



Te Whatu Ora
Health New Zealand

**REVIEW OF THE PROCESS
UNDERLYING PUBLICATION
OF CLINICAL DATA ON THE
WEBSITE OF TE WHATU ORA**

April 2023

Contents

HE MIHI ACKNOWLEDGEMENTS	1
GLOSSARY	2
1. EXECUTIVE SUMMARY	5
Introduction and purpose	5
Terms of reference for the review	5
Scope of the review	5
Key questions	5
Methods	6
Limitations	6
Māori data sovereignty and Te Tiriti obligations	8
Key findings and themes	9
Recommendations	13
Action plan	17
2. BACKGROUND AND CONTEXT	18
3. PROCESS UNDERLYING PUBLICATION OF CLINICAL DATA ON WEBSITE OF TE WHATU ORA IN MARCH 2023	20
4. QUARTERLY REPORTING OF PERFORMANCE MEASURES	30
5. PUBLICATION OF OTHER CLINICAL MEASURES ON THE WEBSITE	32
6. FURTHER COMMENTS BY THE HEALTH QUALITY AND SAFETY COMMISSION FOR THIS REVIEW	33
7. KEY QUESTIONS	35
How the errors occurred	35
Improvement opportunities	43
APPENDIX ONE: TERMS OF REFERENCE	45
APPENDIX TWO: LIST OF DOCUMENTS REVIEWED	48
APPENDIX THREE: LIST OF INTERVIEWEES	49
APPENDIX FOUR: NATIONAL COLLECTIONS AND DATA QUALITY CHECKS AS AT 16 MARCH 2023	50
APPENDIX FIVE: 12 PERFORMANCE MEASURES SELECTED FOR MONTHLY PUBLIC REPORTING	55
APPENDIX SIX: ERRORS IN EMERGENCY DEPARTMENT DATA ON THE WEBSITE	57
APPENDIX SEVEN: NATIONAL COLLECTIONS DATA QUALITY ISSUES 28 FEBRUARY 2023	58
APPENDIX EIGHT: END-TO-END PROCESS FOR THE COLLECTION, COLLATION, STORAGE AND REPORTING OF THE 12 PERFORMANCE MEASURES ON THE WEBSITE	59
APPENDIX NINE: THE DATA PIPELINE FOR SHORTER STAYS IN EMERGENCY DEPARTMENTS (SSED)	63

HE MIHI | ACKNOWLEDGEMENTS

The Review Team would like to thank people who made time to share their knowledge and experience to inform this review.

We acknowledge the challenges staff face establishing new performance reporting processes in the context of significant health system reform, workforce shortages and system pressures.

We recognise the efforts of all people involved in the management of data and information systems and the commitment to provide the public with information about the performance of Te Whatu Ora.

The panel acknowledges the context of the events that led to this review. The review reflects a health system that is experiencing significant challenges. The establishment of Te Whatu Ora and transition to a new hauora system represents the largest and most ambitious change to the health system in recent times. The transition follows an era of unprecedented impact on health services due to the COVID-19 pandemic. The system is facing extraordinary demands on its services and staff. There has been a lack of whole of system performance reporting in the past and there are multiple systems for recording performance information, many of which involve manual processes. Te Whatu Ora has just commenced building a performance reporting system, which is a multi-year work programme.

The report has undergone review by Te Aka Whai Ora Chief Medical Officer, Dr Rawiri McKree Jansen.

The report has also undergone peer review by:

- Vince Galvin, Chief Methodologist, Tataurangi Aotearoa | StatsNZ
- Dr Vanessa Selak, Senior Lecturer in the Section of Epidemiology and Biostatistics at the School of Population Health, Faculty of Medical and Health Sciences, University of Auckland
- Martin Chadwick, Chief Allied Health Professions Officer from the Office of the Chief Clinical Officers, Manatū Hauora
- Richard Hamblin, Director of Health Quality Intelligence, Health Quality and Safety Commission.

We thank the reviewers for their time and effort to review the draft report. We sincerely appreciate all comments and suggestions.

The report findings and recommendations are offered in the spirit of continuous improvement of data and information systems and the development of a more comprehensive and meaningful picture of health system performance that is shared with the people of Aotearoa.

Ngā mihi nui

The Review Team

Dr Dale Bramley, National Director Service Improvement and Innovation, Te Whatu Ora

Wendy Hamilton, General Manager Data System Capability, Stats NZ

Dr Jenny Walker, Chief Medical Officer, Te Whatu Ora – Te Tai Tokerau

Nadine Gray, Chief Nursing Officer, Te Aka Whai Ora

Dr Penny Andrew, Director Service Improvement and Innovation, Te Whatu Ora

Zoe O’Riordan, Patient Safety Advisor, Te Whatu Ora – Capital, Coast and Hutt Valley

Briar Coleman, Quality & Patient Safety Manager, Te Whatu Ora – Capital, Coast and Hutt Valley

Valerio Malez, Portfolio Manager, Service Improvement and Innovation Directorate, Te Whatu Ora

GLOSSARY

GLOSSARY OF ACRONYMS

ASH	<p>Ambulatory sensitive hospitalisations</p> <p>Hospital admissions related to a defined set of conditions agreed to be potentially preventable through primary health care intervention.</p>
DNW	<p>Did not wait</p> <p>A code applied to ED presentations when a patient leaves before receiving a medical consultation.</p>
ED Admissions	<p>Patients who have been triaged and received treatment in an emergency department and then transferred for further treatment i.e. to an observation unit or to a ward or to another hospital.</p>
ED Attendances	<p>Patients who present to an emergency department requesting treatment.</p>
EFT	<p>Electronic file transfer</p> <p>A protocolised process for secure data movement between two points.</p>
ESPI	<p>Elective Services Patient Flow Indicators</p> <p>A suite of five indicators relating to the planned care patient journey.</p>
ETL	<p>Extract, transform, load</p> <p>A three-phase process for extraction, cleaning and loading of data into an output data container.</p>
FCT	<p>Faster Cancer Treatment</p> <p>A former Health Target that 90% of all patients who are referred to hospital services with a high suspicion of cancer (to be seen within 14 days) start treatment within 62 days of referral.</p>
FSA	<p>First Specialist Appointment</p> <p>An appointment between the patient and the specialist, at which the specialist assesses the person's condition and recommends the best option of care for them.</p>
HQSC	<p>Health Quality and Safety Commission</p> <p>A crown entity responsible for monitoring, promoting and improving the quality and safety of services across the health and disability sector.</p>
HSI	<p>Health System Indicators Framework</p> <p>The HSI replaced the national health targets for previous performance measures. The indicators were developed within a Health System Indicators Framework that measures and reports on how well the health and disability system is doing for all New Zealanders. The Government chose an initial set of 12 national, high-level indicators for the framework aligned with its priorities to help the health and disability system to focus on the areas where improvement is needed the most. Ten of the indicators have been reported since August 2021. The indicators are reported quarterly via on an online dashboard developed by the HQSC for reporting improvements on the HSI.</p>
NBRS	<p>National Booking and Reporting System</p> <p>A national data collection containing data, by specialty, on waiting times for elective procedures and number of patients waiting.</p>

NCAMP	<p>National Collection Annual Maintenance Project</p> <p>An annual review of the processes and data specifications for national collections that sets out changes required by the districts for national collections reporting.</p>
NHI	<p>National Health Index</p> <p>A unique identifier assigned to each individual who uses health and disability services in Aotearoa New Zealand.</p>
NIR	<p>National Immunisation Register</p> <p>A computerised information system that contains all registered immunisation enrolments and events of children born since 2005. NIR is being replaced by the Aotearoa Immunisation Register (AIR) that will provide information about immunisation coverage across the population as well as a record of vaccinations New Zealanders have received or chosen not to receive.</p>
NMDS	<p>National Minimum Data Set</p> <p>A national collection of public and private hospital discharge information, including coded clinical data for inpatients and day patients.</p>
NNPAC	<p>National Non-Admitted Patients Collection</p> <p>A national collection including event-based purchase units that relate to medical and surgical outpatient events and emergency department events.</p>
NSFL	<p>Nationwide Service Framework Library</p> <p>A collection of business rules and non-clinical guidelines used by Manatū Hauora and former District Health Boards, along with performance measures and reports.</p>
OPF	<p>Operating Policy Framework</p> <p>The OPF set out detailed data collection, data quality and reporting requirements for District Health Boards and is published on the National Services Framework Library.</p>
PAS	<p>Patient Administration System</p> <p>An electronic system used by healthcare providers to automate administrative tasks, store patient information and track patient movement.</p>
PRIMHD	<p>Programme for the Integration of Mental Health Data</p> <p>A single national mental health and addiction information collection of service activity and outcomes data for health consumers.</p>
SLM	<p>System Level Measures</p> <p>A suite of six outcome-focused measures developed by Manatū Hauora to provide a framework for continuous quality improvement. The HSI are an evolution of the SLM e.g. ASH, acute bed days and patient experience are all previous SLM.</p>
SQL	<p>Structured Query Language</p> <p>A programming language used for the creation and manipulation of databases.</p>
SSED	<p>Shorter Stays in Emergency Departments</p> <p>A former Health Target that 95% of people presenting to emergency departments are transferred, admitted or discharged within six hours.</p>
SSRS	<p>SQL Server Reporting Services</p> <p>Software for producing reports using data stored in SQL databases.</p>

GLOSSARY OF SOFTWARE APPLICATIONS

Oracle	Database management software currently used for accepting and processing NNPAC data submissions from districts.
R-Shiny	A tool for building interactive web-apps for data presentation and visualisation that uses the statistical programming language R.
Snowflake	Cloud data platform, collection and amalgamation of NNPAC data is currently being transitioned from Oracle to Snowflake.
Qlik	Data analytics and visualisation software used for creation of interactive data dashboards.

OTHER TERMINOLOGY

Datamart	A data storage system that contains information specific to an organisation's business unit. It contains a small and selected part of the data that the organisation stores in a larger storage system (data warehouse).
----------	--

1. EXECUTIVE SUMMARY

Introduction and purpose

This report sets out the findings of a review of the process underlying the publication of clinical data on the website of Te Whatu Ora (the website) in March 2023.

The purpose of the review was to identify how inaccurate data about Aotearoa New Zealand's Emergency Departments (EDs) was published on the website, and to identify improvements to systems and processes to prevent a recurrence.

The review panel was also asked to consider the publication of all clinical data on the website and make recommendations for improving the accuracy of the data where appropriate.

Terms of reference for the review

The terms of reference for the review are set out in [Appendix One](#).

Scope of the review

The scope of the review was to undertake an adverse event review process for 12 clinical measures published on the website, including the ED data from January 2022 to the present. The focus of the adverse event review was on the process for publication of the 12 measures, how the errors in the data occurred, and the systems, processes and procedures in place for ensuring the accuracy of the data prior to its publication.

At the request of the CEO the scope of the review included documenting and reviewing the process for publication of all other clinical data on the website, and reviewing the systems, processes and procedures in place for ensuring the accuracy of the data prior to its publication.

Key questions

The review panel was asked to address the following key questions:

How the errors occurred

1. What is the end-to-end process for the collection, collation, storage and reporting of clinical data on the website (the data pipeline)?
2. Where in this process are errors in the data likely to occur?
3. Where did the errors occur (or most likely occur) in this case?

Quality assurance

4. What systems, processes and procedures were in place to ensure the accuracy of data?
5. Is there clarity about the roles and responsibilities in relation to these systems, policies and processes?
6. Why did these systems, processes and procedures not identify inaccuracies in the data?

Improvement opportunities

7. What changes are required to systems, policies and processes to ensure the clinical data is accurate prior to its publication on the website?
8. Are there opportunities to improve the way the data is collected and reported to minimise the opportunities for data errors?
9. How can corrections and feedback from users who are outside Te Whatu Ora be incorporated into the quality assurance of the data?
10. Are any changes to the capacity and capability of the teams required in future?

Methods

A mixed method approach was utilised for this review. As part of primary data collection, stakeholder interviews were conducted with people involved in the end-to-end process of publication of clinical data on the website.

Interviews were conducted via Zoom or Microsoft Teams or by written questions. Online interviews were conducted with at least one panel member and one member of the review team supporting the review panel. The interviews were semi-structured, using a set of guide questions. Interviews were recorded by the members of the review team taking notes. After each interview, the notes were collated, summarised and emailed to the interviewees for review. A written response was received from one person.

All data was stored on a confidential MS Teams page and was accessible to all review team members.

Secondary data collection and analysis included review of publicly available reports, information on the website and documents provided by stakeholders. A list of documents reviewed by the team is set out in [Appendix Two](#).

Limitations

The review was limited by the following factors:

Time. This review was completed over three weeks, which limited the examination of primary and secondary data to inform the review.

Number and diversity of people and groups interviewed. A total of 26 stakeholders were interviewed/provided feedback or answers to written questions for this review, representing key parts of the end-to-end process for the collection, collation, storage and reporting of clinical data on the website. Given the timeframe, it was not possible to interview every local data team manager or a team member; 12 data managers/team members were interviewed, and themes identified from these interviews. A list of interviewees is set out in [Appendix Three](#).

Data completeness and quality. The national collections system is a dynamic data environment with data in the databases continuously updated. The data extracted from the databases reflects the data at the particular time of extraction. Therefore, it was not possible to replicate exactly the data that was reported on the website on 6 March 2023.

Summary of events

In July 2022 Te Whatu Ora | Health New Zealand was formally established and became responsible for reporting on the performance of Aotearoa New Zealand's health system. Prior to the establishment of Te Whatu Ora, Manatū Hauora | Ministry of Health was responsible for health system performance reporting and published quarterly performance reports to the public.

Quarterly public reporting by Manatū Hauora was a well-established practice involving non-financial reporting of (then) District Health Boards (DHBs). Data used for the public quarterly performance reporting by Manatū Hauora was, to a large extent, captured through national collections databases (national collections of health and disability information).¹ A Manatū Hauora team (the National Collections and Reporting Group) was responsible for maintaining the collections' databases and monitoring the quality of the information in the collections, and there was a wider Manatū Hauora team of analysts with subject matter expertise in each of the collections and years of experience in the quarterly reporting.

There were a number of steps in place to check and validate the data, with a three-month lag in data that was reported each quarter. This allowed for completion of data uploading, preparation of the data for reporting, and data validation and sign-off. The checking and validation process included local staff (data managers, clinicians and service managers) checking and verifying data.

With the establishment of Te Whatu Ora, Manatū Hauora ceased its non-financial performance reporting processes on 30 June 2022. The National Collections and Reporting Group transferred from Manatū Hauora to the Data and Digital Directorate of Te Whatu Ora. However, some of the national collections' subject matter expert analysts did not transfer to Te Whatu Ora. In addition, some of the roles transferred were vacated due to staff leaving on transfer, leading to a loss of knowledge and expertise in the national collections and performance reporting.

In July 2022, Te Whatu Ora commenced monthly financial and non-financial performance reporting to its Board (the Board); this information was not released to the public.

The public release of performance information was discussed by the Board at its meeting in September. A paper presented to the Board noted that there was a project underway to publish key operational data on the website. The Board requested the Chief Executive (CE) draft an approach to the public release of performance data for the Board's endorsement.

A project team consulted and engaged with a broad group of people to develop a set of indicators for monthly public reporting and agree a process for validating and publishing the data. The purpose of public reporting was to provide visibility of key operational information to the public in a way that builds trust and confidence in Te Whatu Ora, and the aim was to publish the first monthly report by Christmas 2022.

A set of 12 performance measures was proposed. The Health Quality and Safety Commission's Health Quality Intelligence team (HQSC team) provided expert advice about the proposed measures and publication process and expressed a number of concerns about the proposal.

The HQSC team emphasised the importance of ensuring accuracy of the data when reporting to the public because its purpose is to build public confidence and trust; if the data is incorrect, trust is easily lost and hard to regain. The team strongly recommended the existing agreed processes for checking the accuracy and validating the health system indicators (HSI)² were maintained – a three-month lag in data reported to allow for data uploading, checking, validation and sign-off. The HQSC team also recommended data was presented using a dashboard rather than MS Excel spreadsheets to minimise manual data handling and data errors and narrative was included in the report to provide context for the public. This advice was not followed.

¹ See: [Collections | Ministry of Health NZ](#)

² The HSI replaced health targets and were developed by Manatū Hauora and the HQSC to measure how well the health and disability system serves Aotearoa New Zealand. An initial set of 12 high-level indicators were chosen with 10 of the indicators reported since August 2021 and a further two developed over 2021/22. The HSI are reported via an online dashboard developed by the HQSC.

The first reports of the 12 measures (a Word document summary report and MS Excel spreadsheets) were published on 19 December 2022. The reports had been prepared by an analyst team at Te Whatu Ora Waitaha | Canterbury. The team was reluctant to undertake this work as they did not have subject matter expertise and experience in the national data collections and reporting systems. This was a new process and there was no standard operating procedure to guide the team. A lot of manual data handling was required. Data had to be sourced from multiple places, exported into an MS Excel workbook and manipulated to produce the required data tables, and then exported into individual MS Excel sheets ready for publication. There was no formal, documented quality assurance process prior to publication. There were some data errors identified post publication that were corrected in the following (March 2023) public report.

In January 2023 the second monthly performance report was prepared by new analysts within the System Accountability and Performance team. There was no formal handover from the Waitaha team and no documented standard operating procedure to guide the team. During the manual process of preparing the data in MS Excel, ED data for November and December 2022 was lost and therefore had to be re-exported. An additional line was re-exported into the MS Excel workbook resulting in data for some districts being offset by one line. The re-extracted data was not checked by a second analyst (as the first extract had been), and districts were not asked to check or validate the data. The regional director roles that had previously been asked to check the data were no longer in place. The summary report was submitted to the Board for approval to publish. The data errors were not evident in the summary report.

The summary report and MS Excel workbook and sheets were published on the website of Te Whatu Ora on 6 March. On 8 March a media organisation notified the Te Whatu Ora communications team that there were errors in the ED data in the MS Excel spreadsheet report. The public reports were withdrawn from the website. Further data errors in the reports published on 6 March have been identified in addition to the ED data transposition error. In response to these issues, the CEO of Te Whatu Ora commissioned this review.

Māori data sovereignty and Te Tiriti obligations

During the review process, engagement occurred with Te Aka Whai Ora including the Chief Medical Officer. From this engagement, Te Aka Whai Ora would like to be a key partner in the implementation of the recommendations of this review. There are two particular interests of Te Aka Whai Ora:

- i. The ability to report key performance indicators by ethnicity.
- ii. Ensuring Te Tiriti obligations are reflected in all performance reporting.

Three recommendations have been made to reflect these principles.

Key findings and themes

The following themes with corresponding key findings have been identified:

KEY FINDINGS

Timeframes and meaningful public reporting

- 1 The timeframe to commence monthly performance reporting was not realistic and led to a number of consequences:
 - The advice of experts from the HQSC was not followed. There was no clear framework and logic underpinning the selection of the measures and reporting process.
 - The accuracy of the data was not given sufficient importance. Accuracy was compromised by a sense of urgency and wanting more frequent (monthly) public reporting.
 - The process for checking and validating the measures was not clearly specified and selected measures were considered to have stable current data sources, which was not the case.
 - The process for sign-off of the measures was inadequate with summary documents being provided without the granular data reports that identify data errors.
 - Well-established processes and procedures in place for ensuring the accuracy of the data prior to its publication were not followed.
 - Teams inexperienced in the national data collections data were required to extract and prepare the data reports without clear instructions and expertise in the national collections. The teams were not able to effectively check the data.
 - There was insufficient time to develop tools to reduce the amount of manual data processing and automate the reporting, and there was no clear view as to how presentation of the data would move to a dashboard.
 - There was no training offered to staff at Waitaha to prepare the data reports.
- 2 Monthly public performance reporting of the 12 selected measures is not feasible currently for a number of reasons:
 - Reporting the 12 indicators does not provide the public with meaningful data e.g. ambulatory sensitive hospitalisation (ASH), rates and acute bed days are difficult to understand without an explanation of the context of the data and what the data is showing. The indicators are not presented in ways that are informative for the public and easy to use.
 - Five of the monthly performance metrics are HSI. The HSI are designed to be reported quarterly to the public and show trends over time. Changes to HSI month to month will not be significant with meaningful change happening over a longer period.
 - The national collections are dynamic datasets and a three-month data lag is advisable to ensure accuracy of the data for public reporting. This allows for completion of data in the national collections, data processing, checking, validation-and sign-off. Currently, monthly public reporting does not provide sufficient time to complete these largely manual processes. Automation and more consistent national collections data may allow for more frequent reporting in the future.
 - The logistics of frequent data extraction, calculation, data checking and validation will require commitment of significant analyst resource that is better freed up for other purposes.

Reporting framework and catalogue

- 3 There is no clear performance reporting framework and catalogue that sets out an underpinning logic and rationale for performance reporting and describes clear systems and processes for reporting including the purpose of reporting (e.g. operational decision making, performance and accountability, building public trust and confidence); reporting priorities; governance and quality assurance processes; and roles and responsibilities. As a result, the amount of reporting continues to increase without rationalising what we do and stopping what is not necessary. This further impacts on the capacity of the teams to prioritise timely data submission, data quality checking and effective reporting.

Māori data sovereignty and Te Tiriti

- 4 **Kaitiakitanga of Māori data:** The inherent rights and interests that Māori have in relation to the collection, ownership and application of Māori data are not recognised in a clear reporting framework and in all performance reporting. Engagement with Te Aka Whai Ora and other partners should occur to enable this to happen.
- 5 **Te Tiriti obligations:** The lack of a clear reporting framework and corresponding performance reporting means Māori are not enabled to exercise tino rangatiratanga over their own data and enable Māori to contribute effectively to equitable health outcomes for Māori. Engagement with Te Aka Whai Ora and other partners should occur to enable this to happen.

Capability

- 6 There is insufficient National Collections subject matter expertise within Te Whatu Ora to support monthly reporting of the 12 performance measures to the public and to support robust quarterly reporting. Some of the Manatū Hauora analyst staff with in-depth subject matter expertise in the national collections did not transfer to Te Whatu Ora. In addition, some of the roles transferred were vacated due to staff leaving on transfer, leading to a loss of knowledge and expertise in the national collections' and performance reporting. Manatū Hauora has tried to transfer responsibility for reporting, but this has not been possible due to lack of sufficient capacity and capability in Te Whatu Ora. This capability and expertise will take time to build.
- 7 Measures selected for monthly reporting come from multiple sources, which require a lot of manual processing by analysts unfamiliar with the national collections data sources.

Capacity

- 8 There is insufficient capacity in the System Accountability and Performance team – particularly analyst resource to support data collection for performance reporting.
- 9 Local data teams are overwhelmed with data demands, do not have sufficient capacity to meet increased demand and do not have a framework/guidance to enable them to prioritise their work.

National collections data collection and processing

- 10 There are two main sources of data errors in data sourced from the national collections for reporting:
 - a. Incomplete or incorrect data in the national collection datasets.
 - b. Manual data processing required to prepare the data for reporting and publication (data extraction from multiple systems and multiple steps in MS Excel to manipulate the data and create the measures).
- 11 There are multiple factors contributing to data quality issues (incomplete or incorrect data) in the national collections, in particular:
 - a. an increasing number of data extract and reporting demands for the local data teams and national collections and reporting teams, without any indication of priority or increased resource
 - b. workforce constraints (a lack of capacity) across the data pipelines, particularly in the local data teams
 - c. the paucity of subject matter expertise in the national collections data bases in Te Whatu Ora leading to a lack of appreciation and awareness of the data sets' quality issues
 - d. variation in the configuration of local data teams and their practices and functions, and the way they manage their national collections' data extraction and reporting processes.
- 12 There are data quality issues across the national data collections. The NNPAAC data pipeline for the ED indicators is particularly problematic with multiple errors identified from multiple districts that warrants further in-depth investigation.
- 13 There is a multitude of systems for recording and reporting performance and clinical measures; there is no central data repository and reporting system. Many of the systems involve manual processes, including data extraction and manipulation in MS Excel spreadsheets.
- 14 The manual data processing in multiple MS Excel spreadsheets by analysts unfamiliar with the national collections data sources increased the complexity of the data processing and the risk of data errors.

Quality assurance

- 15 The quality assurance data checks put in place for the monthly performance reporting were inadequate:
 - a. There was no standard operating procedure for analysts preparing the data.
 - b. Analysts in Te Whatu Ora did not have sufficient subject matter expertise in the national collections' data to check the data effectively.
 - c. There was a lack of sense checking by clinicians/people with experience of the context of the data, and a lack of data validation at source.
- 16 There is a lack of clarity of roles, responsibilities and accountability for data quality issues at each step of the national collections' data pipelines.
- 17 There is a lack of clarity of the roles, responsibilities and accountability for the quality assurance steps required for preparing reports and publishing the data.
- 18 There is a lack of clarity of roles and accountability for sign off for reporting publication, including executive sign off for public reporting.

Culture

- 19** There is no clear understanding about what is meaningful information to the public and what the public would like to see reported regarding the performance of Te Whatu Ora and the ways this information should be presented.
- 20** Expert advice and concerns about the lack of a well-developed, robust public reporting process and the risk to damaging public confidence and trust, were not escalated to the ELT. Concerns about the lack of capacity and capability were raised but staff felt they were not responded to adequately. There was no formal escalation path to guide staff, encourage them to speak up, acknowledge expert advice and report concerns about insufficient capacity and capability, and inform staff about how concerns would be responded to.
- 21** Expectations about timelines and quality of data were not realistic in the circumstances. These expectations were not challenged and no one spoke up and told the Board that monthly public reporting was not feasible without compromising quality and trust in data.
- 22** The events leading to this review have undermined the trust and confidence of staff, particularly analysts. Rebuilding this trust and confidence and acknowledging their skills and expertise is important.

Recommendations

RECOMMENDATIONS		Timeframe for Action
Timeframes and meaningful public reporting		
1	Public reporting of the 12 performance measures should occur on a three-monthly cycle as part of the quarterly public performance reporting. It is important for Māori public to have this quarterly data disaggregated by ethnicity.	Immediate
2	Undertake further work to enable reliable and more frequent public reporting that builds trust and confidence. This should include codesign of measures with consumers and whānau, improvements to the national collections systems and improvements to the systems for public reporting (automation of data processing, validation and reporting). The data being disseminated needs to tell a clear story and note the limitations of the available data.	12 months
3	Continue to develop rapid datasets to support operational decision making.	Immediate
Reporting framework and catalogue		
4	<p>Develop a Te Whatu Ora reporting framework with the support of external expertise from the HQSC and Stats NZ.³ The framework should describe all reporting measures based on desired outcomes outlined in Te Pae Tata, the Interim Government Policy Statement and other key strategic documents. The reporting framework should:</p> <ol style="list-style-type: none"> define principles on which indicators are selected define a rationalised set of reporting measures that will provide evidence of progress towards strategic outcomes (or actions), in particular equity articulate a wider system view that illustrates what relationship, if any, can be expected between the individual indicators define required performance reporting at national, regional and local levels for clinical and non-clinical performance that enable equity reporting define the purpose of reporting e.g. operational decision making; quality improvement; performance management (executive); internal monitoring and accountability (governance); public reporting (transparency, trust and confidence) define appropriate reporting intervals (ad hoc, monthly, quarterly, annual) define reporting priorities include a governance model include a quality assurance framework (see recommendation 20). <p>Well-selected, well-defined and well-executed performance measures need to be presented in a way that tells a convincing, well-tested story about the data. The reporting framework should be used to drive reporting prioritisation, investment decisions, ensure standardisation decisions are made consistently, and determine capacity and capability of required resourcing.</p>	12 months

³ The Treasury and Te Kawa Mataaho have published guidance and supporting material on performance reporting in the public sector, available at: [Reporting: Performance \(treasury.govt.nz\)](https://www.treasury.govt.nz/reporting-performance). See also guidance published by the Controller and Auditor General: [Reporting: Performance \(treasury.govt.nz\)](https://www.cag.govt.nz/reporting-performance).

5	<p>Review measures chosen for public reporting. As part of developing a reporting framework, the measures selected for public performance reporting should be reviewed.</p> <p>This review should take into account:</p> <ol style="list-style-type: none"> the meaningfulness of the measure to the public and its relevance to strategic outcomes the completeness and complexity of the source data systems for the measure the lag required to ensure a complete data set is available for reporting of the measure. 	6 months
6	<p>Plan for automation: Develop a plan and implement automation of data processing for public reporting that minimises manual data handling, minimises data processing steps, provides a simplified, auditable sign-off process, and provides for automation of publication with a public-facing dashboard(s).</p>	6 months
Māori data sovereignty and Te Tiriti		
7	<p>Te Aka Whai Ora to be a key partner in the implementation of the recommendations of this review.</p>	12 months
8	<p>Kaitiakitanga of Māori data: The inherent rights and interests that Māori have in relation to the collection, ownership, and application of Māori data must be recognised in the reporting framework and in all performance reporting.</p>	12 months
9	<p>Te Tiriti obligations: The reporting framework and performance reporting must enable Māori to exercise tino rangatiratanga over their own data and enable Māori to contribute to equitable health outcomes for Māori.</p>	12 months
Capability		
10	<p>Recruit a small, dedicated analyst team to provide a rapid response team with domain expertise for national collections and publication.</p>	Immediate
11	<p>Transition of performance reporting functions: Create and implement a transition plan for wider performance reporting from Manatū Hauora to Te Whatu Ora that transfers national collections subject matter expertise. This should be through job shadowing and peer review by Manatū Hauora for a specified number of reporting months.</p>	4 months
12	<p>Subject matter expertise in national data collections: Invest in building subject matter expertise in national collections through mentoring, coaching and training within Te Whatu Ora, and provide a mechanism for national collections' insights to be recorded and accessible in the context of the measures.</p>	Immediate
13	<p>Review the capability and capacity of the System Accountability and Performance team to ensure there is sufficient resource to develop a reporting framework and meet evolving reporting requirements.</p>	6 months

Capacity		
14	Review local data team capacity: Adequately resource local data teams to meet the demands for data provision and data quality checking, and match capacity to demand to enable timely and accurate data submitted to the national collections.	6 months
15	Prioritisation of data requests: Develop a national prioritisation framework for local data team requests.	3 months
National collections data collection and processing		
16	Investigate data pipeline: arrange for an external specialist-led investigation of the NNPAAC data pipeline to identify and correct data quality errors.	6 weeks
17	<p>Streamline data pathways from national collections to publication: Simplify and streamline the data pathways for national collections with an initial focus on the process for reporting on the ED indicators that achieves the following:</p> <ol style="list-style-type: none"> A reliable and consistent data point for publication on the ED part of acute care. Documentation of the standard operating procedure that includes local validation steps, local and national clinical oversight, and sign off before publication. Documentation of the roles and responsibilities for each step in the pipeline. Timely reporting that is repeatable for internal and public reporting. Adequate quality meta data is transferred through the data pathway along with the data. Identification of where in the end-to-end cycle, processes should be carried out. <p>When streamlining national collections there should be explicit design steps that take an overview of the suggested improvements and ensure that they are integrated in a comprehensive design.</p>	3 months
18	<p>Develop a data reporting system that simplifies and automates the production of measures from national collections for reporting and publication and provides an auditable quality assurance and sign-off process. This will include:</p> <ol style="list-style-type: none"> a central data repository for all measures using national collections' data a single public-facing tool for reporting measures to the public. 	4 months
19	Standardise local data practices: Streamline and standardise (where appropriate) local data collection (i.e. mapping and reporting), quality checks and data correction processes; streamline data team configurations and functions; and clearly specify timeframes for data submission.	3 months
Quality assurance		
20	Develop a quality assurance framework: Implement a quality assurance framework for performance reporting, with clear, documented standard operating procedures, data definitions and calculations, robust quality assurance checks to support the extraction and processing of data for reporting, and inclusion of the analysts involved in extracting and processing the data in the national collections' data quality feedback loops.	6 weeks

21	<p>Quality assurance checks for public reporting: The quality assurance steps documented in the quality assurance framework will depend on a number of factors including the purpose of reporting, the frequency of reporting and the process for reporting e.g. manual or automated. For public reporting from national collections, the following steps should be considered for the framework:</p> <ol style="list-style-type: none"> A check of all the data and analytics by a second, peer analyst. A check of all the data by a subject matter expert e.g. a National Collections' analyst. A 'sense check' of the data by a person with experience of the context e.g. a clinician. A 'sense check' by a person who can look for patterns (pattern sense check) using rules such as tolerance limits, and tools such as a heat map. Validation of the data by a person who uses a trusted data source, usually a person close to the data source e.g. a district data manager who includes checking of raw data against own data, calculation checks and a consistency check. External expertise for sense checking of public reporting measures e.g. the HQSC. <p>Accountable roles should be identified for each of the checks related to the national collections, and a checklist completed before publication to confirm each check has been completed.</p>	6 weeks
22	<p>Strong ongoing clinical input: There should continue to be strong, ongoing clinical input into the validation of the data.</p>	Immediate
23	<p>Automate validation processes: Validation checks should be automated where possible once the principles and rules are agreed.</p>	6 months
Culture		
24	<p>Incorporate consumer and whānau perspective: In partnership with HQSC, explore and implement methods for understanding what the public would like to see reported regarding the performance of Te Whatu Ora, and the ways this should be visualised and presented to the public to facilitate feedback.⁴ As part of this process, consider different groups and their particular information needs (e.g. active consumers and whānau, informed public (including the media), and the general public). Include feedback loops so that changes that are implemented can be monitored and consumers and whānau and the public can give feedback on reporting.</p>	6 months
25	<p>Identify critical external users and work with them to understand the trade-offs between data quality and timeliness that matter to them and understand how credible they find the data story being told.</p>	
26	<p>Explore feedback options: Consider providing an option for the public to give feedback/note errors in the data via the performance reporting website.</p>	6 months
27	<p>Build a safety culture: Provide a clear, documented escalation plan for staff to express and report concerns about performance reporting, including a system of policies and practice guidelines that encourage staff to report their concerns.</p>	6 months & ongoing
28	<p>Build trust and confidence: Acknowledge the skills, expertise and experience of staff, particularly analysts, and gain their confidence and trust with a supportive, continuous learning environment. Provide a mechanism for regular engagement with the local teams to receive feedback from them, and help the local teams get value from what is being provided.</p>	6 months & ongoing

⁴ Joint guidance from the Office of the Auditor General, Audit New Zealand and the Treasury: Good practice in reporting about performance, published in October 2021, states "In my view, the first step in preparing a meaningful story about public sector performance is to understand what people want to know about public organisations, and their contribution to New Zealanders' wellbeing." Available at: [Good practice in reporting about performance — Office of the Auditor-General New Zealand \(oag.parliament.nz\)](https://www.oag.parliament.nz/publications/good-practice-in-reporting-about-performance)

Action plan

National Collections Pipeline and Reporting System Action plan

The key recommendations are summarised in the following high-level action plan:

IMMEDIATE – WEEK 1

- Engage with Te Aka Whai Ora as a key partner in implementing the review recommendations.
- Move monthly public performance reporting of the 12 measures to a three month cycle aligned with current quarterly reporting.
- Commence recruitment of analyst roles for national collections (to provide domain expertise for national collections and publication).

MEDIUM TERM – WEEK 1–6

- Expert-led investigation and correction of NNPAC data pipeline data quality issues.
- Develop a national collections' reporting system that simplifies and automates the production of measures for reporting including:
 - a central data repository for all measures using national collections
 - a single public-facing tool for reporting measures to the public
 - an auditable quality assurance and sign-off process.

LONGER TERM – WEEK 1–12+

- Develop a Te Whatu Ora reporting framework

The health sector principles (section 7, Pae Ora (Healthy Futures) Act 2022) will need to be fully considered when a detailed action plan for implementation is developed.

2. BACKGROUND AND CONTEXT

Pre July 2022 – Manatū Hauora performance reporting

1. Prior to the establishment of Te Whatu Ora in July 2022, health system performance measures were published and updated by Manatū Hauora. Data was published in multiple different formats including databases and downloadable MS Excel spreadsheets and web-based dashboards. Data was reported via multiple locations including the website of Manatū Hauora,⁵ the National Services Framework Library⁶ and an online dashboard developed by the HQSC.⁷
2. Data used for performance reporting was captured through national collections' databases⁸ (national collections of health and disability information), which were managed by a Manatū Hauora national collections and reporting team. There are 15 national collections (see [Appendix Four](#)). Data for the national collections is largely produced by hospitals with regular uploads to the national collections.
3. The national collections and reporting team included staff responsible for maintaining the databases and monitoring the quality of the information in the collections, and a wider team of analysts with subject matter expertise (SME) in each of the collections. These SME analyst teams have in-depth knowledge of the data in a collection and how it can and should be used.
4. Manatū Hauora maintained a Nationwide Service Framework Library (NSFL) website, which included a collection of business rules and non-clinical guidelines for DHBs along with some performance reports.⁹ An Operating Policy Framework (OPF) for DHBs set out detailed data collection, data quality and reporting requirements.
5. The OPF set out requirements for when DHBs had to report data to national collections; for the National Booking Reporting system (NBRS), National Non-Admitted Patient Collection (NNPAC) and National Minimum Data Set (NMDS) collections, which are relevant to this review; this is generally within 21 days post the months of service/discharge. Therefore, the earliest that data from these collections should be used is after the first refresh i.e. after the 21st of the month; an earlier extract from the collection will likely be incomplete data.
6. At Manatū Hauora usual practice was to run all performance reports on the first Monday of the month, one month in arrears. This was to allow extra time for 'late' data submission and error corrections.
7. Manatū Hauora coordinated and published quarterly performance reports of DHBs to the public as part of a non-financial quarterly reporting process to monitor progress against DHB annual plans and an accountability framework ('DHB Quarterly Non-Financial Reporting'). This quarterly reporting process involved five main steps: (i) Manatū Hauora populated a reporting website with the list of reports required for the quarter and sent reporting templates to DHBs with data from national collections, for DHBs to review and complete; (ii) DHB reporting was uploaded to the site by the 20th of the month following the end of the quarter; (iii) DHB reports were assessed by Manatū Hauora and initial ratings and feedback provided via the website; (iv) DHBs accessed the initial results and responded to the feedback from Manatū Hauora; and (v) Manatū Hauora assessed the responses and supplied a final rating. These activities set a three-month delay to generation of reports, meaning the quarterly reports' data lagged by one quarter. The reporting processes run under the DHB system were resource intensive (over 60 separate templates as at Q4 2021/22), and had developed over many years.

⁵ For example, National and regional immunisation coverage data: [National and regional immunisation data | Ministry of Health NZ](#).

⁶ The National Services Framework Library (NSFL) is a website administered by Manatū Hauora with business rules and templates for reporting, and performance measures and reports. Data for Manatū Hauora quarterly performance reports hosted on the NSFL website include faster cancer treatment and shorter stays in emergency departments; mental health, alcohol and drug addiction sector performance monitoring and improvement; and ambulatory sensitive (avoidable) hospital admissions. See: [Data for quarterly reports and reporting | Nationwide Service Framework Library \(health.govt.nz\)](#)

⁷ The Health System Indicators (HSI) are reported via an online dashboard. Available at: <https://reports.hqsc.govt.nz/HSI/>

⁸ See: [Collections | Ministry of Health NZ](#)

⁹ See footnote 2.

8. For ED data, DHBs submitted data from their data systems to the NN PAC national data collection. DHBs were also required to fill in a template ('SS10' template) with ED volumes at their facilities each quarter to report the shorter stay in ED (SSED) metric for the quarterly (non-financial) performance reporting. DHBs sourced these numbers from their respective patient administration systems (PAS). However, the SS10 data could not be broken down by demographic features including ethnicity, which is critical for understanding and addressing equity. In addition, in April 2021 a further data collection was introduced, 'weekly acute data reporting', with DHBs completing a weekly template of a small number of metrics reflecting acute demand. The weekly acute report included the SSED metric.
9. Additional public reporting occurred via individual DHBs. Performance measures were included in an update on non-financial performance as part of DHBs' monthly Board papers, which were made available to the public. There was no standard format and no standard set of measures for DHB Board reporting, and the timeframes for reporting data varied.
10. In June 2022 a paper for the "Interim Health New Zealand Executive Leadership Team" (Interim ELT paper) proposed initial (internal) monthly and quarterly reporting under a draft Health New Zealand Integrated Performance Reporting Framework. The paper, titled "Approach to Health New Zealand Integrated Performance Reporting Framework" and dated 28 June 2022, proposed reporting at three levels, to Ministers/government departments to fulfil legal obligations; the Board of Te Whatu Ora "on operational performance and organisational risk management"; and the Executive Leadership Team (ELT), "executive level reporting". The paper set out proposed indicators for monthly reporting to the Board. The Interim ELT paper did not make any reference to public reporting of performance indicators.

Handover of performance reporting to Te Whatu Ora

11. Te Whatu Ora was formally established on 1 July 2022. Arrangements were made for the handover of performance monitoring and reporting from Manatū Hauora to Te Whatu Ora from 1 July. Some staff overseeing performance reporting at Manatū Hauora transferred to Te Whatu Ora. This included a National Collections and Reporting Group, which is responsible for monitoring and improving data reporting to the national collections. The National Collections and Reporting Group is now part of the Data and Digital Directorate of Te Whatu Ora.
12. Some of the Manatū Hauora analyst staff with in-depth subject matter expertise in the national collections did not transfer to Te Whatu Ora. In addition, some of the roles transferred were vacated due to staff leaving on transfer, leading to a loss of knowledge and expertise in the national collections' and performance reporting; this included a principal advisor role for the System Accountability and Performance team.
13. Manatū Hauora ceased its non-financial performance reporting processes as of 30 June 2022.
14. In August 2022 Manatū Hauora shared with Te Whatu Ora detailed handover documentation to enable Te Whatu Ora to continue Manatū Hauora operational reporting and analytics processes. Manatū Hauora proposed to provide ongoing support for performance reports until 30 September 2022 on the basis "we would anticipate that Te Whatu Ora will have built national analytical capability and capacity" during this time. Manatū Hauora noted that new reports or data requests remained the sole responsibility of Te Whatu Ora.

3. PROCESS UNDERLYING PUBLICATION OF CLINICAL DATA ON WEBSITE OF TE WHATU ORA IN MARCH 2023

Development of the 12 measures for monthly public performance reporting

Selecting the metrics

15. In July 2022, Te Whatu Ora commenced monthly reporting of financial and non-financial performance information to its Board. This information was not reported publicly.
16. In September 2022, the Board of Te Whatu Ora discussed at its meeting, a paper titled “31 August Monthly Report”. The paper is dated 21 September 2022 and was prepared by the Lead, System Accountability and Performance. The paper refers to the public release of performance information in two respects.
17. First, the 21 September Board paper states that “We understand that it is now proposed that the monthly financial and non-financial performance reports will be publicly released following provision to the Minister of Health and completion of communication and Official Information Act review processes. This will commence with the 31 August report. It is also proposed that the quarterly report will be published on the website and linked with internal and external pānui.”
18. Second, the 21 September Board papers states that “A project is also underway to publish key operational data on Te Whatu Ora website, initially focused on hospital-level information. A number of steps are required to deliver this level of public reporting, including:
 - Agreement to an indicator set. The measures selected will drive when reporting can begin.
 - Agreement to a curation/validation process to confirm material ahead of publication.
 - Ideally creating a single place where the public can locate this information, with links from local websites where appropriate.

An update on the public reporting project will be provided at the October Board meeting.”

19. The minutes of the September Board meeting record that “The Board discussed releasing performance data to the public arena. It was agreed that there are different levels of information required to govern and manage the business that are not always appropriate for the public. DHBs released performance datasets, which Te Whatu Ora will continue to do.” The Board minutes record an action following this record: “CE to draft an approach to the public release of performance data for the Board’s endorsement. Also consider monitors and the information they receive.”
20. The project established to publish key operational data on the website of Te Whatu Ora was led by the Governance, Partnerships and Risk Group. A working group was formed that included staff from Governance Partnerships and Risk, Communications, Hospital and Specialist Services, and National Public Health staff. Advice was sought from Manatū Hauora, HQSC and Te Aka Whai Ora.

21. A project brief titled “Public reporting of key operational information” sets out the purpose of the proposed monthly public reporting: “Providing public visibility of Te Whatu Ora’s key operational information in a way that builds trust and confidence in the entity”. The aim of the project was “to identify what key operational data should be published on the website”. The project brief identified three key steps as set out in the 21 September Board paper: agree an indicator set; agree a curation/validation process to confirm material ahead of publication; and, ideally, create a single place for publication.
22. The project brief set out a project timetable that included initiation week 1, commencing the week of 3 October 2022 with design of the project and establishing a working group; a workshop commencing the week of 10 October to agree what key data is available and can be published; preparing draft advice for the ELT summarising the key operational information to be released, the curation/validation process and how the information will be made available to the public; and making recommendations to the Board. An ELT paper was due 13 October and a Board paper on 19 October.
23. A set of 12 performance measures was proposed based on criteria including: “having a current source of stable national data”; the measures would cover those previously reported by DHBs; and measures could be published on a monthly basis with a three-month data lag. The 12 proposed indicators included five Health System Indicators (HSI).¹⁰
24. On 10 October the Principal Advisor, Government, Partnerships and Risk, convened a workshop to discuss a list of potential metrics for publication. Attendees at the workshop included representatives from the Government, Partnerships and Risk team; Hospital and Specialist Services; National Public Health Service; Data and Digital directorate; Te Whatu Ora Communications team; Manatū Hauora; and two representatives from the HQSC.

HQSC advice

25. The two HQSC representatives were senior members of the Commission’s Health Quality Intelligence team with expertise and good knowledge of public reporting. The HQSC team emphasised the following points at the 10 October workshop:
 - The proposed measures included HSI and the HQSC had been part of the team that developed the HSI. The process for developing the HSI was laborious, thorough and underpinned by a logic framework. The framework underpinning the proposed performance measures for public reporting was not clear to the HQSC.
 - Te Whatu Ora needed to look at the timetable for reporting the data. There is a lag in reporting the HSI which is important to allow for data to be uploaded to the national collections and the data reports to be validated by the local teams. The HQSC team described the HSI checking and validation process, which includes an internal peer review then review by local teams to check the data aligns with their understanding. It is usual practice to allow two to three weeks for local teams to check and provide an accompanying narrative for the data.
 - There is a clear distinction between reporting for operational purposes and reporting to the public. For operational reporting, timeliness can be important and there may be a trade-off of timely reporting over accuracy (e.g. a tolerance limit) to allow rapid decision making. In contrast, for public reporting a high degree of accuracy of the data does matter.
 - The way the HSI were proposed to be used was against the HQSC’s advice. The HSI were designed to be reported quarterly. A three-month lag in reporting was required to allow for completeness of data and thorough checking and validation. The three-month lag also compensated for the fact that the national collections were dynamic – frequently being updated with new data and historic data corrected by local teams.

¹⁰ See footnote 7.

- The HQSC team offered to take the Te Whatu Ora team through the HSI reporting process in more detail; however this offer was not taken up by Te Whatu Ora. The HQSC team's impression was a sense of urgency from Te Whatu Ora staff: there was a need to do something quickly and get something up on the website.
 - HQSC stressed that the purpose of public reporting is to build public confidence and trust and if the data comes out wrong trust is easily lost and hard to regain. For this reason, public reporting demands a high threshold for data accuracy – people need to be confident in the robustness of the data. Therefore accuracy of the data should not be compromised by frequency of reporting. HQSC sensed that the Te Whatu Ora team was willing to trade off accuracy for timeliness (more frequent, monthly, reporting).
26. On 11 October 2022, the Principal Advisor, Government, Partnerships and Risk, sent an email to the workshop attendees asking for feedback for a list of potential metrics for publication including any issues or challenges with the proposed measures “e.g. cadence, speed of reporting, data validity”.
27. An HQSC senior advisor who attended the workshop replied to the Principal Advisor on 12 October stating that some of the HSI information was incorrect and needed to be updated, and that the detail on the time lag for the indicators needed “tidying up”. The HQSC advisor noted that all HSI are reported to the public a quarter behind except for immunisations and two patient experience indicators. The quarter (three-month) time lag is to allow for provisional data to be confirmed by the local teams. “We are assuming that the reporting will follow the same process as previous, which allows time for validation and informing the Minister’s office (if required).” The HQSC noted that the source of the proposed reporting was confusing – some being data already publicly reported, and some internally reported (e.g. through Te Whatu Ora Qlik dashboards).¹¹
28. On 17 October 2022 the System Accountability and Performance Lead emailed the workshop attendees and asked them for feedback on a draft text for a Board paper on public reporting of performance data. An HQSC senior advisor replied to the System Accountability and Performance Lead on 19 October with “strong advice and recommendations covering indicators, process and reporting”. The senior advisor noted “the reporting advice is probably the most significant and we would urge you to take this on board seriously, getting this wrong at the start will make it very hard to shift to a coherent transparency agenda later.” The advice of the HQSC senior advisor included the following:
- Updating indicators monthly is a large task and the logistics of updating measures such as ambulatory sensitive hospitalisations (ASH) need to be considered carefully.
 - The Board paper suggests the agreed process for validating the HSI data may not occur for the monthly reporting. The HQSC strongly cautioned against moving away from this process noting that nothing would reduce public trust more than having to correct data later routinely.
 - Given reporting will be at a local level, local teams will need to validate the data. This is particularly important in the context of public reporting because there will likely be media scrutiny and local teams will be contacted for comment.
 - It will be important to ensure the HQSC’s HSIs dashboard has the same data that Te Whatu Ora makes available, otherwise it will lead to confusion. The best approach would usually be to share the dataset, report a point in time and not change historic data with each update. Therefore, the data needs to be accurate.

¹¹ Qlik is a data integration, analytics and reporting tool. It provides for interactive dashboards and self-service visualisations of data. The Qlik environment is not accessible to the public; however, staff at Te Whatu Ora and support agencies can gain access through allocation of licences.

- The way the data is presented is very important. For transparency to work well, context needs to be provided. For example, measures concerning access reported purely as numbers without information about performance over time is not particularly useful as this will not inform people about the scale and nature of the problem. This can be addressed quite simply by the way the data is presented. For example, by using a statistical process control chart by month showing data over a period of years; and a distribution chart showing how long people are waiting in weeks. Showing these details is important because the causes and response will be different.
 - The Commission strongly recommended using a dashboard rather than MS Excel spreadsheets because this will help ensure the best presentation, and a dashboard is far more flexible and easier for the public to use. The Commission noted that developing a dashboard could be done relatively easily and the Commission could help to do this. The Commission advised that if there was a view that immediate publication was needed before a dashboard could be built, then there should be a clear view about how reporting will move to a dashboard.
29. A Board paper titled “Public Reporting of Performance Information” and dated 21 October 2022 (October Board paper), was submitted to the Board and discussed at its October 2022 meeting. The purpose of the paper was to “report back on the project underway to publish key performance information on Te Whatu Ora’s website as part of operating a transparent Aotearoa New Zealand health system”. The paper recommended the Board discuss the update on the progress of the project, agree a set of planned indicators for public reporting and agree a proposed implementation plan.
 30. The October Board paper reports that a project team, led by the Governance, Partnerships and Risk Group, had consulted and engaged with Te Whatu Ora staff from Performance Reporting, Data and Digital, Hospital and Specialist Services, National Public Health Service and Communications staff, along with staff from Manatū Hauora, the HQSC and Te Aka Whai Ora. The project team identified a small set of performance measures (12 measures set out in the paper) that could be published on the website of Te Whatu Ora on a monthly basis. The paper notes the identified measures have a current source of stable national data and cover areas of key public interest such as mental health, cancer treatment and planned care. The paper includes discussion about the ‘curation/validation process’, the form and location of publication, the risks associated with publication and the timing of publication.
 31. The October Board paper acknowledges “There is a trade-off between timeliness and accuracy in data preparation” and notes that “Historically, accuracy had been favoured over timeliness. Data was produced by districts mostly through regular uploads to the national collections. Manatū Hauora then produced collated templates for DHBs to review and complete. These activities set a three-month delay to generation of reports, meaning quarterly reports have lagged by one quarter. This system ensured data accuracy and stability in the decentralised DHB system.” The paper states that “The project team has recommended measures which have stable current data sources and will enable reliable and rapid public reporting of information. The recommended indicator set can be reported each month, with three-month data currency.”
 32. With respect to the format of publication, the project team recommended, in the short term, the 12 measures were presented as MS Excel datasets with an overview summary of high level trends, noting in the Board paper that “This balances the ability of those who wish to interrogate the data with a user-friendly summary that meets government accessibility standards.” The paper noted that interactive tools could be developed in time.

33. The October Board paper notes that analytical resource would be sought from Canterbury to build a prototype analytical dashboard for the measure set; this was because the System Accountability and Performance team, who were now leading the development of performance reporting, did not have analyst resource and the team wanted to begin reporting before Christmas. The paper noted that reporting lines for the analytic team would move as national functions were created and the operating model for the performance reporting and accountability function was developed. The paper states “We want monthly performance reporting to begin before Christmas. To achieve this, we need agreement to the indicator set and arrangements for establishing a delivery team.”
34. The Board of Te Whatu Ora approved the 12 metrics recommended for monthly public reporting (see [Appendix Five](#)).
35. On 2 November 2022, the System Accountability and Performance Lead emailed the October 10 workshop attendees, thanking them for their advice on public reporting and enclosing a summary of the Board paper. The HQSC senior advisor noted that the information provided to the Board did not reflect the HQSC’s advice from 19 October. The System Accountability and Performance Lead advised the attendees that the public reporting implementation plan would address the points raised by the group.
36. A Board report titled “31 October Monthly Board Report”, and dated 21 November 2022, was submitted to the Board for its November meeting. The report asks the Board to note a “draft implementation plan for public reporting of performance metrics” ([Appendix Three](#).) The draft implementation plan sets key steps including “building the analytical dashboard for the indicator set” and sets out a timeline stating that public reporting will commence prior to Christmas 2022. The implementation plan did not address the concerns raised by the HQSC.

FINDINGS

- The short timeframe to set up and commence monthly performance reporting was not realistic. The sense of urgency to commence public reporting led to the advice of the HQSC not being reflected in the October 2022 Board paper and not being followed fully. Specifically:
 - the logistics of updating the measures particularly complex measures such as the ASH rates, was not sufficiently considered
 - many of the proposed measures were not designed for monthly public reporting. Sufficient time needed to be allowed for preparing and checking and validating the data and providing narrative (context) for the public
 - the Board paper did not discuss the validation process as recommended by the HQSC (the HSI validation process including validation by districts), and the process for validating the measures was not clearly specified
 - the Board paper did not discuss the importance of providing context with the report
 - the Board paper did not discuss aligning the timing of the publication of the measures with the HQSC’s publication of the HSI dashboard
 - the Board paper did not acknowledge the principle that public reporting demands a high threshold for data accuracy, and this should not be compromised by frequent reporting.
- The Board paper did not provide a clear view as to how presentation would move to a dashboard to mitigate the risk of manual data handling and provide more meaningful data to the public. Concerns about the unrealistic timeframe, and the risk of damaging public confidence and trust, were not escalated to the ELT and no one spoke up and said to the Board that monthly public reporting was not feasible.

Data sources and preparation of the data for the inaugural monthly public performance report (December 2022)

37. In late November 2022, the System Accountability and Performance Lead sought the advice of a Manager, Performance Monitoring and Analytics at Manatū Hauora about what data sources should be used for the 12 performance measures. The Manatū Hauora Manager had expert knowledge and experience (over 11 years) in the national collections and performance reporting previously undertaken by Manatū Hauora; there was no equivalent experience within Te Whatu Ora. The Manager provided advice in relation to six of the 12 measures, recommending national data collections that should be used for particular measures (including the ED measures) and providing a set of written instructions with diagrams (screenshots) about where to source and how to extract data for two of the measures via the previous Manatū Hauora (and now Te Whatu Ora), Qlik data environment.
38. The System Accountability and Performance Lead brought together a small delivery team (primarily analytic staff from Te Whatu Ora Waitaha | Canterbury, and communications staff), to collate and prepare the measures and information for the inaugural publication. This was necessary because there was no analyst resource in the System Accountability and Performance team at this time to undertake this work.
39. The analytics team at Te Whatu Ora Waitaha | Canterbury did not have subject matter expertise in the national collections systems that would be used to source the data. The Waitaha analytics team leader advised the System Accountability and Performance Lead that the analytics team could not prepare a data report because it would require the team to start developing a solution from scratch, and the team would need to call extensively on knowledge and access to data from others who have previously been involved in health system indicator reporting.
40. The analytics team leader noted that there was no existing dataset available for these measures on a monthly basis; and there was no detailed documentation on where and how to access the required data to report on the measures. The team leader stated that development of new processes would take considerable time and resource and would not enable the team to produce any reporting of value before Christmas. The team leader suggested a virtual team of existing staff who had previously been involved in managing the data or reporting these measures in the past would be the most expedient way to prepare the data for reporting.
41. The System Accountability and Performance Lead advised that the data had to be prepared for reporting per the Board's requirements and there was a deadline – the measures needed to be reported before Christmas.
42. The Waitaha analytics team contacted the Manager, Performance Monitoring and Analytics at Manatū Hauora who had previously provided advice to the System Accountability and Performance Team about the data sources that should be used for six of the 12 performance measures. The Manatū Hauora Manager provided the Waitaha analytics team with a document detailing the data sources for the six measures with instructions on how to extract and prepare the data, and provided further advice to the analytics team when they had issues extracting the data.
43. There were multiple sources of data identified for the measures:
 - Te Whatu Ora Qlik data environment developed and previously overseen by Manatū Hauora for Immunisation data, sourced from the National Immunisation Register national collection).
 - Te Whatu Ora Qlik data environment ED data, sourced from the NNPAAC national collection.
 - The Nationwide Service Framework Library (NSFL) for ambulatory sensitive hospitalisation (ASH) data and Acute hospital bed day data.

- National Booking and Reporting System (NBRS) KPI Qlik apps (raw data sourced from the NBRS national collection for Elective Services Patient Flow Indicator (ESPI) data. Or the data could be extracted from a R-Shiny tool.
 - A Mental Health Team at Manatū Hauora who provide an MS Excel spreadsheet of data (PP8 Mental Health Access Rates reporting) extracted from the Programme for the Integration of Mental Health Data (PRIMHD) national collection. The data sent was in raw form; the Waitaha analytics team ran this through a business intelligence tool, Tableau, to calculate percentages.
 - Te Aho o Te Kahu | Cancer Control Agency, who report Faster Cancer Treatment data. The data that came from Te Aho was six months of data in a complete format appropriate for reporting.
44. The Waitaha analytics team extracted all data into a single MS Excel workbook. Some of the data was extracted from the Qlik environment; this was a new process for the analytics team, as Qlik was relatively new to the team. Most of the source data sets do not contain regional rates or volumes and therefore these need to be calculated within MS Excel. The data was aggregated into regions and the aggregate values copied into tables in a Word document for publication alongside individual MS Excel sheets for each measure.
 45. The Waitaha analytics team noted when checking the data that the data extracted from NNPAAC (used to report the ED performance measures) did not reconcile with local Waitaha data, and there appeared to be volume gaps in the data. The team was unable to verify the data as they did not have subject matter expertise in the data source, the Qlik app and NNPAAC data set. The team provided caveats to the data reports that they submitted to the System Accountability and Performance team.
 46. The System Accountability and Performance Lead instigated a quality assurance process for the data reports provided by the Waitaha analytics team. The data reports were sent to the System Accountability and Performance Team Leader, and the Hospital and Specialist Services Regional Directors for review; and the aggregated data report (regional level data in a Word document format) was submitted to the Board and Minister of Health. The System Accountability and Performance Lead did not receive a response from the Regional Directors.
 47. In December 2022 an advance copy of the 12 performance measures reports that Te Whatu Ora planned to release in December, alongside publication of the first quarterly report, was presented to the Minister in an Aide Memoire. It was recommended that the 12 performance measures reports be published on the Te Whatu Ora website on 19 December 2022.
 48. On 14 December the System Accountability and Performance Lead advised the HQSC that Te Whatu Ora would be publishing the 12 performance measures next week and this had been agreed by the Board of Te Whatu Ora.
 49. The Waitaha analytics team received an email on 21 December advising them that the 12 performance measures reports had been published on the website. The measures were published as tables with whole numbers or rates and did not have any narrative/context commentary for the public.
 50. Following publication, the Waitaha analytics team was advised by a Capital Coast analyst colleague that there was a data error in the published report concerning the national result for people waiting over 365 days for treatment (indicator 9). The System Accountability and Performance team corrected this error in the subsequent March 2023 data report and the correction was noted in the report; this was the only data error notified to the Waitaha team.
 51. During this review, a local data team manager noted that November and December 2022 ED volumes were low for the district due to zero lengths of stay. Checking these errors exposed more issues that delayed the district's re-submission of data. The district was reporting the same admission and discharge date and time. The issue has now been fixed.

FINDINGS

- The handover of performance reporting from Manatū Hauora to Te Whatu Ora did not provide for transfer of sufficient performance reporting analyst expertise with knowledge and experience in the national data collections to enable the rapid and reliable development of new performance reporting to the public.
- There was insufficient capacity and capability in the System Accountability and Performance team, in particular analyst resource, to support the rapid development of monthly public performance reporting.
- The analyst team preparing the data were required to extract and prepare the data reports without clear instructions and expertise in the national collections.
- The measures selected and data systems for national collections required data extraction from multiple data sources and a lot of manual handling manual processing in multiple MS Excel spreadsheets by analysts unfamiliar with the national collections data sources, which increased the complexity of the data processing and the risk of data errors.
- Short timeframes meant there was insufficient time to develop tools to reduce the amount of manual data processing and automate reporting.
- The data quality assurance checks to ensure the quality of the data and accuracy of the reports were not documented and were inadequate.

Preparation and publication of the data for the second monthly public report (March 2023)

52. In January 2023, the System Accountability and Performance team commenced preparation of a second monthly public performance report for the 12 selected measures. The team now had two team members who could prepare the data and reports. One team member, an advisor, who had limited capacity, was involved in most of this work. A summary report (Word document) was required for the Board paper urgently. The regional and national data was calculated separately, and it was agreed the data sheets could be prepared after the summary had been submitted to the Board.
53. A Board paper dated 1 February titled “Public reporting of key performance metrics January 2023” was prepared and submitted to the Board. The paper included a monthly key performance measures summary Word document (data aggregated to regional level).
54. The paper notes that performance has been updated to the latest available period across all measures. It also notes limitations of data availability due to national collections, coding and analytical processes mean that for some measures the most available data is to September 2022, while other measures are available to December 2022. The data error in the December report and correction were also noted.
55. An Aide Memoire dated 2 February was prepared for the Minister of Health titled “31 December 2022 Monthly Reporting”; the Word document data report (regional level data) was enclosed with this paper.
56. A System Accountability and Performance team advisor extracted the data for the performance reports published in March, from the same sources used by the Waitaha analytics team. As this was the first time the analyst had done the extraction, the full table for NNPAC ED data from Qlik was downloaded for the 2022 calendar year. The extract was downloaded to a MS Excel file and a pivot table used to produce the required tables for the ED calculations. The measures were then copied and pasted into individual sheets. The regional and national data was calculated separately and, therefore, when the ED data sheet was reviewed by the advisor, it appeared as though the volumes added up.

57. There was a delay between the summary document being submitted to the Board and the eventual publication on the website as decisions were made about how the documents should be presented. During the process of completing the data, some sets of data were downloaded more than once. During a pre-publication check, the analyst noticed that data within the Shorter Stays in Emergency Departments (SSED) data sheet had been lost (two tables were empty) for the months of November and December 2022. The reason why the data was lost is not clear.
58. The SSED data for the months of November and December could not be retrieved. The System Accountability and Performance team advisor re-extracted the data from Qlik, exporting it into the MS Excel sheet. The data was exported with an additional line included in the November and December data, which resulted in the correct data being offset by one line in the spreadsheet from Northland downwards. (See [Appendix Six](#) for a visualisation of this error.)
59. The MS Excel spreadsheet with the re-extracted data was not checked by a second analyst. The MS Excel workbook and Word document summary report were sent to the System Accountability and Performance Lead and the Team Leader. The reports were not sent to the Regional Directors for checking, as these roles were no longer in place.
60. The Word document summary report (“National Performance Reporting Indicators – Board Update January 2023: key metrics summary”) was sent to a Manager, Performance Monitoring and Analytics at Manatū Hauora for review; the Excel workbook with data sheets was not included. On 7 February, the Manatū Hauora Manager replied to the System Accountability and Performance Lead with suggested rephrasing of two SSED measure caveats in the summary report, as the comments were not technically correct.
61. On 28 February the System Accountability and Performance team advisor who had prepared the January 2023 reports for the 12 publicly reported measures (MS Excel workbook and Word document summary report), sent an email to a group of Manatū Hauora Performance Monitoring and Analytics staff with a proposed reporting calendar for the 12 publicly reported performance measures.
62. The System Accountability and Performance team advisor noted in their 28 February email that they had established limited resource to achieve monthly Board and public reporting; however, the production cycles for the measures do not align with either the monthly Board paper dates or with each other. Feedback was sought from the Manatū Hauora staff about what data would be available on the 18th of each month.
63. On 1 March, the Manatū Hauora Manager, Performance Monitoring and Analytics replied to the System Accountability and Performance team advisor. The Manager noted that for three national collections, NBRIS, NNPAAC and NMDS, reporting requirements for districts is generally within 21 days post the ‘month of service/discharge’. Therefore, the absolute soonest this data could be used is after first refresh, i.e. after the 21st of the month; “[a]ny earlier than this and you are likely to be looking at (very) incomplete information which is likely to change.” The Manager noted that the general practice at Manatū Hauora is to run all performance reports on the first Monday of the month, one month in arrears; this gives extra time for ‘late’ submissions, error corrections and validation. Therefore, there would be an approximate six-week lag, with January results final and complete on 18 March.
64. In the email of 1 March, the Manatū Hauora Manager, Performance Monitoring and Analytics, raised the issue of data submissions to the national collections becoming more delayed due to a reprioritisation of local resources to other projects. An email attached to their message set out a list detailing national collections data quality issues for 11 districts for NBRIS, NNPAAC and NMDS data in November and December 2022 and January 2023 (see [Appendix Seven](#) for the list). The Manager noted that “Even on the 28th of February there is still substantial missing data for a number of districts for December [2022] – and the January [2023] data is looking pretty patchy.” The Manatū Hauora Manager did not receive a response to this email.

65. On 6 March 2023, the January 2023 reports for the 12 publicly reported measures (MS Excel spreadsheets and Word document summary report) were published on the website. The reports reported data up to and including December 2022. The measures were published as tables with whole numbers or rates and did not have any narrative/context commentary for the public.
66. On 8 March, the media team at Te Whatu Ora were notified by a media organisation that it would be reporting on ED waiting times. A media advisor for Te Whatu Ora replied to the media organisation providing a link to the monthly performance measures report on their website. The media organisation then replied to the media advisor that there seemed to be data errors in the performance report published on the website and highlighted the example of the data for indicator 12 – SSED.
67. The incorrect data reports were removed from the website on 9 March and updated data republished on 10 March.

FINDINGS

- The lack of subject matter knowledge and expertise in the national data collections meant the analyst teams preparing the data were not aware of/did not appreciate the significance of the dynamic nature of the collections' data and the concerns regarding the quality of the data (incomplete and incorrect data).
- The analyst team preparing the data was required to extract and prepare the data reports without clear instructions and expertise in the national collections.
- The measures selected and data systems for national collections required data extraction from multiple data sources and a lot of manual handling manual processing in multiple MS Excel spreadsheets by analysts unfamiliar with the national collections' data sources, which increased the complexity of the data processing and the risk of data errors.
- Short timeframes meant there was insufficient time to develop tools to reduce the amount of manual data processing and automate reporting.
- The data quality assurance checks put in place to ensure quality and accuracy of the reports were not documented and were inadequate, and the checks that were in place were not always followed. The lack of subject matter expertise in the national data collections meant the analyst team was unable to effectively sense check the data; there was a lack of sense checking by clinicians/people with experience of context, and a lack of validation of the data at source. Roles and responsibilities and an executive sign off process were not clear.
- Concerns about the lack of a well-developed, robust public reporting process and the risk to damaging public confidence and trust were not escalated to the ELT and no one spoke up and said to the Board that monthly public reporting was not feasible.
- Important information (i.e. the more detailed data in the MS Excel spreadsheets) was not made available to key stakeholders during the quality assurance checks. If the spreadsheets had been included in the information shared for checking, there is a high likelihood that someone would have noticed errors in the same way the media organisation did.

4. QUARTERLY REPORTING OF PERFORMANCE MEASURES

68. The Quarterly Performance Report of Te Whatu Ora is another report with clinical measures published on the website. The first Quarterly Report by Te Whatu Ora, covering the period 1 July to 30 Sept 2022, was finalised and submitted to the Board in November 2022 and was published on the website on 3 February 2023. The report includes some of the 12 measures selected for the monthly public performance reporting with national and regional data (not local-level data; narrative/commentary is provided).
69. The first Quarterly Performance Report notes that reporting is constrained by what, how and when information is currently collected, with current measures being a mix of on time, real time, near time and lag time measures. The report also notes there are challenges with the mix of systems for recording performance information, many of which involve manual processes, and there are data quality and system constraints including the absence of national reporting systems, data quality and consistency checks; challenges in providing comparatives, with data not comparable with previous collections; variation in pay cycles across Te Whatu Ora, and challenges in aligning these with the reporting in Quarter One; and gaps in some data sets.
70. The report acknowledges that building a Te Whatu Ora performance reporting system is a multi-year work programme.
71. In early February 2023, the System Accountability and Performance team completed a rapid six-week review of the previous Manatū Hauora non-financial quarterly performance reporting process for District Health Boards (DHBs) that had been handed over to Te Whatu Ora (“inherited DHB non-financial performance reporting processes”). The team prepared a “Project brief: Developing Te Whatu Ora’s performance framework” for the ELT proposing to complete work on developing a future performance framework for Te Whatu Ora. The project brief notes “there is an expectation that the full New Zealand Health Plan will include an outcomes framework ... alongside a system-wide performance framework, which will be in place at the start of the 2024/25 year”. The brief states that “shaping Te Whatu Ora’s performance framework should play a key role in helping to develop the system-wide performance framework” and proposed a first phase of a project to complete the work to develop a Te Whatu Ora performance framework to commence in quarter three (2023). The ELT approved the approach proposed. The work has not progressed at this stage due to resourcing issues.

FINDINGS

- There is no clear performance reporting framework and catalogue that sets out an underpinning logic and rationale for performance reporting and describes clear systems and processes for reporting including the purpose of reporting (e.g. operational decision making, performance and accountability, building public trust and confidence); reporting priorities; quality assurance processes; roles and responsibilities; governance processes.
- Many of the 12 measures selected for monthly public performance reporting are also reported in the Quarterly Performance Report. The measures are designed, and are more appropriate, to be reported quarterly.
- The Quarterly Reporting measures are largely sourced from the national data collections and consequently there are similar/the same challenges as seen with monthly performance reporting:
 - A mix of systems for recording performance information, many of which involve manual processes
 - Data quality and system constraints including the absence of national reporting systems, data quality and consistency checks; challenges in providing comparatives with data not comparable with previous collections; and gaps in some data sets.

5. PUBLICATION OF OTHER CLINICAL MEASURES ON THE WEBSITE

72. Clinical measures published on the website, in addition to the 12 performance measures reported monthly, are almost all found on the website's "Data and Statistics" page.¹² There are 12 reports/web tools presenting interactive tables and graphs and comparative data covering a wide range of areas including new cancer registrations, maternity clinical indicators, specialist inpatient and community mental health and addiction services data, mortality data and pharmaceutical data.
73. These Data and Statistics reports are longstanding, initially published by the National Collections and Reporting team of Manatū Hauora. There are well-established and documented quality assurance processes to check and validate the data published in these reports. The relative lag in reporting these data (most data is reported to 2020; the most recent data is for FY2021/22 (suspected self-inflicted deaths), reflects the rigour of the processes and procedures in place for ensuring the accuracy of the data prior to its publication.
74. The National Collections and Reporting team that is responsible for publishing these data reports, transferred to the Data and Digital directorate of Te Whatu Ora, with the establishment of Te Whatu Ora on 1 July 2022. The team continues to oversee the publication of these data reports now on the website.
75. Given the stability of this reporting system and well-established processes for publication of this clinical data on the website, and the short time for this review, the review team has not undertaken any further documentation of the processes for publication of these data.

¹² See: [Data and statistics – Te Whatu Ora - Health New Zealand](#)

6. FURTHER COMMENTS BY THE HEALTH QUALITY AND SAFETY COMMISSION FOR THIS REVIEW

76. Two senior advisors from the HQSC provided the following additional comments for the purposes of this review.

- There has been a lot of discussion over the years about national collections data and whether performance reporting should be monthly, quarterly and/or annual. People have asked 'how forward can we publish the data and at what level?' The consensus has always been quarterly reporting, because you have to go through a robust checking and validation process. If you want to do monthly reporting, you will tie up all your analysts in the reporting and you will get incorrect data each month; you will get more stable data with quarterly reporting.
- Monthly as a time period for performance reporting is not realistic; there is virtually nothing that you can report that is meaningful because the changes you want to see, and will see, will either happen much more quickly (in which case you need more frequent, near real-time reporting, or over a much longer period, for example changes in prescribing practice and better diagnostics that were demonstrated in the Atlas of Variation over a two to three year period.
- The HQSC recommends quarterly public performance reporting, not monthly; this will free up time to allow for good measurement on a daily basis for operational use.
- The HQSC would be happy to look at the proposed measures prior to reporting and provide a sense check. Stats NZ would also be a good external agency to provide advice and an independent review of a publication process to rebuild the public's confidence. Consideration could be given to an early media briefing, prior to or at the time of publication of the measures report, to describe what the measures show and what has changed; this was done by the NHS when publishing hospital standardised mortality data, mitigating the risk of misreporting.

FINDINGS

- Monthly public performance reporting of the 12 selected measures is not a realistic timeframe currently for a number of reasons including:
 - Reporting the 12 indicators does not provide the public with meaningful data e.g. ASH rates and acute bed days are difficult to understand without an explanation of context of the data and what the data is showing.
 - The indicators are not presented in ways that are informative for the public and easy to use.
 - Five of the monthly performance metrics are HSI. The HSI are designed to be reported quarterly and show trends over time. Changes to HSI month to month will not be significant with meaningful change happening over a longer period.
 - The data sources for the measures are largely the national collections, which are dynamic data sets and a three-month lag in reporting is advisable to ensure accuracy of data for public reporting. This allows for completion of data in the national collections, data processing, checking, validation and sign-off.
 - Monthly reporting does not provide sufficient time to complete these largely manual processes.
 - The logistics of frequent data extraction, calculation, data checking and validation will require commitment of significant analyst resource that is better freed up for other purposes.

7. KEY QUESTIONS

How the errors occurred

What is the end-to-end process for the collection, collation, storage and reporting of clinical data on the website (the data pipeline)?

77. The end-to-end process for the collection, collation, storage and reporting of the 12 performance measures selected for monthly public reporting is set out in [Appendix Eight](#). There are seven pathways for the 12 measures reflecting the different data sources and national collection systems for the measures.

FINDING

- The data pipelines for the 12 performance measures selected for public reporting are complex involving multiple teams and multiple data sources located in multiple sites, and require manual data extraction and manual processing in MS Excel spreadsheets for public reporting.

Where in this process are errors in the data likely to occur?

78. A diagram in [Appendix Eight](#) for Emergency Department attendances, ED admissions and shorter stays (indicators 10, 11 and 12) identifies 12 potential points of error along the data pipeline. These points are common to the other data pipelines (except for the immunisation pathway). A detailed description of the data pipeline for the shorter stays in emergency departments (SSED) measure, including the potential sources of error at each step of the pathway, is set out in [Appendix Nine](#).

79. The 12 potential sources of error along the data pipelines that are: common to nearly all the national collections' data pipelines include the following:

- i. System collection error. For example, some systems simply do not collect the data in real-time. On the West Coast, the ED presentation time is generally reliable, but the discharge date is entered retrospectively and sometimes days or weeks later.
- ii. Replication error. Data is replicated into a secondary data environment, bringing all the data from production systems together in one environment. Errors can occur depending on the tools/code used for replication and the source system.
- iii. Extract process error. The code to generate each national collection is complex and needs to change with every front-end system change and every annual National Collections Annual Maintenance Project (NCAMP) change. The National Collections team run compliance testing processes to mitigate this risk.
- iv. Withholding data at a local level. This causes a data delay (rather than error), which causes the total number of events to be erroneous.
- v. Data transportation process error. For example, a district puts the file in the wrong folder on Electronic File Transfer system (EFT) and the auto process doesn't pick it up. Or, in another example, the district names the file incorrectly and it is also not picked up. There can be timing issue: for example, there is one district that has a system of archiving that sometimes runs before the auto process can collect the file. The National Collections team has manual systems in place to monitor these issues and catch them soon after they have happened, as it is very important for files to be loaded in order to maintain the correct sequence.

- vi. The national collections acceptance process. This is not an error as such. The national collections system rejects records if they do not meet specific standards e.g. the wrong format or dates are inconsistent or codes are invalid. Therefore, those records remain invisible until the local team has corrected the error. Approximately 2% of NNPAC events are rejected. An added complication is that the Oracle platform that this collection sits on is old and legacy technology. The national team are currently shifting off Oracle and on to Snowflake.
- vii. Processing error. It is possible for a processing error to occur as all district files are amalgamated. This is an unlikely source of the March report data problem as there are processes to check for this.
- viii. Transformation error – Oracle to Qlik. This is a potential source of error but unlikely.
- ix. Data modelling error. Again, a potential source of error but not identified in this investigation.
- x. Qlik user error. Applying a wrong filter is possible but does not account for the errors seen.
- xi. MS Excel manipulation error. This is the error identified by the media on 8 March 2023.
- xii. Data is not validated at all or not validated by people who are aware of historical trends and current performance in each district.

FINDINGS

- There are 12 potential sources of error along the NNPAC data pipeline for ED attendances, ED admissions, and shorter stays in ED indicators (indicators 10, 11 and 12). These are common points for all but one of the 12 measures selected for monthly public performance reporting.
- Further investigation is required to identify the sources of error and opportunities for improvement in data quality for the districts with more frequent data errors.

Where did the errors occur (or most likely occur) in this case?

80. Two types of error have been identified.

- First, there was an MS Excel manipulation error in the ED data ([Appendix Six](#)), which occurred after the data was re-extracted from the Qlik ED data app and exported to an MS Excel worksheet. The data was re-extracted from the Qlik app after the original extracted data was lost for the months November and December 2022 and could not be retrieved. The data was re-extracted with an additional line (for non-DHB agencies) included in the November and December data. As a result of the extra line of data, the correct data was offset by one line from Northland downwards.
- Second, there were errors in respect of the quality of the data from the national collections systems, in particular missing and incomplete data from the NBRS, NMDS and NNPAC collections. For example, a list of data quality issues for 11 districts as at 28 February 2023 is set out in [Appendix Seven](#).

81. A number of interviewees described identifying an increasing number of data quality errors in national collections' data over the past 12 or more months. Manatū Hauora's Performance Monitoring and Analytics team regularly notifies the analysts in the National Collections and Reporting team when data quality issues are identified as part of a feedback loop between users, Manatū Hauora's Performance Monitoring and Analytics team, and the National Collections and Reporting team who is responsible for monitoring the quality of the data. Examples of emails sent from the Performance Monitoring and Analytics team with a list of districts and particular data issues was provided for the months of January, February, April, July, September, October and December 2022; and, as noted in the 'Background' above, in January and February 2023. The new System Accountability and Performance analysts at Te Whatu Ora were not included in this feedback loop.
82. In September 2022, the Deputy Chief Executive and Deputy Director General System Performance and Monitoring at Manatū Hauora (Deputy CE) wrote to Te Whatu Ora Chief Executive regarding the lapse in timeliness of data submissions to the national mental health and addictions PRIMHD data collection. The Deputy CE stated that there had been a deterioration in the completion and accuracy of data in PRIMHD over recent years. Historically, the PRIMHD data collection has taken up to three months to reflect activity recording with sufficient confidence but was now trending toward six months in arrears for many districts. The Deputy CE acknowledged that the COVID-19 response has impacted workforce capacity, both clinical and administrative, and the impact of the current pressure on the sector from the wider health system reforms.
83. Te Whatu Ora Chief Executive responded to the Deputy CE stating the National Collections and Reporting Group has data quality analysts working closely with each district. A recent survey documented the underlying issues each organisation is facing and the challenges they have in addressing these issues. The Chief Executive supported the Deputy CE's proposed plan for more timely submission and to shorten the lag for data to be reported.
84. Interviewees described a number of factors contributing to the increase in quality issues in the national collections data: the impact of COVID-19, in particular on workforce capacity leading to delays in data submission to the national collections; an increasing number of data extract and reporting requests for the district data teams and national collections and reporting teams, without any indication of priority or increased resource; a diversion of resources away from submitting timely data including to the new Rapid National Data Automation project;¹³ uncertainty about whether the OPF rules for data quality and timeliness still apply to districts; the removal of inter-district flow (IDF) funding requirements, which has removed an incentive for 'chasing' timely data; the impact of the health system reforms; and the paucity of subject matter expertise in the national collections data bases in Te Whatu Ora leading to a lack of appreciation and awareness of the data sets' quality issues.
85. This review has identified data quality issues across the national data collections. The NNPA data pipeline for the ED indicators is particularly problematic with multiple errors identified for multiple districts.

13 The Rapid National Data Automation Project is establishing automated, daily, patient-level data feeds of key information from districts to the national data environment to provide system signal data.

FINDINGS

- There are two main sources of data errors in data sourced from the national collections for reporting:
 - Incomplete or incorrect data in the national collection datasets.
 - Manual data processing required to prepare the data for reporting and publication (data extraction and multiple steps in MS Excel to manipulate the data and create the measures).
- There are multiple factors contributing to data quality issues in the national collections:
 - The impact of COVID-19 on workforce capacity leading to delays in data submission.
 - An increasing number of data extract and reporting demands for the local data teams and national collections and reporting teams, without any indication of priority or increased resource.
 - Workforce constraints including vacancies across the data pipelines, particularly in the local data teams.
 - A diversion of resources away from submitting timely national collections data.
 - Uncertainty about whether the OPF rules for data quality and timeliness still apply to districts.
 - The removal of inter district flow (IDF) funding requirements which has removed an incentive for 'chasing' timely data.
 - The impact of the health system reforms.
 - The paucity of subject matter expertise in the national collections data bases in Te Whatu Ora leading to a lack of appreciation and awareness of the data sets' quality issues.
 - Variation in the configuration of local data teams and their practices and functions, and the way the districts manage their national collections data extraction and reporting processes.
- There are data quality issues across the national data collections. The NNPAC data pipeline for the ED indicators is particularly problematic with multiple errors identified for multiple districts that warrants further in-depth investigation.
- There are multiple systems for recording and reporting national collections information; there is no central data repository and reporting system. Many of the systems involve manual processes, including data extraction and manipulation in MS Excel spreadsheets.
- The manual data processing in multiple MS Excel spreadsheets by analysts unfamiliar with the national collections data sources increased the complexity of the data processing and the risk of data errors.

What systems, processes and procedures were in place to ensure the accuracy of data?

86. There are two main systems in place to ensure the accuracy of the national collections data.
87. The National Collections and Reporting team (in the Data and Digital Directorate) is responsible for continuous monitoring and data quality checks of the national collections systems. The team has detailed file specifications with business rules and edit checks for each collection. A description of the quality checks carried out by the national collections team is set out in [Appendix Three](#). An automated sequence of checks is performed throughout the processing of the data and invalid/rejected data is returned to the district with action detailed for each record in the file.
88. While the continuous monitoring and data quality checks are robust, they require a workforce able to respond to requests to correct and update the data and to deadlines for submitting data. Workforce constraints across the data pipelines have had a significant adverse impact on ensuring timely, accurate national collections data.
89. Each district has various validation processes in place to ensure that the data they send to NNPAC is complete and correct. When errors occur, the local data teams manually analyse and correct the rejected data returned to them. The data teams' increasing workload and limited resources means they can only perform these tasks on a best effort basis. As a result, most districts can only re-submit the corrected data in the following extraction cycle. For some districts this cycle is weekly, while for others it is monthly. This delay in obtaining a complete dataset from the districts can adversely influence the effectiveness of the quality checks the centralised team performs.
90. There is variation in the way the districts manage their national collections data extraction and reporting processes. For example, for many districts, the data checking and error checking responsibilities sit across two or more teams. Some data teams have a person responsible for national data collections who focuses on data checking and quality. In smaller districts, the roles and responsibilities for data reporting to the national collections are split over more than one team and the teams are not always coordinated. Within districts, there are some services that do not capture data adequately to be sent to NNPAC – there are still services that do not use electronic systems to capture NNPAC data.
91. The second main system to ensure the accuracy of the data is putting in place robust quality assurance checking processes for the extraction and reporting of the data. This includes:
- a clearly documented standard operating procedure (SOP) that describes the step-by-step process that needs to be taken to prepare the data for analysis and reporting, and describes any risks associated with the process
 - a series of quality assurance checks once the data has been prepared and prior to it being published and used
92. At the time of the preparation of the first monthly performance measures report, there was no standard operating procedure in place. At the time of the preparation of the second report in January–February 2023, a draft procedure had been started but it was incomplete. The analyst teams preparing the reports relied on a short set of instructions about extracting the data prepared by a Manatū Hauora Manager, Performance Monitoring and Analytics, and there was no formal handover of the process from the Waitaha analytics team to the System Accountability and Performance team.
93. For the first monthly performance report (published in December 2022), the following quality assurance checks were put in place:
- The reports were sent to the Regional Directors for review. The Directors did not respond.
 - A Board paper and performance report were sent to the System Accountability and Performance Team Leader for approval.

- A Board paper/Aide Memoire with the summary key performance metric Word document (data aggregated to regions), was submitted to the Board and to the Minister. The MS Excel workbook with sheets for each of the 12 measures was not included. The data errors can only be identified in the MS Excel document with the more granular data.

94. For the second monthly performance report (published in March 2023), the following quality assurance checks were put in place:

- The first data extract (MS Excel workbook with datasheets) was checked by a second analyst in the System Accountability and Performance team. The worksheet with the re-extracted ED measures data was not checked by a second analyst.
- The summary key performance metric Word document was sent to a Manatū Hauora Manager, Performance Monitoring and Analytics. The MS Excel workbook with sheets for each of the 12 measures was not included.
- A Board paper and performance report were sent to the System Accountability and Performance Team Leader.
- The Board paper/Aide Memoire with a summary key performance metric Word document was submitted to the Board and to the Minister. The MS Excel workbook with sheets for each of the 12 measures was not included.

95. Senior analysts interviewed for this review described the following steps as ‘good practice’ for data quality assurance in relation to these reports:

- A check of all the data (MS Excel workbook and raw data) by a second, peer analyst.
- A check of all the data by a subject matter expert analyst. This is an analyst who has subject matter expertise in the data sources (in this case the national collections), the data, and the uses of the data.
- A ‘sense check’ of the data by a person with experience of the context (experience sense check). This should include checking at the relevant subset as well as total level, for example, by district and ethnicity. For the ED measures this could be a senior clinician and/or senior operations manager who works in/understands the clinical environment and uses their knowledge to ask ‘knowing what is happening, does this make sense?’
- A ‘sense check’ by a person who can look for patterns (pattern sense check) and asks ‘is this plausible?’ This check can use tools e.g. a heat map, and apply rules e.g. does the data show >10% variation (tolerance limit) (if so, the data needs to be examined further). Tolerances should be set by ‘experienced sense checkers’ and a quality assurance step that matches values to tolerances should be checked by ‘pattern sense checks’.
- Validation of the data by a person who uses a trusted data source. This is usually a person close to the data source e.g. a local data manager.¹⁴ They will be provided with the raw data and the report (end product that uses the raw data). There are three checks:
 - Actual numbers (raw data) against own data, ‘does my trusted data source match the raw data and what I see in the report?’
 - Calculation checks – ‘are the calculations correct?’ The checker will need the data definitions and equations.
 - Consistency check – check whether there is consistency (or not) of the definition used for the raw data collection. This is often an area where inconsistent data is collected as ‘collectors’ can count events/people/things differently based on a different understanding of what they are counting/collecting (i.e. the definition).

Many (but not all) validation checks can be automated once the principles and ‘rules’ are agreed. Sense checking does not lend itself to automation.

14 One of the National Health Information Principles (“Guiding principles for national health information”) is “validate data at source”

FINDINGS

- Complete, correct data in the national collections depends on:
 - timely data submission by data management teams/others required to submit data to the collection
 - continuous quality checks by the National Collections and Reporting team
 - continuous quality checks by national collections subject matter expert analysts with feedback to the National Collections Reporting team and local data managers
 - robust quality assurance processes and sign-off prior to publication
- Workforce constraints across the data pipelines have had a significant adverse impact on ensuring timely, accurate national collections data.
- There is variation in the way the districts manage their national collections data extraction and reporting processes and this may adversely affect the timeliness of submission of data to the national collections and accuracy (quality) of the national collections' data.
- Insufficient systems, processes and procedures were in place to ensure the accuracy of data. There were:
 - no standard operating procedure for analysts preparing the data
 - no effective sense checks e.g. by an analyst with subject matter expertise in the national collection; a person with experience in the context; pattern sense check
 - no validation of the data by a person at the source/near the source who understands the context, using a trusted data source.

Is there clarity about the roles and responsibilities in relation to these systems, policies and processes?

96. Interviewees confirmed there was clarity about the roles and responsibilities of the local data management teams and the National Collections and Reporting Team with respect to file specifications, business rules and edit checks for the national collections. However, as noted above, there is variation in the way the districts manage their national collections data extraction and reporting processes. Some larger districts have a single data management team and a person responsible for national data collections who focuses on data checking and quality. In smaller districts the roles and responsibilities for data reporting to the national collections is split over more than one team and the teams are not always coordinated.
97. In addition, some interviewees were uncertain about the status of the OPF data specifications and quality (including timeliness) requirements. While there was generally good awareness of the data specifications and rules, the issue for both the local data managers and National Collections and Reporting Team is the lack of sufficient capacity to respond to the increasing data requests and meet the timeliness requirements.
98. Interviewees noted that the quality assurance checks that were put in place for the monthly public reporting of the 12 measures performance measures were not documented, and the lack of a clear, documented standing operating procedure meant the analyst teams preparing the data and reports were learning about the source systems and how to prepare the data and reports as they were manipulating the data and putting the reports together.
99. The interviews highlighted that there is no clear role accountable for each of the steps of the data pipeline and for the quality assurance steps prior to data publication.

100. Interviewees also noted that there is a paucity of knowledge and expertise (subject matter expertise) about particular national collections' databases with this knowledge and expertise remaining with Manatū Hauora. These subject matter experts have well-established relationships with data providers and users at source as well as the National Collections and Reporting team, so there was an efficient and effective feedback loop for regular quality checks of the data. The role of the new System Accountability and Performance analysts in 'sense checking' the national collections data and providing feedback to the National Collections and Reporting team is not clear.

FINDINGS

- There is a lack of clarity of roles, responsibilities and accountability for data quality issues at each step of the national collections data pipelines
- There is a lack of clarity of the roles, responsibilities and accountability for the quality assurance steps required for preparing reports and publishing the data
- There should be clearly identified national collections analyst roles that are responsible for developing subject matter expertise in the collections, overseeing the quality of the collections' data, and supporting the preparation and sense checking of reports from the national collections

Why did these systems, processes and procedures not identify inaccuracies in the data?

101. The systems, processes and procedures did not identify inaccuracies in the data because:
- Analysts who did not have knowledge and experience in the national collections data sets were required to extract data from the collections and process the data for performance reporting. Consequently, the analysts were unable to perform an effective 'sense check' of the data
 - Subject matter expertise in the data sets did not transfer from Manatū Hauora to Te Whatu Ora and these subject matter experts were not provided with the granular data required for them to validate the data
 - Quality assurance checks were not clearly documented, were not always followed, and were inadequate

Improvement opportunities

What changes are required to systems, policies and processes to ensure the clinical data is accurate prior to its publication on the website?

102. The following changes are recommended to ensure clinical data is accurate prior to its publication on the website:
- Create a reporting framework and catalogue to give visibility to the extent of reporting and analytics across the organisation. This should include other relevant national health agencies (for example Manatū Hauora, Te Aka Whai Ora and HQSC) who have a reporting functions, to minimise duplication of effort. Through this process, rationalise data reporting to focus on the key measures and associated timeframes e.g. monthly, quarterly, annually and provide clear guidance for local data teams about how their work should be prioritised, Such a framework could help focus only on the measures required to be reported and could be reviewed when context changes. This will also allow an overview of all reporting which can help sense-check the value of reported measures and help determine the volume and capability of required resources. The framework needs to acknowledge the extent of ad hoc reporting such as Official Information Act (OIA) requests and Written Parliamentary Written Questions (WPQs).
 - Simplify the data pathway to publication to minimise the opportunity for data errors to occur. This should include minimising manual handling of data and external MS Excel manipulation. There should be automation of reporting with publication of a public-facing dashboard(s) from national data collections.
 - Simplify the process of validation and sense checking through organisation-wide visibility of data, clearly defined roles and responsibilities for 'sign-off' prior to publication, and an auditable checking and validation process.
 - Create dedicated positions to develop subject matter expertise in national collections and develop a repository of key measures accessible through a commonly accessed, drillable dashboard.
 - Transfer the subject matter expertise of national collections analysts in Manatū Hauora to this Te Whatu Ora team through coaching and mentoring.
 - Implement a quality assurance framework for performance reporting, clear standard operating procedures with robust quality assurance checks to support the extraction and processing of data for reporting, and inclusion of the System Accountability and Performance analysts in the national collections data quality feedback loops.
 - Develop a clear pathway for publication sign-off, including clear instructions on what must happen if sign-off is refused. For public reporting there should be executive sign off.

Are there opportunities to improve the way the data is collected and reported to minimise the opportunities for data errors?

103. The following opportunities to improve data collection and minimise errors have been identified:
- Increase the capacity of local data team to enable timely and accurate data submission to the national collections.
 - Simplify, streamline and standardise local data management of national collections data. Join up data management functions in districts; provide for clear reporting lines and a single point of accountability; and ensure districts are reporting off the same set of data specifications. Consideration should be given to what processes currently happening at the local level might be more effectively or efficiently undertaken at national level.

- Review the robustness of districts' data quality checks and error corrections; clarify the status of the Operating Policy Framework and expected timelines for reporting. Consider the adequacy of the resourcing and expertise of the teams, and implementing incentives for timely reporting and/or consequences for consistently not meeting timeframes.
- Make data transparent to the local level so that people can see where along the data pipeline the errors are occurring.

How can corrections and feedback from users who are outside Te Whatu Ora be incorporated into the quality assurance of the data?

104. Provide an option for the public to give feedback/note errors in the data via the performance reporting website.
105. There is no clear understanding about what is meaningful information to the public and what the public would like to see reported regarding the performance of Te Whatu Ora, and the ways this information should be presented. The views of the public should be sought through multiple methods (e.g. work with consumer and whānau groups in partnership with the HQSC; undertake surveys; crowd source tools), to ascertain what the public would like to see reported regarding the performance of Te Whatu Ora and the ways this should be visualised and presented to the public to facilitate feedback.¹⁵ As part of this process, different groups and their particular information needs should be considered (e.g. active consumers and whānau, informed public (including the media) and the general public).

Are any changes to the capacity and capability of the teams required into the future?

106. The capacity of local data teams and the Systems Accountability and Performance teams needs to be reviewed to ensure there is sufficient capacity to meet evolving reporting requirements.
107. The events leading to this review have undermined the trust and confidence of staff, particularly analysts. Rebuilding this trust and confidence and acknowledging their skills and expertise is important. There should be investment in building subject matter expertise in the national collections with formal training, coaching and mentoring.

Key findings and recommendations

See the [Executive Summary](#).

¹⁵ Joint guidance from the Office of the Auditor General, Audit New Zealand and the Treasury: Good practice in reporting about performance, published in October 2021, states "In my view, the first step in preparing a meaningful story about public sector performance is to understand what people want to know about public organisations, and their contribution to New Zealanders' wellbeing." Available at: [Good practice in reporting about performance – Office of the Auditor-General New Zealand \(oag.parliament.nz\)](https://www.oag.parliament.nz/guidance/good-practice-in-reporting-about-performance)

APPENDIX ONE: TERMS OF REFERENCE

Terms of reference

Review of process underlying publication of clinical data on the Te Whatu Ora website

Approved by Chief Executive 16 March 2023

Purpose of the review

The purpose of this review is to identify how inaccurate data about Aotearoa New Zealand's Emergency Departments was published on Te Whatu Ora's website, and to identify improvements to systems and processes to prevent a recurrence.

The review will also consider the publication of all clinical data on Te Whatu Ora's website and make recommendations for improving the accuracy of the data where appropriate.

Background

On 8 March 2023, data about Aotearoa New Zealand's Emergency Departments (EDs) published on Te Whatu Ora's website was identified to be inaccurate. The data concerned ED waiting times and total number of ED presentations.

A regional breakdown of monthly ED wait times for the year 2022 showed many areas lagged well behind the historic target of 95% of people being seen within six hours. This was consistent throughout 2022 before some EDs reported substantial improvement, with near 100% performance in November and December for two EDs, while two EDs reported substantial deterioration in performance.

A regional breakdown of total number of ED presentations showed substantial decreases in numbers of presentations in November and December for some EDs, while other EDs showed substantial increases in presentation numbers.

The incorrect data was removed from Te Whatu Ora's website on 9 March and updated data republished on 10 March.

The ED measures (wait times and total number of presentations) are part of 12 clinical measures that are published on the website following a single, common process to publication.

This review has been initiated by Te Whatu Ora at the request of the Chief Executive Officer.

Scope

The scope of the review is to undertake an adverse event review process for 12 clinical measures published on Te Whatu Ora's website, including the ED data from January 2022 to the present. The adverse event review will focus on the process for publication of the 12 measures, how the errors in the data occurred, and the systems, processes and procedures in place for ensuring the accuracy of the data prior to its publication.

At the request of the CEO the review will also document and review the process for publication of all other clinical data on Te Whatu Ora's website, and review the systems, processes and procedures in place for ensuring the accuracy of the data prior to its publication.

Key questions the review will address include:

How the errors occurred

1. What is the end-to-end process for the collection, collation, storage and reporting of clinical data on Te Whatu Ora's website (the data pipeline)?
2. Where in this process are errors in the data likely to occur?
3. Where did the errors occur (or most likely occur) in this case?

Quality assurance

4. What systems, processes and procedures were in place to ensure the accuracy of data?
5. Is there clarity about the roles and responsibilities in relation to these systems, policies and processes?
6. Why did these systems, processes and procedures not identify inaccuracies in the data?

Improvement opportunities

7. What changes are required to systems, policies and processes to ensure the clinical data is accurate prior to its publication on Te Whatu Ora's website?
8. Are there opportunities to improve the way the data is collected and reported to minimise the opportunities for data errors?
9. How can corrections and feedback from users who are outside Te Whatu Ora be incorporated into the quality assurance of the data?
10. Are any changes to the capacity and capability of the teams required into the future?

Process

The reviewers will assess relevant information held by Te Whatu Ora relating to the publication of the ED data. The reviewers may interview former and current Te Whatu Ora staff and any other persons as required.

Exclusions

The reviewers will not assess non-clinical information that is published on Te Whatu Ora's public facing website.

Review panel

The review panel will report to Dr Dale Bramley, National Director of Improvement and Innovation. Additional reviewer(s) with particular areas of expertise may be appointed/asked to contribute to support the review panel, as required.

Members of the review panel will be:

- Dr Penny Andrew, Director i3, Te Whatu Ora, Service Improvement and Innovation Directorate (co-chair)
- Nadine Gray, Te Aka Whai Ora (co-chair)
- Wendy Hamilton, Stats NZ
- Dr Jenny Walker, Chief Medical Officer, Te Whatu Ora
- Zoe O'Riordan, Patient Safety Advisor, Te Whatu Ora

The review panel will be supported by:

- Briar Coleman, Quality & Patient Safety Manager, Te Whatu Ora
- Valerio Malez, Portfolio Manager, Ko Awatea, Te Whatu Ora

Deliverables

The review panel will produce a report that will address the key questions identified in these terms of reference and make recommendations for action as appropriate to the National Director of Improvement and Innovation.

The National Director of Improvement and Innovation will receive the report as well as any external peer reviews required of the report. He will then make final recommendations to the Chief Executive Officer.

The review panel will include interim updates on progress as required to the National Director of Service Improvement and Innovation and/or Chief Executive, Te Whatu Ora.

The Chief Executive Officer of Te Whatu Ora will receive the final recommendations from the National Director of Improvement and Innovation including associated materials. Based on these, an action plan for implementation will be developed at the direction of the Chief Executive Officer.

The Chief Executive will report the progress and outcome of this work to the Board of Te Whatu Ora, as well as the Minister of Health.

Timeframes

The review panel will report to the National Director of Service Improvement and Innovation with a draft report by 27 March 2023, and a final report provided by 6 April 2023. The National Director of Service Improvement and Innovation will make final recommendations to the CEO by 14 April.

Issues and conflicts resolution

Issues and potential conflicts will be identified and documented by review members and escalated within Te Whatu Ora as identified.

APPENDIX TWO: LIST OF DOCUMENTS REVIEWED

1. 2019/2020 DHB Non-Financial Monitoring Framework and Performance Measures (2019)
2. Te Whatu Ora – Public reporting of key performance metrics (December 2022)
3. Te Whatu Ora – Public reporting of key performance metrics (March 2023)
4. Te Whatu Ora Executive Leadership Team Papers
 - a. Approach to Health New Zealand Integrated Performance Reporting Framework
 - b. Review of Inherited Performance Reporting Processes
5. Te Whatu Ora Board Papers
 - a. Public Reporting of Performance Information (October 2022)
 - b. First Quarterly Performance Report (November 2022)
 - c. Public reporting of key performance metrics January 2023 (February 2023)
6. Te Whatu Ora Board meeting minutes extracts
 - a. August 2022
 - b. September 2022
7. Ministerial Aide Memoires
 - a. Monthly public reporting of Te Whatu Ora performance metrics and Annex 2 public reporting of performance information
 - b. 31 December 22 Monthly (February 2023)
8. Draft Standard Operating Procedures – Public performance reporting data collection for each of the 12 indicators (February 2023) (not complete)
9. Te Whatu Ora Project Briefs
 - a. Developing a Te Whatu Ora performance framework
 - b. Public reporting of key operational information
10. Memorandum – SSED Performance Metric Incident and Response (March 2023)
11. Te Whatu Ora Monthly Non-Financial Report October 2022
12. Project brief – Implementing public reporting of key performance metrics
13. Event Summary – SSED performance metric incident
14. Monthly NMDS and NNPAC volumes reports (email, various dates)
15. Manatū Hauora Memo – Operational Analytics handover to Health New Zealand
16. National Minimum Dataset (NMDS) File Specification for File Version 15.9.4 (September 2022)
17. National Non-Admitted Patients Collection (NNPAC) File Specification for File Version V07.0 (July 2020)
18. Operational policy framework 2021/22
19. ED and acute care weekly reporting – Guide for DHBs (June 2021)
20. Historical emails provided by interviewees containing information relevant to the review (various dates)
21. Documents created for the review panel by interviewees or panel members containing information relevant to the review

APPENDIX THREE: LIST OF INTERVIEWEES

Position, organisation	Date	Spoke with
<ul style="list-style-type: none"> Lead, System Accountability and Performance, Te Whatu Ora 	21/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Group Manager, Hospital and Specialist Services, Te Whatu Ora 	22/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Associate Deputy Director General and Group Manager, System Planning and Accountability, Manatū Hauora 	22/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Senior Manager, Business Intelligence Business Partnering, Te Whatu Ora Waitaha Canterbury Business Intelligence Business Partner, Te Whatu Ora Waitaha wCanterbury 	23/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Group Manager, Data and Digital – National Collections and Reporting, Te Whatu Ora Manager, Data Management – National Collections and Reporting, Te Whatu Ora Senior Project Manager, National Collections and Reporting 	23/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Manager, Performance Monitoring and Analytics, Manatū Hauora 	24/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Interim Chief, Strategy Planning and Performance, Te Whatu Ora 	27/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Director, Health Quality Intelligence, Health Quality and Safety Commission Assistant Director, Health Quality Intelligence, Health Quality and Safety Commission 	31/03/2023	Penny Andrew, Briar Coleman-Browne, Zoe O’Riordan
<ul style="list-style-type: none"> Senior Advisor, System Accountability and Performance, Te Whatu Ora 	n/a	Written questions
Local data teams		
<ul style="list-style-type: none"> Data Warehouse, Te Whatu Ora Counties Manukau Data Warehouse Manager, Te Whatu Ora Counties Manukau Analyst Team Leader, Te Whatu Ora Counties Manukau Analyst, Te Whatu Ora Counties Manukau 	22/03/2023	Valerio Malez
<ul style="list-style-type: none"> Database Administrator, Te Whatu Ora Waitemātā 	23/03/2023	Valerio Malez
<ul style="list-style-type: none"> Manager, Decision Support Unit, Te Whatu Ora Lakes Chief Information Officer, Te Whatu Ora Lakes 	23/03/2023	Valerio Malez
<ul style="list-style-type: none"> Data Analyst Health Intelligence and Decision Support, Te Whatu Ora Capital, Coast and Hutt Valley 	23/03/2023	Zoe O’Riordan
<ul style="list-style-type: none"> General Manager, Digital operations, Te Whatu Ora Southern Digital Application Specialist, Te Whatu Ora Southern 	24/03/2023	Valerio Malez
<ul style="list-style-type: none"> Data Warehouse Manager, Te Whatu Ora Te Tai Tokerau 	29/03/2023	Valerio Malez
<ul style="list-style-type: none"> Data Warehouse Manager, Te Whatu Ora Capital, Coast and Hutt Valley 	n/a	Written questions

APPENDIX FOUR: NATIONAL COLLECTIONS AND DATA QUALITY CHECKS AS AT 16 MARCH 2023

National collection data set	Definition	Data timeliness/ frequency of update	Data quality checks
Mortality collection (MORT)	Collection that classifies the underlying cause of death for all deaths registered in New Zealand, and all registerable stillbirths (foetal deaths). Core datasets (BDM registrations) are from DIA and further information (including causes of death) is added from external and internal sources depending on how the person died.	Updated by fortnightly files of death and stillbirth registrations from BDM. Cause of death codes are assigned daily on data that arrived weeks/months earlier, using information obtained from real-time Death Documents, paper certificates of cause of death, NMDS, Cancer Registry and coroners' files. Datamart updated daily.	NHIs are assigned via sophisticated matching software and/or by highly experienced analysts in the Health Identity team to ensure accuracy of identity. Dates and location of death are consistent with other information from NMDS (for deaths in hospital), Police, Water Safety NZ, Coroners, etc. Underlying cause of death is coded according to the WHO international standards. New mortality clinical coders have all their coding checked by other experienced coders for at least the first 12 months. For complex cases coding decisions are checked in the Iris auto coding software (international standard). For deaths from cancer the primary site of cancer is verified against NZCR data. Comprehensive information about deaths reported to the coroner is obtained online from the National Coronial Information System (NCIS). This allows more detailed and precise cause of death coding for deaths that are reported to the coroner (approx. 10% of all deaths). An annual audit of the cause of death coding is conducted by the Mortality Team Leader and results reported to the Classification & Terminology Manager and Audit NZ. Analysis of aggregated cause of death data for a year, and comparisons of the data across several years, are carried out by data analysts before the data is published. Publication of the data is delayed until the data is largely complete (i.e. when most deaths have a specific cause of death code). Publication is always held up by delays in receiving all coroners' findings for the year.

National collection data set	Definition	Data timeliness/ frequency of update	Data quality checks
National Booking Reporting System (NBRS)	Contains information by health specialty and booking status on how many patients are waiting for planned care. Information is collected about the patient's date of entry into the system, their assessed priority and their booking status. (National Patient Flow (NPF): provides information on the outcome of referrals from primary care to secondary care and the time it takes patients to access care – developmental).	Load files from DHBs are processed every day. Monthly outpatient wait list information. Datamart updated weekly.	Data is reported using a file specification and each field is verified against code tables and accurate date sequences within the record. Validation that this is not a duplicate. Links to NMDS and NNPAC to validate that the patient did have their procedure. Each vendor has to pass compliance testing before they can report to production environments.
National Enrolment Service (NES) collection	Information about patients' enrolment in a primary health organisation (PHO). It has been developed to provide up-to-date patient demographics, supporting accurate identification of the enrolled population. It also provides information on the last date on which they received services from their GP. Superseded the PHO collection in April 2019. Data in NES starts from April 2019.	Daily files from Identity team are loaded into the datamart.	Information is gathered via an API. The updater gives us the NHI, name, date of birth and gender. We check they are the same in the NHI data base before they can create or update an enrolment.
National Immunisation Register (NIR)	Contains all registered immunisation enrolments and immunisation events for routine childhood vaccination, for children born from 2006 onwards. All routine childhood immunisation events must be recorded. Contains some adult vaccines, but not consistently. NB: There is a new programme underway – Aotearoa Immunisation Register (AIR) that will replace this immunisation data collection.	Extract from the NIR transactional system delivered every week and loaded into the datamart.	Data is provided to the file specification and each field is verified against code tables.

National collection data set	Definition	Data timeliness/ frequency of update	Data quality checks
National Minimum Dataset (NMDS)	Contains information on hospital inpatient events, at time of discharge. A national collection of administrative information routinely collected for all publicly funded hospital discharges, as well as most privately funded hospital discharges, including coded clinical data for inpatients and day patients. It contains demographic and clinical data, including data on diagnoses and procedures.	Load files are processed from DHBs and private hospitals every day. Oracle and Snowflake datamarts updated every day.	Data is reported using a file specification and each field is verified against code tables and accurate date sequences within the record. Validation that this is not a duplicate file or record. Validation that the diagnosis and procedures reported are appropriate (e.g. for sex, age, normally occurs in NZ, etc.). Each vendor has to pass compliance testing before they can report to production environments. NMDS data is reconciled against data in other data collections (MORT, NNPAC, NBRIS and Cancer). For example, if a patient had a 'Discharged dead' discharge type in NMDS then MORT is checked for the death record; and NZCR clinical coders reconcile the cancer site coded in NMDS against the cancer site registered in NZCR for that patient. Links to 3M Batch Grouper to calculate the DRG and associated fields.
National Non-Admitted Patient Collection (NNPAC)	Contains information on people who receive healthcare from a hospital, but who are not admitted. Provides nationally consistent data on non- admitted patient (outpatient and emergency department) activity. Its primary purpose prior to 1 July 2022 had been for the calculation of Inter District Flows (IDFs) and to provide information to measure health outcomes and inform decisions on funding allocations and policy. Currently it is used to give insights into ED and outpatient services provided. Gives a basis for costing and pricing of outpatient and ED events. New SNOMED coded information about the presenting complaints for patients attending ED is underway (16 Districts reporting).	Load files from Districts every night. Datamart updated every day.	Data is reported using a file specification and each field is verified against code tables and accurate date sequences. Each vendor has to pass compliance testing before they can report to production environments. Links to Cost Cubes where each outpatient event is costed.

National collection data set	Definition	Data timeliness/ frequency of update	Data quality checks
National Patient Flow (NPF)	The National Patient Flow collection provides more comprehensive information on the outcome of referrals from primary care to secondary care and the time it takes patients to access care. It captures the outcome of the referral decision so that the demand for services and whether demand is being met can be better understood. Over time National Patient Flow will connect related patient referrals and activities to provide a complete view of the patient's secondary care pathway.	Load files from Districts automatically enter the queue to commence processing as soon as they arrive (24/7). Snowflake datamart updated every day.	Data is reported using a file specification and each field is verified against code tables and accurate date sequences. Each vendor has to pass compliance testing before they can report to production environments.
NZ Cancer Registry (NZCR)	A population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous and basal cell skin cancers. Based on lab test results, diagnoses of cancer on hospital admissions, radiation oncology data and underlying cause of death information.	Labs records received daily via HL7, daily sweep of NMDS and mortality for additional data. New registrations created daily. Cancer datamart updated daily.	Primary source of data is Lab reports identifying cancer diagnoses. NMDS, MORT and radiation oncology records are additional sources of information for clinically diagnosed cancers, and for establishing the date of diagnosis. For cancer deaths the site of cancer is matched against MORT. Some automated code assignment is built into the processing system for in-situ cancers and other variables where 1+1 always = 2. Registrations are verified as unique and cancer information is coded using ICD-10-AM and ICD-O. Data is edit checked once a year's registrations are complete then aggregated data tables are checked by analysts (e.g. comparing incidence numbers and rates by cancer site across several years) before it is published. A low percentage (<2%) of cancers registered from MORT records indicates high-quality data sources.
Primary Health Organisation Enrolment Collection (PHO)	Includes information about patient's enrolment in a primary health organisation (PHO). Superseded by the NES dataset in April 2019. NES is updated daily in the datamart, however, NCR update this datamart monthly with a snapshot from the NES data. It is used as denominator information for many reports across many datamarts.	Monthly snapshot of NES data is added to the history of PHO data every month.	Information is gathered via an API. The updater gives us the NHI, name, date of birth and gender. We check they are the same in the NHI database before they can create or update an enrolment.

National collection data set	Definition	Data timeliness/frequency of update	Data quality checks
Programme for the Integration of Mental Health Data (PRIMHD)	Collects information on the provision of secondary and tertiary mental health and alcohol and drug services funded by the government. This includes secondary inpatient, residential, outpatient and community services provided by DHBs and non-government organisations (NGOs). Does not include information on the provision of primary mental health care, for example from general practitioners (GPs).	Files are loaded from Districts and NGOs as soon as they arrive. Online tool enables NGOs report in real-time. Datamart refreshed weekly.	Data is reported using a file specification and each field is verified against code tables and accurate date sequences. Each vendor has to pass compliance testing before they can report to production environments.
Health Service User (HSU) population dataset	A list of people who received health services in a given 12-month period. People are included if they had a health event recorded in the National Collections datasets, received a COVID-19 vaccine, had a COVID-19 test, or were enrolled with a PHO, in a given 12-month period.	Calculated twice a year in January and July. Derived from PHO and NES, NZCR, labs, NMDS, NNPAC, GMS, Pharms, NIR, CIR, COVID testing information, PRIMHD, mortality, and maternity datasets.	While developing the HSU, a wide range of checks were undertaken, including comparison with Stats NZ data and other sources. Now the methods have been finalised, these checks are run each time the data is run: (a) total populations, (b) age, gender, ethnicity, and location (DHB) time series, (c) % PHO enrolled, (d) missing information/null values, (e) remove dead people, (f) remove person if activity is before date of birth (e.g. genetic testing), or if incorrect NHI linkage, or if aged over 115 years.
National Maternity Collection (MAT)	Contains information on people giving birth and babies being born in New Zealand. Provides statistical, demographic and clinical information about selected publicly funded maternity services up to nine months before and three months after a birth. It combines hospital discharge information, data from claims submitted by lead maternity carers (LMCs), and information on birth registrations from Births, Deaths and Marriages.	Extracts from six data sources loaded into the MAT datamart weekly. NMDS, Sector Ops claims ORD, Sector Ops contracts (CCPS), NHI for mother baby matching, DHB Primary Care files, HCU table.	Each input source has their own data quality processes. More quality checks are run when the data is integrated.
Virtual Diabetes Register (VDR)	Contains data about people suspected as having diabetes, identified through their use of diabetes-related health services. Data is extracted from hospital inpatient and outpatient, laboratory test type, and pharmaceutical dispensing data collections. The VDR indicates if a person probably has diabetes, based on their use of health services.	Calculated annually from NMDS, NNPAC, Labs and Pharms, PHO and NHI data.	Volumes by district hospital, trends over time, comparing VDR counts with lab test results in the Northern region, looking at changes in any of the contributing datasets that inform the VDR.

APPENDIX FIVE: 12 PERFORMANCE MEASURES SELECTED FOR MONTHLY PUBLIC REPORTING

Domain	High-level indicator	Description
Improving child wellbeing	Immunisation rates for children at 24 months (Indicator 1)	Percentage of children who have all their age-appropriate scheduled vaccinations by the time they are two years old
	Ambulatory sensitive hospitalisations (ASH) for children (age range 0–4) (Indicator 2)	Rate of hospital admissions for children under five for an illness that might have been prevented or better managed in the community
Improving mental wellbeing	Under 25s able to access specialist mental health services within three weeks of referral (Indicator 3)	Percentage of child and youth (under 25) accessing mental health services within three weeks of referral
Improving wellbeing through prevention	Ambulatory sensitive hospitalisations (ASH) for adults (age range 45–64) (Indicator 4)	Rate of hospital admissions for people aged 45–64 for an illness that might have been prevented or better managed in the community
Strong and equitable public health system	Acute hospital bed day rate (Indicator 5)	Number of days spent in hospital following an acute admission presented as a rate per 1000 population
	Faster cancer treatment (FCT) (31 days) (Indicator 6)	Percentage of patients with a confirmed diagnosis of cancer to receive their first cancer treatment (or other management) within 31 days of decision to treat.
Planned Care	ESPI 2: Patients waiting longer than 4 months for their first specialist assessment (Indicator 7)	Number and percentage
	ESPI 5: Patients given a commitment to treatment but not treated within 4 months (Indicator 8)	Number and percentage of total waiting list
	People waiting for planned care (elective services) through a public hospital for > 365 days (Indicator 9)	Number and percentage of total waiting
Acute demand	ED attendances (Indicator 10)	Total number of ED presentations at Emergency Departments
	ED admissions (Indicator 11)	Total number of ED and proportion of ED presentations admitted to hospital
	Short-stay ED performance (SSED) (Indicator 12)	Percentage of patients treated, transferred or discharged within six hours

Measure	Source for website publication
Immunisation rates for children at 24 months	MoH website (following publication by the Immunisations team)
Ambulatory sensitive hospitalisations for children (age range 0–4)*	System Level Measures Framework website
Under 25s able to access specialist mental health services within three weeks of referral	PP8 report from Data Services team
Ambulatory sensitive hospitalisations for adults (age range 45–64)*	System Level Measures Framework website
Acute hospital bed day rate*	System Level Measures Framework website
Faster cancer treatment (31 days)	Te Aho o Te Kahu Cancer Control Agency
ESPI 2: Patients waiting longer than 4 months for their first specialist assessment	Qlik – NBRIS KPI app (ESPI 2 and 5)
ESPI 5: Patients given a commitment to treatment but not treated within 4 months	Qlik – NBRIS KPI app (ESPI 2 and 5)
Volume of people waiting for planned care (elective services) through a public hospital for > 365 days	Qlik – NBRIS KPI app (ESPI 2 and 5)
ED attendances	Qlik – Emergency Department Use (ED data tables)
ED admissions	Qlik – Emergency Department Use (ED data tables)
Short stay ED performance	Qlik – Emergency Department Use (ED data tables)

APPENDIX SIX: ERRORS IN EMERGENCY DEPARTMENT DATA ON THE WEBSITE

The following errors were identified on 6 March 2023 in the published data on ED Shorter Stays Target and Qualifying ED Presentations (highlighted and numbered in the spreadsheet screenshot below):

1. Spreadsheet manipulation error.
2. Waikato data missing for Oct.
3. Extremely low value for West Coast May 22.
4. Large variation in ED presentation numbers in Southern – from 7246 to 3,932 in adjacent months.
5. Counties Manukau had unusually low Dec presentation numbers. Volumes in previous months were higher than reported by Counties on 10 March.
6. MidCentral presentation numbers and SSED performance were about 10% lower than reported through the Acute and ED Weekly Spreadsheet. Note: that would not be obvious in the data pattern.

Published prior to Mar 8

District	% ED Events <6 Hours Jan - Oct 2022												ED Presentations												
	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	
Auckland	79%	80%	80%	81%	78%	75%	77%	77%	72%	71%	75%	70%	7,875	7,483	7,798	7,660	9,057	9,255	8,723	9,085	9,239	9,204	9,031	9,175	
Bay of Plenty	81%	79%	78%	78%	76%	77%	76%	73%	74%	76%	77%	74%	6,151	5,038	5,516	5,479	6,144	6,090	5,734	6,050	6,064	6,299	6,234	6,548	
Canterbury	82%	82%	81%	80%	79%	80%	77%	78%	75%	71%	71%	72%	10,230	9,014	9,673	9,749	10,638	10,113	9,725	10,198	10,033	10,135	9,858	10,283	
Capital and Coast	68%	69%	63%	58%	59%	56%	50%	48%	50%	47%	53%	4,753	4,029	4,424	4,516	4,984	4,679	4,658	4,775	4,556	4,711	4,535	4,424		
Counties Manukau	80%	77%	80%	80%	71%	72%	69%	66%	67%	66%	62%	55%	8,417	8,149	8,781	8,517	10,067	10,387	9,456	9,924	9,705	9,875	8,053	5,835	
Hawkes Bay	78%	76%	77%	79%	77%	77%	75%	76%	75%	78%	77%	76%	3,759	3,386	3,733	3,634	4,519	4,156	3,897	3,870	3,901	4,067	4,245	4,373	
Hutt Valley	79%	83%	81%	80%	78%	75%	76%	75%	76%	73%	70%	72%	3,719	3,352	3,530	3,452	3,874	3,686	3,569	3,684	3,771	3,842	3,961	3,894	
Lakes	85%	85%	86%	85%	85%	83%	80%	81%	83%	82%	82%	84%	4,589	3,748	3,741	3,933	4,245	4,259	4,094	4,183	4,155	4,383	4,226	4,508	
MidCentral	65%	51%	58%	53%	43%	41%	41%	41%	36%	36%	36%	38%	3,293	2,863	3,083	3,005	3,047	2,931	2,830	2,864	2,786	2,811	2,775	2,970	
Nelson Marlborough	88%	87%	87%	87%	87%	88%	84%	84%	86%	84%	84%	85%	4,273	3,506	3,873	3,809	4,063	3,980	3,889	3,928	4,126	4,133	4,150	4,460	
Northland	84%	82%	81%	80%	79%	79%	78%	80%	78%	77%	99%	100%	4,946	4,159	4,364	4,451	4,788	4,894	4,651	4,740	4,928	4,903	361	318	
South Canterbury	94%	95%	94%	95%	92%	94%	91%	92%	92%	91%	79%	79%	1,731	1,474	1,622	1,620	1,721	1,635	1,602	1,747	1,730	1,708	4,880	5,535	
Southern	81%	78%	80%	82%	75%	78%	71%	70%	76%	75%	90%	93%	4,585	7,246	3,932	3,282	4,802	4,264	7,342	7,722	4,269	4,465	1,707	1,725	
Tairāwhiti	97%	96%	96%	95%	96%	96%	95%	97%	96%	96%	78%	75%	2,031	1,736	1,714	1,704	2,013	2,116	1,877	1,963	2,002	2,041	3,868	6,875	
Taranaki	79%	79%	77%	78%	80%	79%	75%	76%	75%	73%	96%	97%	3,840	3,332	3,576	3,623	4,014	4,031	3,958	3,986	4,015	3,989	2,039	2,270	
Waikato	67%	65%	66%	66%	61%	59%	57%	59%	60%	N/A	74%	76%	10,732	9,204	9,818	9,624	10,912	11,021	9,958	10,565	10,415	10,514	4,058	4,296	
Wairarapa	78%	74%	77%	76%	79%	77%	77%	76%	76%	67%	67%	70%	1,377	1,131	1,109	1,121	1,231	1,237	1,099	1,258	1,227	1,348	10,298	10,320	
Waitemata	80%	77%	80%	86%	83%	82%	76%	71%	73%	70%	71%	77%	7,573	6,866	7,480	7,345	8,318	8,644	8,124	8,216	8,241	8,364	1,349	1,470	
West Coast	86%	85%	86%	85%	89%	80%	76%	75%	77%	80%	68%	70%	974	722	790	833	3	92	698	746	681	721	695	8,231	8,646
Whanganui	83%	79%	78%	77%	75%	76%	68%	72%	65%	66%	82%	86%	1,732	1,548	1,688	1,600	1,676	1,798	1,612	1,651	1,635	1,713	841	1,015	

APPENDIX SEVEN: NATIONAL COLLECTIONS DATA QUALITY ISSUES 28 FEBRUARY 2023

MidCentral and Whanganui still no NBRIS files (latest December 16 and November 29).

Counties (ED06001), Lakes, Waikato and Whanganui NNPAAC volumes (ED, FSA and Follow ups) are zero for January 2023.

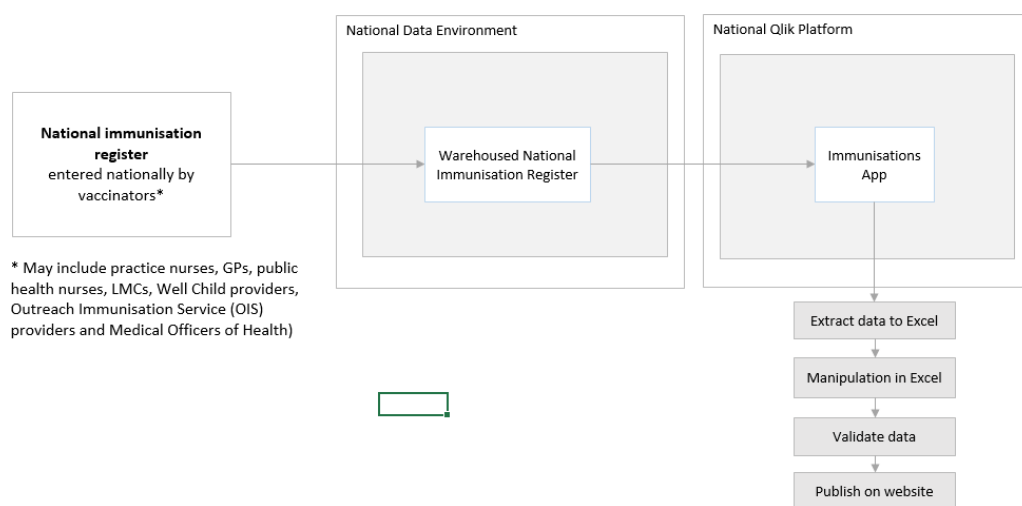
For the districts below, NMD volumes lower than December 2022, and lower than January 2022.

January 2023 national collections data:

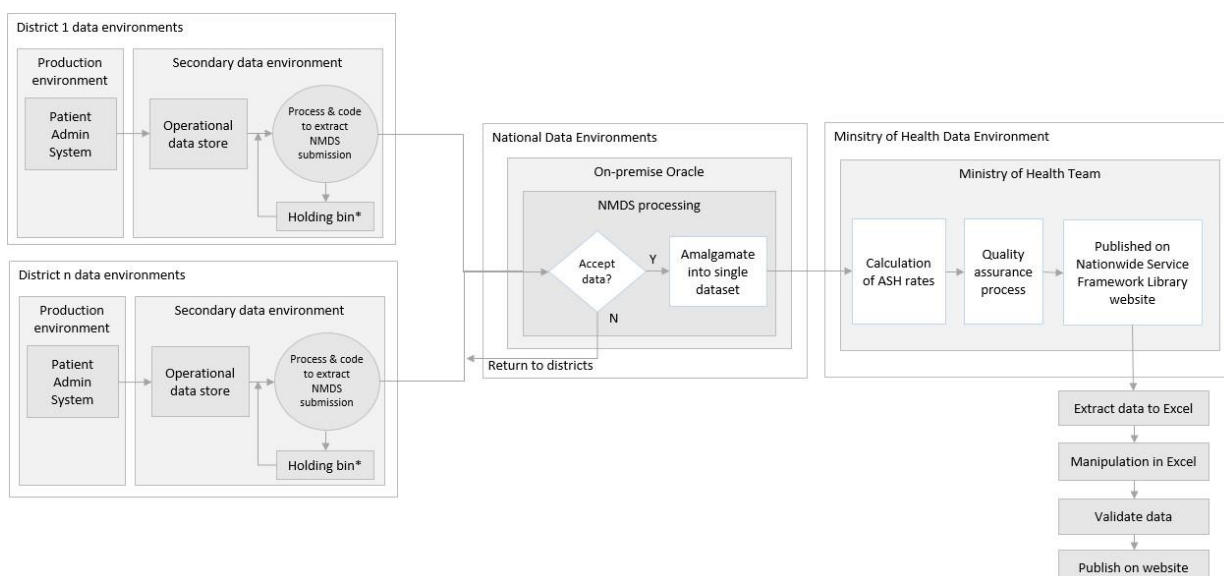
- Counties Manukau
 - NNPAAC: ED06001 no counts against. Volumes halved in November, zero in December and January. ED06001A looks normal.
 - NMDS: volumes a lot lower than January 2022 and December 2022.
- Northland
 - NMDS: volumes much lower than December 2022 and January 2022.
- Lakes
 - NNPAAC: no ED or FSA/Followup volumes.
- Tairāwhiti
 - NMDS volumes lower than January 2022 and December 2022.
 - NNPAAC FSA/Follow ups lower than January 2022 and December 2022.
- Waikato
 - NNPAAC: no ED or FSA/Followup volumes
- Hawkes Bay
 - NMDS: volumes much lower than January 2022 and December 2022.
- Hutt Valley
 - NMDS: volumes much lower than January 2022 and December 2022.
- MidCentral
 - NBRIS: No file since mid-December. No exits for January 2023 data.
 - NMDS: volumes much lower than January 2022 and December 2022.
- Wairarapa
 - NMDS: volumes lower than January 2022 and December 2022.
- Whanganui
 - NBRIS: no exits in December 2022 and January 2023.
 - NNPAAC: no ED or FSA/Follow up volumes.
- Southern
 - NMDS: volumes lower than January 2022 and December 2022.

APPENDIX EIGHT: END-TO-END PROCESS FOR THE COLLECTION, COLLATION, STORAGE AND REPORTING OF THE 12 PERFORMANCE MEASURES ON THE WEBSITE

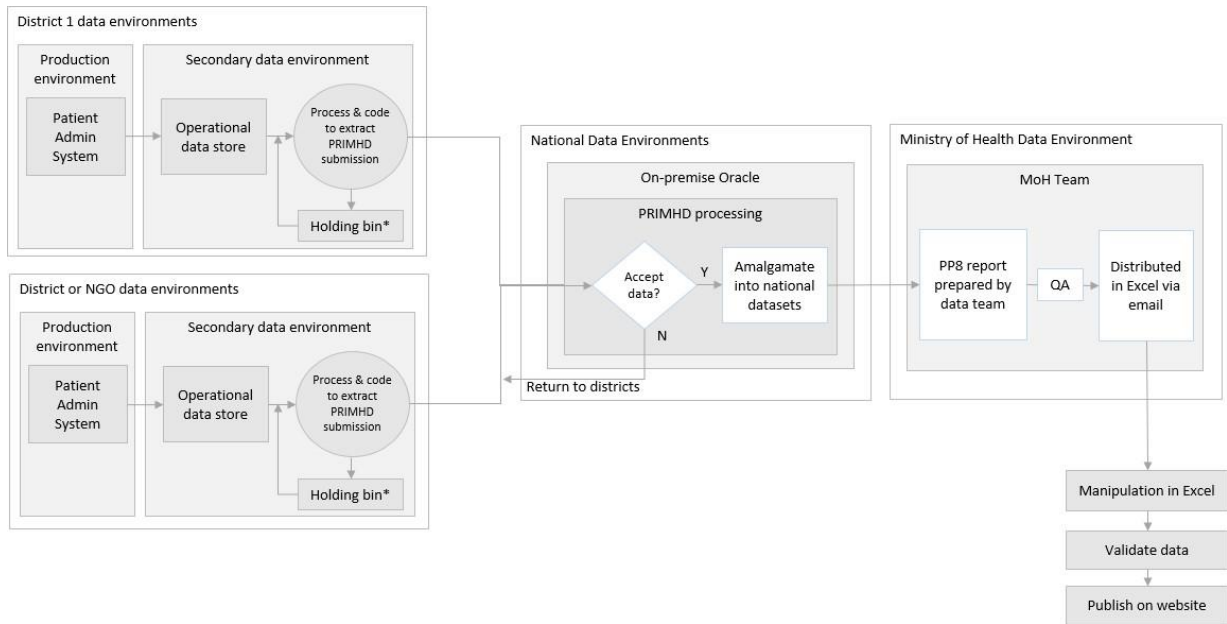
Immunisation Rates (Indicator 1)



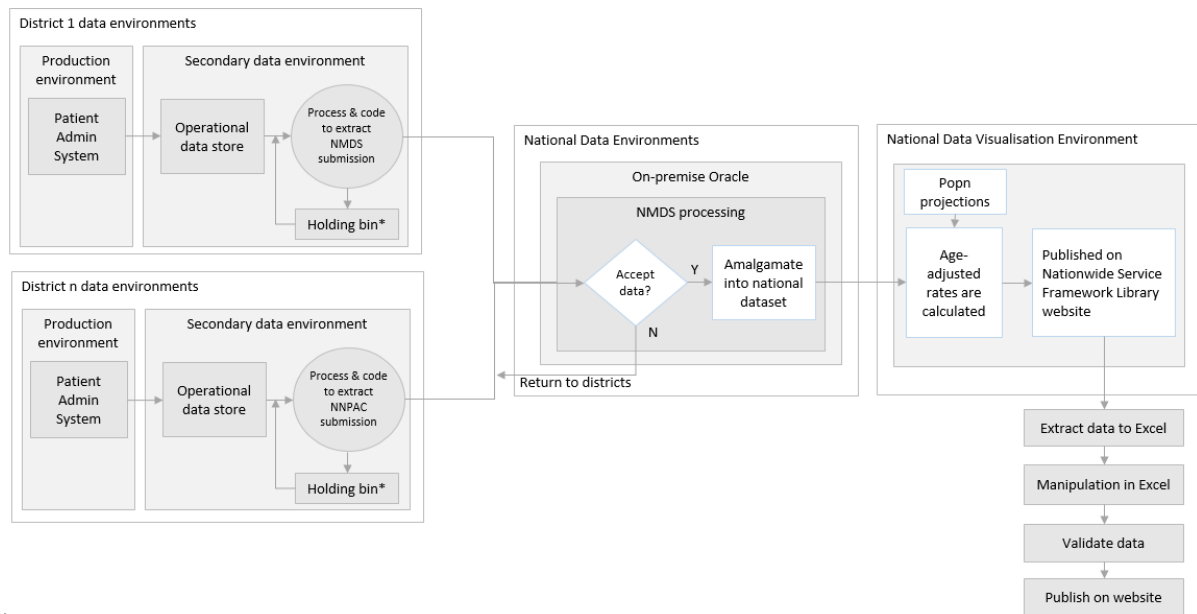
Ambulatory Sensitive Hospitalisation (ASH) Rates (Indicators 2 – 0–4 year olds and 45–64 year olds)



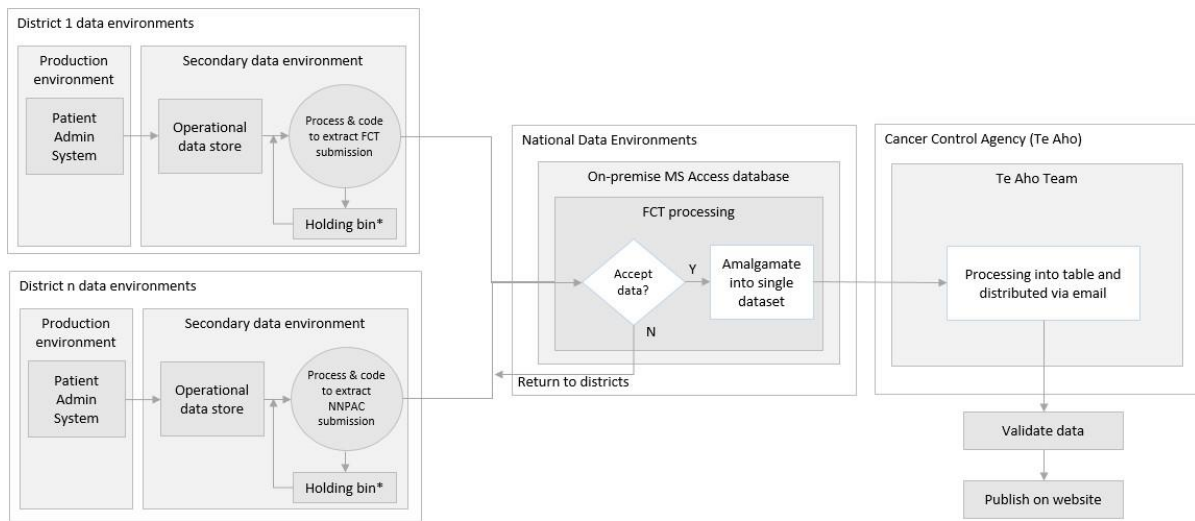
Under 25s able to access specialist mental health services within three weeks of referral (Indicator 4)



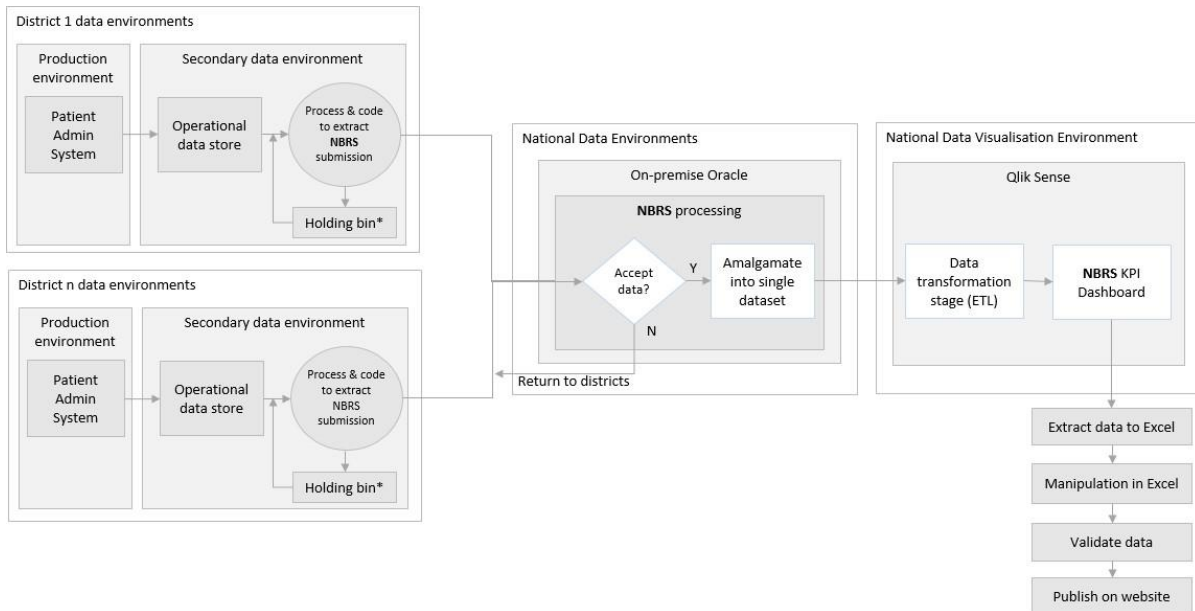
Acute Hospital Bed Day Rate (Indicator 5)



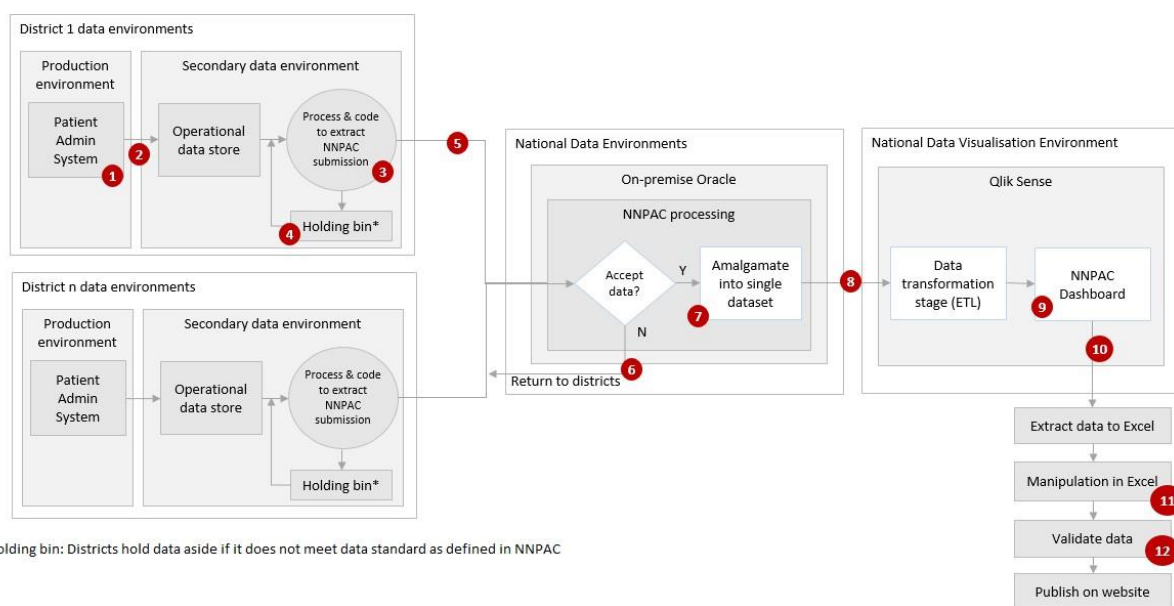
Faster Cancer Treatment (Indicator 6)



Waiting for First Specialist Appointment (FSA) or procedure (Indicators 7, 8 and 9)



Emergency Department Attendances, ED Admissions and Shorter Stays in ED (Indicators 10, 11 and 12)



Potential points of error identified in the above ED attendances, ED admissions and SSED data pathway are:

1. System collection error. For example, we know some systems simply do not collect the data in real time. On the West Coast, the ED presentation time is generally reliable, but the discharge date is entered retrospectively, and sometimes days or weeks later.
2. Replication error. Data is replicated into a secondary data environment. Errors can occur depending on the tools/code used for replication and the source system.
3. Extract process error. The code to generate each national collection is complex and needs to change with every front-end system change and every annual National Collections Annual Maintenance Project (NCAMP) change. The national collections team run compliance testing processes to mitigate this risk.
4. Withholding data at district. This causes a data delay (rather than error), which causes total number of events to be erroneous.
5. Data transportation process error. For example, a district puts the file in the wrong folder on Electronic File Transfer system (EFT) and the auto process doesn't pick it up. Or, in another example, the district names the file incorrectly and it is also not picked up. There can be timing issues: for example, we have one district that has a system of archiving that sometimes runs before the auto process can collect the file. The national collections team have manual systems in place to monitor these issues and catch them soon after they have happened, as it is very important for files to be loaded in order to maintain the correct sequence.
6. The national collections acceptance process. This is not an error as such. The national collections system rejects records if they do not meet specific standards e.g. the wrong format or dates are inconsistent or codes are invalid. Therefore, those records remain invisible until the district has corrected the error. This is one of the most likely sources of the problems you have seen. An added complication is that the Oracle platform that this collection sits on is old and legacy technology. The national team are currently shifting off Oracle and onto Snowflake. NNPAC is in the process of being shifted so this risk is being mitigated and should not impact on the data.
7. Processing error. It is possible for a processing error to occur as all district files are amalgamated. This is an unlikely source of our current problem as there are processes to check for this.
8. Transformation error – Oracle to Qlik. This is a potential source of error but unlikely.
9. Data modelling error. Potential source of error but not identified in this investigation.
10. Qlik user error. Applying a wrong filter is possible but does not account for the errors seen.
11. Excel manipulation error. This is the error identified by the media.
12. Data is not validated at all or not validated by people who are aware of historical trends and current performance in each district.

APPENDIX NINE: THE DATA PIPELINE FOR SHORTER STAYS IN EMERGENCY DEPARTMENTS (SSED)

The process for SSED data, from generation, through to publishing on Te Whatu Ora website

Local data environments: Production environments

A Patient Administration System (PAS) is an electronic record-keeping system used by healthcare providers for collecting and storing patient information. The districts use various PAS software systems, but they all record information necessary to track time in the emergency department (ED).

Potential sources of error at this step

- Data entry error. When data is incorrect or incomplete, it is not accepted into the national dataset. When corrected in the PAS and re-submitted, historical national data event numbers change. This error is rare because most PASs force acceptable values only.
- Not all districts have PASs that collect all data in real time. West Coast records discharge time retrospectively.

Local data environments: Secondary data environment

Data held in the PAS is replicated into a secondary data environment; this is a data warehouse environment where data from multiple source systems can be amalgamated and transformed to meet national reporting requirements and extracted using structured query language (SQL) to compile local reports or national data submissions. From here, code written by the local data teams is used to extract the data required for submission to the National Non-Admitted Patient Collection (NNPAC). This is a national data set of all outpatient events, including ED presentations. All districts spoken to had extraction processes that searched a specified time period of historical data up to the current time for any events that had been added or altered since the previous extraction.

In some districts this data will be manually checked for any obvious errors that might trigger it to be rejected by the national data environment. If errors are found data is held back until it can be corrected. This step does not occur in all districts.

Each district then sends its data to the national data environment using an electronic file transfer (EFT). This is a secure, protocolised process for sending data files between two points. The frequency with which NNPAC data is extracted and transferred ranges from daily to monthly and varies from district to district. Districts are required to send data at least once per month and all events must be sent within 20 days of the end of the month in which they occurred. The NNPAC data is used to calculate performance of districts against the ED wait time (SSED) target. The variables used for this target are:

- ED attendance date and time
- ED departure date and time
- attendance type – indicates if a patient left ED without being seen. These events are excluded from the calculation.
- purchase unit code – which indicates the emergency department level
- volume – indicates whether a patient transferred directly to a short-stay/assessment unit.

Potential sources of error at this step

- Load errors during the data replication process. Load errors will trigger alert messages to data team personnel who are then able to troubleshoot the issue.
- Error in code used to extract NNPAC data. The main opportunities for code error are when data is required to be added or changed under the national collection annual maintenance program (NCAMP) or if source systems are replaced or upgraded.

National data environments: NNPAC processing

When files containing NNPAC records are received by the Te Whatu Ora Oracle system an automated sequence of checks is performed throughout the processing of the data:

- A pre-processing check confirms that the files are named and formatted correctly and have no duplicate records. If files do not meet compliance, no further processing is carried out, the file is automatically rejected and returned to the district via EFT.
- All remaining files then undergo record validation. A file is valid if:
 - each field contains the correct type of characters (letters/numbers etc.) and that data meets formatting rules e.g. correctly formatted dates and times
 - all mandatory fields are completed, and conditional fields are completed where required
 - all dates are in the past
 - all codes used are valid
 - the NHI used is genuine
 - rules for data in related fields are met e.g. the date and time of presentation is before the date and time of departure.

Valid files are then loaded into the NNPAC data set; invalid files are rejected.

For each file that passes pre-processing, an acknowledgement file is returned via FTP to the district detailing the action for each record in that file. Actions include:

- 'inserted', denoting a record that has met all validation requirements and has been added to the NNPAC data set
- 'updated', denoting a record that has met all validation requirements but has the same key as a record already contained in the NNPAC data set (an event that has been previously submitted by the district), and in this situation all fields in the previous record will be overwritten with the data in the new record
- 'error', denoting the record contains a critical validation error that must be corrected – the record has been rejected and has not been added to the NNPAC data set.

The NNPAC dataset resides in a datamart with other national datasets in read-only format. Data is extracted into an application where it can be visualised or manipulated using code.

Potential sources of error or omission at this step

- Incomplete data set. The data accepted may not represent a complete set of ED events. Prior to processing each month data checks are run to compare the number of events for each district to their numbers for previous months. Differences of 10% or more for a district generate an automatic email to the district data manager. This process will detect large discrepancies but does not guarantee completeness of data.

National data visualisation environment

Code is used to extract data from the NNPAC datamart and transform it into visualisable and analysable data in Qlik® a data visualisation tool. This is not a public-facing environment; it is only for use within Te Whatu Ora. The process of transforming data from the code contained in the datamart to the data visualisations available in Qlik® is known as an extract, transform load (ETL) process. ETL extracts data from its sources, validates and conforms it, then loads it into a presentation format such as a table. This data is then displayed in the NNPAC dashboard where it can be visualised, filters can be applied and data can be extracted into an Excel spreadsheet.

Potential sources of error at this step

- Transformation error. Errors can occur in the ETL process; for instance, data that does not meet validation criteria will then not be included in total numbers. This is a previously recognised issue with data from ex-private hospitals not being attributed to a district.
- Inclusion of irrelevant data. The data in Qlik contains rows for 'non-district agencies'. These numbers are included in the national totals but are not reported on separately and should not be included in national numbers.

ED data table

Period filters

Financial year

...

Patient filters

Gender

Ethnic group MPAD

Deprivation quintile (NH)

...

Event filters

DHB of service

Facility

Attendance

...

DHB of service

Auckland

Bay of Plenty

Canterbury

Use this table to download data and feed into provided Excel sheet. Select relevant time frame and then export data. The sum of minutes duration will allow for calculation of average wait times in Excel. Note: The last five measures in the table are only calculated for attended events. Admitted are End type codes: DW, EA, ET and OB. All others are Non-admitted.

Data table various measures

Financial year	Financial quarter	Year	Month	Calendar year-month	Region	District	Facility	ED admitted flag	Attend... code	Ethnic...	# ED presentations	# attended ED events	# events under 6 hrs
Totals											12,477,353	12,146,553	18,086,664
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Admitted	ATT	Māori	274	274	233
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Admitted	ATT	Other	2,121	2,121	1,778
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Admitted	ATT	Pacific	431	431	358
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	ATT	Māori	163	163	162
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	ATT	Other	1,335	1,335	1,325
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	ATT	Pacific	215	215	214
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	DNW	Māori	8	8	8
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	DNW	Other	69	69	69
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Auckland City Hospital	Non-admitted	DNW	Pacific	7	7	7
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Admitted	ATT	Māori	179	179	159
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Admitted	ATT	Other	718	718	647
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Admitted	ATT	Pacific	342	342	298
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	ATT	Māori	175	175	175
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	ATT	Other	1,891	1,891	1,891
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	ATT	Pacific	361	361	361
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	DNW	Māori	2	0	0
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	DNW	Other	17	0	0
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Auckland	Starship Child & Family Unit	Non-admitted	DNW	Pacific	5	0	0
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Counties Manukau	Middlemore Hospital	Admitted	ATT	Māori	593	593	519
2012/13	Q1-20	2012	Jul	2012-Jul	Northern	Counties Manukau	Middlemore Hospital	Admitted	ATT	Other	1,495	1,495	1,380

Data manipulation in MS Excel®

The data table in Qlik is not designed in the specific 'shape' of the data required for the publicly facing published spreadsheet. Therefore, the data needs to be exported from Qlik to a MS Excel spreadsheet and the table needs to be manipulated in MS Excel to summarise and add regional and national totals.

Potential sources of error at this step

- Data transposition or deletion during manipulation in MS Excel®.
- Incorrect summarising of detail sheet. This was the first and most obvious error found in the data – the summary for the months of November and December picked up the row for the next district down, so numbers for those two months were offset by one row.

District	% ED Events <6 Hours Jan - Oct 2022											
	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Auckland	79%	80%	80%	81%	78%	75%	77%	77%	72%	71%	75%	70%
Bay of Plenty	81%	79%	78%	78%	76%	77%	76%	73%	74%	76%	77%	74%
Canterbury	82%	82%	81%	80%	79%	80%	77%	78%	75%	71%	71%	72%
Capital and Coast	68%	69%	63%	58%	59%	56%	56%	50%	48%	50%	47%	53%
Counties Manukau	80%	77%	80%	80%	71%	72%	69%	66%	67%	66%	62%	55%
Hawkes Bay	78%	76%	77%	79%	77%	77%	75%	76%	75%	78%	77%	76%
Hutt Valley	79%	83%	81%	80%	78%	75%	76%	75%	78%	73%	70%	72%
Lakes	85%	85%	86%	85%	85%	83%	80%	81%	83%	82%	82%	84%
MidCentral	55%	51%	58%	53%	43%	41%	41%	41%	36%	36%	36%	38%
Nelson Marlborough	88%	87%	87%	87%	87%	88%	84%	84%	86%	84%	84%	85%
Northland	84%	82%	81%	80%	79%	79%	78%	80%	78%	77%	99%	100%
South Canterbury	94%	95%	94%	95%	92%	94%	91%	92%	92%	91%	79%	79%
Southern	81%	78%	80%	82%	75%	78%	71%	70%	76%	75%	90%	93%
Tairāwhiti	97%	96%	96%	95%	96%	96%	95%	97%	96%	96%	78%	75%
Taranaki	79%	79%	77%	78%	80%	79%	75%	76%	75%	73%	96%	97%
Waikato	67%	65%	66%	66%	61%	59%	57%	59%	60%	N/A	74%	76%
Wairarapa	78%	74%	77%	76%	79%	77%	77%	76%	78%	67%	67%	70%
Waitemata	80%	77%	80%	88%	83%	82%	76%	71%	73%	70%	71%	77%
West Coast	86%	85%	86%	85%	89%	80%	76%	75%	77%	80%	68%	70%
Whanganui	82%	78%	78%	77%	75%	78%	68%	72%	65%	66%	82%	86%

Validation and publication

The prepared MS Excel workbook with sheets for each of the 12 measures is then prepared for sign-off.

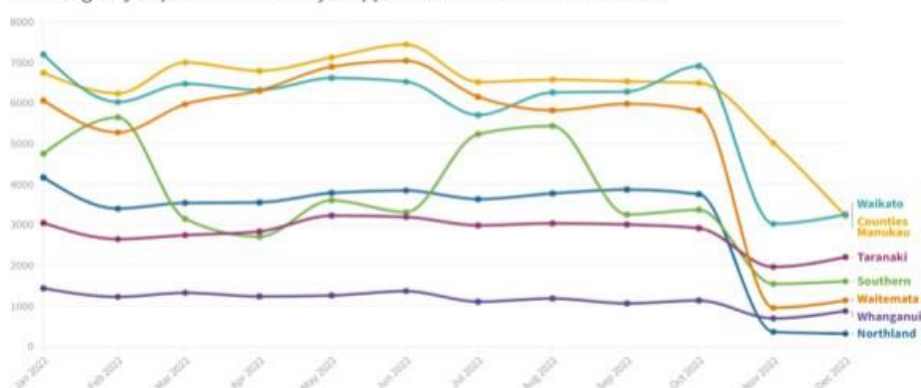
Once sign-off is obtained the spreadsheet is emailed to the communications team to publish the information on the website.

Potential sources of error at this step

- Sign-off is obtained from people who do not have sufficient service knowledge to validate that data is a fair representation of front-line experience.
- Patterns in data are not analysed to identify unfeasibly high or low values, or unlikely trends. A media-generated graphic of the spreadsheet illustrated the implausible pattern in the ED wait time (SSED) data.

ED wait times that appeared to suddenly deteriorate

Faulty data published by Health NZ suggested the number of people seen within six hours of arriving at an Emergency Department suddenly dropped in seven former DHB districts



Source: Health NZ - This data has subsequently been removed

A Flourish data visualization



Te Whatu Ora
Health New Zealand

