	Professional Nurse Advisor
	Trendcare Co-Ordinator
	Other leadership role

* Based on the answer of question 2, the survey branched to either presenting the frontline or the leadership versions of questions for the sections 2, 3, and 4.

4. The Survey Questions - Section 2

Question	Section 2 – Frontline Version: Quality work environment for staff	Section 2 – Leadership Version: Quality work environment for staff
10	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • My work environment allows me to provide complete care to patients. • I receive sufficient guidance to provide complete care to patients. • I feel well supported at work. • My workload, in the majority of my shifts, is manageable. • Generally, I end my shifts feeling satisfied that I have done a good job. • There are sufficient nursing staff in my shifts on most of my days. 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • Nurses’ work environment allows them to provide complete care to patients. • There is sufficient guidance provided to nurses to ensure complete care for patients. • Our nurses are well supported. • For the majority of shifts, nurses’ workloads are manageable. • Generally, I end my shifts feeling satisfied that I have done a good job. • There are sufficient nursing staff on shifts on most days.
11	Of your last 10 shifts, how many were understaffed?	Out of the last 10 shifts, how many shifts are negative variance?
12	How did you know the shifts were understaffed? (You can choose more than one answer.)	How do nurses know that shifts are understaffed? ? (You can choose more than one answer.)
13	What happened to you in those understaffed shifts? (You can choose more than one answer.)	What happens to the nurses in the understaffed shifts? (You can choose more than one answer.)
14	How would you rate your mental state in those understaffed shifts? (0 for "Very Poor" to 10 for "Very Healthy".)	What do you think the nurses’ mental state is in those understaffed shifts? (0 for "Very Poor" to 10 for "Very Healthy".)
15	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • Patients in understaffed shifts are receiving complete care. • Staff are available when needed for Variance Response. • I find it easy to take planned annual leave. 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • Patients in understaffed shifts are receiving complete care • Staff are available when needed for Variance response. • Nurses can easily take planned annual leave.
16	How often are you asked to work extra shifts?	How often do nurses get asked to work extra shifts?
17	How many times do you help other wards because of Variance Response Management (VRM)?	NA
18	If help arrives on an understaffed shift, how often is it the right type of help, e.g. RN or HCA?	If help arrives on an understaffed shift, how often are you able to send the right type of help e.g. RN or HCA?
19	Anything else you’d like to tell us on the topic of “Quality work environment for staff”?	Anything else you’d like to tell us on the topic of “Quality work environment for staff”?

5. The Survey Questions - Section 3

Question	Section 3 – Frontline Version: Feedback on TrendCare	Section 3 – Leadership Version: Feedback on TrendCare
20 *	I know what TrendCare is: Yes/No	I know what TrendCare is: Yes/No
21	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • I understand the goals of TrendCare • The reasons for bringing in TrendCare were explained clearly to me • TrendCare is easy to understand • I have received sufficient training / guidance on TrendCare • There are people I can approach for guidance if I do not understand something about TrendCare. 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • I understand the goals of TrendCare • The reasons for bringing in TrendCare were explained clearly to me • TrendCare is easy to understand • I have received sufficient guidance on TrendCare • There are people I can approach for guidance if I do not understand something about TrendCare.
22	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • TrendCare has been implemented well in my workplace • TrendCare has improved my workplace environment • TrendCare has had a positive impact on patient care at my workplace • TrendCare has had a positive impact on safe staffing at my workplace. 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • TrendCare has been implemented well in my DHB • TrendCare meets the needs of my workplace • TrendCare has had a positive impact on patient care at my workplace • TrendCare has had a positive impact on safe staffing at my workplace.
23	What proportion of time in your shift is usually spent on inputting data at TrendCare?	What proportion of time do you think nurses spend on inputting data at TrendCare?
24	How often are you asked to adjust your predictions of actualisations on TrendCare?	How often are nurses asked to adjust their predictions or actualisations in TrendCare
25	Anything else you'd like to tell us on the topic of TrendCare?	Anything else you'd like to tell us on the topic of TrendCare?

* If participants answered "No" to question 20, then they were not presented with the remaining questions of this section (21-25)

6. The Survey Questions - Section 4

Question	Section 4 – Frontline Version: Feedback on CCDM	Section 4 – Leadership Version: Feedback on CCDM
26 *	I know what CCDM is: Yes/No	I know what CCDM is: Yes/No
27	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • I understand the purpose of CCDM • The CCDM programme was explained clearly to me • CCDM is easy to use and understand 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • I understand the purpose of CCDM • The CCDM programme was explained clearly to me • CCDM is easy to understand
28	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • CCDM has been implemented well at my workplace • Executive Leadership is supportive of CCDM • Leadership speak positively about CCDM • CCDM has improved my work environment • CCDM has had a positive impact on patient care at my workplace • CCDM has had a positive impact on safe staffing at my workplace • CCDM is effective at resource allocation • CCDM has delivered on what I was told it would • CCDM has made my workload more manageable • CCDM data is used to make positive changes in my ward • The Core Data Set is easy to understand • The Core Data Set is easy to understand • CCDM’s purpose is to balance “Quality of patient care”, “Quality work environment”, and “Best use of health resources”. Which is currently prioritized? 	<p>Please let us know how much you agree with the following statements.</p> <ul style="list-style-type: none"> • CCDM has been implemented well at my DHB • I am supportive of CCDM • I speak positively about CCDM • CCDM has improved my work environment • CCDM has had a positive impact on patient care at my workplace • CCDM has had a positive impact on safe staffing at my workplace • CCDM is effective at resource allocation • CCDM has delivered on what I was told it would • CCDM has made my workload more manageable • CCDM data is used to make positive changes in my ward • The Core Data Set is easy to understand • The Core Data Set is easy to understand • CCDM’s purpose is to balance “Quality of patient care”, “Quality work environment”, and “Best use of health resources”. Which is currently prioritized?
29	There is an active CCDM council in my DHB: Yes/No/Don’t know	There is an active CCDM council in my DHB: Yes/No/Don’t know
30	There is an active local data council in my ward: Yes/No/Don’t know	There is an active local data council in my DHB: Yes/No/Don’t know
31	How often does your local data council meet in your ward?	How often does your CCDM council meet?
32	CCDM adds values and should continue to be used in my workplace: Yes/No/Don’t know	CCDM adds values and should continue to be used in my workplace: Yes/No/Don’t know
33	What suggestions do you have to make CCDM better? / anything else you would like to tell us?	What suggestions do you have to make CCDM better? / anything else you would like to tell us?

* If participants answered “No” to question 26, then they were not presented with the remaining questions of this section (28-33)

7. Survey Demographics

There were 3992 unique respondents in the survey. Participants were allowed to select only one primary role but could select more than one secondary role, DHB, and so on.

3451 out of 3992 participants said they knew what TC is and 2742 out of 3992 participants said they knew what CCDM is.

By DHB and Implementation group

Implementation	DHB	Participants	TrendCare	CCDM
Fully Implemented	Hawke's Bay	177	159	137
	Northland	164	151	88
	Auckland	503	411	334
	Bay of Plenty	210	191	153
	Nelson	132	117	105
	Marlborough	254	201	148
	Waitematā	140	130	113
	Hutt Valley	88	85	70
Mostly Implemented	Whanganui	88	85	70
	Lakes	79	68	61
	MidCentral	175	163	142
	Capital and Coast	324	300	245
	Tairāwhiti	42	39	32
	Southern	227	197	163
	South Canterbury	60	55	47
Least Implemented	Taranaki	124	113	97
	Counties Manukau	312	252	172
	Wairarapa	43	35	29
	West Coast	39	38	34
	Canterbury	643	576	422
	Waikato	309	213	182

By Experience in years

Years in the current role	Participants
0-1 year	688
1-3 years	870
3-5 years	644
5-10 years	639
10+ years	1151

Years at the health sector	Participants
0-1 year	98
1-3 years	263
3-5 years	361
5-10 years	725
10+ years	2545

By Primary Role

Primary role	Participants	TrendCare	CCDM
Registered Nurse	2675	2366	1822
Other Frontline	691	518	390
Leadership	626	567	530

By Department

Department	Participants	TrendCare	CCDM
Emergency Department	561	475	390
Maternity Service	218	192	153
Mental Health	504	420	303
Other	3045	2667	2151
N/A	62	54	47

In section 3 of the survey, participants were asked if they knew TrendCare. If they answered "Yes", the questions about TrendCare would be asked. If they answer "No", the survey would go to the next section.

In section 4 of the survey, participants were asked if they knew CCDM. If they answered "Yes", the questions about CCDM would be asked. If they answer "No", the survey would go to the end.

8. Survey Demographics: Roles

At beginning of the survey, participants were asked their primary role(single selection) within DHBs. The following sections in the survey were split into Frontline or Leadership versions based on the answer to their primary role.

Job title	Primary role	Number of participants
Frontline	Registered Nurse / Staff Nurse	2675
Frontline	Healthcare assistant / Hospital Aide	342
Leadership	Charge Nurse Manager / Clinical Nurse Manager	139
Leadership	Clinical Nurse Specialist (CNS)	127
Leadership	Associate Charge Nurse Manager / Associate Clinical Nurse Manager	119
Frontline	Enrolled Nurse	116
Leadership	Duty Nurse Manager / Nurse Manager	74
Leadership	Nurse Co-ordinator / Other Co-ordinator	73
Frontline	Nurse Educator / Simulation Nurse Educator	66
Frontline	Specialty Clinical Nurse (SCN)	56
Frontline	Other frontline role	39
Frontline	Mental Healthcare assistant	36
Leadership	Other leadership role	31
Frontline	Nurse Practitioner	19
Leadership	CCDM Co-ordinator	18
Leadership	Associate Director of Nursing / Director of Nursing	15
Frontline	Clinical Resource Nurse	11
Leadership	TrendCare Co-ordinator	8
Frontline	Registered Obstetric Nurse	6
Leadership	CEO / COO / GM HR	6
Leadership	Operations Managers	6
Leadership	Patient flow Co-Ordinator	5
Leadership	Professional Nurse Advisor	3
Leadership	NETP / NESP Coordinator	2
Total		3992

9. Summary of Main Observations from the Survey

Overall

- There is overall agreement between Frontline and Leadership (we only had 6 participants on a CEO level, most of the leadership participants were close to frontline).

On the topic of quality work environment:

- Fifty percent of frontline staff felt supported at work and able to take leave while 50% did not. Executive and non-executive leadership thought frontline staff need more guidance and support.
- The majority of frontline participants state the workload is not manageable, there are not enough staff and patients do not receive complete care. Even higher numbers of leadership state the same.
- When we asked out of your last 10 shifts how many were understaffed, "5", "10", and "8" were the most popular answers covering 40% of the Frontline and 48% of Leadership.
- When we asked participants to rate the nurses mental state at the end of a shift from 0 to 10, 0 being the poorest, "3", "5", "4" were the most popular answers, covering 57% of Frontline and 63% of Leadership.
- Frontline participants identified that the major indicator of understaffed shifts was a mismatch between the number of staff on the shift versus the number of staff on the roster.
- Leadership observe that their staff are unable to take their meal breaks and report it as the second most important indicator that the shift is understaffed.
- Both frontline and leadership participants agreed that nurses being stressed, dissatisfied and exhausted were the most common consequences of understaffed shifts.

Participants were slightly positive on understanding the purpose of TC and CCDM and thinking there is enough training and support but the vast majority of participants are negative on whether they have made a difference to safe staffing and patient care.

Different Stages of Implementation

No major differences were observed in the participants' responses from DHBs at a different stage of CCDM implementation. Participants from DHBs that have fully implemented CCDM are slightly more negative.

Mental Health vs Maternity vs Emergency Department vs Overall

The responses from participants of these 3 departments followed the same trend as the overall responses of the survey.

However, participants from Emergency Departments and Maternity Services are a lot more negative when it come to all questions around the quality work environment.

Their work environment is reported by the participants to be in worse situation than the average ward.

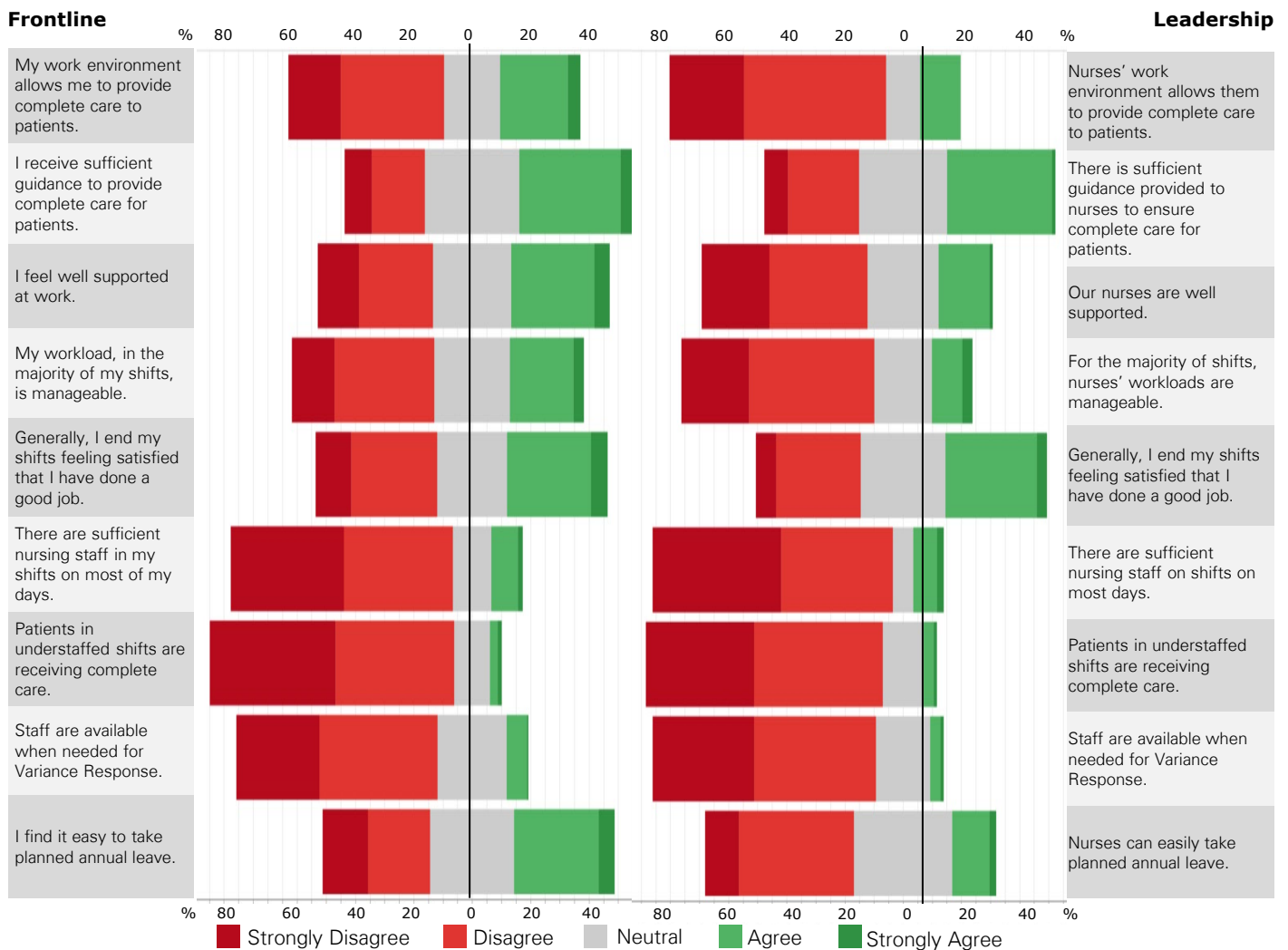
ED participants expressed the greatest dissatisfaction in the survey across all questions.

10. Survey Results: Quality work environment for staff Likert scale questions

We provided the participants of the survey a number of statements and asked them to denote how much they agree with each of them. Frontline (3366 participants) and Leadership (626 participants) roles were provided with slightly different questions, effectively asking the same thing.

Observations

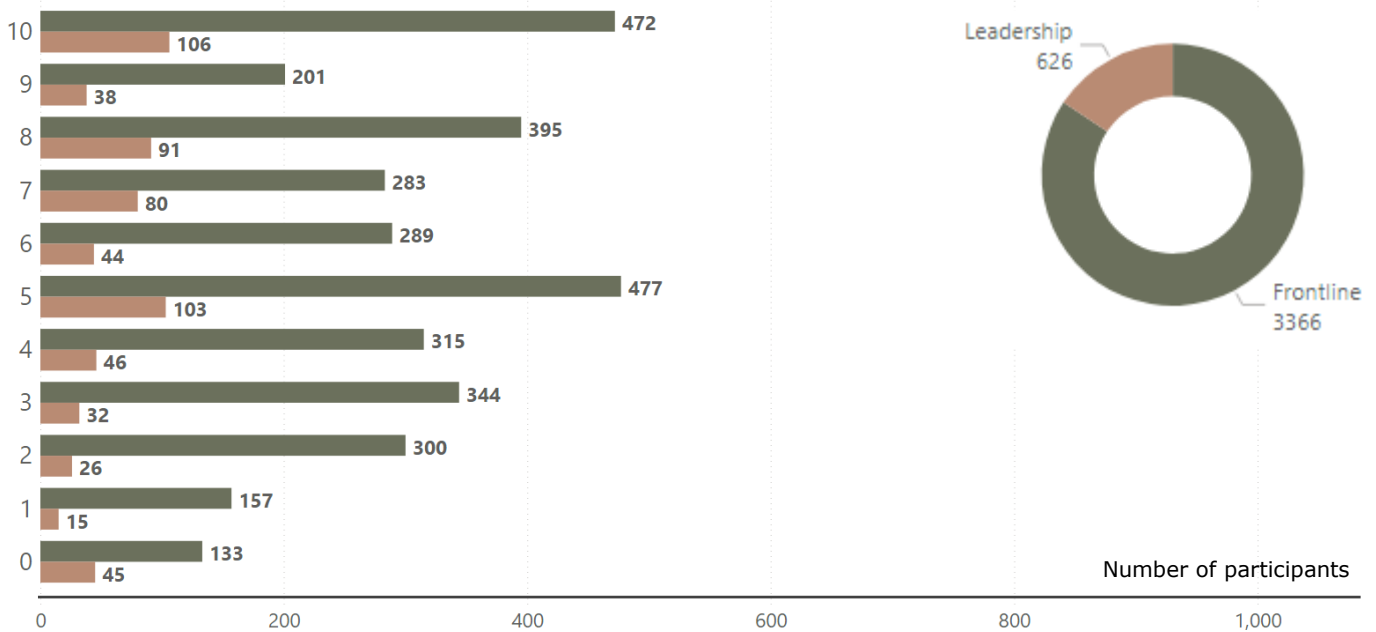
- Overall we see agreement between Leadership and Frontline that the quality of work environment is low. Leadership is slightly more negative around manageable workloads and the ability to provide complete care to patients.
- When we looked at the responses from participants from DHBs at different implementation levels, the responses were similar and in agreement with this overall picture.
- When we looked at the responses specifically from ED, Maternity Services, and MH, all the plots had even more weight on the left (red – disagree) side.



11. Survey Results: Quality work environment for staff - Understaffed Shifts Number & Mental State

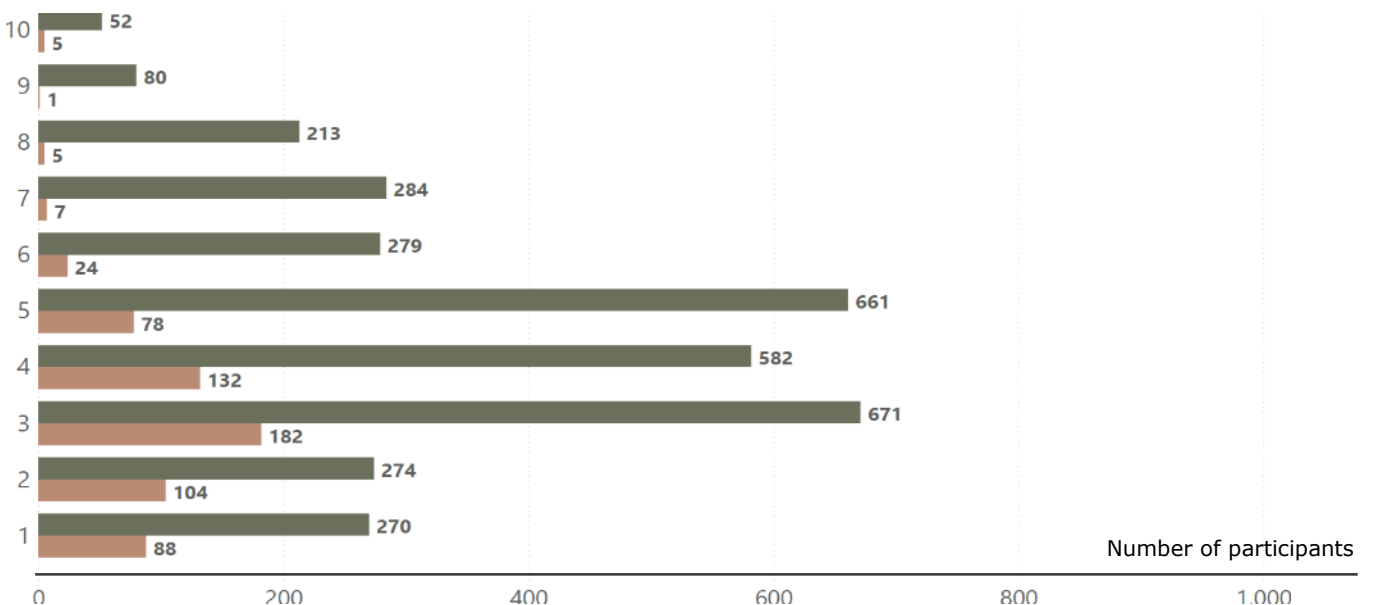
Frontline question: Of your last 10 shifts, how many were understaffed?

Leadership question: Out of the last 10 shifts, how many shifts are negative variance?



Frontline question: How would you rate your mental state in those understaffed shifts? (0 for "Very Poor" to 10 for "Very Healthy")

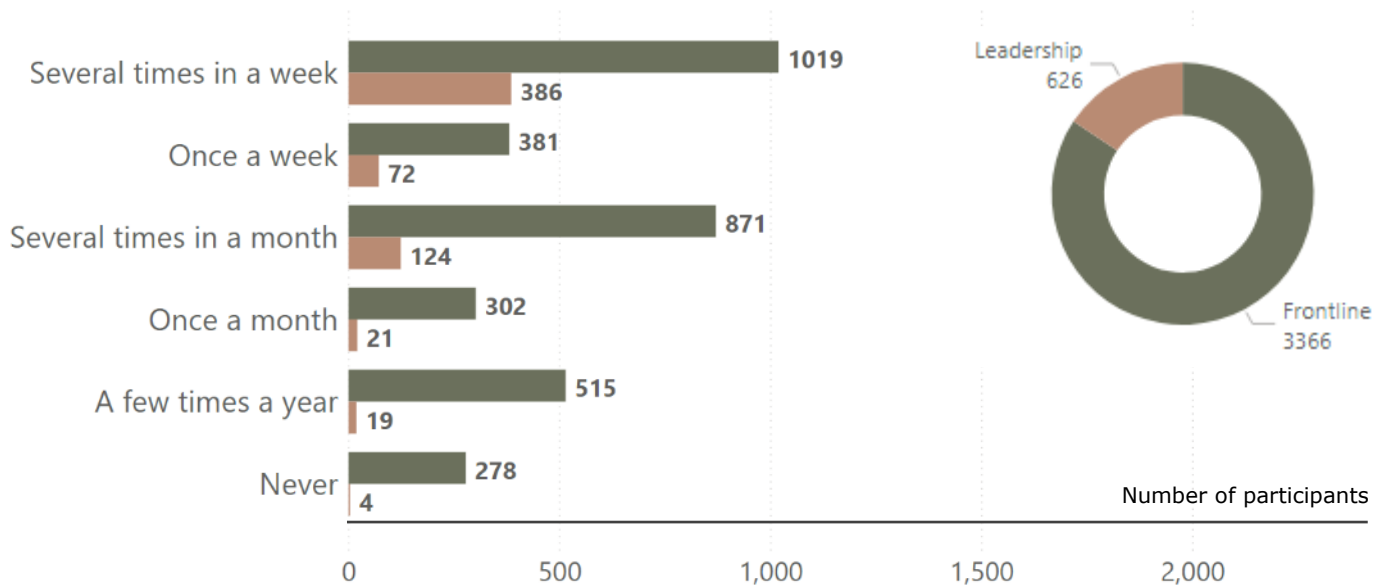
Leadership question: What do you think the nurses' mental state is in those understaffed shifts? (0 for "Very Poor" to 10 for "Very Healthy")



12. Survey Results: Quality work environment for staff - Extra Shifts & Right Help

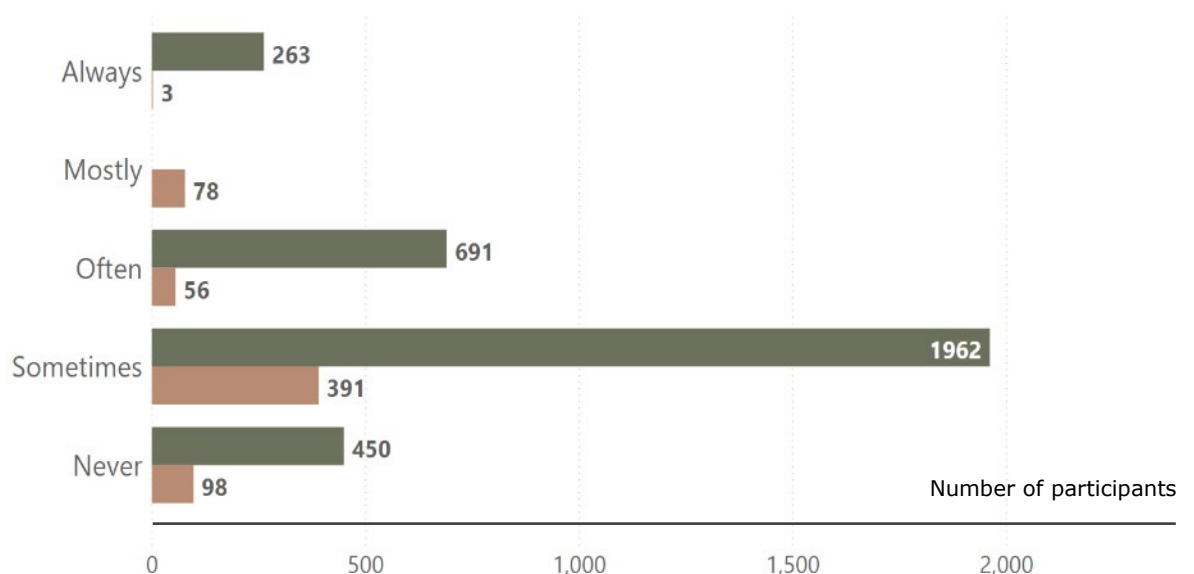
Frontline question: How often are you asked to work extra shifts?

Leadership question: How often do nurses get asked to work extra shifts?



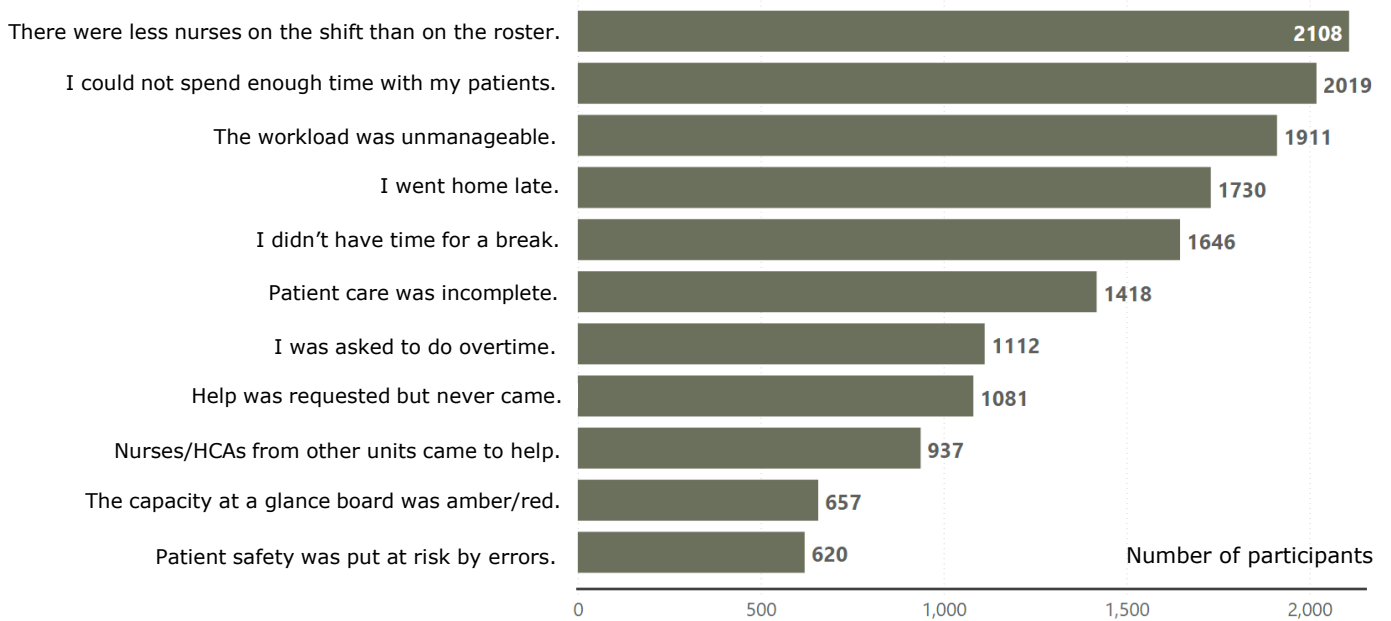
Frontline question: If help arrives on an understaffed shift, how often is it the right type of help e.g. RN or HCA?

Leadership question: If help arrives on an understaffed shift, how often are you able to send the right type of help e.g. RN or HCA?

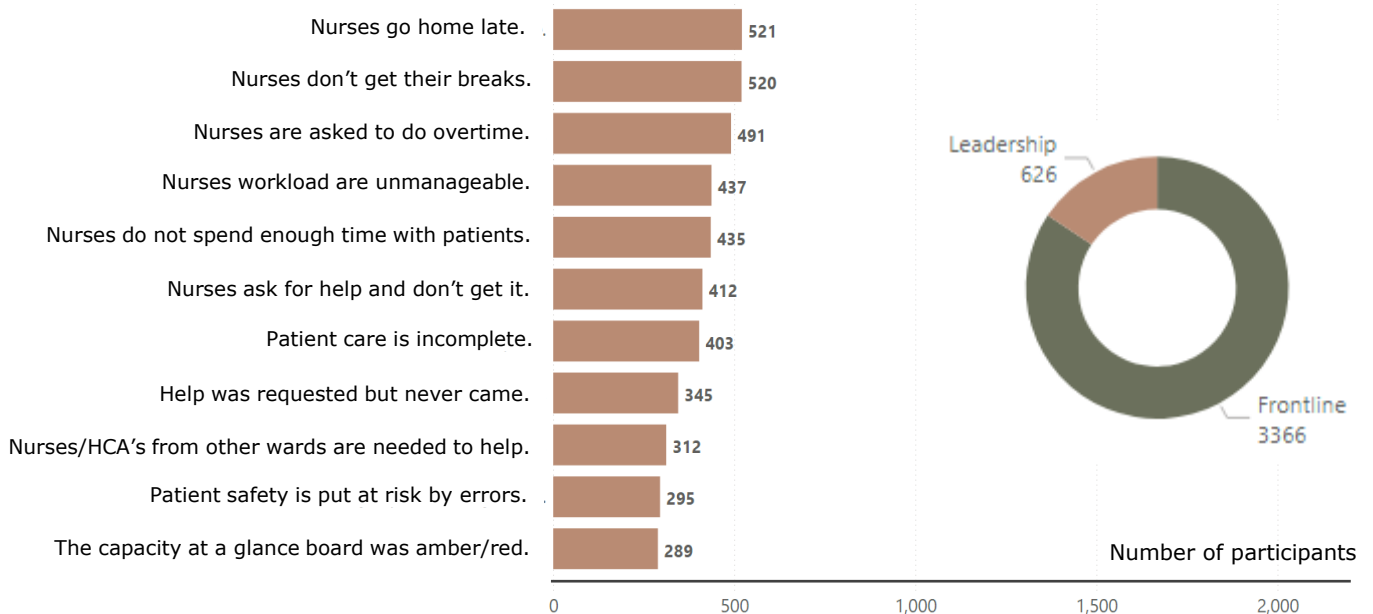


13. Survey Results: Quality work environment for staff - Signs of Understaffed Shifts

Frontline question: How did you know the shifts were understaffed? (what indicators do they use to describe how they know)

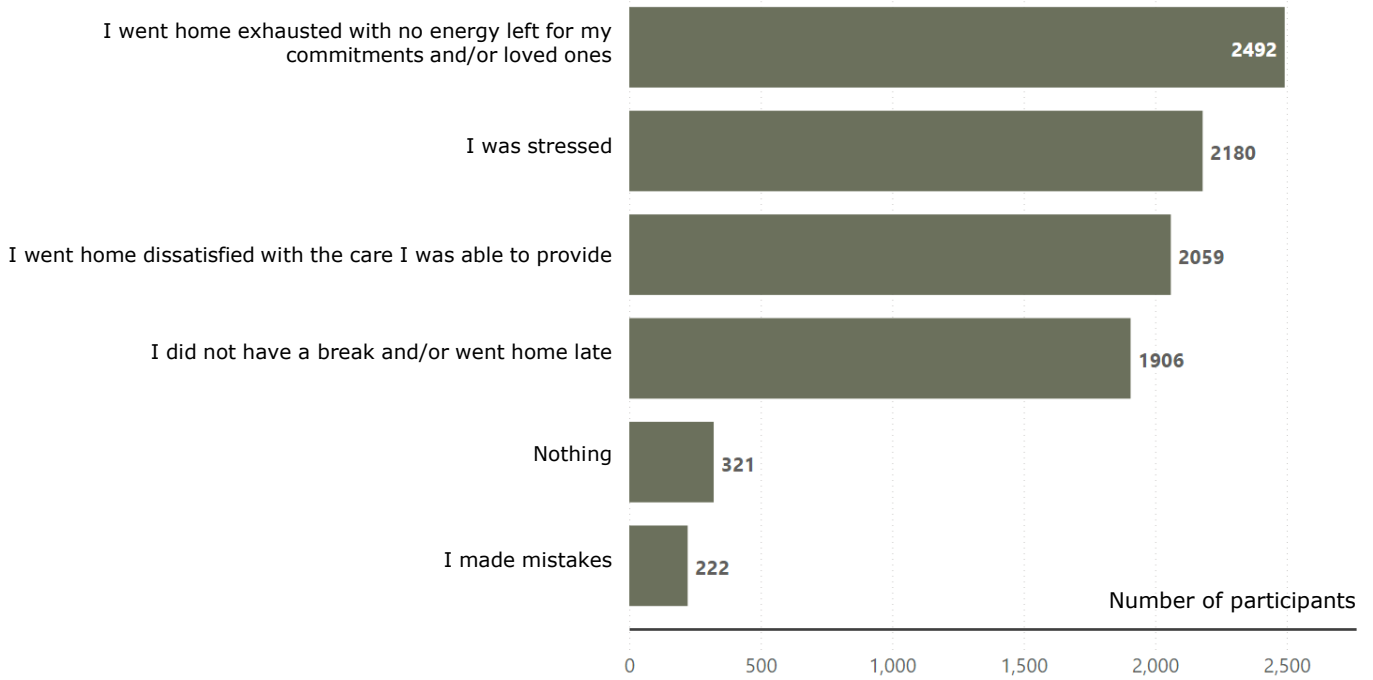


Leadership question: How do nurses know that shifts are understaffed? (multi)

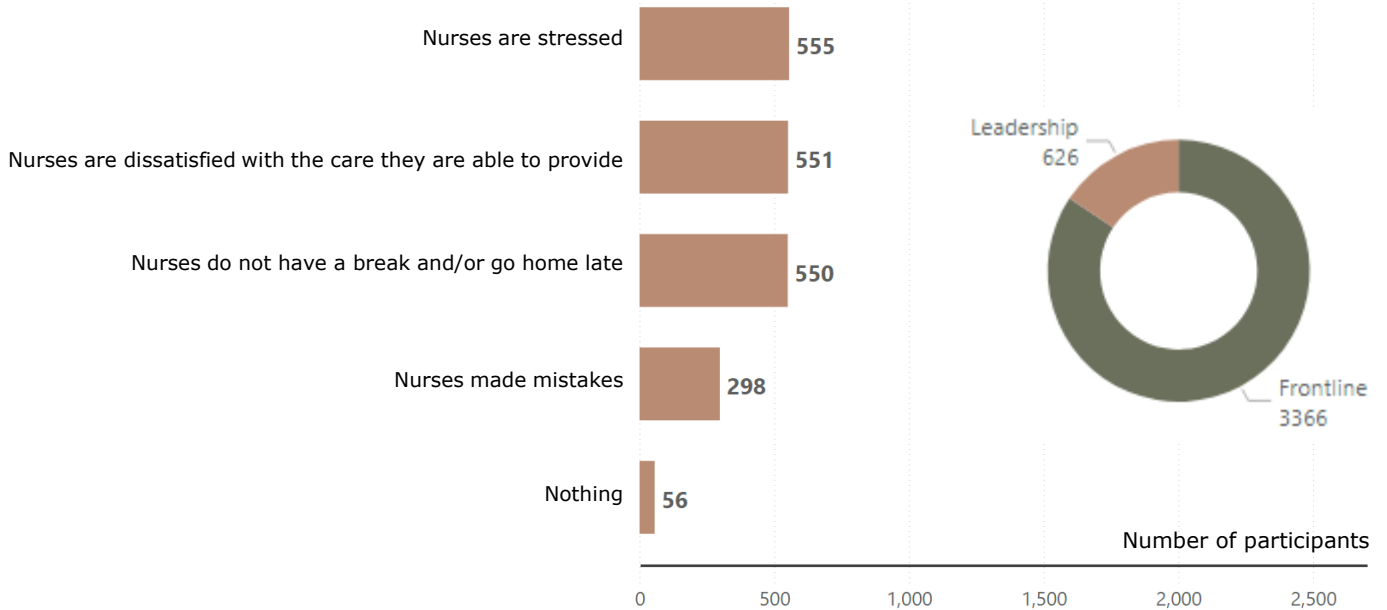


14. Survey Results: Quality work environment for staff - Understaffed Shift Effects on Nurses

Frontline question: What happened to you in those understaffed shifts? (multi)



Leadership question: What happens to the nurses in the understaffed shifts? (multi)



15. Survey Results: Quality work environment for staff - Free text comments' topic analysis 1/2

1720 participants of the 3992 who participated in this section, provided optional free text comments on the question: Anything else you'd like to tell us on the topic of "Quality work environment for staff"?

256 of the 626 Leadership participants & 1464 of the 3366 Frontline participants.

A majority of the responses mentioned an acute shortage of staff and a huge amount of workload.

Key topics mentioned by staff

1. Short-staffed with high workload
 - Lack of ability to access education and training facilities
 - No time left for paperwork.
2. Stress causing mental and physical health deterioration
 - Stress affecting personal and family life
 - Staff mentioned that assaults are common which affect nurses' mental health
 - Compassion fatigue has become normal.
3. Time/resource constraints causing lack of patient care.
4. Staff turnover is high with senior staff being replaced by less experienced staff.
5. Increase in pay deserved.
6. Additional management support required
 - Annual leave is not approved or sick leave cannot be taken
 - Appreciation is lacking and managers are disconnected with the situation on the floor
 - Management have told people to change their TC data
 - Better communication and approachability expected.

...nurses are like chickens running around the ward trying to do all the cares but when you fill up the TrendCare, we are still in green ...

RN/SN, Auckland

Less computer more customer!

RN/SN, MidCentral

Nurses sign up to work in hospitals, not factories.

RN/SN, MidCentral

Management ... change the CCDM comments made by the floor staff, to purposely change the 'colour flag' to understate the issues/urgency experienced by staff.

RN/SN, Counties Manukau, Mental Health

15. Survey Results: Quality work environment for staff - Free text comments' topic analysis 2/2

A majority of the responses mentioned an acute shortage of staff and a huge of workload.

Key Topics mentioned by staff

7. Better environment and enough infrastructure support
 - Inadequate ventilation causes dehydration and fatigue in summer
 - Inadequate safety alarm system
 - Lack of basic facilities such as shower, tea room, changing room
 - Better tools such as working iPads used for observations
 - Broken or missing equipment
 - Over crowded wards
 - Lack of IT support.
8. Staff being redeployed in unfamiliar areas creates stress and anxiety e.g. VIS responders do not always have the needed skills.
9. Using VRM as the primary tool for resource allocation does not capture the difference in skills required in the different areas.
10. Some mentioned the use of different languages at the workplace.
11. Some mentioned that people working in the community or out of hospitals have not been taken into consideration.

A few people mentioned that they love being in the medical field, but staff shortages make it exhausting.

Staff have been strangled, punched and you have to be on high alert at all times. The hospital security wont even come to aid us.

HCA/HA, South Canterbury, Mental Health

There are also many unsupportive charge nurses who should be reviewed, ward nurses are often yelled at, snapped at and belittled in front of other staff.

RN/SN, Canterbury

...my work is killing me...but I stay as I love my work and hope things will change soon for the better.

RN/SN, Taranaki, Mental Health

Skill mix is dreadful with so many expert nurses leaving...

RN/SN, Canterbury, Mental Health

16. Survey Results: Feedback on TrendCare - Likert scale questions

This section started with the question "I know what TrendCare is". 3451 out of 3992 participants answered "Yes".

We provided the participants of the survey who answered "yes" with a number of statements and asked them to denote how much they agree with each of them. Frontline (2884 participants) and Leadership (567 participants) roles were provided with slightly different questions, effectively asking the same thing.

Observations:

- Overall we see agreement between Leadership and Frontline that they don't think TrendCare has a positive impact on patient care and safe staffing at the workplace.
- When we looked at the responses from participants from DHBs at different implementation levels, the responses were similar and in agreement with this overall picture. Frontline staff from Least Implemented group showed slightly more negative on the impact of TrendCare.
- When we looked at the responses specifically from ED, Maternity Services, and MH, the responses were similar with ED had a higher proportion of negative responses.

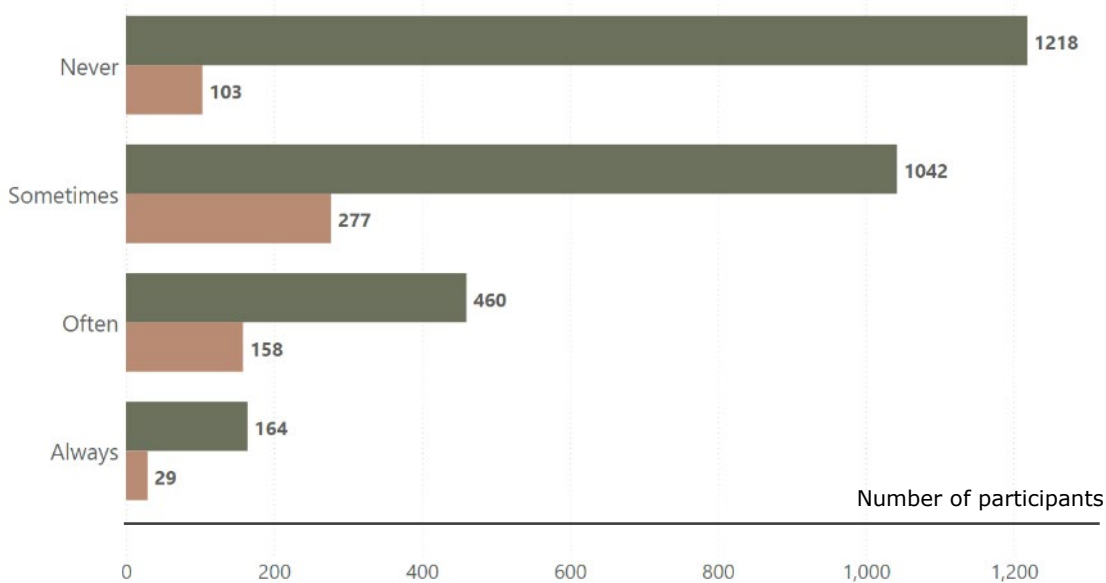


Figure: Survey Results: Feedback on TrendCare Likert scale questions

17. Survey Results: Feedback on TrendCare – Interfacing with TrendCare

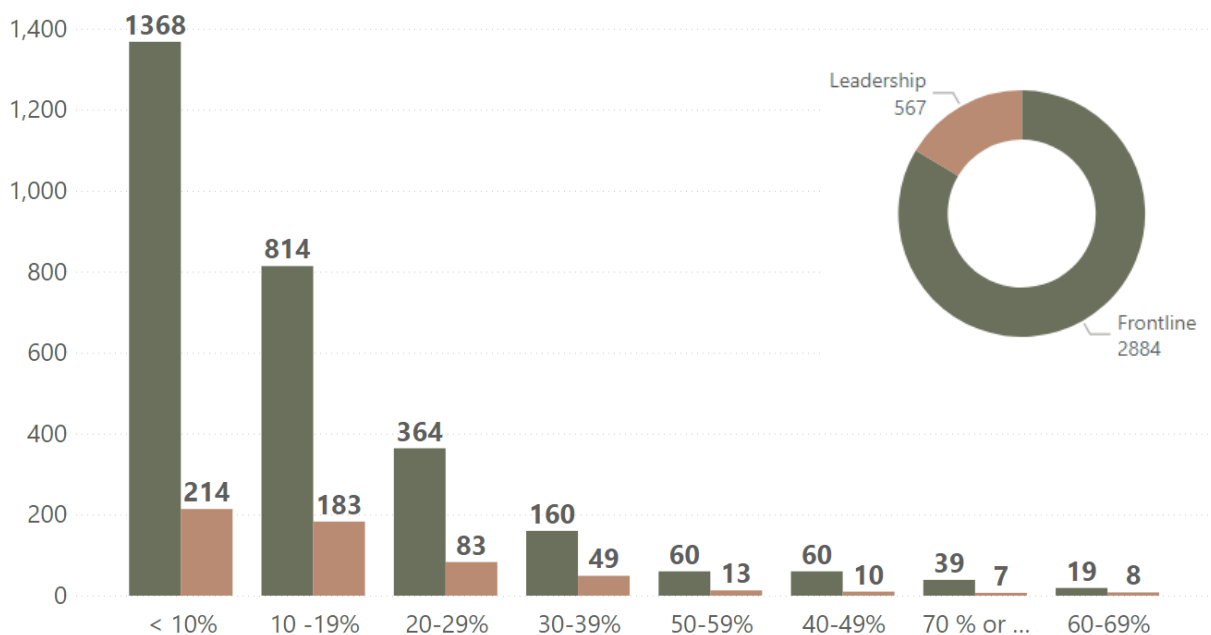
Frontline question: How often are you asked to adjust your predictions of actualisations on TrendCare?

Leadership question: How often are nurses asked to adjust their predictions or actualisations in TrendCare?



Frontline question: What proportion of time in your shift is usually spent on inputting data at TrendCare?

Leadership question: What proportion of time do you think nurses spend on inputting data at TrendCare?



18. Survey Results: Feedback on TrendCare – Free text comments’ topic analysis

1829 participants of the 3451 who participated in this section, provided optional free text comments on the question: Anything else you’d like to tell us on the topic of TrendCare? 326 of the 567 Leadership participants & 1503 of the 2884 Frontline participants.

A majority of the responses mentioned TrendCare as being inaccurate and time-consuming

Key Topics mentioned by Staff

1. Inaccurate reflection of acuity/workload
 - The nature of care needed by patients is not captured
 - Quality of care is not measured
 - Reduction in time allocated to each patient underestimates the required effort
 - TrendCare is adult focused (e.g. mother and baby considered as one unit in maternity wards)
2. Time-consuming and non-productive
 - System often crashes, freezes, is complicated, takes a lot of time to log, old and not user-friendly.
 - Make TrendCare available on portable devices
3. TrendCare seems to be used to take away staff rather than provide more staff
4. Staff shortages causing ineffective usage
 - Difficulty finding a computer during busy times
 - Staff leaving late to complete TrendCare
5. Insufficient fields/features to capture all information
 - Too uniform i.e. does not suit every patient or scenario
 - Inaccurate predictions across wards/departments e.g. mental health and paediatrics
6. Not enough training received to work with TrendCare
7. TrendCare coordinators sometimes have a limited understanding of patient types
8. Some staff also mentioned that they do not have access to TrendCare in their area

"Also it does not accurately take into account complex pt behaviour or IV medication preparation or the time it takes to complete ADLS. Clinically it does not work for us! "

RN/SN, Auckland/Counties Manukau, ED

"If our predictions show we are short staffed a TrendCare co-ordinator in an office somewhere goes into our ward system and alters the information. "

RN/SN, Auckland

"Often TrendCare says we are over staffed by 1-2 nurses even though we are run off our feet."

RN/SN, Canterbury

"TrendCare if resulting in avoidable patient harm, and acting as a barrier to the successful implementation of CCDM"

RN/SN, Nelson Marlborough/West Coast, ED

"TrendCare is more often used to take staff away then provide additional staff"

RN/SN, Tairāwhiti

19. Survey Results: Feedback on CCDM - Likert scale questions

This section started with the question "I know what CCDM is". 2742 out of 3992 participants answered "Yes".

We provided the participants of the survey who answered "yes" with a number of statements and asked them to denote how much they agree with each of them. Frontline (2212 participants) and Leadership (530 participants) roles were provided with slightly different questions, effectively asking the same thing.

Observations:

- Overall we see agreement between Leadership and Frontline that they don't think CCDM has improved the work environment or has a positive impact on patient care and safe staffing at the workplace. Frontline staff showed slightly more negative towards CCDM.
- When we looked at the responses from participants from DHBs at different implementation levels, the responses were similar and in agreement with this overall picture.
- When we looked at the responses specifically from ED, Maternity Services, and MH, the responses were similar with ED and MH had a higher proportion of negative responses.

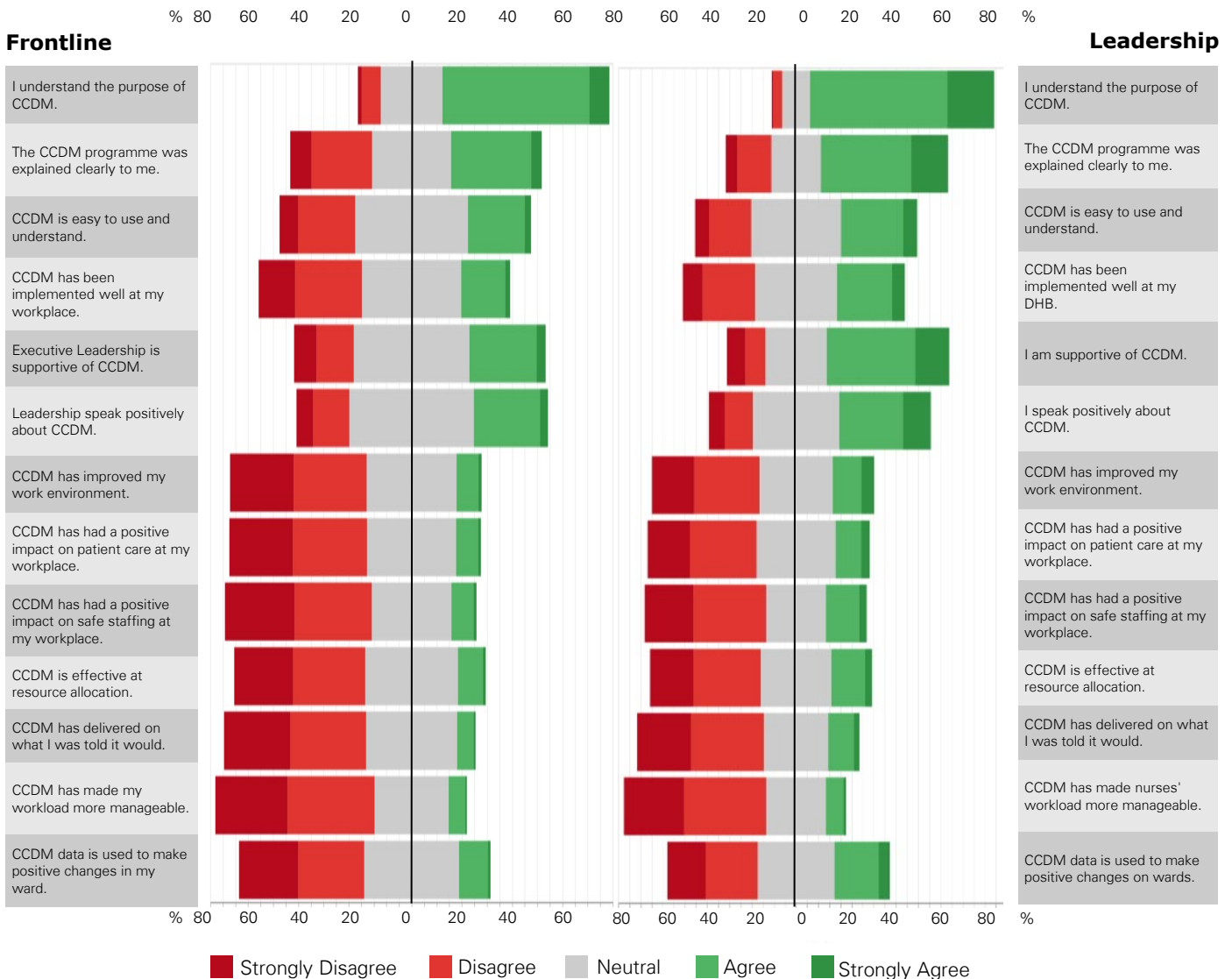
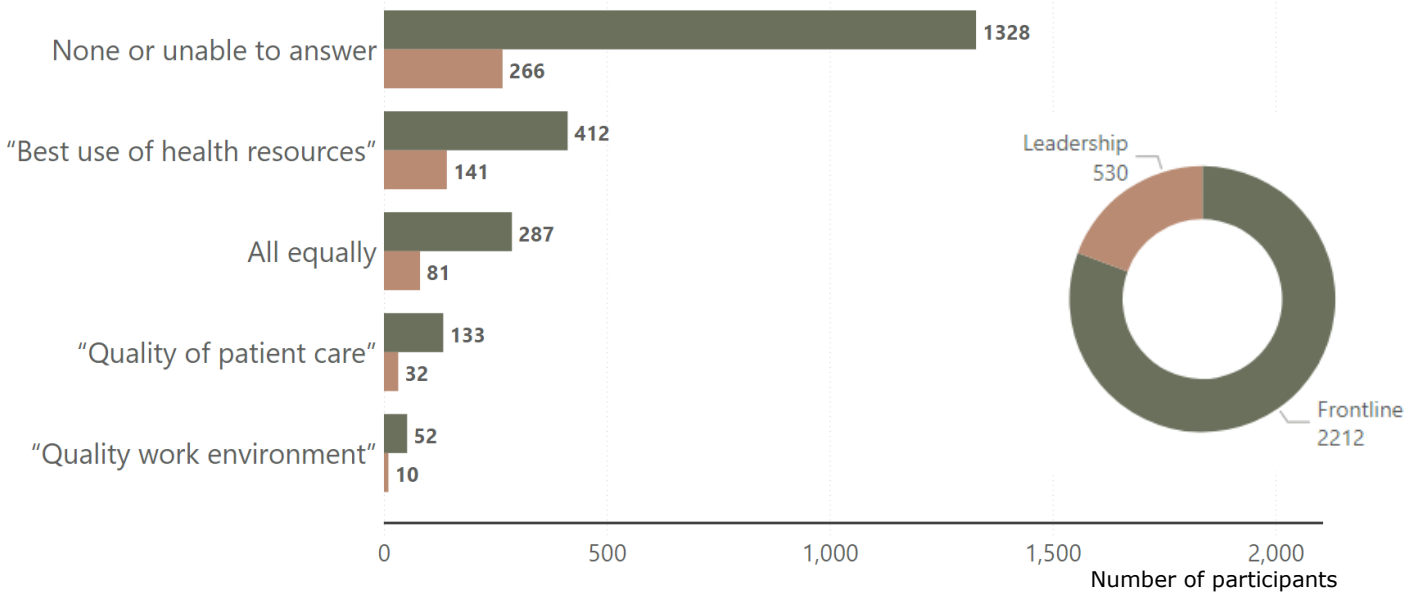


Figure: Survey Results: Feedback on CCDM Likert scale questions

20. Survey Results: Feedback on CCDM – CCDM’s priorities & Local Data Council meetings

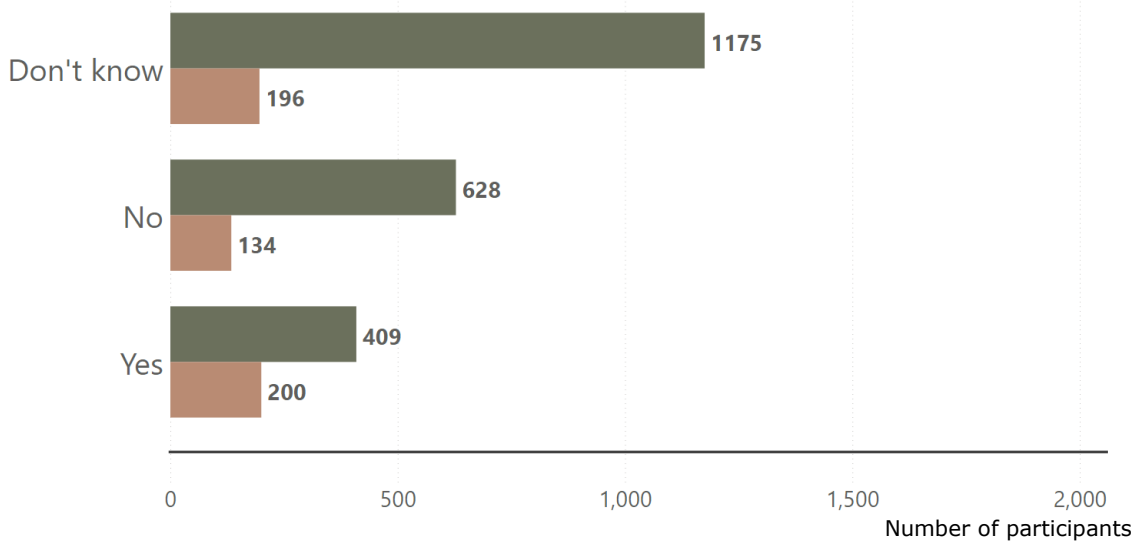
Question asked

CCDM’s purpose is to balance “Quality of patient care”, “Quality work environment”, and “Best use of health resources”. Which is currently prioritized?



Question asked

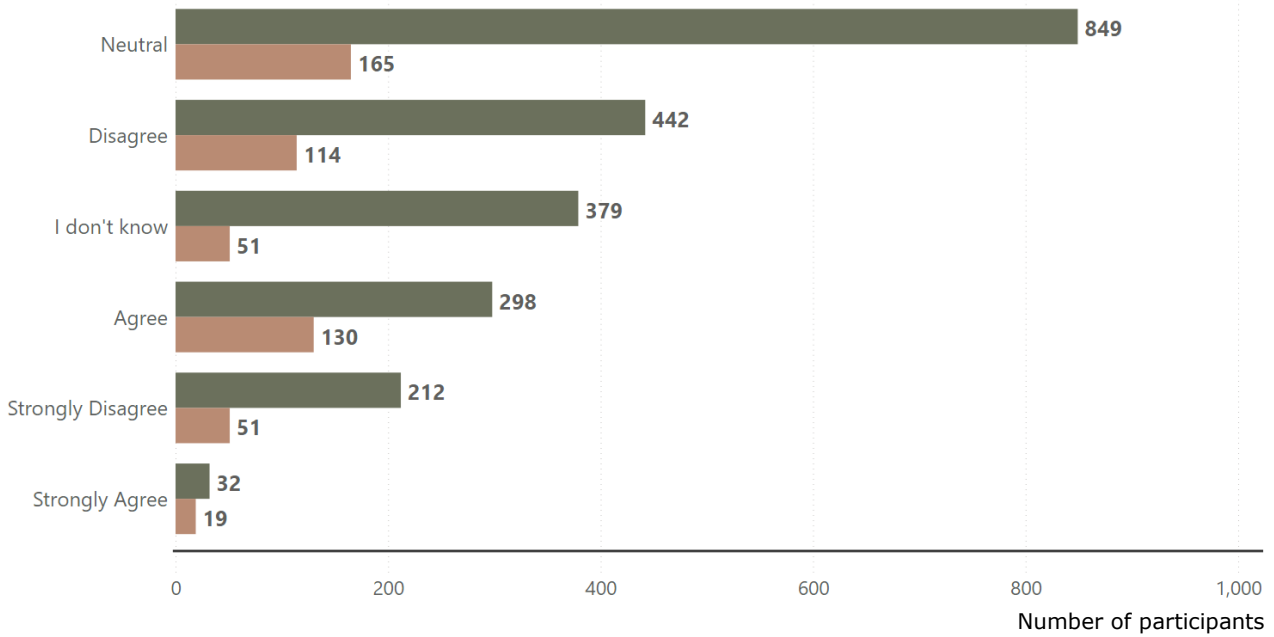
CCDM adds values and should continue to be used in my workplace



21. Survey Results: Feedback on CCDM – Core Data Set

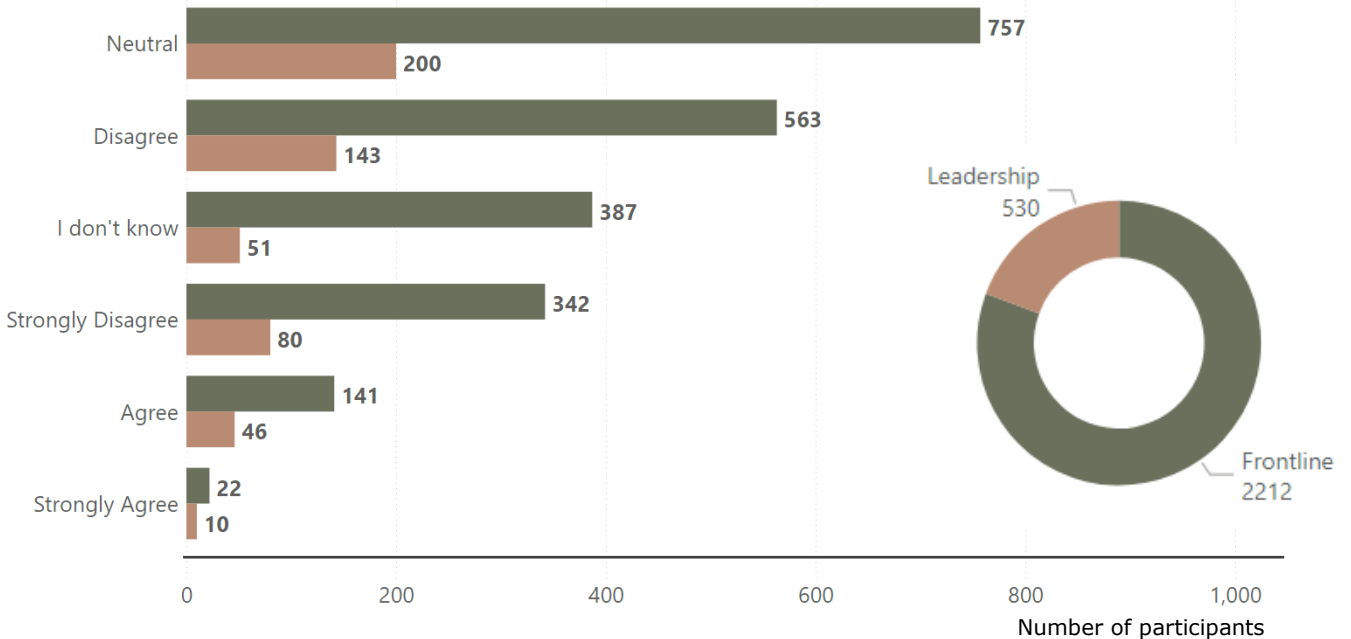
Question asked

The Core Data Set is easy to understand



Question asked

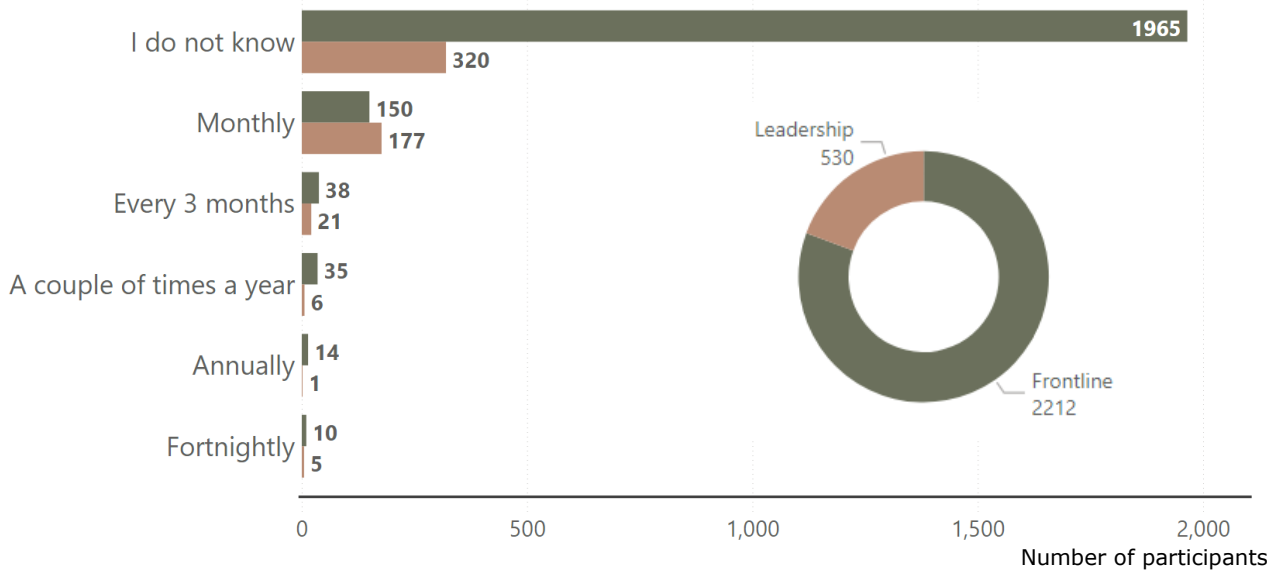
The Core Data Set has improved the quality of patient care delivered



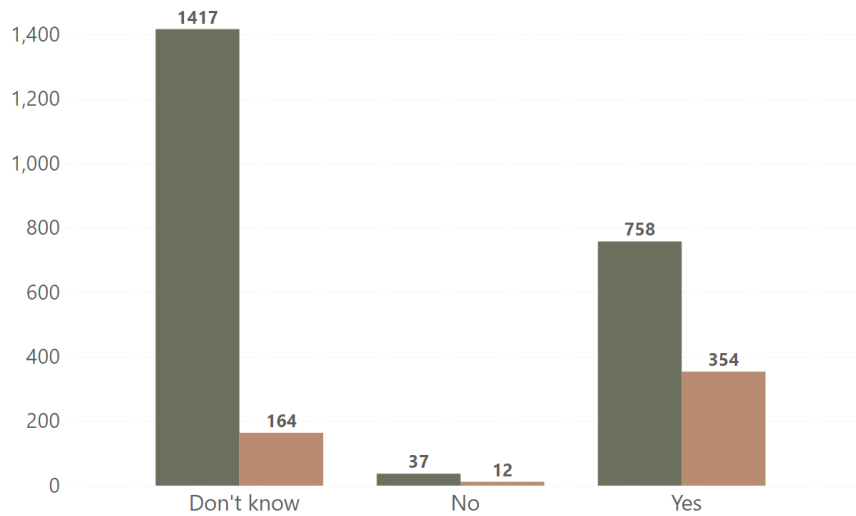
22. Survey Results: Feedback on CCDM – CCDM’s value & CCDM councils

Frontline question: How often does your local data council meet in your ward?

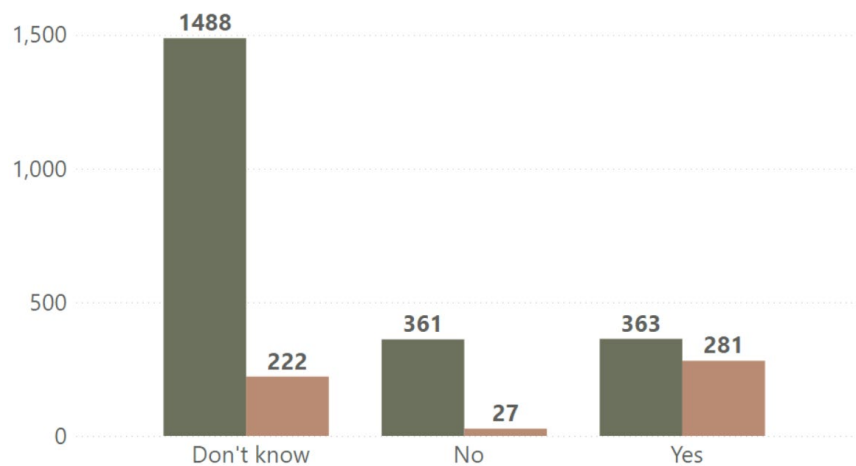
Leadership question: How often does your CCDM council meet?



Is there an active CCDM council in your DHB?



Frontline question: There is an active local data council in my ward.



Leadership question: There is an active local data council in my DHB.

23. Survey Results: Feedback on CCDM – Free text comments’ topic analysis

1147 participants of the 2742 who participated in this section, provided optional free text comments on the question: Anything else you’d like to tell us on the topic of TrendCare? 274 of the 530 Leadership participants & 873 of the 2212 Frontline participants.

A majority of the responses mentioned CCDM being inaccurate and a lack of actions on the results by management

Key Topics mentioned by Staff

1. Staff shortage causing ineffective use
 - Busy departments have no time to access the system e.g. emergency department.
 - Small hospitals do not have extra resources to call on.
2. Inaccurate information with limited reflection makes information worthless (e.g. CCDM does not provide any support for management)
3. Implementation difficulties means it is not used actively e.g. time-consuming
 - More time spent on paper work than with patients.
 - Need to have independent person without direct patient care to accurately determine the data
4. Results are not actioned
 - Effective in theory by showing more staff needed, but no impact unless actioned. No support or follow up on CCDM usually.
 - Long process to get more recruitment.
 - Some staff suggest to loosen the budgets.
5. Staff not aware or have never heard of CCDM.
6. More training required to better understand it
7. Data should not be manipulated by management/senior staff. More transparency expected from leadership.
8. CCDM doesn’t work - some staff suggest getting rid of CCDM and going back to legislated nurse to patient ratio.
9. Some staff members mentioned the phrase ‘Robbing Peter to pay Paul’ to indicate redeployment of staff from one short-staffed area to another.

"... all metrics determined and adjusted by management to make it show what they want it to show."

RN/SN, Waikato, Maternity Services

"Patients ARE at risk if I am deployed to an area outside my area of expertise"

RN/SN, Nelson Marlborough

Staff come back in tears from other work areas as they felt unsafe

RN/SN, Capital and Coast

"They are taking staff from one understaffed area to another more understaffed area. It's unsafe."

RN/SN, Canterbury

"Staff always get abuse by patients. "

HCA/HA, Auckland, ED

"If DHBs want you to work longer hours add an incentive like an extra annual leave day."

RN/SN, Lakes

24. Survey Results: Free text comments' Linguistic and Emotional Analysis

Besides the topic analysis, we automatically analyzed all free text comments provided by the participants for sentiment, emotions and tone. Here we report findings from this linguistic-based analysis.

DATA:

Section 2: Quality work environment for staff

Question: Anything else you'd like to tell us on the topic of "Quality work environment for staff"?
1720/3992 responses (Leadership: 256/626, Frontline: 1464/3366)

Section 3: Feedback on TrendCare

Question: Anything else you'd like to tell us on the topic of TrendCare?
1829/3451 responses (Leadership: 326/567, Frontline: 1503/2884)

Section 4: Feedback on CCDM

Question: What suggestions do you have to make CCDM better? / anything else you would like to tell us?
1147/2742 responses (Leadership: 274/530, Frontline: 873/2212)

Sentiment Analysis

Overall the sentiment of the responses was neutral.

But in the section 2, the comments were using "mild negative" language. It remained neutral for sections 3 and 4.

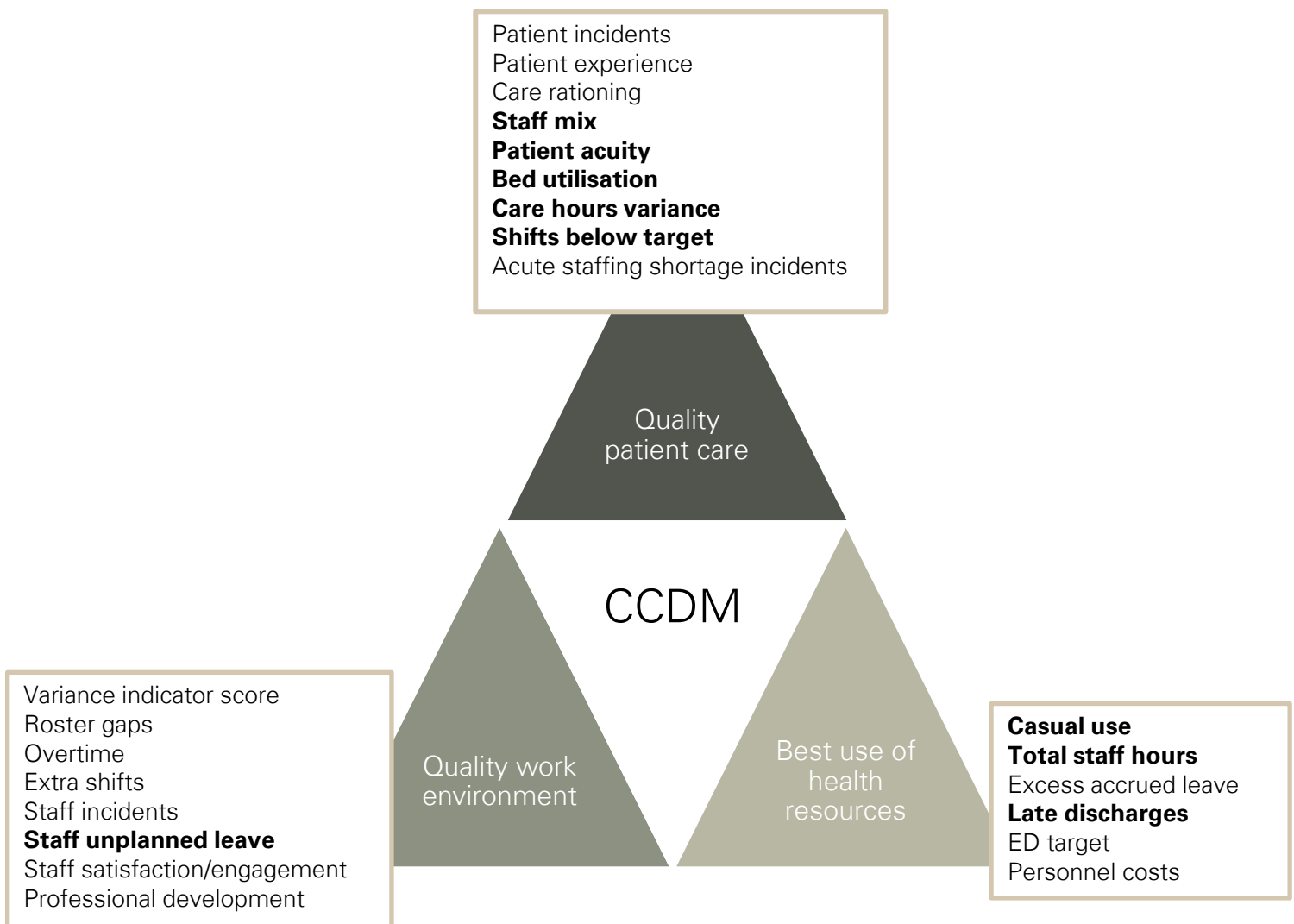
Emotional & Tone Analysis

Participants used language that signaled anxiety and some sadness. Anxiety was higher in participants affiliated to Mental Health (both frontline and leadership).

"Risk" was also automatically identified quite high in their language.

25. CDS: 23 metrics overview

Officially CCDM comes with 23 metrics. Collecting data against those metrics make up the Core Data Set (CDS). The purpose of the CDS is to provide DHBs with a balanced set of measures to determine how successfully they are matching care capacity with patient demand.



The diagram shows the complete set of measures and how they are balanced around the three sides of the CCDM triangle.

TrendCare is the "Supported Patient Acuity System" mentioned in the official documentation. All the metrics in **bold font** are captured there.

Source: "Core data set directory 5.7" listed in: <https://www.ccdm.health.nz/core-data-set>

26. Data Request 1 Overview

On 11th October, the second revised data request was sent out. We focused on a subset of data from the CDS that are from TC. The advice on how to export the data from TC was also provided.

In addition to the selected TC data, the CDS definition used for each DHB FTE calculation report, and a document containing questions about the visibility of CDS were also requested.

Below is the summary of data received from each DHB for the revised

	DHB	Core Data Set Definitions	TrendCare				Inter-rater Reliability (IRR) scores	FTE Calculations	Questions on Core Data Set
			Patient Acuity	Care Hours Variance	Shift below target	Staff Mix			
			The sum of hours required by patient acuity (clinical hours only).	Hours required by patient acuity minus clinical hours available calculated for AM, PM and N.	Number of shifts within target divided by total number of shifts x 100.	The number of regulated staff (RN, RM, and EN) divided by number of staff x 100.	Inter-Rater Reliability testing is an essential component of the successful administration of the TrendCare System to ensure data integrity remains at a high level. CCDM Champions will be facilitating the IRR testing.		
	20	13	5	18	7	13	14	14	
Grouping			Totally different from each other	14 DHBs provided similar and comparable format data, but 3 of them need transformation	3 DHBs provided similar format; 2 needs transformation; 1 DHBs is monthly report by each ward	9 DHBs provided similar and comparable format; 3 DHBs provided different format.	2 DHBs provided PDF, 1 DHB provided screenshot, 2 DHBs(Hutt Valley and Midcentral) provided the same format, 3 DHBs provided same format	DHBs provided 30-40 pages reports.	
Fully implemented	Hawke's Bay	Y		Y		Y		Y	
	Northland	Y		Y (different)		Y	Y (pdf report)	Y	
	Auckland	Y	(can be found from shift Measures)	(shift Measures)	(shift Measures)		Y (pdf report)	Y	
	Bay of Plenty	Y		(TrendCare data for CDS)			Y	Y	
	Nelson-Marlborough	Y		Y	Y	Y			
	Waitematā			Y			Y	Y	
	Hutt Valley		Y (Different, needs transformation)	Y	Y (Different, needs transformation)	Y (Different)	Y	Y	
Mostly implemented	Whanganui			Y			Y	Y	
	Lakes	Y		Y				Y	
	Midcentral	Y		Y	Y	Y (different)	Y	Y	
	Capital Coast	Y		Y		Y	Y	Y	
	Tairāwhiti		Y (different)	Y (different)		Y (different)	Y	Y	
	Southern	Y		Y	Y	Y	Y	Y	
	South Canterbury		Y (different)	Y		Y			
Least implemented	Taranaki			Y		Y	Y	Y	
	Counties Manukau	Y		Y		Y	Y	Y	
	Wairarapa	Y		Y	Y	Y	Y	Y	
	West Coast	Y						Y	
	Canterbury	Y					(Can't open)	Y	
Waikato		Y (different)	Y (different)	Y (different)	Y (different)		Y		

27. Data Request 2 Overview

Because of the inconsistent formatting of the data received from each DHB, we revised the data request and sent out a customised email for each DHB providing further clarification on the 15th of Nov.

In agreement with the NAG, the detailed data analysis focused on four wards – Medical, Surgical, Adult Acute Mental Health, and Rehab (AT & R). The ward list for each DHB was sent out to check and highlight all the wards under these categories. Any subsets or specialisations within the categories are included in the total number of wards in each category.

In view of the fact that “patient acuity”, “care hours variance”, and “shifts below target” are from the same report, we requested “care hours variance” and “staff mix” only for last three years (1/10/2018 – 30/09/2021).

After the deadline of 19th Nov, the summary of data received from the final request is shown in the table.

DHB	CCDM implementation grouping	Ward of interest	Care Hours Variance	Date	Staff Mix	Date	Notes
Auckland	Fully implemented	Y	Y	1/01/2017-11/10/2021	Y	1/11/2018-30/09/2021	
Bay of Plenty	Fully implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Hawke's Bay	Fully implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Hutt Valley	Fully implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Nelson-Marlborough	Fully implemented	Y	Y	1/10/2016-30/09/2021	Y	1/10/2016 - 30/09/2021	
Northland	Fully implemented	Y	Y	1/10/2016-30/09/2021	Y	1/10/2016-30/09/2021	
Waitematā	Fully implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Capital Coast	Mostly implemented	Y	Y	1/08/2018-30/09/2021	Y	1/08/2018-30/09/2021	
Lakes	Mostly implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018 - 30/09/2021	
Midcentral	Mostly implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018 - 30/09/2021	
South Canterbury	Mostly implemented	Y	Y	1/01/2016-7/10/2021	Y	1/01/2016 - 7/10/2021	
Southern	Mostly implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018 - 30/09/2021	
Tairāwhiti	Mostly implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Whanganui	Mostly implemented	Y	Y	1/10/2017-14/10/2021	Y	1/10/2018-30/09/2021	
Canterbury	Least implemented	Y	Y	1/11/2020-17/11/2021	Y	1/11/2020-17/11/2021	Only one year of data available
Counties Manukau	Least implemented	Y	Y	1/01/2019-12/10/2021	Y	1/01/2019 - 12/10/2021	Only available from 2019
Taranaki	Least implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	
Waikato	Least implemented	Y					Excluded from analysis because not using TrendCare
Wairarapa	Least implemented	Y	Y	1/10/2018-30/09/2021	Y	1/10/2018-30/09/2021	One combined ward for medical and surgical
West Coast	Least implemented	Y	Y	1/10/2018/30/09/2021	Y	1/10/2018-30/09/2021	Use one ward for medical, surgical and rehab
Total		20	19		19		

28. Analysis for Care Hours Variance and Shifts Below Target

We concentrated on two metrics for making comparisons across DHBs with different level of implementation and across the 4 types of wards we focused on.

<p>Data Dates</p> <p>We received data from each DHB for the period: 1/10/2018 – 30/09/2021</p> <p>Not all DHBs could provide data for the full period.</p>	<p>Wards Types</p> <p>We concentrated on 4 ward types:</p> <ul style="list-style-type: none"> - Medical - Surgical - Adult Acute Mental Health - Rehab (AT & R) 	<p>Metrics</p> <p>Care Hours Variance</p> <p>is the difference between the clinical hours (actual provided hours) and required hours (patient needed hours). It is recorded per shift. It can be represented as a percentage value which allows for easier comparison.</p> <p>The ideal zone (green) is between 2 hours positive and a -4% variance.</p>
<p>DHBs</p> <p>We analysed data from 19 out of 20 DHBs. All except for Waikato, which experienced a recent cyber attack and no data was available before October 2019 as they did not have TrendCare in place.</p>	<p>Ward Number</p> <p>In total, we receive data for 260 wards.</p> <p>Some wards merged or split out during the period of considered data. We analysed the number as they were at the time. 260 is the most recent number after all changes.</p>	<p>Shifts Below Target</p> <p>A shift is considered below target if the difference in the care hours provided and the care hours required was smaller than negative 8.5% (or more than 40 minutes per FTE). It is calculated on a monthly level by dividing the number of shifts below target by the total number of shifts in that month.</p> <p>Ideally, 0% of shifts are below target.</p>

Our analysis grouped the DHBs per level of implementation (see Table 1). We also broke down the analysis per ward type. We were able to provide an overview across NZ in terms of Care Hours Variance and Shifts Below Target. Please see "Care Hours Variance Analysis Method" and "Shifts Below Target Analysis Method" in the appendices to understand the analyses and visualisations.

Please, also see the relevant appendix sections for the complete analysis.

Ward Types	Average clinical hours (provided) vs. patient acuity hours (needed) per ward type per shift	Care Hours Variance percentage difference per shift across the 3 years.	Shifts Below Target
Medical	Appendix Section 36	Appendix Section 40	Appendix Section 45
Surgical	Appendix Section 37	Appendix Section 42	Appendix Section 46
Adult Acute Mental Health	Appendix Section 38	Appendix Section 43	Appendix Section 47
Assessment, Treatment and Rehabilitation	Appendix Section 39	Appendix Section 44	Appendix Section 48

29. Main Observations from the Analysis for Care Hours Variance and Shifts Below Target

Looking at the overall analysis across all 19 DHBs which were able to provide us data, over the 3 levels of implementation and across the 4 ward types of interest:

Overall:

- Overall the national overview is very concerning. We observe serious staffing issues to levels that are critical for safe work environment for nurses and care for patients.
- Day shifts are the ones most in trouble across levels of implementation and ward types.

Difference based on implementation level:

- Implementation status appeared to be linked to lower variability in CHV. The range of CHV in DHBs that were fully implemented was typically smaller, while DHBs that were at mostly implemented and least implemented showed larger positive and negative spikes in CHV.
- DHBs showed wide variations in the number of SBT regardless of implementation status. This is likely because DHBs face similar staffing shortages which is reflected in the high SBT, and visibility is lower in DHBs with CCDM least implemented.

Difference based on different ward types:

- Across different types of ward, medical and surgical wards show a more stable trend and have a lower care hours variance % compared with AAMH and AT&R.
- AAMH has the least stable trend of CHV from all the DHBs, which showed large spikes in positive and negative CHV.
- At the same time, the variability of CHV is highly related to the number of wards. The DHBs with a higher number of wards have less amount of variation from shift to shift with night shifts having the largest variance hours % followed by evening and day shifts.
- Except for Auckland and Bay of Plenty DHBs who have been understaffed for a long term, DHBs in the fully implemented group have a more stable and lower shift below target for medical and surgical wards, compared with the mostly implemented DHBs, prior to COVID-19. After COVID-19, there is an increasing trend for each DHB.
- For medical and surgical wards, the least implemented DHBs have the lowest SBT among the three groups, which may be because of the size of DHB.

30. CDS Methodology Overview

The key objectives of the project were to review the implementation of CCDM and compare outcomes in DHBs where CCDM is fully implemented with those who are at early stages.

Data request

1. In agreement with the Nursing Advisory Group, the detailed analysis was focused on four wards and two Core Data Set metrics.
2. The ward list for each DHB was sent out to check and highlight all the wards under these categories:
 - Medical,
 - Surgical,
 - Adult Acute Mental Health,
 - Rehab (AT & R).
3. Any subsets or specialisations within these categories are included, e.g.: Surgical HD should be included in the Surgical Ward.
4. By the time all the data were received, there was little time to analyse everything. The collective decision was made to concentrate on two metrics that are from TrendCare for the last three years (1/10/2018 – 30/09/2021) :
 - Care Hours Variance - (exported from Ward Period Shift Variance report)
 - Shifts below target - (exported from Ward Period Shift Variance report)

DHB Grouping

5. Based on the Quarter 1 2021- 22 National Reporting Framework and discussion with Nursing Advisory Group, we divided 20 DHBs into three groups as of the CCDM Implementation status (see table 1):
 - Fully implemented (7)
 - Mostly Implemented (7)
 - Least Implemented (6)

Data analysis

Waikato DHB, which is under the Least Implemented group, is not using TrendCare at the moment. Therefore, 19 out of 20 DHBs provided data for the analysis.

All the 19 DHBs provided the Shift Variance report for the last three years which includes Clinical hours (actual hours), Patient Acuity hours (patient needed hours), and Care Hours Variance. But not all the DHBs provided Shifts Below Target(SBT) because they mentioned it was not captured in TrendCare. DHBs usually calculated SBT themselves using Shift Variance report based on the definition.

Care Hours Variance definition:

The difference between the hours required by acuity for inpatient care versus the clinical hours available to provide care by shift (AM, PM, N). These are clinical hours or direct patient care hours only.

Shifts below target definition:

A shift is considered below target if the difference in the care hours provided and the care hours required was smaller than negative 8.5% (or more than 40 minutes per FTE). It is calculated on a monthly level by dividing the number of shifts below target by the total number of shifts in that month.

In our analysis, we treated all the wards under the same type as one, and sum up the Clinical hours (actual hours), Patient Acuity hours (patient needed hours), and Care Hours Variance on the same shift. Meanwhile, we calculated SBT by the aggregated data for each type ward.

31. CDS Methodology: DHB Grouping based on Implementation Level

The 20 DHBs were divided into three groups based on the latest report (July to September 2021 – Quarter 1) from National Reporting Framework.

Grouping	DHB	Implementation Rate
Fully implemented	Hawke's Bay	100%
Fully implemented	Northland	100%
Fully implemented	Auckland	99%
Fully implemented	Bay of Plenty	95%
Fully implemented	Nelson-Marlborough	93%
Fully implemented	Waitematā	93%
Fully implemented	Hutt Valley	92%
Mostly implemented	Whanganui	92%
Mostly implemented	Lakes	90%
Mostly implemented	Midcentral	87%
Mostly implemented	Capital Coast	86%
Mostly implemented	Tairāwhiti	82%
Mostly implemented	Southern	81%
Mostly implemented	South Canterbury	80%
Least implemented	Taranaki	72%
Least implemented	Counties Manukau	71%
Least implemented	Wairarapa	69%
Least implemented	West Coast	69%
Least implemented	Canterbury	42%
Least implemented	Waikato	42%

32. CDS Methodology: DHB wards used for the analysis

The detailed analysis focused on the four wards. Any subsets or specialisations within the category are combined together and treated as one. In Auckland and Canterbury DHBs, there are combined wards with Medical and Surgical care except for the independent Medical ward and Surgical ward. In Wairarapa and West Coast DHBs, they don't have independent Medical wards and Surgical wards but combined wards with multiple cares.

Because of the facility change in some DHBs, the number of wards under the category changed over the last three years. The table shows the most recent number of wards under the category in each DHB.

DHB	Implementation	Medical	Surgical	Rehab (AT & R)	Adult Acute Mental Health
Auckland	Fully Implemented	16	14	3	3
Auckland		4 combined wards (Medical & Surgical)			
Bay of Plenty	Fully Implemented	4	4	1	3
Hawke's Bay	Fully Implemented	5	3	1	1
Hutt Valley	Fully Implemented	3	3	2	NA
Nelson-Marlborough	Fully Implemented	3	3	2	1
Northland	Fully Implemented	3	2	1	1
Waitematā	Fully Implemented	10	7	1	2
Capital Coast	Mostly Implemented	4	7	1	4
Lakes	Mostly Implemented	1	2	1	1
MidCentral	Mostly Implemented	3	4	1	1
South Canterbury	Mostly Implemented	1	1	1	1
Southern	Mostly Implemented	7	6	3	8
Tairāwhiti	Mostly Implemented	1	1	1	1
Whanganui	Mostly Implemented	1	1	1	1
Canterbury	Least Implemented	10	10	9	12
Canterbury		2 combined wards (Medical & Surgical)			
Counties Manukau	Least Implemented	8	12	4	7
Taranaki	Least Implemented	3	3	1	3
Wairarapa	Least Implemented	1 Combined ward (Medical & Surgical)		1	NA
West Coast	Least Implemented	1 Combined ward (Medical & Surgical & Rehab)			1

33. Shifts Below Target and Shifts in Red Zone Analysis – National Overview 1/2

To gain a better understanding of how many Shifts are Shift Below Target or Shifts in “red zone” and how this number changes year by year, we normalised data on the ward level and calculated monthly average shifts per ward by year. Red zones (the critical zone in the VRM) were calculated from Care Hours Variance. We considered as red zone shift any shift below -12.5% variance. This is the definition from TrendCare. It means that the full 12.5% buffer has been used and all time set aside for unplanned work and staff breaks has been utilized. We should note that in NZ “red zones” are not strictly defined and charge nurses need to answer a set of questions to determine the zone status. SBT are using a higher threshold at -8.5% variance.

The analysis is for the period 1/10/2018 – 30/09/2021 for four ward types:

- Medical
- Surgical
- Adult Acute Mental Health
- Rehab (AT & R)

How the values in the tables were calculated

Data were normalised at ward level.

So, for all of NZ, for 2018, we took the monthly reports from all 260 wards considered from all DHBS for Oct, Nov and Dec.

All monthly reported percentage of shifts in SBT (-8.5% threshold) or red zone (-12.5% threshold) were added up, and divided by ward # (260) and by month number (3). And so on for the other years.

How to interpret the numbers

Example: Looking at the first cell of each table:

All NZ has 32% Shifts Below Target and 25% Shifts that were in red zone for Day shifts in the 3 months of data we analysed for 2018. This number includes all 4 types of wards we focused on and all DHBS.

Observations

There is a very large number of Shift Below Target and a large portion of them are in the critical red zone.

Overall the national overview is really concerning. We observe serious staffing issues to levels that are critical for safe work environment for nurses and care to patients.

Day shifts are the ones most in most difficulty across levels of implementation and ward types.

33. Shifts Below Target and Shifts in Red Zone Analysis – National Overview 2/2

* D: Day E: Evening N: Night O: Overall

Shift Below Target	2018 Month Ave (%)				2019 Month Ave (%)				2020 Month Ave (%)				2021 Month Ave (%)			
	D	E	N	O	D	E	N	O	D	E	N	O	D	E	N	O
All NZ	32	16	11	20	34	18	12	21	28	15	11	18	36	19	14	23
Fully Implemented DHBs	38	20	12	23	40	20	13	24	30	16	11	19	43	23	15	27
Mostly Implemented DHBs	27	13	11	17	36	19	14	23	32	16	11	20	35	19	15	23
Least Implemented DHBs	12	8	5	8	9	5	4	6	17	10	9	12	27	13	11	17
Medical wards	32	19	13	21	37	21	16	25	29	16	12	19	42	23	18	28
Surgical wards	37	15	9	20	40	18	11	23	32	15	9	19	38	18	13	23
AAMH wards	30	16	8	18	25	11	6	14	27	14	10	17	34	14	7	18
Rehab (AT & R) wards	16	11	9	12	17	13	10	13	12	11	8	10	17	13	11	14

Table 2 : Shifts Below Target across NZ

Red zone Shifts	2018 Month Ave (%)				2019 Month Ave (%)				2020 Month Ave (%)				2021 Month Ave (%)			
	D	E	N	O	D	E	N	O	D	E	N	O	D	E	N	O
All NZ	25	13	9	16	27	13	10	17	21	11	8	13	29	14	11	18
Fully Implemented DHBs	31	15	10	19	31	15	10	19	23	12	8	14	34	17	12	21
Mostly Implemented DHBs	21	10	9	13	28	14	11	18	25	12	9	15	28	14	12	18
Least Implemented DHBs	8	6	4	6	6	4	3	4	14	9	8	10	21	10	9	13
Medical wards	25	14	11	17	28	15	13	19	21	12	10	14	33	18	14	22
Surgical wards	29	11	7	16	31	13	8	17	25	11	7	14	30	13	10	18
AAMH wards	26	14	8	16	21	9	6	12	23	13	9	15	28	11	6	15
Rehab (AT & R) wards	11	7	7	8	12	9	8	10	8	8	6	7	12	9	9	10

Table 3 : Shifts in VRM’s Red Zone across NZ

34. Care Hours Variance Analysis Method

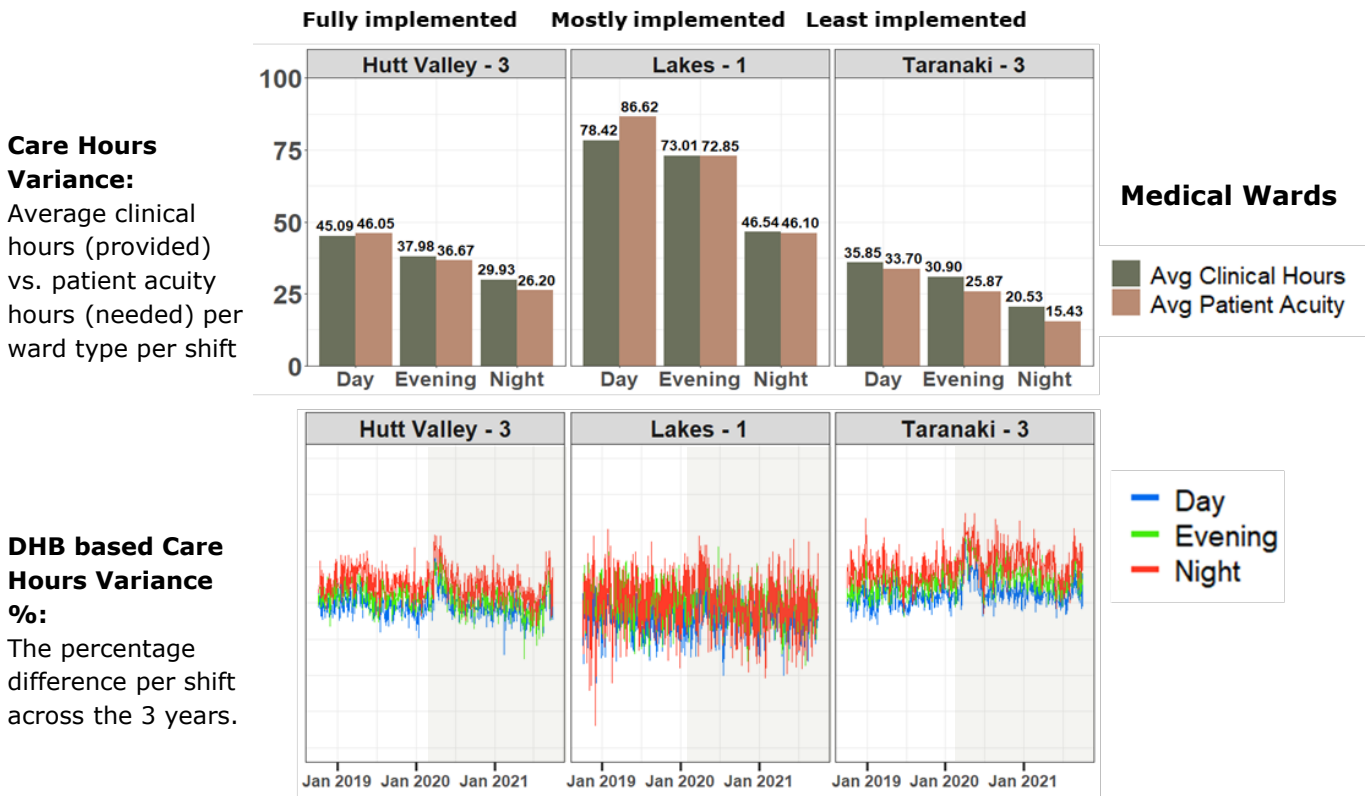


Figure 1: Care Hours Variance analysis for medical wards

How to read these visualisations

All visualisations are grouping DHBs per implementation level to allow for trend comparisons across the levels.

The number next to DHB names are the count of medical wards within DHBs considered. In this analysis, we treated all the wards under the same type as one in each DHB.

Day, evening and night shifts are considered separately.

The top graphs show the average clinical hours (provided) against average patient acuity hours (needed) per ward per shift within the DHB over the last three years. They indicate the average size and demand of wards that DHBs have. These are aggregated plots that do not display day-to-day variability.

The bottom graphs demonstrate the care hours variance % trend over the last three years. The white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data. Each line represents a shift (day, evening, or night) across all wards in the respective DHB. Each point represents the Care Hours Variance % for a particular shift (day, evening, night) on a particular date. The variance % has been calculated using the sums of clinical (available) and acuity (needed) hours across all wards on that particular shift. According to TrendCare, the ideal zone (green) is between 2 hours positive and a -4% variance. This visualisation provides insight into the ward activity on a day-to-day and shift-to-shift basis for each DHB. The variance of the plot also indicates the stability of care hour variance through out 24 hours. These plots show the range of the variance on any one shift on DHB level. When the line approaches the top of the plot, indicated overstaffing, while approaching the bottom of the plot indicates understaffing.

So, Hutt Valley is a DHB considered to have fully implemented CCDM. It has 3 medical wards.

Top graphs: On average, their day shifts have a variance of -0.96 hours (45.09-46.05), their evening shifts 1.31 hours and the night shifts 2.83 hours.

Bottom graphs: Over the past 3 years looks stable with the variance trend remaining quite tightly in the middle of the graph. Day shifts consistently are the most challenging ones.

35. Shifts Below Target Analysis

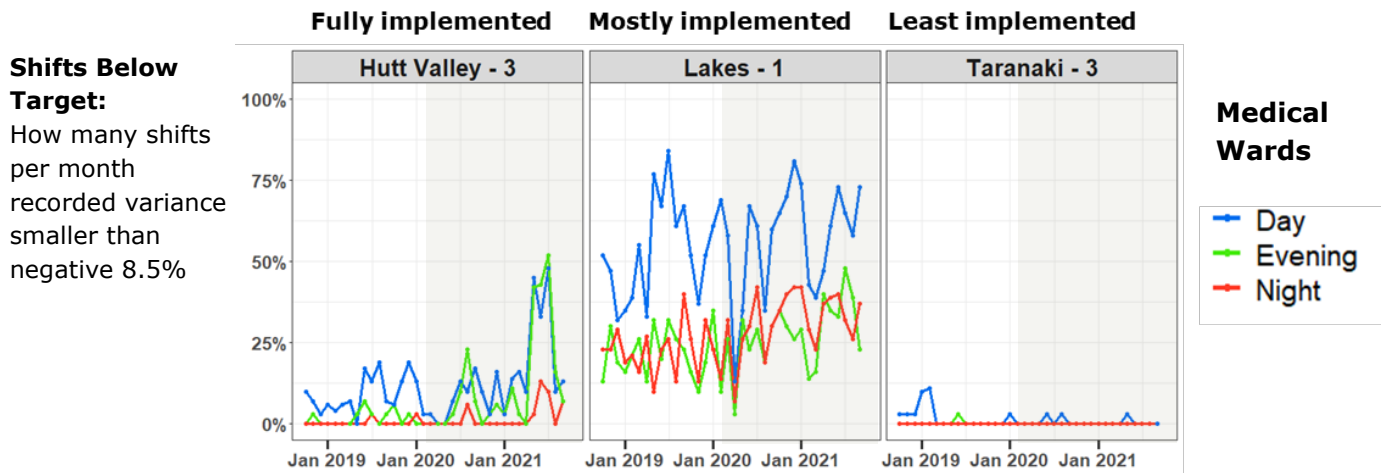


Figure 2: Shifts below target analysis for medical wards

How to read these visualisations

All visualisations are grouping DHBs per implementation level to allow for trend comparisons across the levels.

The number next to DHB names are the count of medical wards within DHBs considered. In this analysis, we treated all the wards under the same type as one in each DHB.

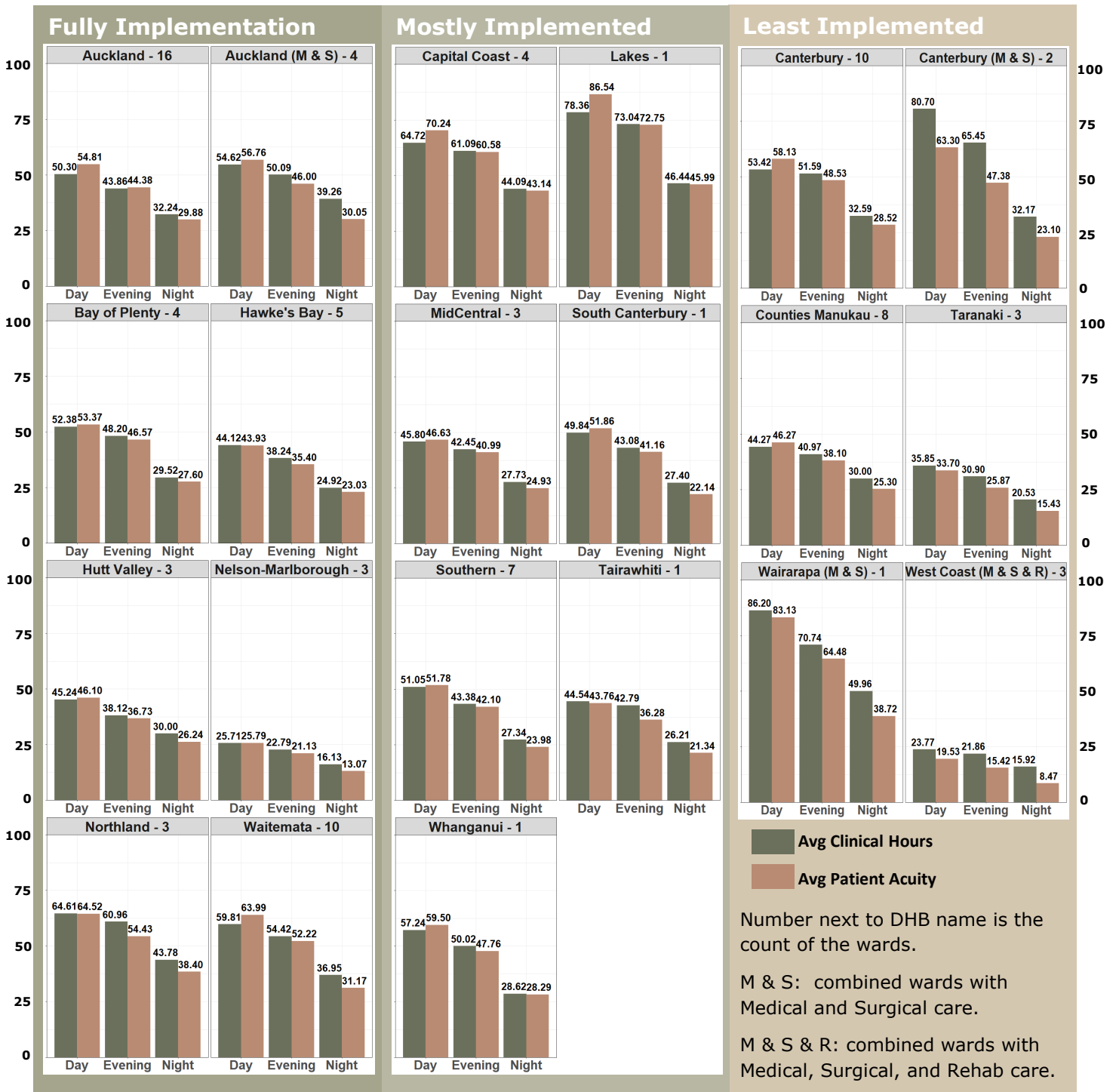
Day, evening and night shifts are considered separately.

SBT analysis reflects the effectiveness of the base roster and VRM. The higher value means more shifts in that month were understaffed, which shows a negative trend.

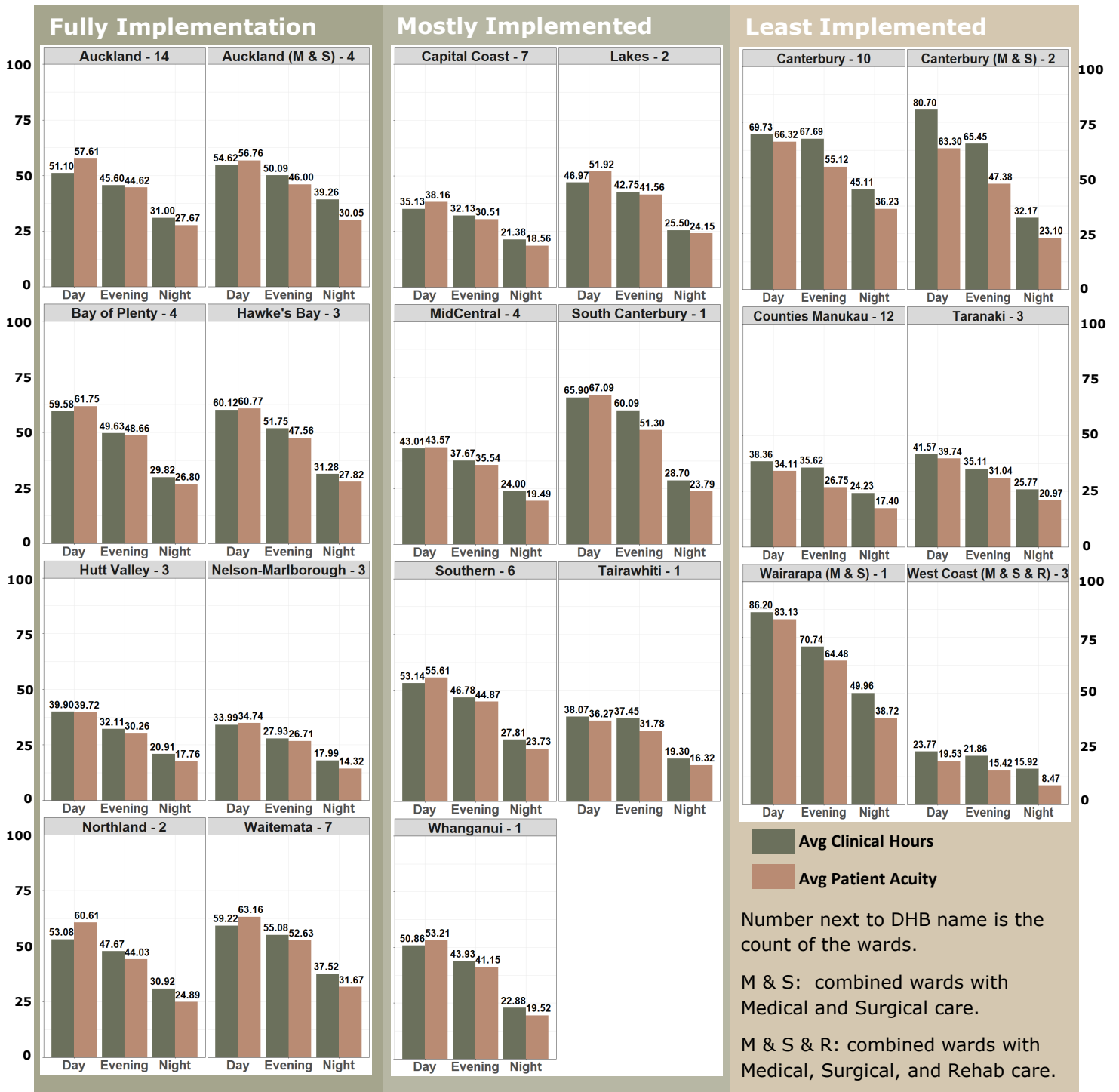
The x axis shows the dates. One point per month, the first 3 points are for the last 3 months of 2018 and so on. One can see how SBT improve or decline over time. The white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data. So, Hutt Valley is a DHB considered to have fully implemented CCDM. It has 3 medical wards.

Up to the beginning of 2021, they managed to keep the SBT to less than 25% (most below 10%) and quite stable overall. Around April 2021, their day and evening shifts moved up to almost 50% and a few months later they managed to bring the number down again.

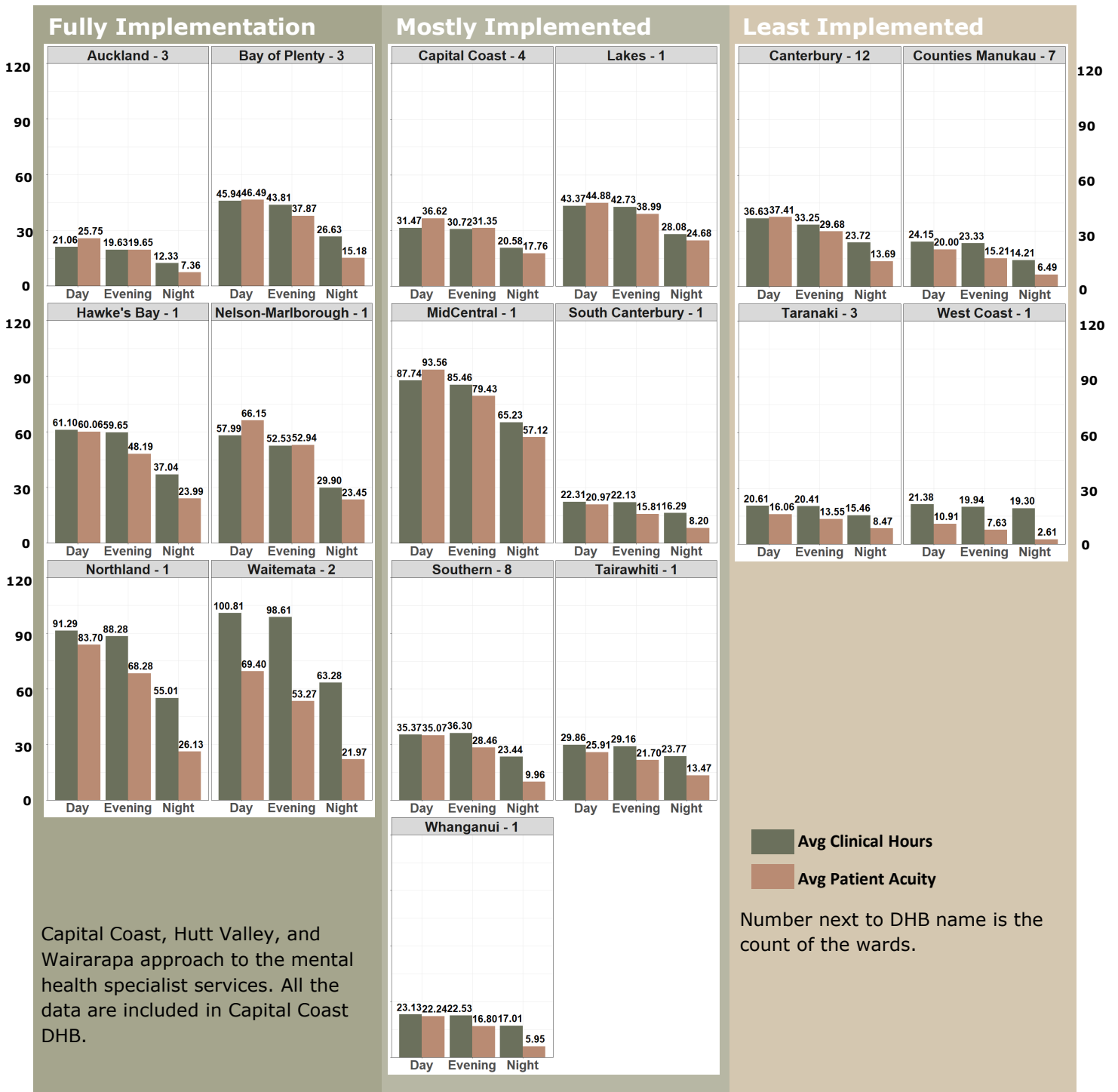
36. Clinical (provided) vs Patient Acuity (needed) hours - Medical wards' comparison across levels of CCDM implementation



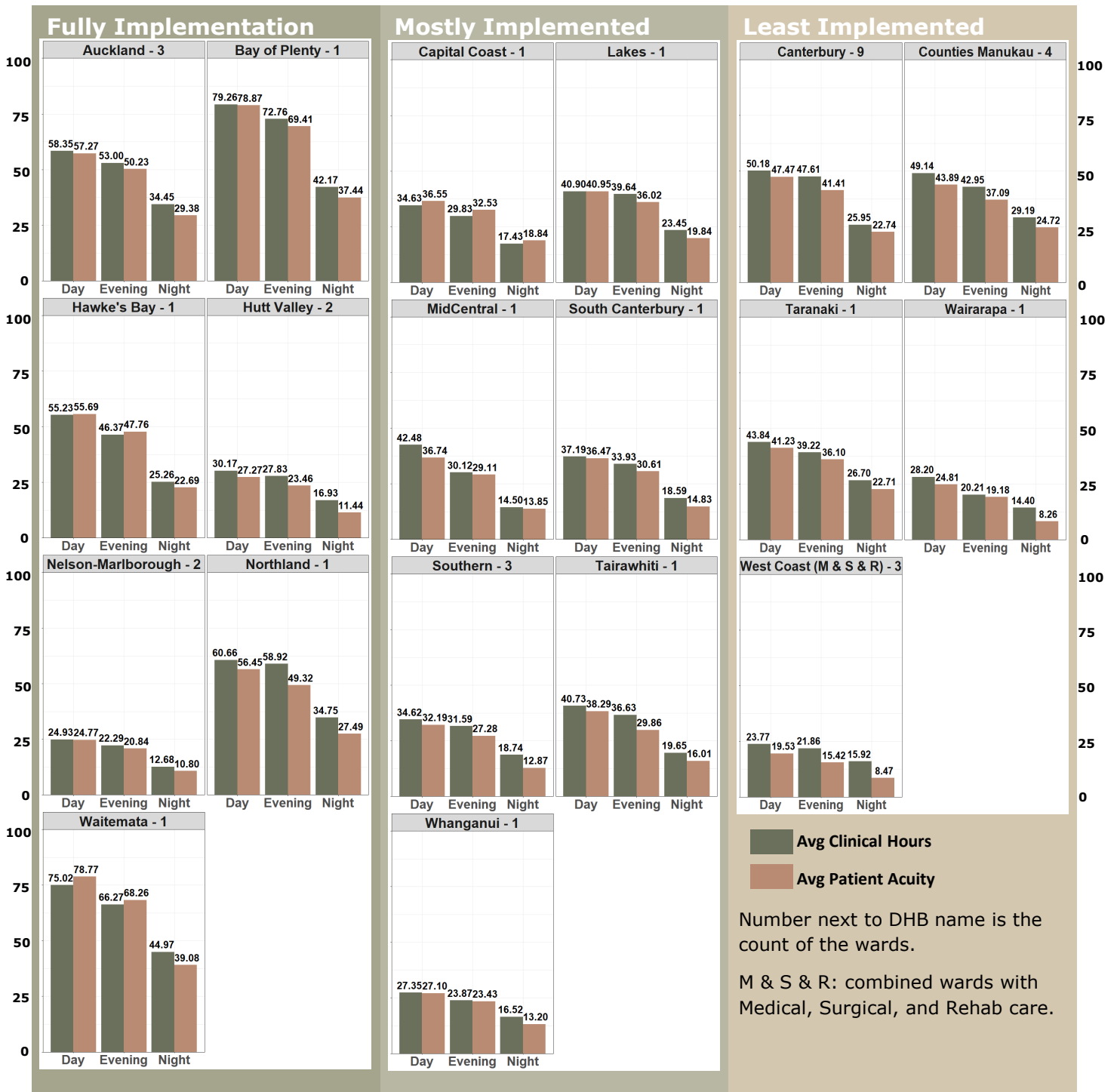
37. Clinical (provided) vs Patient Acuity (needed) hours – Surgical wards’ comparison across levels of CCDM implementation



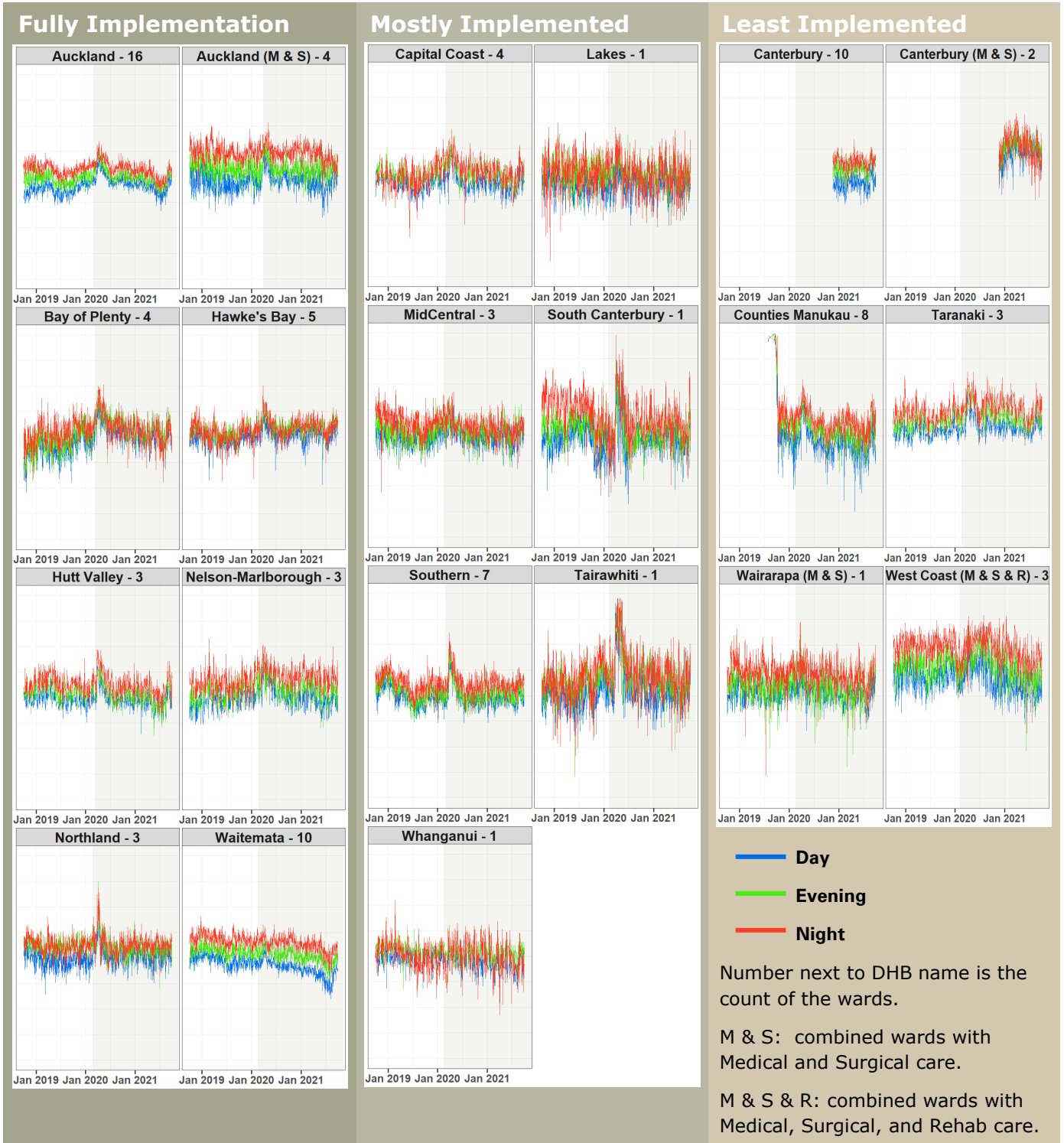
38. Clinical (provided) vs Patient Acuity (needed) hours – Adult Acute Mental Health wards’ comparison across levels of CCDM implementation



39. Clinical (provided) vs Patient Acuity (needed) hours – Rehab (AT & R) wards’ comparison across levels of CCDM implementation

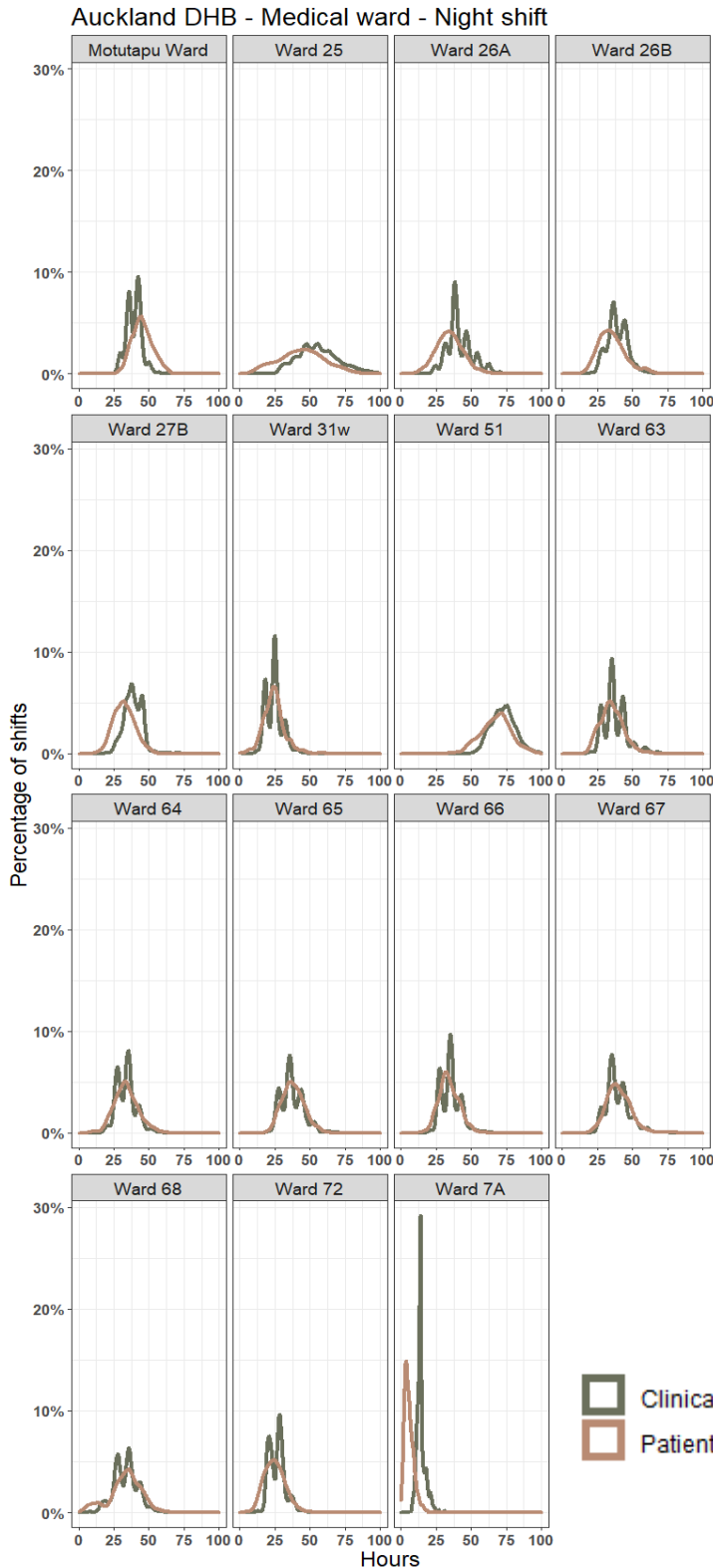


40. DHB based Care Hours Variance – National View of the Medical wards



*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

41. Clinical (provided) vs Patient Acuity (needed) hours - DHB range example: Auckland



The microplots produced for the DHB based Care Hours Variance aim at looking at a DHB as a whole using aggregated data. This means that extremes might average out, providing a misleading smoothing appearance.

Auckland, being the largest DHB have many more wards than others. Plotting them all separately for the DHB based Care Hours Variance – National View would create a variance. We analysed at different wards behind the single lines of the ADHB for the medical wards.

Here we show the 16 medical wards that Auckland DHB has.

They are all of different size and different clinical demand.

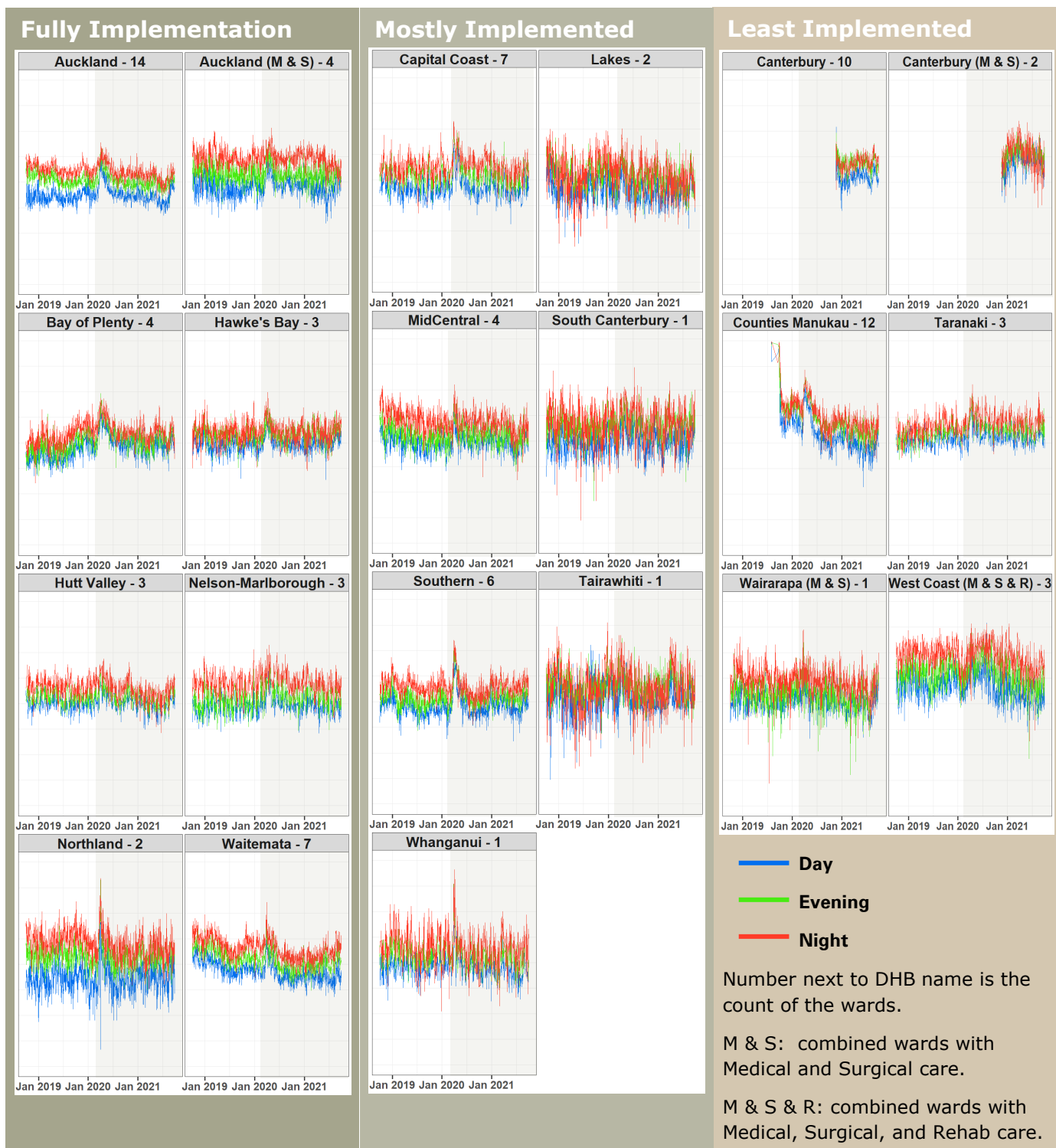
Ward 27A & 28B are Starship Play Service wards. But Ward 27A is only open during the day.

This plot shows the distributions of Clinical hours and Required Hours in each ward. Each data point represents the percentage of shifts for these hours.

How to read this:

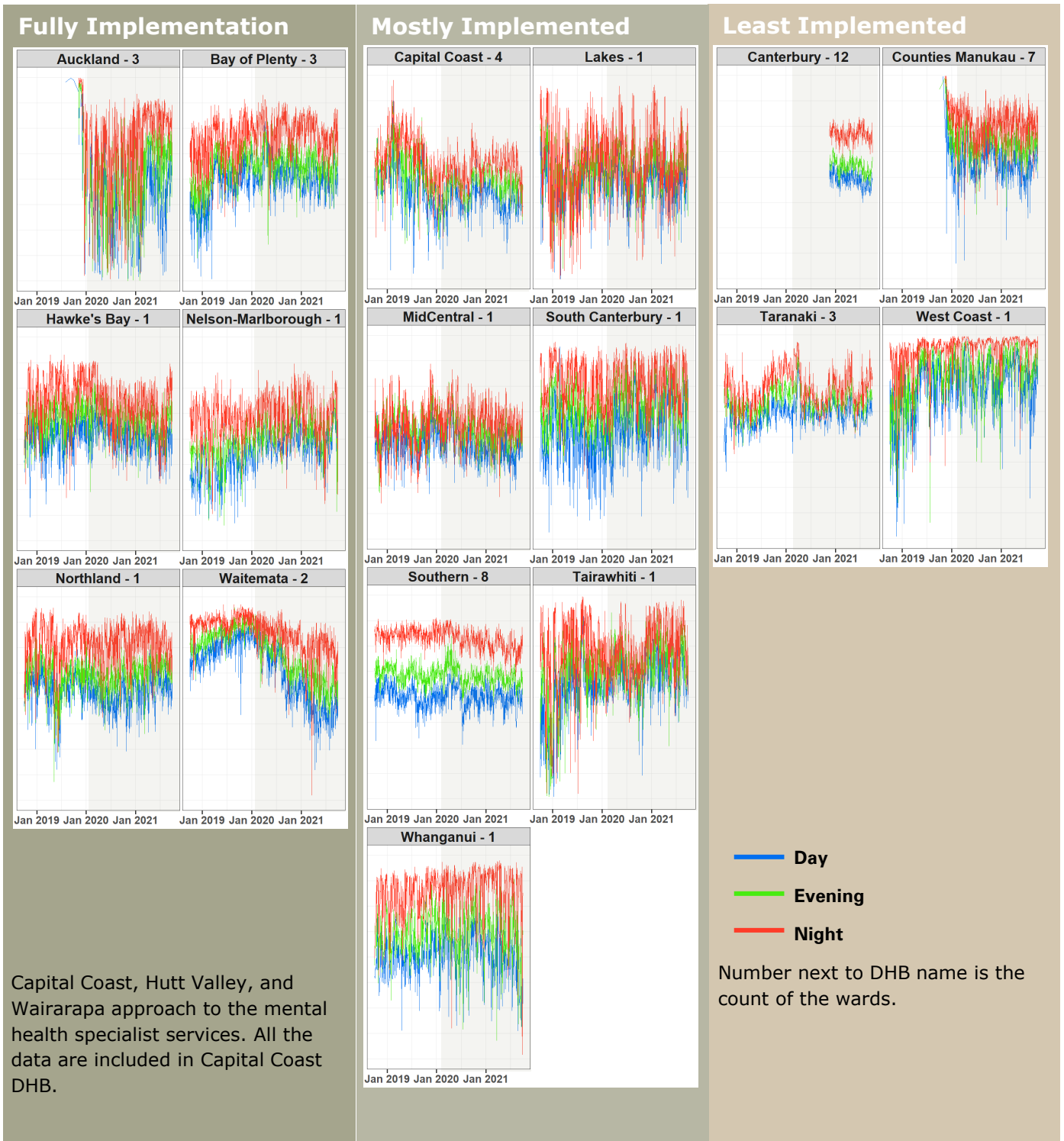
Ward 7A, for example, the clinical hours and patient acuity hours per night shift over the last three years are in a range of 0 to 25. The most frequent clinical hours is 15, which is about 28% of night shifts. 5 patient acuity hours are the most frequent for the night shift, which is about 15%.

42. DHB based Care Hours Variance – National View of the Surgical wards

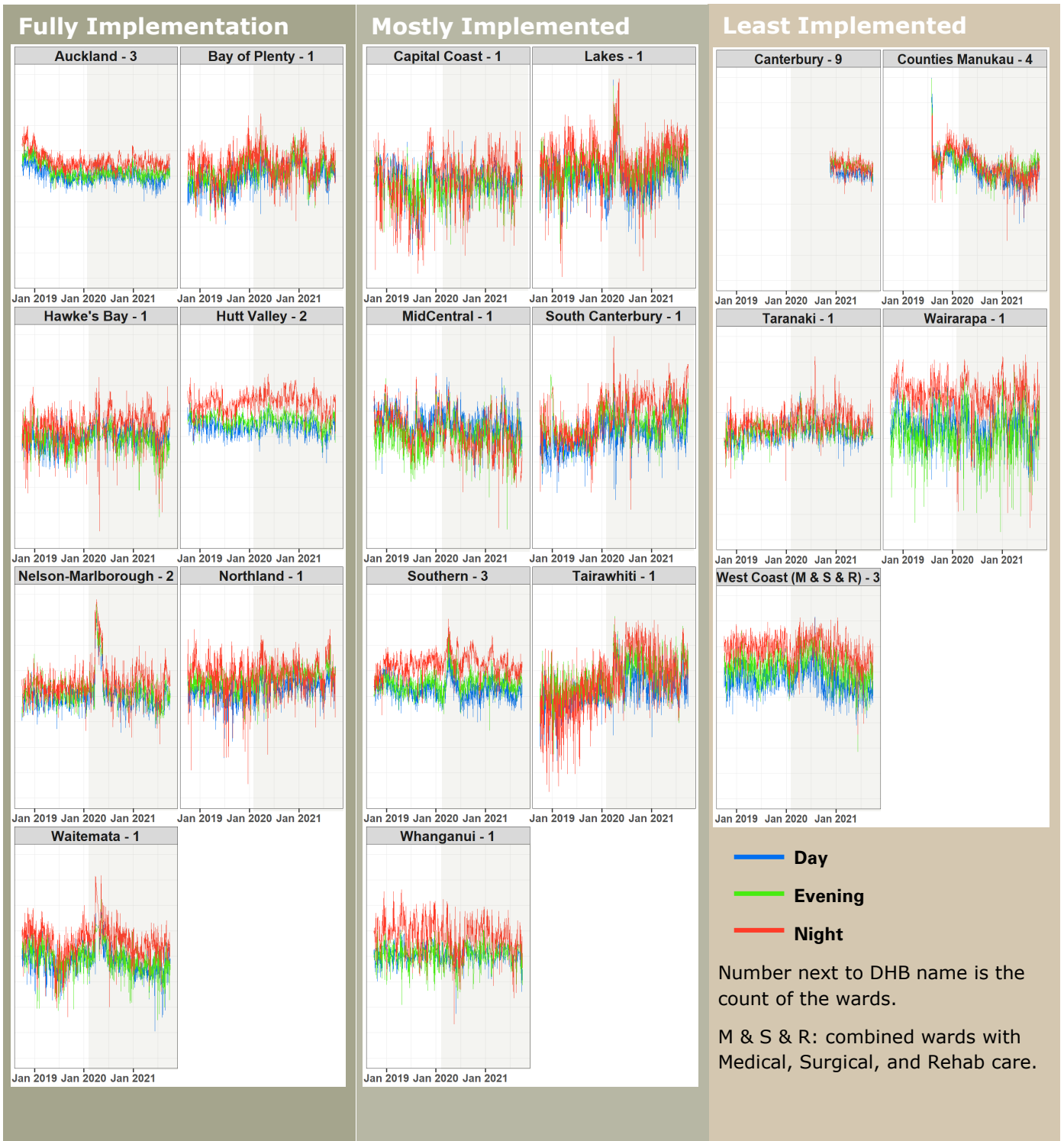


*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

43. DHB based Care Hours Variance – National View of the Adult Acute Mental Health wards

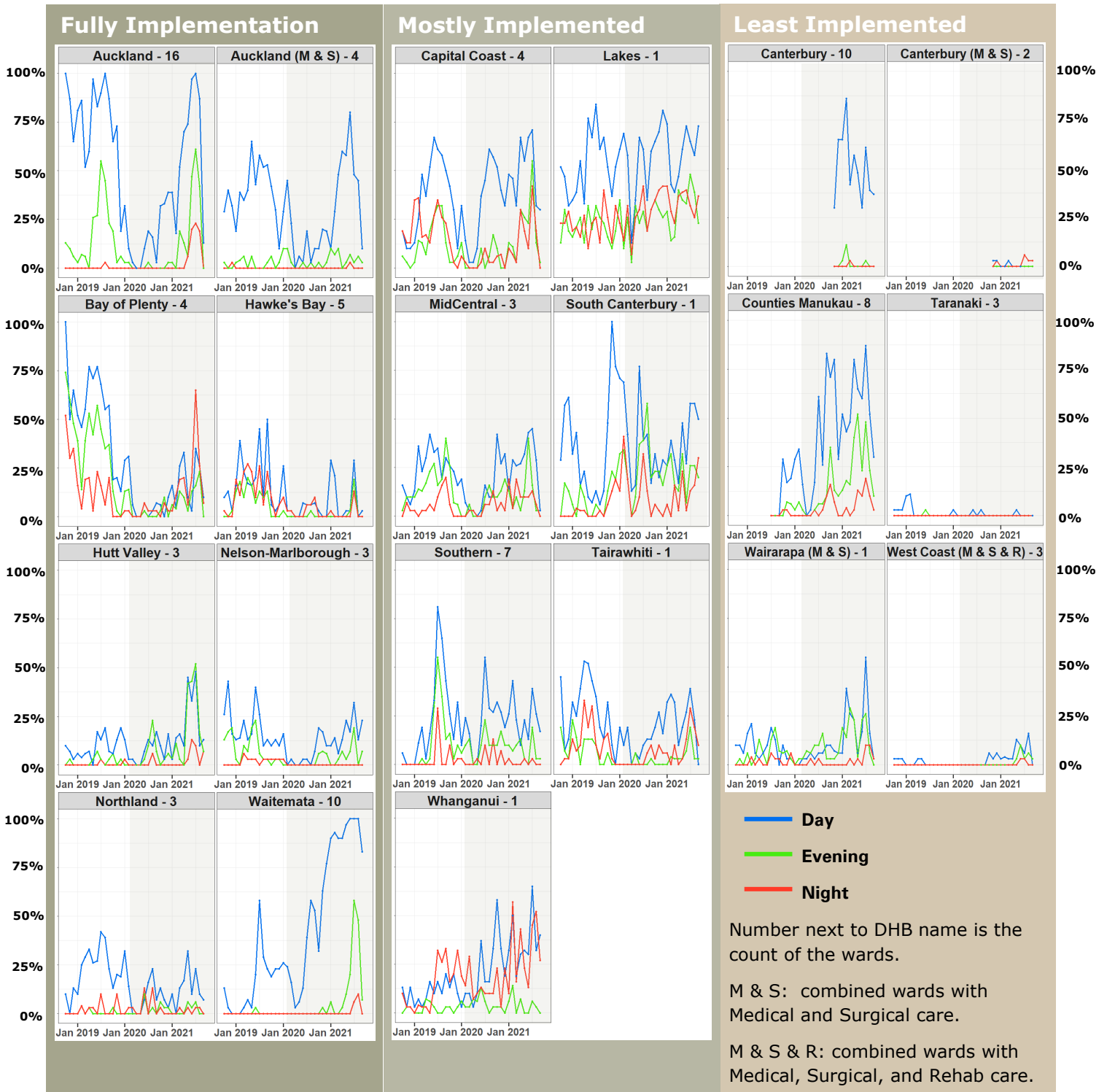


44. DHB based Care Hours Variance – National View of the Rehab (AT & R) wards



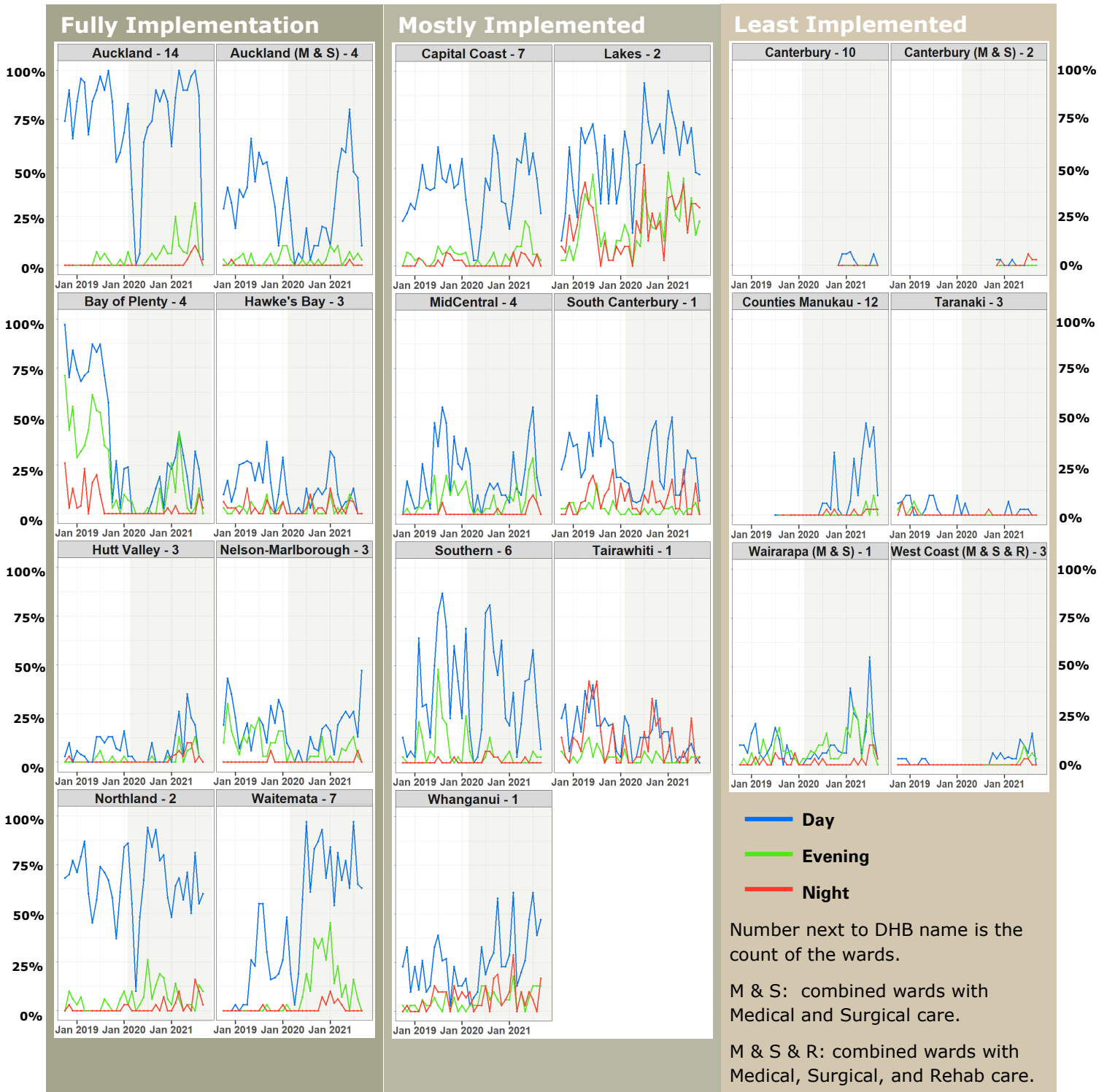
*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

45. Shifts Below Target- Medical wards' comparison across levels of CCDM implementation



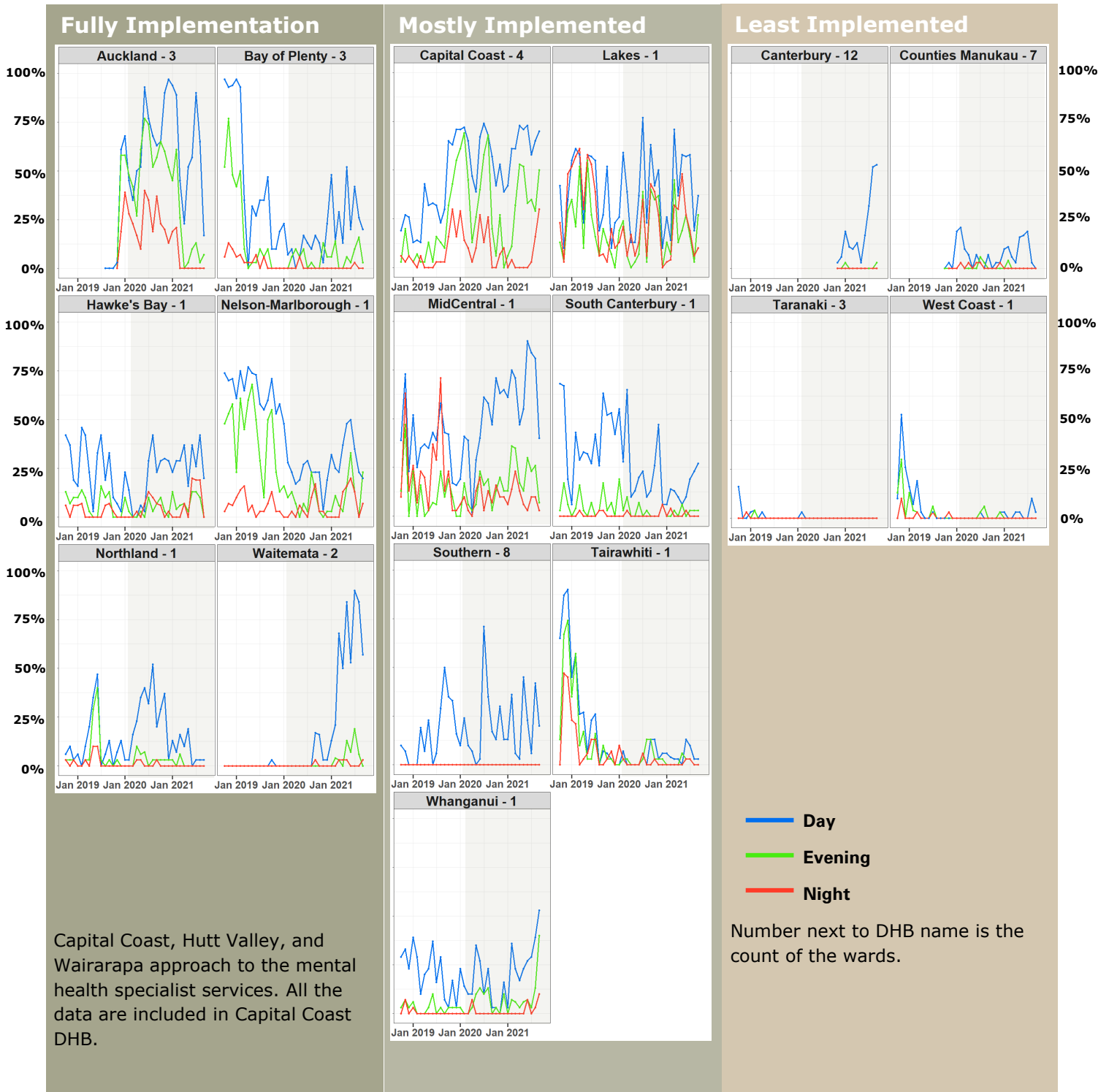
*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

46. Shifts Below Target- Surgical wards' comparison across levels of CCDM implementation



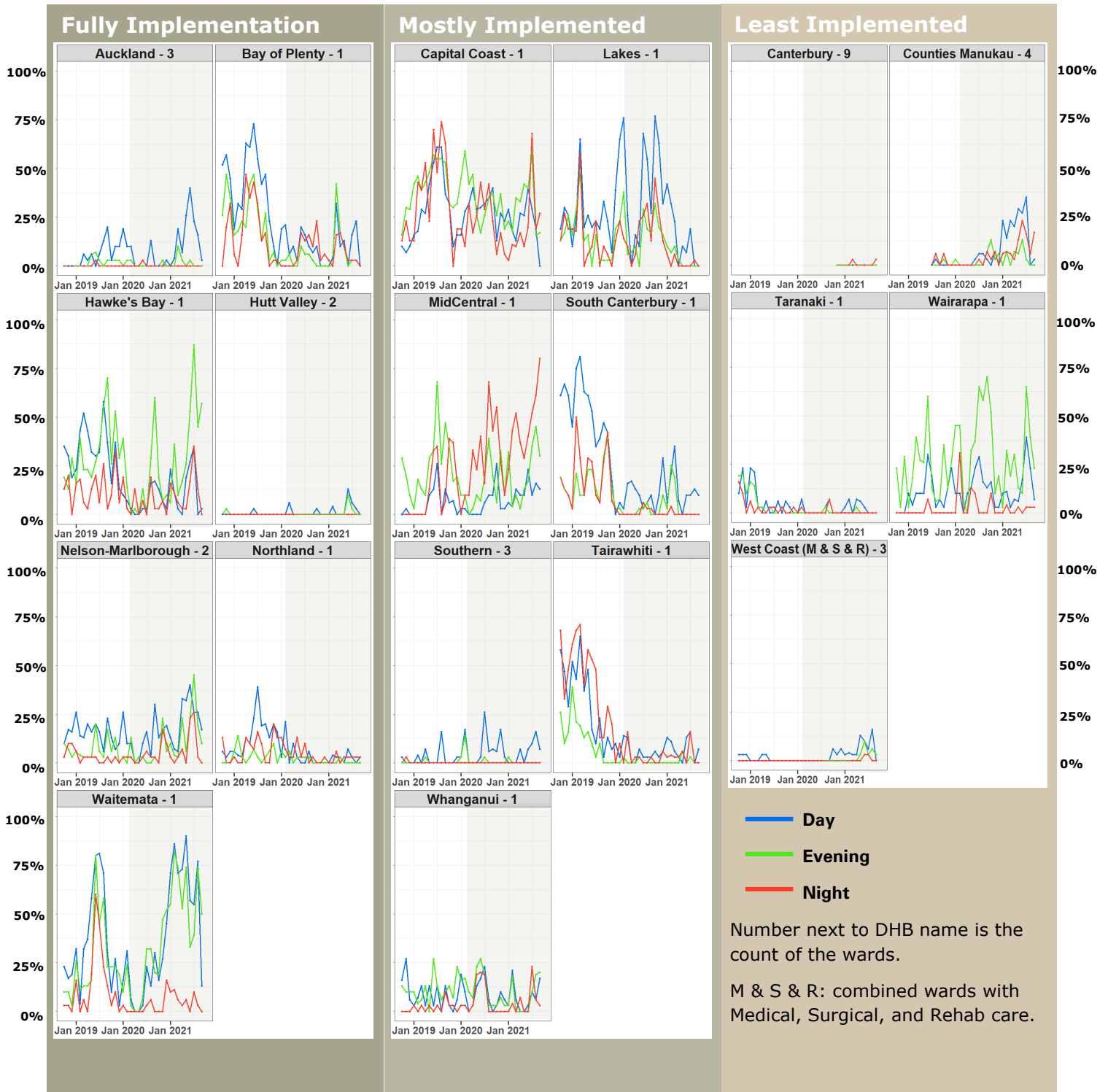
*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

47. Shifts Below Target - Adult Acute Mental Health wards' comparison across levels of CCDM implementation



*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

48. Shifts Below Target - Rehab (AT & R) wards' comparison across levels of CCDM implementation



*The above white areas on the plots reflect pre-pandemic data prior to 28th February 2020, which was the first Covid-19 outbreak in New Zealand. The greyed out portions reflect the post-pandemic data.

49. Behind the metrics: Care Hours Variance & Shifts Below Target – Scenario Analysis

TrendCare Buffer & VRM zones

When TC calculates the needed clinical hours, it adds a 12.5% buffer. 12.5% equates to 1 hour for each nurse working for 8 hours (FTE). It provides time for breaks (4% or ~20 min per FTE) and allowance for unpredictable work (8.5% or ~40 min per FTE).

The VRM colour code system describes the ideal green zone ("Staffing meets demand") as between a -4% variance and 2 hours positive variance.

The Sub-productive purple zone ("Excess care capacity") starts at more than 2 hours positive variance.

Understaffed Scenario

Consider an evening shift at a medical ward. 21 patients of various levels of acuity. 1 Charge Nurse (Nurse Manager), 4 RNs, and 1 HCA are available (another RN called in sick).

TrendCare shows that 42 clinical (or patient care) hours are needed. This estimate includes a buffer of 1.68 hours for breaks and 3.57 hours for unplanned work.

- With the existing staff, up to 37 clinical hours can be provided.
- The Charge Nurse has a lot of admin responsibilities and she can provide 3 hours for clinical care.
- Each RN can provide 8 hours of clinical care. That means they do not have time for any other tasks.
- The HCA will be able to provide 2 hours of clinical care. HCAs can do limited tasks that are considered clinical care but with just 1 HCA in a shift with 21 patients, this person will be very busy with other tasks.

The variance is $37 - 42 = -5$ hours (or -13.5%)

VRM flagged the shift red (critical VRM zone).

It indicates that the ward is beginning the shift with their entire buffer (12.5% or 5.25 hours) consumed and requiring an extra 1% (25 min).

Using VRM, a nurse from another ward came to help for 4 hours. An RN from the previous shift stayed on for overtime. He is available to work 5 hours but since the new variance is -1, he is being asked to work for 1 hour. Now the shift can deliver an extra 5 clinical hours, a total of 42 clinical hours. VRM flags them in green. The actual clinical hours provided and recorded at the end, including the overtime and the VRM were 41 (some unplanned work came up as acuity went up for some patients and they also had 2 new admissions). They had to use most of the buffer (which means some missed breaks).

At the end of the shift:

Care Hours Variance % = $((41 - 42) / 41) * 100 = -2.4\%$

Shifts Below Target: $-2.4\% > -8.5\%$, so this is not considered as SBT

Issues with the reported metrics:

- We don't know the initial available clinical hours by the staff in the roster
- We don't know 1 hour came from overtime
- We don't know 4 hours came from VRM.

Definitions & Calculations

Care Hours Variance

The difference between the hours required by acuity for inpatient care versus the clinical hours available to provide care by shift (AM, PM, N). It considers clinical hours or patient care hours only.

Variance = Available - Required
 Care Hours Variance = $((\text{Available} - \text{Required}) / \text{Available}) * 100\%$

Shifts Below Target

A shift is considered below target if the difference in the care hours provided and the care hours required was smaller than negative 8.5% (or more than 40 minutes per FTE).

It is calculated on a monthly level by dividing the number of shifts below target by the total number of shifts in that month.

Overstaffed Scenario

This is medical ward. 26 patients of average acuity. 1 charge nurse, 5 RNs, 2 HCA.

TrendCare shows that 45 clinical (or patient care) hours are needed. This estimate includes 1.8 hours for breaks and 3.83 hours for unplanned work.

With the existing staff, up to 52 clinical hours can be provided.

- The Charge Nurse has admin responsibilities but she can provide 3 hours for clinical care.
- Each RN can provide 8 hours of clinical care.
- The 2 HCAs can collectively provide 9 hours of clinical care but there is 7 hours of other necessary work on the ward that the HCA have to do.

The variance is $52 - 45 = 7$ hours.

VRM flags the shift purple.

Responding to VRM, 1 RN and 1 HCA go to other wards that are in red to help out. They each go for 4 hours.

Now, up to 44 clinical hours can be provided. The variance is $44 - 45 = -1$ hour (or -2.22). VRM flags them green. The actual hours provided and recorded in the end were 45 (4 patients had incidents and needed more care than predicted). This means they used all their buffer, missed their breaks and the RNs did not have time for any non clinical work.

At the end of the shift:

Care Hours Variance % = $((45 - 45) / 45) * 100 = 0\%$

Shifts Below Target: $0\% > -8.5\%$, so this is not considered as SBT

50. Behind the metrics: Care Hours Variance & SBT – Reporting & Communication Issues 1/2

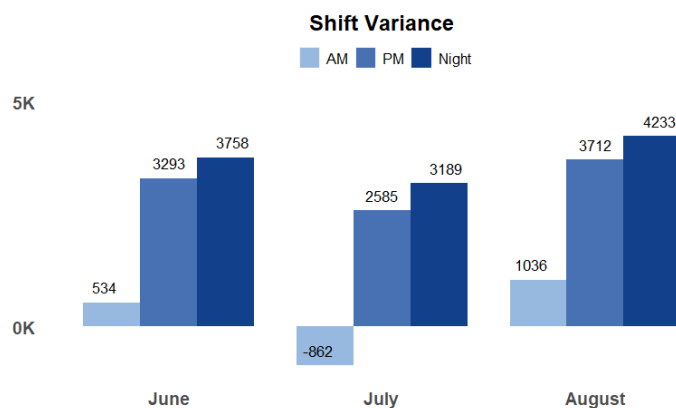
Some DHBs have visual displays of the recorded CCDM metrics. These should enable some roles to monitor how the metrics are tracking and whether they need to take actions for improving safe staffing.

The dashboards provide visibility on metrics across each DHB or by ward, typically on a monthly basis. This is a great way to get an overview of what is happening and someone with the right training can make a lot of this display.

However, the aggregated numbers and reporting metrics in isolation are not the optimal way for grasping what is really happening on the wards on a shift-basis.

We did not have visibility of the reports that make it to senior leadership, but presumably, the same visuals that appear in dashboards make it to these reports.

Consider the following visual. It is from a DHB that has 20 wards.



Issues with this visualisation

1. If someone sees that in the month of August there were 4233 hours over the required clinical hours during the night shifts, will immediately think there is not an issue with staffing, if anything, there might be overstaffing.
But when you divide by 31 days and 20 wards that are represented in this DHB’s report, you get 6.8 hours over the required clinical hours per shift. 6.8 is barely healthy since nurses have more responsibilities other than clinical (direct patient care) hours.
2. While 6.8 hours/shift is a better figure to report, this is also an average and it hides the variability from ward to ward and from one night shift to another night shift. There might have been several shifts with negative variance that are getting lost when averaged like that. Displaying the range (perhaps by combining data points into categories) will provide a better overview of the reality.
3. An additional issue with night shifts, is that there is a minimum staffing requirement. So some shifts might have staff covering way above the needed clinical hours but this might be part of safety issue. This information also gets lost in plot like that.
4. Finally, we know that the provided clinical hours recorded at the end of a shift might be coming from VRM and/or overtime. This information is also not visible in this visualisation.

50. Behind the metrics: Care Hours Variance & SBT – Reporting & Communication Issues 2/2

Care Hours Variance – Improving visualisations

The data is complex. Understanding the right picture from the visuals at a glance is paramount to allow for actionable insights. The information displayed needs to be simple, unambiguous, clearly labelled and complete. Measures should be combined instead of needing to be looked at concurrently with additional graphs in different places.

Two examples are provided below to illustrate how Care Hours Variance can be visualised more effectively to accurately convey the reality for frontline staff. Note that both Example 1 and Example 2 still aggregate data over a period together. They both ideally need to be integrated with another graph or a visual cue illustrating the range across shifts.

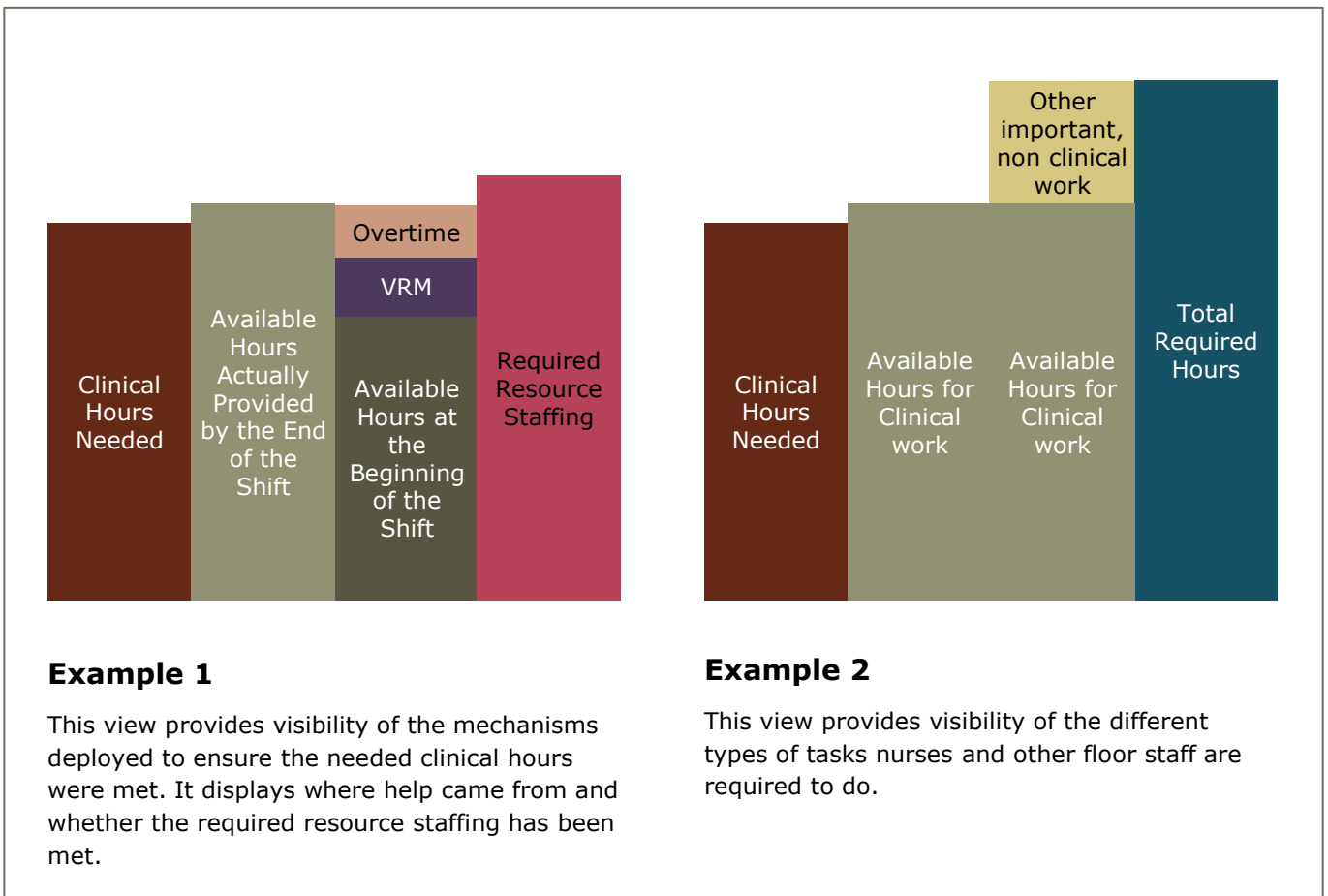


Figure 3: Two examples of how Care Hours Variance can be visualised more effectively