Australian Government

Department of Health

National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care

Data Validation Project Report

Doll Martin Associates

July 2017

TABLE OF CONTENTS

Glossary ii

1 Executive Summary 1

1.1 Introduction 1
1.2 Methodology 1
1.3 Findings 2
1.4 Recommendations 11

2 Data Validation Project Methodology 12

2.1 Project Purpose 12
2.2 Project Scope 13
2.3 Methodology 14
2.4 Reporting Function 20

3 Findings 21

3.1 General Observations 21
3.2 Observations by nKPI 24
3.3 MedicalDirector Results 29
3.4 Communicare Results 32
3.5 MMEx Results 36
3.6 Manual Reporting Results 40

GLOSSARY

ACR	Albumin/Creatinine Ratio
AIHW	Australian Institute of Health and Welfare
AUDIT-C	Alcohol Use Disorders Identification Test
BMI	Body Mass Index
BP	Blood Pressure
CARPA	Central Australian Rural Practitioners Association
CDS	Control Dataset
CIS	Clinical Information System
COAG	Council of Australian Governments
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardio-vascular disease
DoB	Date of birth
DLP	Direct Load Project
DMA	Doll Martin Associates
DOCLE	Doctor Command Language
DVP	Data Validation Project
eGFR	estimated Glomerular Filtration Rate
GP	General Practitioner
HbA1c	Glycated haemoglobin, a measure of blood sugar levels used for diabetes diagnoses.
MD	MedicalDirector
METeOR	Metadata Online Registry
MMEx	A clinical information system and a trading name for the company that owns the application
nKPI	National Key Performance Indicator
NVDPA	National Vascular Disease Prevention Alliance
OSP	OchreStreams Portal
OSR	Online Services Report
PI	Performance Indicator
PIRS	Patient information and recall system
SNOMED	Systematized Nomenclature of Medical Terms
UI	User Interface
XML	Extensible Markup Language

1 EXECUTIVE SUMMARY

1.1 Introduction

The National Key Performance Indicators (nKPIs) are one of the key data sets used across government and the health sector to inform policy development and monitoring activities in Indigenous health. nKPI data is collected from over 200 Indigenous health services funded to provide primary health care under the Indigenous Australians' Health Program. This occurs through extraction of data from clinical information systems (CISs) and its transfer to a secure data portal, OCHREStreams, developed and managed by the Improvement Foundation.

The purpose of the Data Validation Project (DVP) was to objectively and independently review the accuracy of the data processing that is performed to produce nKPIs. The DVP has checked the integrity of the data extraction, transformation and reporting process from the in-scope CISs - MedicalDirector, Communicare (a product of Telstra Health) and MMEx. It provided a specifically developed Control Data Set of nKPI patient data as input to each CIS extraction process and checked the output as produced for the OCHREStreams portal.

The DVP ran in parallel with the Direct Load Project, which is developing new nKPI report submission processes.

As the various CIS products were tested, vendors were consulted on unexpected or apparently aberrant results, and provided the opportunity to resolve any issues. This has meant that the project has developed from being a status measurement project to an improvement project, contributing to the development of updated versions of the CIS products for 2017 reporting.

1.2 Methodology

1.2.1 The Data

The DVP developed a Control Data Set (CDS) as a common basis for the nKPI reports in each CIS.

The CDS included test cases to exercise all of the nKPIs. The CDS comprises of patient records with demographics and conditions to test most analysis categories, or "measure codes", which are the disaggregation points for each nKPI[1].

Additional cases were developed for negative tests (where patients did not meet conditions for inclusion in the relevant nKPI report), and to test boundary conditions, for example breaks between age groups.

As there was often more than one way (and more than one field) to enter the data required to generate the nKPIs, test cases were included to test alternative input methods for each CIS. Although data entry processes were out of scope for the DVP, it was important to test which fields were included in extracts for nKPI reporting, to determine any resulting impact on the accuracy of the output.

Additional scenario testing for individual nKPIs was also conducted outside the CDS to test particular hypotheses and issues.

[1] The test cases for the CDS were included in the "nKPI Data Validation Plan - Data Validation Project", dated March 2017.

1.2.2 The Method

Test environments for the DVP were established by each of the Vendors. These included remote access servers from MedicalDirector and Telstra Health, and a test health facility established within MMEx.

The Improvement Foundation provided access to a non-production environment for the purposes of receiving and viewing the uploaded nKPI report files from each of the Vendor test environments and through the manual reporting process.

It was initially intended that the CDS would be provided to each vendor to upload directly into the test environment. However, no vendor had currently available functionality to upload of the entire CDS, and the development to enable this could not be completed within the DVP timeframe. Consequently, the project team adopted an alternative approach involving manual entry via the user interface of the majority of the test data. Patient demographics were able to be uploaded using functionality to support data migration in Communicare and MedicalDirector. The MedicalDirector suite includes import/export functions that supported the upload of the patient demographic data and limited clinical information (some conditions, measurements and patient visits). MedicalDirector also provided a test patient database developed for their own internal testing of the MedicalDirector Insights application that would be used to generate the nKPI reports.

The next stage in the process used internal reporting processes to compare these to the expected patient numbers from the CDS to validate that the test case data had correctly loaded. This included testing against the nKPI reporting functions developed by the vendors for the Direct Load project.

Where discrepancies indicated a data entry issue, the test data was corrected and reports re-run to validate the data update. At the conclusion of this process, the remaining discrepancies that could not be resolved by the project team were provided to the individual vendors for investigation. These issues were discussed with each vendor, leading to issues being either retested and resolved or flagged by vendors for resolution by modifications to their reporting processes.

1.2.3 The Consultations

In addition to the Department of Health representatives, the project team consulted with the following groups in the course of the project:

- Data Validation Project Working Group.
- CIS vendors.
- Australian Institute of Health and Welfare (AIHW).
- Improvement Foundation (IF).

1.3 Findings

1.3.1 General Observations

The Department initially expected that the project would produce one of the following outcomes:

- It would provide an independent assessment that data collected and transformed within each of the PIRS produced comparable and accurate nKPIs
- It would establish that the data processes are mostly accurate, but there were some minor issues which can be addressed; or

- It would establish that there are significant inaccuracies in the data processes, and make recommendations on how they can be rectified.

Our general finding is that the DVP has established that the data processes are mostly accurate, but there are some minor issues that can be addressed.

For each of the vendors, the majority of the indicator values produced through the vendors nKPI reporting are identical, or very close, to the results expected from the control data set.

For each vendor system, a small number of potential areas for improvement were noted and discussed with the vendors. In most instances, vendors have accepted these findings and have already made corrections to address the issues identified.

There were five types of issues that were identified that affected the nKPI results with one or more vendors. They are briefly discussed here:

1.3.1.1 Inconsistency in vendor interpretation of nKPIs

The nKPIs are documented in two main sources, namely the AIHW METeOR definitions, and the Improvement Foundation definitions, based on the METeOR definitions but providing greater detail to assist software vendors.

Developed at a national level under the auspices of COAG, the METeOR definitions constitute the primary source for the nKPI definitions. However, by themselves the METeOR definitions do not always contain sufficient detail for software vendors to accurately and consistently implement reporting of the nKPIs from within their clinical systems. We understand that the required additional detail to support vendors was subsequently developed by the Improvement Foundation, based on the METeOR definitions.

In practice, some inconsistencies between these documents have led to confusion and differences in interpretation and implementation by vendors, impacting the overall accuracy and consistency of reporting across different clinical systems. The main example here is with nKPI 20 – “Necessary risk factors assessed to enable cardiovascular risk assessment”. Where METeOR includes a reference to “information recorded on Diabetes” among the risk factors, the IF definition specifically excludes it. Consequently, it was noted that Communicare and MedicalDirector followed the IF definition and ignore “diabetes” status while MMEx only included patients with a Diabetes diagnosis.

Variations in the way that nKPIs have been interpreted were observed between vendors, impacting the reliability of a number of nKPIs. For example, in nKPI 01 and 02:

- In MedicalDirector and Communicare, babies are only captured in the nKPI report if they have their own record and a birth weight is recorded.
- In MMEx, babies are only captured when the baby’s birth weight is recorded on the mother’s record. No reference is made to the child’s record.
- MedicalDirector and Communicare did not exclude multiple births from nKPI 02, as information about multiple births is not included in the baby’s record. MMEx does now exclude multiple births when that information is entered into the mother’s record.

The AIHW User Guide was also used by health services to assist their understanding of the nKPI reports. Early in the project we identified some minor variations between the User Guide and the METeOR definitions in relation to PI01 but note that this has been resolved in the version released in June 2017.

1.3.1.2 Variations in clinical definitions

For some nKPIs, clinical definitional differences between CISs affect the results. For example, the diagnostic codes that are considered to indicate Type 2 diabetes vary between systems, leading to some variations in the patients who will be picked up in the nKPIs where Type 2 diabetes is a pre-requisite. In MedicalDirector DOCLE codes are used,

Communicare uses ICPC2 and MMEx uses SNOMED. However, these codes are not directly visible through the user interface and are presented as a text list, some of which will trigger the record's inclusion in the nKPI report.

1.3.1.3 System defects

A small number of defects in the nKPI reports were identified. For example:

- All babies in MMEx are recorded as fully immunised even if they have had no immunisations.
- The report for nKPI 09 in MedicalDirector was showing the same patients in the detailed breakdown as both smokers and non smokers.
- In MMEx, if smoking status is recorded as 'Non smoker' the record was not included in the count of 'Smoking status recorded'.
- In MMEx, only a smoking status is recorded as 'Ex smoker' was recognised for inclusion in the numerator for nKPI 20.
- Failure to recognise AUDIT-C assessments as part of nKPI 16 in Communicare.

All identified defects have been scheduled by vendors to be fixed in their June/July releases.

These changes can potentially impact on time series analysis. As the impact on time series was out of scope for the project, the potential impact is unknown.

1.3.1.4 Variation in system functionality/business rules/workflow

Each system had multiple methods of entering the data required to generate some nKPIs. For example:

- In MedicalDirector, immunisations can be added through an Immunisation tab or, for immunisations given at another practice, through the History tab.
- BMI calculation fields in MedicalDirector can be accessed via an icon on the tool bar, via a drop down menu which provides access to a range of measurement types, via the history tab or via Progress notes/examination notes.
- Absolute CV Risk assessments in Communicare offers two calculation methods – National Vascular Disease Prevention Alliance (NVDPA or Framingham) and CARPA, with the assessment level being reduced for CARPA by 5% according to AIHW requirements.

Where different data entry paths were possible, some methods of data entry resulted in valid records being included in the nKPI, while other (likely to be less commonly used) methods resulted in records being excluded. This is not expected to have a significant impact on nKPIs, as in the majority of cases the common system workflows do correctly result in records being included in nKPI reporting. However, it was not possible to quantify the potential impact of reporting accuracy within the scope of this project.

1.3.1.5 Customisation of clinical information systems

CISs generally support some degree of customisation to meet specific needs of health services or groups of health services. Such facilities include specification of clinical items, care plans, documents or work flows. Customisation that involves recording or manipulating data items used in generating nKPI reports may need special attention to ensure that data recorded by customised processes is captured by nKPI reports. For example, a custom care plan used as the basis for a diabetes diagnosis may not be captured by an nKPI report searching for a diagnostic code for diabetes.

As a result of differences in the way each CIS generates nKPI reports, differing approaches to ensuring customisations are captured are required. These may include recording or

updating a particular variable; use of specific system codes, clinical coding or descriptors where reporting is based on searching for particular values; or modification of the business rules for nKPI reporting. Generally, as any customisations are likely to be implemented by individual services or perhaps groups of services, vendor modification of nKPI reporting on the basis of local customisation is unlikely to be feasible.

Significant levels of customisation could potentially impact the accuracy of nKPI reporting.

1.3.2 Summary of Findings

The CDS approach demonstrated that an extensive validation of the nKPI reporting functions could be achieved, and that it enabled the reporting systems to be tested and exercised much more extensively than has been done previously. This fact has generally been acknowledged by the vendors.

A summary of the results for each vendor is shown below, indicating whether the system correctly generated the nKPI report data or if there were errors. This table shows the status of each vendors' nKPI reporting function at the time of writing and includes updates and corrections implemented in response to the DVP findings.

Note: Where a defect was identified and acknowledged by a vendor, and a fix was scheduled for the next release, the result is shown as "To be fixed in next release". Where possible these have been re-tested and validated, but not all vendors made the new releases available in time for these to be retested before the completion of this report.

The table below summarises by nKPI the type of issues that were identified during testing. Some were issues or incorrect business rules that required a minor code fix. Others were attributed to differences in interpretation or inconsistency of the nKPI definition, which meant that the nKPI report was operating as intended within an individual system, but in a way that was not consistent between vendors.

	Legend
C	Calculations are correct
E	Errors with potentially significant impact on nKPIs
M	Minor issues – not expected to significantly impact on nKPIs
I	Calculation correct according to vendor specification, but issues with interpretation on nKPI between vendors
R	Issue identified and vendor will resolve in next release
U	Unable to test
MD	MedicalDirector
CCare	Communicare

Table 1 - nKPI Report Analysis Results Overview

Description	MD	Ccare	MMEx	Observations
nKPI 1 Birthweight recorded	C	C	I	This nKPI was affected by issues around the interpretation of the nKPI requirement, which resulted in variable implementation by vendors. Each CIS calculated this nKPI in line with their specification. However, the business rules for this indicator are not consistent in the various guidelines. Communicare and MedicalDirector only include records if there is a birth weight recorded on the baby's record, whereas MMEx only includes records where the birth weight is recorded on the mother's record. Babies are only counted if the baby is explicitly identified as Indigenous within the relevant record. The METeOR definition requires that babies be included if a parent is identified as Indigenous, and does not reference the Indigenous status of the baby.
nKPI 2 Birthweight result (low, normal or high)	M	M	R	Multiple births were not being excluded by any vendor (This has now been resolved by MMEx). The guideline indicates that the nKPI should be based on the baby record not the mother. However, in Communicare and MedicalDirector, which rely on the child's record for report data this information is generally only available on the mother's record. Similarly, the requirement to exclude babies with 'unknown gestational age' is not being met by Communicare and MedicalDirector as this information is not routinely recorded on the baby's record. This could be a result of confusion caused by inconsistencies between sources of documentation for this nKPI, as the requirement to exclude babies with unknown gestational age is only specified in the METeOR source. *METeOR:* Excludes multiple births and stillbirths. Births that are at least 20 weeks gestation **OR** at least 400 grams birthweight are included. Excludes unknown birthweight and unknown gestational age. *IF Measures:* Counts only babies born within the previous 12 months, excludes stillbirths, multi-births, births less than 20 weeks gestation, birth weights less than 400 grams, and does not require a minimum number of visits. It was also noted that there was a variance between the above elements of the respective definitions for this nKPI, namely, the METeOR definition implies that if the gestation age is greater than 20 weeks or the birthweight is above 400 grams then the birth will be counted rather than in the IF definition where both conditions must be satisfied for the birth to be counted.
nKPI 3 Health assessment (MBS Item 715)	C	C	U	In both MedicalDirector and MMEx, the nKPI report for this nKPI was dependent on successfully lodging an MBS claim. The business rule in Communicare is that an item 715 claim is counted at a point in the process prior its submission. Only claims explicitly discarded after a rejection are subsequently excluded. Testing for MedicalDirector and MMEx was dependent on having a valid Medicare On-line Provider ID before an MBS claim could be batched. These were not

Description	MD	Ccare	MMEx	Observations
				available to the DMA team. However, DMA was able to incorporate test cases (patients) that MedicalDirector had created for their internal testing which included successfully lodged bulk billing transactions for this and other MBS items. This enabled DMA to test the MedicalDirector reporting functions for this and the other MBS related nKPIs (ie. nKPIs 03, 07 & 08).
nKPI 4 Fully immunised children	C	C	R	The calculations for this nKPI were correct in all three systems. The age groups for reporting this indicator are children aged: • 12 months to less than 24 months • 24 months to less than 36 months • 60 months to less than 72 months Depending on the child's age at the time of reporting there may be a small number of babies incorrectly excluded as a result of age boundary conditions (eg if a report is run and a child is 12 months and 3 days, but is not immunised until they are 12 months and 5 days, they will be excluded as not fully immunised). Although this issue was identified in testing, it is expected to have a minimal impact. Communicare defines a child as "fully immunised" if the child has no outstanding immunisation reviews. However, in itself this is not enough to indicate a child is not fully immunised if there is evidence of a completed review that is acceptable. For example, a completed four year review overrides an uncompleted 18 month review as all age based reviews include a review of all immunisations for that child (see section 3.4 for more detail on the business rules applied). In MMEx this nKPI was not reporting correctly. The vendor recognises this issue and it will be fixed in version V17.2.44.
nKPI 5 HbA1c test recorded (clients with type 2 diabetes)	C	C	I	While MMEx offers two pathways for adding a Type 2 Diabetes diagnosis to a patient, it appears that data entered through only one of those pathways is captured within Type 2 Diabetes related items within the nKPI report. Specifically, a special diabetes care plan is included within MMEx that allows a user to assign a Care Plan and a diagnosis within the same workflow. MMEx has advised that this care plan applies specifically to Type 2 Diabetes patients and has been developed in response to user demands. Users can create their own care plan template for diabetes, however, and if they do this, the diabetes diagnosis will not be picked up in the report. MMEx also offers the opportunity to enter the diagnosis directly into the medical history section of the patient's record. However, it would appear that a specific Type 2 diabetes diagnoses entered through this pathway will not be appropriately captured within the nKPI reports. There are inconsistencies between vendors in the specification of the diabetes codes that should be included for type 2 diabetes.

Description	MD	Ccare	MMEx	Observations
nKPI 6 HbA1c result (clients with type 2 diabetes)	C	C	I	See nKPI 05.
nKPI 7 GP Management Plan (MBS Item 721)	C	C	U	See nKPI 03.
nKPI 8 Team Care Arrangement (MBS Item 723)	C	C	U	See nKPI 03.
nKPI 9 Smoking status recorded	R	C	C	MedicalDirector – Did not count any patients who did not have smoking status recorded. Figures for "Without Smoking Status Recorded" are incorrect and repeat the "With Smoking Status Recorded". This was fixed after being identified in testing.
nKPI 10 Smoking status result	C	C	C	No issues identified with this nKPI.
nKPI 11 Smoking status results of women who gave birth	C	C	C	No issues identified with this nKPI.
nKPI 12 BMI (overweight or obese)	C	C	C	No issues identified with this nKPI.
nKPI 13 First antenatal care visit	C	C	R	In MMEx, where there is no antenatal visit (and therefore no gestational age at a visit), the record is counted as a visit with no gestational age – ie. records are included in the "no gestational age" numerator even where there is no visit. The issue has been identified and will be fixed in the next release.
nKPI 14 Influenza immunisation (aged 50 and over)	C	C	C	No issues identified with this nKPI.
nKPI 15 Influenza immunisation (type 2 diabetes or	C	C	I	See nKPI 05. Although there was a consistent interpretation of this nKPI between vendors, there are inconsistencies between vendors in the list of conditions that are counted as COPD for the

Description	MD	Ccare	MMEx	Observations
COPD clients				purposes of this nKPI.
nKPI 16 Alcohol consumption status recorded	C	R	C	Communicare – an issue was found where report did not include patients with an AUDIT-C assessment. This has now been resolved by Communicare.
nKPI 17 Audit C with result within specified levels	C	C	R	This indicator will be collected for the first time in the June 2017 collection period. It was generally correctly calculated, however, in MMEx, the calculation for Female 35-44 used the male group as denominator, giving a wrong result for this demographic group. MMEx have indicated that this will be resolved in the next release.
nKPI 18 Kidney function test recorded (type 2 diabetes or CVD clients	R	C	R	MedicalDirector issue was found and fixed. In Calculation 1, "Total Both Genders" for "15-24yrs" age range was incorrect, showing the "Males total" figures for that age range. Also in Calculation 1, top level "Proportion" figures was a repeat of the "Number" figures rather than percentages. In Calculation 2, the count for "Indigenous regular clients aged 65 years and over, Males" category was not included in the total for "eGFR, Males". The absence of a single specification indicating which diagnostic codes should be included, and the use of different coding schemes between vendors, creates the risk of inconsistencies between vendors in the list of codes/conditions that are counted as diabetes type 2 or CVD for the purposes of this nKPI.
nKPI 19 eGFR and ACR results	C	C	I	See nKPI 05.
nKPI 20 Necessary risk factors assessed to enable cardiovascular risk assessment	I	I	I	The implementation of this nKPI is inconsistent across vendors, due to inconsistencies across source documents. The definition in METeOR is: *The number of indigenous regular clients without known CVD, aged 35 to 74 years, who have had all of the following information recorded within the previous 24 months:* • *Tobacco smoking* • *Diabetes* • *Systolic blood pressure* • *Total cholesterol and HDL cholesterol levels* • *Age*

Description	MD	Ccare	MMEx	Observations
				• *Sex.* It then relaxes the currency requirement: *Where an Indigenous regular client's tobacco smoking status and/or sex does not have an assessment date assigned within the Patient Information Record System (PIRS), tobacco smoking status and/or sex as recorded in the PIRS should be treated as current (i.e. as having been updated within the previous 24 months).* *Age is to be derived from date of birth.* AIHW user guidelines are in accordance with METeOR, but relax the currency requirement further and expand diabetes information: • *Do include information on risk factors (diabetes status (that is, with or without diabetes), tobacco smoking status (that is, current smoker, ex-smoker, non-smoker), age and sex) from the most recent record for the client, regardless of how old that record is.* However, the IF Measures Specification definition has excluded reference to the diabetes information requirement. Both MedicalDirector and Communicare have adopted the IF definition while MMEx check for a diabetes diagnosis, according to their interpretation of the METeOR requirement. Communicare had an issue with filtering risk factor records for previous 2 years which has been fixed. However, as identified above, within the METeOR definition there is a special exclusion for non-date-stamped "Smoking Status". MMEx only recognised the smoking status of "Ex Smoker" as a risk factor and the vendor is working to resolve this to include all smoking status options, where recorded.

Description	MD	Ccare	MMEx	Observations
nKPI 21 Absolute cardiovascular risk assessment result	C	C	R	This indicator has not been collected to date, and will be included in the June 2017 reporting for the first time. Each CIS offers a cardiovascular risk assessment tool, which automatically calculates the CVD risk based on entered and recorded values of the risk factors. Manual entry of the risk value by the user is also supported. The CVD assessment tools used by each vendor are based on the Framingham risk assessment methodology, while Communicare also includes the CARPA CVD risk assessment tool. The CARPA tool, also based on Framingham, includes an additional allowance for indigenous populations. The Communicare CARPA scores are adjusted downwards by 5% (as required by AIHW) when included in the report. In MMEx a history of CVD was not part of the calculation. The existence of a CV risk assessment places a record in the denominator. This will be addressed in the next release.
nKPI 22 Cervical screening recorded	C	R	C	Communicare – issue found and fixed. The procedure of cervical cancer screening applied to a patient record did not register in the nKPI report.
nKPI 23 Blood pressure recorded (clients with type 2 diabetes)	C	C	I	See nKPI 05.
nKPI 24 Proportion of regular clients with Type II diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	C	C	I	See nKPI 05.

1.4 Recommendations

It is recommended that:

1. Follow-up validation testing be conducted with each vendor as new versions of their applications are released or patched.
2. The CDS approach be expanded to cover the increased number of test cases to fully test all aspects of the nKPI reporting regime within the vendor systems.
3. Work is initiated with each vendor to develop automated CDS uploaders to streamline and standardise future testing/validation of the nKPI (and potentially other) reporting regimes.

4. Consistency be established and maintained between the various sources that relate to the nKPI definitions, namely:
    - AIHW METeOR definition, the primary source for nKPI definitions.
    - Improvement Foundation documentation.
    - AIHW User Guide.
5. This could be included in any future review of the nKPI data set.
6. The Department maintains a document register on an appropriate page on its website as a definitive source of the status and updates (with links) to all documents relevant to the nKPI reporting process, whether produced by AIHW (including its METeOR registry), IF or the Department.
7. The Department/AIHW specify the disease codes within the commonly used coding systems (DOCLE, SNOMED and ICPC2) that should be included in the nKPIs relating to:
    a. Diabetes Type 2
    b. COPD
    c. CVD
    d. Other chronic diseases as they become relevant to reporting in the future.
8. Each vendor conduct a workflow review and mapping of data elements to nKPI extracts to ensure that data generated as a result of each possible workflow process is correctly reported.
9. As the necessary facilities to support uploading nKPI reports to the IF OCHREStreams portal were not provided in sufficient time for thorough testing to be conducted before finalisation of our report, consideration be given to extending any future stages of the DVP to include separate testing of this process.

2 DATA VALIDATION PROJECT METHODOLOGY

2.1 Project Purpose

The nKPIs are one of the key data sets used across government and the health sector to inform policy development and monitoring activities in Indigenous health. nKPI data are collected from over 200 Indigenous health services funded to provide primary health care under the Indigenous Australians' Health Program. This occurs through extraction of data from clinical information systems (CISs) and its transfer to a secure data portal, OCHREStreams, developed and managed by the Improvement Foundation.

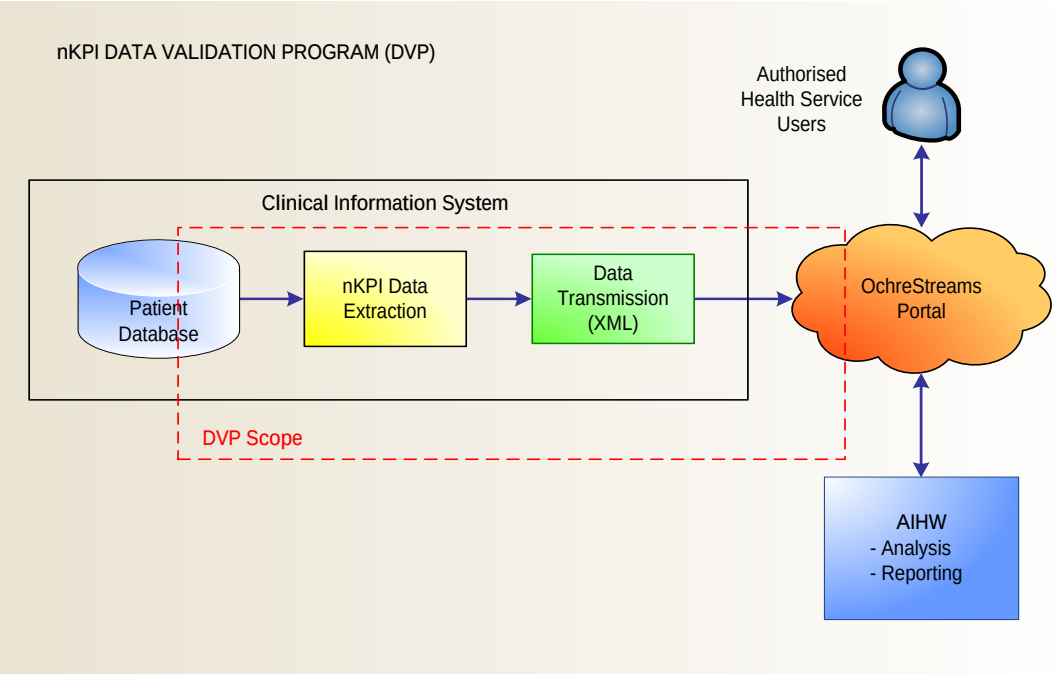
The purpose of the Data Validation Project (DVP) was to objectively and independently review the accuracy of the data processing that occurs to produce nKPIs. The DVP has checked the integrity of the data extraction, transformation and reporting process from in-scope CISs, MedicalDirector, Communicare (a product of Telstra Health) and MMEx, as well as the manual reporting process (an Excel spreadsheet developed and maintained by the Improvement Foundation).

The DVP reported regularly to the DVP Working Group. This provided both the Department and the Aboriginal health sector with information on how accurately the nKPI values reported by health services represent the underlying data in their clinical systems.

2.2 Project Scope

The project scope is shown on the following diagram. It was focused on the extraction, transformation and reporting process, and excluded data quality issues that could occur at the user interface. The process has identified inconsistencies in data mapping that could contribute to variation in nKPI results between vendors.

Figure 1 – Data Validation Scope



The validation did not include:

1. Errors resulting from health service data entry or interpretation errors
2. Assessment of CIS local configuration within individual health service implementations
3. Record audits of source data.

It should be noted that consideration of PenCAT and previous reporting arrangements was out-of-scope for the project.

The DVP investigated the process of data extraction, transformation and reporting of nKPI information from the following clinical information systems:

1. Communicare
2. MedicalDirector
3. MMEx
4. Manual Submission Form (Excel spreadsheet developed and maintained by the Improvement Foundation).

It provided a specifically developed Control Data Set of nKPI patient data as input to each CIS extraction process and checked the output as produced for the OCHREStreams portal.

2.3 Methodology

2.3.1 The Control Data Set

The DVP developed and used a control dataset (CDS) to generate nKPI reports in each system, in conjunction with additional focused scenario testing for individual nKPIs to test particular hypotheses and issues. With a CDS, records were created to meet the requirements of the scenarios that require testing. This enabled a robust dataset to be created that tests all the potential measure codes, and to test negative scenarios to check that records that should have be excluded were not being included in nKPI calculations.

The key benefits of the CDS approach to the validation testing were that it:

- Exercised the broadest possible range of measure codes within the nKPI set compared to a typical Health Services' actual patient data.
- Did not need to deal with live patient data, avoiding issues around privacy.
- Focussed specifically on the mechanics of the reporting process.
- Provided the potential for a standardised validation benchmark for all vendors.
- Enabled the project team to have control over the data being entered so that the expected results are known.
- Required less effort and involvement from the vendors and health services for data extraction.
- Delivered a potentially repeatable process that can be used for ongoing periodic validation after nKPI and/or CIS changes.

The CDS included patients that variously:

- Qualify as both Indigenous and non-Indigenous patients.
- Cover all gender, age and weight ranges.
- Cover all lifestyle cases (eg. Smoking, alcohol consumption).
- Cover all reportable conditions (eg. Diabetes II, CVD, COPD).
- With test results for HbA1c, BP, kidney function, BMI, etc.
- Test value ranges and boundary conditions (eg. Age, BP, BMI, weight, ACR, eGFR, HbA1c).
- Meet the "regular patient" criteria, by including a minimum of three "visits" over the required time period for sample patients.
- Were deceased.

Each CDS record included patient demographic data, including name, date of birth, gender, Indigenous status, and identification variables such medical record number and Medicare number and relevant clinical data, including diagnoses, procedures, progress notes, medications and results.

The CDS development resulted in an initial 431 patient records. Where subsequent further investigation of discrepancies was required, additional patient records were created and input for detailed testing of specific issues.

The initial CDS was documented and uploaded into each CIS as described in section 2.3.4.

2.3.2 Documentation

In order to specify the test cases to be included in the CDS, the project team needed to rely on definitions and guidelines for the nKPI reporting process. The nKPI process has evolved over recent years, and early in the DVP a new version of the definitions was published with minor variations from earlier versions. The CDS was reviewed to assess any changes that may have impacted the tests already performed or the data used.

The key organisations maintaining nKPI documentation include:

- The Australian Institute of Health and Welfare, which maintains the nKPI specifications and makes them available through their METeOR online registry and holds the nKPI database.
- The Improvement Foundation, which maintains the OCHREStreams online reporting environment under contract to the Department of Health.

The principal documents on which we have based our interpretation of the nKPI definitions are:

- Indigenous primary health care key performance indicators (2015-2017). 21 Feb 2017 Exported from METeOR, (AIHW's Metadata Online Registry)
- AIHW nKPI database - User guide reporting period ending 30 June 2017
- Improvement Measures available for submission to the Improvement Foundation databases Last Updated: 20/04/2017, Version: 6.6 (draft): Improvement Foundation
- Various mapping documents giving guidance on how each of the CIS applications record items required to generate nKPI reports, produced by Pen Computing in support of the previous PenCAT based nKPI reporting process.

While the hierarchy of these documents starts with the METeOR definitions and then the IF definitions, which are based on the METeOR definitions, we encountered various ambiguities and inconsistencies between relevant documents, in some cases resulting in different interpretations by each of the vendors. Where this has impacted the results of the data validation process, comments on these issues are included in Section 3.

2.3.3 Approach

Test environments were established by each of the Vendors. These included Remote Desktop Protocol access to cloud-based servers from MedicalDirector and Telstra Health, and a test health facility established within the cloud-based MMEx.

The Improvement Foundation provided access to one of their non-production environments for the purposes of receiving and viewing the uploaded nKPI report files from each of the Vendors' test environments and the manual submission process.

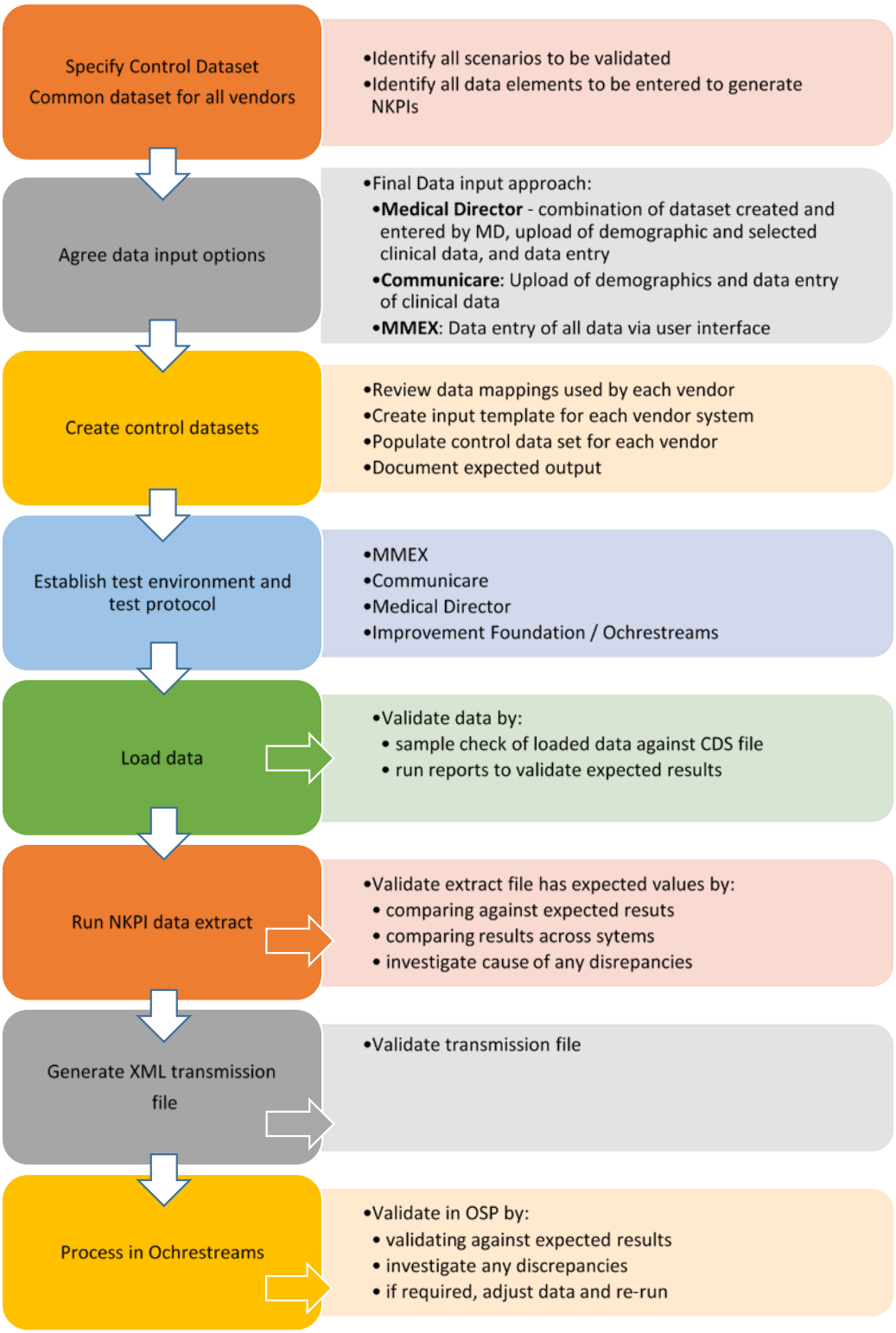
Following initial meetings with each of the vendors, early indications were that the intended approach of providing the CDS to each vendor to upload directly into the test environment would be possible. However, as discussions progressed, it became evident that no vendor had currently available functionality that would enable file uploads (other than core demographics), and that the required development could not be completed within the DVP timeframe. Consequently, a changed (and more onerous) approach to loading the majority of test data was implemented, involving manual entry via the user interface.

Patient demographics were able to be uploaded using functionality to support data migration in Communicare and MedicalDirector. MedicalDirector also provided a test patient database that they had developed for their own internal testing of the MedicalDirector Insights application that would be used to generate the nKPI reports. A number of these test

cases/patients were incorporated into the CDS. In particular, this included test cases relating to MBS items and pathology results.

The diagram below shows the high level approach that was followed in validating the nKPI process within the vendor systems.

Figure 2: Approach



2.3.4 Testing Facilities

This section provides an overview of the approach used by the project team to upload the CDS in each system, covering importing/uploading, manual data entry and validation of the input data.

2.3.4.1 MedicalDirector

MedicalDirector provided two environments for testing the MedicalDirector suite, namely:

- A temporary licence which enabled a local installation of the MedicalDirector suite, and
- A test server environment, accessible via RDP

The main testing was conducted in the test server environment and the local environment was used to conduct supplementary testing and verification without affecting the main patient database.

- MedicalDirector comprises a suite of applications, which include:
- MedicalDirector Clinical Clinical management application
- MedicalDirector Pracsoft - Patient management and billing
- MedicalDirector Insights - Reporting and business intelligence
- MedicalDirector Maintenance - collection of maintenance utilities

Within the Maintenance suite, MedicalDirector included an import/export capability that enables patient records to be imported and exported in either HTML or XML format. Patients can be imported or exported either individually or as the entire patient database. Initially, patients could only be imported individually, but MedicalDirector updated this feature during the course of the project to support batch import of multiple patient records.

However, it became apparent that the import function had some limitations, which meant that several elements of the patients' records could not be automatically uploaded. Significantly, the import included additional visits and patient interactions that qualified them as regular patients (ie. each patient intended to be a regular patient for validation purposes had 3 records loaded).

The remaining data was entered manually through the user interface (UI) in MedicalDirector Clinical and, in some cases, MedicalDirector Pracsoft.

The patient record export function was used in conjunction detailed analysis of the MedicalDirector Insights report to verify that the patient data had been entered correctly.

In addition, MedicalDirector made available the patient database that they had developed to test MedicalDirector Insights nKPI reporting function, and provided information on how to enter the data into MedicalDirector Clinicals/Pracsoft.

As some test cases required input data (ie MBS data and some measurement results) that the DMA team was unable to access, several of the MedicalDirector patients were incorporated into the test patient database.

MedicalDirector has multiple data entry paths for much of the data required for the nKPIs. Data was entered using each of these data entry paths to identify which data entry points populated the extracts for nKPI reporting. Not all of them were equivalent and some of them did not produce a required result.

2.3.4.2 Communicare

Telstra Health provided the DVP project access via Remote Desktop to a demonstration instance of Communicare V15.0.1.128.

For Communicare, loading the CDS involved the following:

- Uploading CDS patient demographic data via a CSV file, generated from the CDS. This utilised a built-in bulk patient upload capability provided within Communicare
- Identification of appropriate processes and screens for manual entry of test case clinical data for these patients. Communicare is structured around a large number of clinical procedures, which in many cases were used to enter the test data. In several cases a number of alternative ways were found, and exercised, to enter the data.
- Extensive use of a data entry wizard in the UI to greatly enhance the efficiency of entry of identical clinical items for multiple patients
- Manual entry of other clinical items on a patient by patient basis.

Clinical information in Communicare is input on the basis of a “Clinical Item” which may be a condition or a procedure, and may include “qualifiers” or measures with specific values. While much of the data required by the nKPIs can be directly entered as a condition or procedure, certain items can be entered only as part of a broader procedure. An example is the Diabetes Annual Cycle of Care, which includes a number of measures such as eGFR and microalbumen.

In normal conditions, many health services would receive pathology results electronically, using these as the basis of automatic entry. We were unable to test pathology results received via HL7, only by direct entry via the UI.

We found in one notable instance the reporting process did not pick up all data entry methods. The example was cervical screening, where the nKPI report ignored patients with a clinical procedure screening cervical cancer, despite picking up patients where results from the procedure were recorded. The report process has since been updated by Communicare to address this issue.

The next stage in the process involved running reports using internal reporting processes (including nKPI reports) compared to expected patient numbers from the CDS to validate that the test case data had correctly loaded. Where discrepancies were identified, indicating a data entry issue, the test data was corrected and reports re-run to validate the data update.

2.3.4.3 MMEx

MMEx does not have any data import capability, necessitating the manual entry of all patient information.

The MMEx UI is intuitive, which meant that most data types could be readily entered. This was supplemented with specific advice from the MMEx team.

It was found that MBS items could not be entered, as these required a bulk billing transaction and a secure connection to the Medicare test portal, which was not available within the project timeframes. In addition, while these were not required for establishing the MMEx CDS data set, importing pathology and laboratory results were not included in the testing.

MMEx includes an OCHREStreams reporting capability that can create an Excel file. A row in the file consists of the data counts for numerator and denominator for each of the disaggregated nKPI elements (measure codes), along with the identifiers for each client that contributed to that numerator or denominator. By combining the MMEx nKPI output with the original Excel CDS client data, a matrix was created that showed client by nKPI element.

For each intersection in the matrix with an N (record contributes to numerator) or a D (record contributes to denominator), the outcome from the report was compared to the CDS design expectation. The cell was marked as conforming or not. From the elements for an nKPI, the nKPI was determined to be calculated correctly or incorrectly. Where there were any concerns, the client data in MMEx was cross-checked.

2.3.4.4 IF test portal

IF provided access to their "stage" environment to facilitate testing of the uploading and reporting process to the OCHREStreams portal and to verify the output of the nKPI reporting regimes. However, as the web service address for reporting is apparently hard-coded within each of the reporting systems that could be tested (ie. MedicalDirector and Communicare), the report outputs could only be sent to the OCHREStreams "production" portal. This issue was resolved by IF staff who were able to transfer the uploaded files into the "stage" environment where they could be viewed and "processed".

The manual submission form was uploaded directly into the "stage" environment and processed.

2.3.4.5 Manual submission form

The latest version of the OCHREStreams Manual Submission form was finalised and released in early May 2017. This includes nKPIs 17 and 21.

The Manual Submission Form (an Excel spreadsheet) was filled in with test data and the export form was generated. A number of validity tests are built into the Manual Submission Form and these must be satisfied before the export form can be generated.

The Manual Submission form was uploaded to the OCHREStreams "stage" environment portal, run through the approval regime and then submitted. In the live production environment, this would have sent the output files to AIHW, but in the stage environment, these files can be recovered by the IF support team (eg that totals for disaggregation elements are consistent with the totals entered for the indicator).

The content of the output files that were intended for AIHW were compared with the input data to determine the validity of the transmission and process.

2.3.5 Application Versions

The validation testing was conducted using the following version(s) of the vendor applications.

Table 2: CIS version numbers

Application	Validation Testing Version(s)	Proposed version[2] - July Reporting
Communicare Synchronicity (Reporting agent)	V15.0.1.128 development plus several ad hoc patches NA	V15.1 – for upgrades Patches for older versions Due June 2017 Due July 2017
MedicalDirector Insights MedicalDirector Clinical	V1.2, V1.3 (temporarily), V1.4 V3.17	V1.4 – Released June 2017

[2] Note – information on release dates provided verbally by vendors but may be subject to change

Application	Validation Testing Version(s)	Proposed version[2] - July Reporting
MMEx	V17.1.5.1 V17.2.0.14 V17.2.1.3 V17.2.2.2	V17.2.4 – Update covering nKPI reporting fixes, released 10 July 2017 V17.3 – Major new update, released-July 2017
Manual Submission Form	V6	V6

While the validation has been completed to date on the current versions as shown above, the preliminary results will influence the versions due to be released prior to the July reporting cycle. In some cases, fixes for issues identified from our testing have been already incorporated in versions of the applications in the test environments.

Further testing was therefore conducted during June and July to validate some of the newer releases, using the current CDS data sets that are now residing within each vendor test environment. The results were updated where the new releases could be tested and analysed. However, several of the new releases were not available in time for detailed analysis to be conducted prior to the finalisation of this report.

2.4 Reporting Function

All three CIS's provide nKPI reporting functions using different approaches. However, each reporting function supports a local presentation of the nKPI reports. Each approach is described below.

2.4.1 MedicalDirector

For MedicalDirector, a new companion product, MedicalDirector Insights, has been developed to provide a range of reporting functions, including the nKPI reports. MedicalDirector Insights takes "snapshots" of the patient database and extracts the nKPI report from the selected snapshot, normally the latest snapshot. Snapshots can be triggered by the user or scheduled for a reference date in the future. However, it was noted that MedicalDirector Insights still relied on the patient database to display the report results (eg. patient names).

Within MedicalDirector Insights, the nKPI report presentation provides a high level overview, with a section devoted to the results for each nKPI. Numbers in the report have a "drill-down" function that enables the user to see which patients are included within the patient count selected.

MedicalDirector Insights also provides a "data export" function to export all of the report data to a spreadsheet. In addition, individual parts of the report can be exported as Excel, HTML, CSV or TSV formatted files.

From within MedicalDirector Insights, the user can also submit the nKPI report to the OCHREStreams portal. The "Submit to the Improvement Foundation" tab enables the authorised health service user to enter the IF Health Service Security Token, select the snapshot data that the report should be based on and the report type (nKPI, OSR). It also displays a list of the submissions lodged, including the submitter, submission date, the report content and snapshot source.

2.4.2 Communicare

Communicare provides a local nKPI reporting function within their extensive suite of reporting options.

This branch of reporting appears to be separate from the actual reporting path through to the OCHREStreams portal, although Telstra Health/Communicare have indicated that their design is closely aligned, using a common set of stored procedures to access information from the patient database.

The local report generally consisted of two reports for each nKPI, namely a patient list and a results report. It also includes an overall patients report listing all regular patients by age and gender and a Summary report, resulting in a total of 50 individual reports. These reports can be displayed on screen, printed or saved in various file formats including Excel, CSV, HTML, test or XML.

It is understood that the July 2017 nKPI reporting for Communicare will be based on another Telstra Health product, Synchronicity. It is understood that the Synchronicity reporting tool extracts data provided by Communicare's stored procedures, which are also used to generate the local nKPI reports, compiles the nKPI report and transmits the report to the OCHREStreams portal.

2.4.3 MMEx

MMEx provides an internal nKPI reporting function, OCHREStreams Report, which provides users with a view of the report data.

This report closely resembles the nKPI measure code structure, presenting each measure code within each nKPI, that is, each subcomponent of the nKPI (eg. nKPI-12011 - Proportion of Indigenous male clients aged 25-34 years who are regular clients of the service, who have had their BMI recorded as obese (greater than or equal to 30) in the last 24 months). A numerator and denominator is provided against each measure code. A "drill-down" function is provided which lists the patients included in the count. This report can be exported to Excel and this also includes the patient list for each numerator and denominator.

It was noted that the patient list for individual numerators and denominators was limited to a maximum 3,006 characters or about 120 patient names. While this was not a problem for the DVP, it could make data verification difficult in a production environment with larger volumes of data.

The OCHREStreams report screen also provided the "Output XML OCHREStreams Report" and "Submit XML to IF Portal" buttons to finalise the report submission.

3 FINDINGS

3.1 General Observations

The following section provides a summary of observations.

3.1.1 Inconsistency in Interpretation of nKPIs

The nKPIs are documented in two main sources, namely:

- AIHW METeOR definitions, and
- Improvement Measures available for submission to the Improvement Foundation databases

Developed at a national level under the auspices of COAG, the METeOR definitions constitute the primary source for the nKPI definitions. However, by themselves the METeOR

definitions do not always contain sufficient detail for software vendors to accurately and consistently implement reporting of the nKPIs from within their clinical systems. We understand that the Improvement Foundation developed additional detail to support vendors, based on the METeOR definitions. The AIHW also developed a User Guide to assist health services to understand the indicators and work more effectively with their data.

In practice, some minor inconsistencies between these documents have led to confusion and differences in interpretation and implementation by vendors, impacting the overall accuracy and consistency of reporting across different clinical systems.

The main example here is with nKPI 20 – "Necessary risk factors assessed to enable cardiovascular risk assessment". Where METeOR includes a reference to "information recorded on Diabetes" among the risk factors, the IF definition specifically excludes it. Consequently, it was noted that Communicare and MedicalDirector followed the IF definition and ignore "diabetes" status while MMEx only included patients with a Diabetes diagnosis.

There are also variations observed in the way that nKPIs have been interpreted between vendors, impacting the reliability of a number of nKPIs. For example, in nKPI 01 and 02:

- In MedicalDirector and Communicare, babies are only captured in the nKPI report if they have their own record and a birth weight is recorded.
- In MMEx, babies are only captured when the baby's birth weight is recorded on the mother's record. No reference is made to the child's record.
- MedicalDirector and Communicare did not exclude multiple births from nKPI 02, as information about multiple births is not included in the baby's record. MMEx does now exclude multiple births when that information is entered into the mother's record.

The AIHW User Guide was also used by health services to assist their understanding of the nKPI reports. Early in the project we identified some minor variations between the User Guide and the METeOR definitions in relation to PI01 but note that this has been resolved in the version released in June 2017.

Inconsistencies between the documents could be eliminated initially through a harmonisation process, followed by active management to maintain consistency in the content. Greater clarity around the hierarchical relationship between the documents, the purpose of each document and robust change and implementation procedures understood by all stakeholders would reduce confusion.

3.1.2 Regular Patient Definition

All nKPIs except 01 and 02 report on regular clients. A regular client is one who has visited a Department of Health funded primary health care service at least 3 times in 2 years. The IF further defines a visit as "*a contact between the health service and the client for the purpose of providing health care".* Testing in the DVP has confirmed that each vendor has correctly applied the regular client definition to their data extract.

There are minor differences between the definitions documented in AIHW and IF sources, specifically:

1. METeOR does not specifically define "visit", or specify rules regarding the inclusion of deceased patients, whereas IF specifically allows (but does not mandate) their inclusion
2. IF incorporates the definition of regularity with patient demographic groups (e.g. *Patients recorded as Aboriginal and Torres Strait Islander, who have at least 3 or more visits recorded within the previous 2 years*)
3. The latest IF document (its status is noted as still draft) includes additional definition of "visit".

The concept of a visit varies within CISs, with services, clinical items and diagnoses, clinical procedures, episodes of care, client contacts, etc., used in CIS data captured in possibly slightly different ways.

3.1.3 Variations in Clinical Definitions

For some nKPIs, clinical definitional differences between CISs affect the nKPI results. For example, the diagnostic codes that are considered to indicate Type 2 diabetes vary between systems, leading to some variations in the patients who will be picked up in all the nKPIs where diabetes type 2 is a pre-requisite. In part, these differences are driven by the variation in the underlying clinical coding systems. In MedicalDirector DOCLE codes are used, Communicare uses ICPC2 and MMEx uses SNOMED. However, these codes are not directly visible through the user interface and are presented as a list of text labels, some of which will trigger the record's inclusion in the nKPI report.

However, it is not always clear which condition descriptions or text labels are relevant and will be captured within the nKPI report.

There are similar issues with COPD and CVD.

3.1.4 System Defects

A small number of defects in the nKPI reports were identified. For example:

- All babies in MMEx were recorded as fully immunised even if they have had no immunisations,
- The report for nKPI 09 in MedicalDirector is showing the same patients in the detailed breakdown as both smokers and non smokers,
- In MMEx, if smoking status is recorded as 'Non smoker' the record is not included in the count of 'Smoking status recorded',
- Failure to recognise AUDIT-C assessments as part of nKPI 16 in Communicare.

3.1.5 Variation in System Functionality/Business Rules/Workflow

Each system had multiple methods of entering the data required to generate some nKPIs. For example:

- In MedicalDirector, immunisations can be added through an Immunisation tab or, for immunisations given at another practice, through the History tab.
- BMI calculation fields can be accessed via an icon on the tool bar, via a drop down menu which provides access to a range of measurement types, via the history tab or via Progress notes/examination notes.
- Absolute CV Risk assessments in Communicare which offers two calculation methods – Framingham and CARPA, with the assessment level being reduced for CARPA by 5% according to AIHW requirements

Where different data entry paths were possible, some methods of data entry resulted in valid records being included in the nKPI, while other (likely to be less commonly used) methods resulted in records being excluded. However, this is not expected to have a significant impact on nKPIs, as in the majority of cases the common system workflows do correctly result in records being included in nKPI reporting. However, it was not possible to quantify the potential impact on reporting accuracy within the scope of this project.

3.1.6 Customisation of Clinical Information Systems

CISs generally support some degree of customisation to meet specific needs of health services or groups of health services. Such facilities include specification of clinical items, care plans, documents or work flows. Customisation that involves recording or manipulating data items used in generating nKPI reports may need special attention to ensure that data recorded by customised processes is captured by nKPI reports. For example, a custom care plan used as the basis for a diabetes diagnosis may not be captured by an nKPI report searching for a diagnostic code for diabetes.

As a result of differences in the way each CIS generates nKPI reports, differing approaches to ensuring customisations are captured are required. These may include recording or updating a particular variable; use of specific system codes, clinical coding or descriptors where reporting is based on search for particular values; or modification of the business rules for nKPI reporting. Generally, as any customisations are likely to be implemented by individual services or perhaps groups of services, vendor modification of nKPI reporting on the basis of local customisation is unlikely to be feasible. Significant levels of customisation could potentially impact the accuracy of nKPI reporting.

3.2 Observations by nKPI

The table below summarises the type of issues that were identified during testing, by nKPI. Some were bugs or that required a minor code fix, others were attributed to differences in interpretation of the nKPI definition, which meant that the nKPI report was operating as intended, but in a way that was not consistent between vendors.

Table 3: Observations by nKPI

nKPI	Description	Observations
1	Birthweight recorded	This nKPI was affected by issues around the interpretation of the nKPI requirement which resulted in different implementation by vendors. Communicare and MedicalDirector only include records if there is a birth weight recorded on the baby's record, whereas MMEx only includes records where the birth weight is recorded on the mother's record. Babies are only counted if the baby is explicitly identified as Indigenous within the relevant record. The METeOR definition requires that babies be included if a parent is identified as Indigenous, and does not reference the Indigenous status of the baby.
2	Birthweight result (low, normal or high)	Initially, multiple births were not being excluded by any vendor. As the sources indicate, this nKPI should be based on the baby's record not the mother's record, and as such, there is no information on the record to indicate if the baby is one of a multiple birth. This information, if available, is recorded in the mother's record. MMEx have since revised their report to exclude multiple births, using the information on the mother's record. Similarly, the requirement to exclude babies with 'unknown gestational age' is not being met by vendors as this information is not routinely recorded on the baby's record. This could be a result of confusion caused by inconsistencies between sources of documentation for this nKPI, as the requirement to exclude babies with unknown gestational age is only specified in the METeOR

nKPI	Description	Observations
		source. Similarly, the requirement to exclude babies with 'unknown gestational age' is not being met by Communicare and MedicalDirector as this information is not routinely recorded on the baby's record. This could be a result of confusion caused by inconsistencies between sources of documentation for this nKPI, as the requirement to exclude babies with unknown gestational age is only specified in the METeOR source. *METeOR:* Excludes multiple births and stillbirths. Births that are at least 20 weeks gestation **OR** at least 400 grams birthweight are included. Excludes unknown birthweight and unknown gestational age. *IF Measures:* Counts only babies born within the previous 12 months, excludes stillbirths, multi-births, births less than 20 weeks gestation, birth weights less than 400 grams, and does not require a minimum number of visits. It was also noted that there was a variance between the above elements of the respective definitions for this nKPI, namely, the METeOR definition implies that if the gestation age is greater than 20 weeks OR the birthweight is above 400 grams then the birth will be counted rather than in the IF definition where both conditions must be satisfied for the birth to be counted.
3	Health assessment (MBS Item 715)	The business rule in Communicare is that an item 715 claim is counted at a point in the process prior its submission. Only claims explicitly discarded after a rejection are subsequently excluded. In both MedicalDirector and MMEx, the report for this nKPI was dependent on a successful bulk billing outcome. This in turn was dependent on establishing a connection with Medicare On-line test portal to complete the test bulk billing transaction, which was not available to the DMA team. However, DMA was able to incorporate test cases (patients) that MedicalDirector had created for their internal testing which included successfully completed bulk billing transactions for this and other MBS items. This enabled DMA to test the MedicalDirector reporting functions for this and the other MBS related nKPIs (ie. nKPIs 03, 07 & 08). However, for MMEx, this was not possible and so DMA were unable to test these three nKPIs. MMEx provides a number of pathways to record an Aboriginal Health Check, including the Care Plan module, but these pathways either lead to the billing module or were otherwise ineffective in generating a reporting result.
4	Fully immunised children	The calculations for this nKPI were correct in all three systems. The age groups for reporting this indicator are children aged: • 12 months to less than 24 months • 24 months to less than 36 months • 60 months to less than 72 months Depending on the child's age at the time of reporting there may be a small number of babies incorrectly excluded as a result of age boundary conditions (eg if a report is run and a child is 12 months and 3 days, but is not immunised until they are 12 months and 5 days, they will be excluded as not fully immunised). Although this issue was identified in testing, it is expected to have a minimal

nKPI	Description	Observations
		impact. Communicare defines a child as “fully immunised” if the child has no outstanding immunisation reviews. However, in itself this is not cause for being not fully immunised if there is evidence of a completed review that is acceptable. For example, a completed four year review overrides an uncompleted 18 month review as all age based reviews include a review of all immunisations for that child (see section 3.4 for more detail on the business rules applied).
5	HbA1c test recorded (clients with type 2 diabetes)	While MMEx offers two pathways for adding a Type 2 Diabetes diagnosis to a patient, it appears that data entered through only one of those pathways is captured within Type 2 Diabetes related items within the nKPI report. Specifically, a special diabetes care plan is included within MMEx that allows a user to assign a Care Plan and a diagnosis within the same workflow. MMEx has advised that this care plan applies specifically to Type 2 Diabetes patients and has been developed in response to user demands. MMEx also offers the opportunity to enter the diagnosis directly into the medical history section of the patient’s record. However, it would appear that a specific Type 2 diabetes diagnoses entered through this pathway will not be appropriately captured within the nKPI reports. General issue: There are inconsistencies between vendors in the specification of the diabetes codes that should be included for type 2 diabetes.
6	HbA1c result (clients with type 2 diabetes)	See nKPI 05.
7	GP Management Plan (MBS Item 721)	See nKPI 03.
8	Team Care Arrangement (MBS Item 723)	See nKPI 03.
9	Smoking status recorded	MedicalDirector – Did not count any patients who did not have smoking status recorded. Figures for "Without Smoking Status Recorded" are incorrect and repeat the "With Smoking Status Recorded". This was fixed after being identified in testing.
10	Smoking status result	No issues identified with this nKPI.
11	Smoking status results of women who gave birth	No issues identified with this nKPI.
12	BMI (overweight or obese)	No issues identified with this nKPI.

nKPI	Description	Observations
13	First antenatal care visit	In MMEx, where there is no antenatal visit (and therefore no gestational age at a visit), the record is counted as a visit with no gestational age – ie. records are included in the "no gestational age" numerator even where there is no visit. The issue has been identified and will be fixed in the next release.
14	Influenza immunisation (aged 50 and over)	No issues identified with this nKPI.
15	Influenza immunisation (type 2 diabetes or COPD clients	See nKPI 05 There are inconsistencies between vendors in the list of conditions that are counted as COPD for the purposes of this nKPI.
16	Alcohol consumption status recorded	Communicare – an issue was found where the report did not include patients with an AUDIT-C assessment. This has now been resolved by Communicare.
17	Audit C with result within specified levels	*This indicator will be collected for the first time in the June 2017 collection period.* This was generally correctly calculated, however, in MMEx, the calculation for Female "35-44 years" uses the male group as denominator, giving a wrong result for this demographic group.
18	Kidney function test recorded (type 2 diabetes or CVD clients	MedicalDirector issue was found and fixed. In Calculation 1, "Total Both Genders" for "15-24 years" age range was incorrect, showing the "Males total" figures for that age range. Also in Calculation 1, top level "Proportion" figures was a repeat of the "Number" figures rather than percentages. In Calculation 2, the count for "Indigenous regular clients aged 65 years and over, Males" category was not included in the total for "eGFR, Males". There are inconsistencies between vendors in the list of codes/conditions that are counted as diabetes type 2 or CVD for the purposes of this nKPI.
19	eGFR and ACR results	See nKPI 05.
20	Necessary risk factors assessed to enable cardiovascular risk assessment	The implementation of this nKPI is inconsistent across vendors, due to inconsistencies across source documents. The definition in METeOR is: *The number of indigenous regular clients without known CVD, aged 35 to 74 years, who have had all of the following information recorded within the previous 24 months:* • *Tobacco smoking* • *Diabetes* • *Systolic blood pressure* • *Total cholesterol and HDL cholesterol levels* • *Age* • *Sex.*

nKPI	Description	Observations
		It then relaxes the currency requirement: *Where an Indigenous regular client's tobacco smoking status and/or sex does not have an assessment date assigned within the Patient Information Record System (PIRS), tobacco smoking status and/or sex as recorded in the PIRS should be treated as current (i.e. as having been updated within the previous 24 months).* *Age is to be derived from date of birth.* AIHW user guidelines are in accordance with METeOR, but relax the currency requirement further and expand diabetes information: • *Do include information on risk factors (diabetes status (that is, with or without diabetes), tobacco smoking status (that is, current smoker, ex-smoker, non-smoker), age and sex) from the most recent record for the client, regardless of how old that record is.* However, the IF Measures Specification definition has excluded reference to the diabetes information requirement. Both MedicalDirector and Communicare have adopted the IF definition while MMEx check for a diabetes diagnosis, according to their interpretation of the METeOR requirement. Communicare had an issue with filtering risk factor records for previous 2 years which has been fixed. However, as identified above, within the METeOR definition there is a special exclusion for non-date-stamped "Smoking Status".
21	Absolute cardiovascular risk assessment result	This indicator will be collected for the first time in the June 2017 collection period. Each CIS offers a cardiovascular risk assessment tool, which automatically calculates the CVD risk based on recorded values of the risk factors. Manual entry of the risk value by the user is also supported. The CVD assessment tools used by each vendor are based on the Framingham risk assessment methodology, while Communicare also includes the CARPA CVD risk assessment tool. The CARPA tool, also based on Framingham, includes an additional allowance for indigenous populations. The Communicare CARPA scores are adjusted downwards by 5% (as required by AIHW) for inclusion in the report.
22	Cervical screening recorded	Communicare – issue found and fixed. The procedure of cervical cancer screening applied to a patient record did not register in the nKPI report.
23	Blood pressure recorded (clients with type 2 diabetes)	See nKPI 05.

nKPI	Description	Observations
24	Proportion of regular clients with Type II diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	See nKPI 05.

3.3 MedicalDirector Results

The following section summarises the outcomes of testing with MedicalDirector by nKPI. Where there was an issue identified, an explanation of the issue and the response by MedicalDirector, is provided in section 3.3.2.

3.3.1 Summary of Results

Table 4 – MedicalDirector nKPI Report Analysis

nKPI	Meteor Name	MedicalDirector CDS result
01	Proportion of Indigenous babies born within the previous 12 months whose birth weight has been recorded, 2015-2017	C
02	Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	M
03	Proportion of regular clients for whom an MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) was claimed, 2015-2017	C
04	Proportion of Indigenous children who are fully immunised, 2015-2017	C
05	Proportion of regular clients with Type II diabetes who have had an HbA1c measurement result recorded, 2015-2017	C
06	Proportion of regular clients with Type II diabetes whose HbA1c measurement result was within a specified level, 2015-2017	C
07	Proportion of regular clients with a chronic disease for whom a GP Management Plan (MBS Item 721) was claimed, 2015-2017	C
08	Proportion of regular clients with a chronic disease for whom a Team Care Arrangement (MBS Item 723) was claimed, 2015-2017	C
09	Proportion of regular clients whose smoking status has been recorded, 2015-2017	R
10	Proportion of regular clients with a smoking status result, 2015-2017	C
11	Proportion of regular clients who gave birth within the previous 12 months with a smoking status of 'current smoker', 'ex-smoker' or 'never smoked', 2015-2017	C

nKPI	Meteor Name	MedicalDirector CDS result
12	Proportion of regular clients who are classified as overweight or obese, 2015-2017	C
13	Proportion of regular clients who had their first antenatal care visit within specified periods, 2015-2017	C
14	Proportion of regular clients aged 50 years and over who are immunised against influenza, 2015-2017	C
15	Proportion of regular clients with Type II diabetes or COPD who are immunised against influenza, 2015-2017	C
16	Proportion of regular clients whose alcohol consumption status has been recorded, 2015-2017	C
17	Proportion of regular clients who had an AUDIT-C with result within specified levels, 2015-2017	C
18	Proportion of regular clients with a selected chronic disease who have had a kidney function test, 2015-2017	R
19	Proportion of regular clients with a selected chronic disease who have had a kidney function test with results within specified levels, 2015-2017	C
20	Proportion of regular clients who have had the necessary risk factors assessed to enable CVD assessment, 2015-2017	I
21	Proportion of regular clients aged 35 to 74 years who have had an absolute cardiovascular disease risk assessment with results within specified levels, 2015-2017	C
22	Proportion of regular clients who have had a cervical screening, 2015-2017	C
23	Proportion of regular clients with Type 2 diabetes who have had a blood pressure measurement result recorded, 2015-2017	C
24	Proportion of regular clients with Type 2 diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	C

	Legend
C	Calculations are correct
E	Errors with potentially significant impact on nKPIs
M	Minor issues – not expected to significantly impact on nKPIs
I	Calculation correct according to vendor specification, but issues with interpretation on nKPI between vendors
R	Issue identified and vendor will resolve in next release

3.3.2 Analysis of Issues

The specific issues that were identified during the analysis were as follows:

Table 5: MedicalDirector issues summary

nKPI	Description	Report issues	MedicalDirector response
2	Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	Relies entirely on the baby's record and so there is no means of recording, and hence excluding, multiple births or births with a gestational age less than 20 weeks.	The issue with nKPI 02 (failing to exclude multiple births) is a limitation of the software and would require product enhancement to resolve. Given the small percentage of multiple births (approximately 1.5% of all births), the impact of this on nKPI results would be minimal.
9	Proportion of regular clients whose smoking status has been recorded, 2015-2017	Did not count any patients who did not have smoking status recorded. Figures for "Without Smoking Status Recorded" are incorrect and repeat the "With Smoking Status Recorded". This issue has now been fixed. There are 4 alternative ways of recording smoking status. All were counted correctly for nKPI numerator.	This issue has been resolved in Medical Insights version 1.4.
14	Proportion of regular clients aged 50 years and over who are immunised against influenza, 2015-2017	If immunisations were entered in progress notes and not specifically in the Immunisation tab, they were not included in the report.	

nKPI	Description	Report issues	MedicalDirector response
18	Proportion of regular clients with a selected chronic disease who have had a kidney function test, 2015-2017	In Calculation 1, "Total Both Genders" for "15-24yrs" age range is incorrect, shows the "Males total" figures for that age range. Also in Calculation 1, top level "Proportion" figures are a repeat of the "Number" figures rather than percentages. In Calculation 2, the count for "Indigenous regular clients aged 65 years and over, Males" category is not included in the total for "eGFR, Males". This issue has now been resolved.	This issue has been resolved in Medical Insights version 1.4.
20	Proportion of regular clients who have had the necessary risk factors assessed to enable CVD assessment, 2015-2017	Patients that are counted in the report do not appear to need the inclusion of any "Diabetes information recorded", as stated in the Meteor definition – However, this requirement is NOT stated in the IF specification. MedicalDirector does comply with the IF specification.	The calculation complies with the Improvement Foundation definition.

3.4 Communicare Results

The following section summarises the outcomes of testing with Communicare by nKPI. Where there was an issue identified, an explanation of the issue and the response by Telstra Health, is provided in section 3.4.2.

3.4.1 Summary of Results

Table 6: Communicare results summary

nKPI	Meteor Name	Communicare CDS result
01	Proportion of Indigenous babies born within the previous 12 months whose birth weight has been recorded, 2015-2017	C
02	Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	M
03	Proportion of regular clients for whom an MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) was claimed, 2015-2017	C
04	Proportion of Indigenous children who are fully immunised, 2015-2017	C
05	Proportion of regular clients with Type II diabetes who have had an HbA1c measurement result recorded, 2015-2017	C
06	Proportion of regular clients with Type II diabetes whose HbA1c measurement result was within a specified level, 2015-2017	C
07	Proportion of regular clients with a chronic disease for whom a GP Management Plan (MBS Item 721) was claimed, 2015-2017	C
08	Proportion of regular clients with a chronic disease for whom a Team Care Arrangement (MBS Item 723) was claimed, 2015-2017	C
09	Proportion of regular clients whose smoking status has been recorded, 2015-2017	C
10	Proportion of regular clients with a smoking status result, 2015-2017	C
11	Proportion of regular clients who gave birth within the previous 12 months with a smoking status of 'current smoker', 'ex-smoker' or 'never smoked', 2015-2017	C
12	Proportion of regular clients who are classified as overweight or obese, 2015-2017	C
13	Proportion of regular clients who had their first antenatal care visit within specified periods, 2015-2017	C
14	Proportion of regular clients aged 50 years and over who are immunised against influenza, 2015-2017	C
15	Proportion of regular clients with Type II diabetes or COPD who are immunised against influenza, 2015-2017	C
16	Proportion of regular clients whose alcohol consumption status has been recorded, 2015-2017	R
17	Proportion of regular clients who had an AUDIT-C with result within specified levels, 2015-2017	C

nKPI	Meteor Name	Communicare CDS result
18	Proportion of regular clients with a selected chronic disease who have had a kidney function test, 2015-2017	C
19	Proportion of regular clients with a selected chronic disease who have had a kidney function test with results within specified levels, 2015-2017	C
20	Proportion of regular clients who have had the necessary risk factors assessed to enable CVD assessment, 2015-2017	I
21	Proportion of regular clients aged 35 to 74 years who have had an absolute cardiovascular disease risk assessment with results within specified levels, 2015-2017	C
22	Proportion of regular clients who have had a cervical screening, 2015-2017	R
23	Proportion of regular clients with Type II diabetes who have had a blood pressure measurement result recorded, 2015-2017	C
24	Proportion of regular clients with Type II diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	C

	Legend
C	Calculations are correct
E	Errors with potentially significant impact on nKPIs
M	Minor issues – not expected to significantly impact on nKPIs
I	Calculation correct according to vendor specification, but issues with interpretation on nKPI between vendors
R	Issue identified and vendor will resolve in next release

3.4.2 Analysis of Issues

It was noted that there had been several changes to Communicare's nKPI reporting functions that were instituted prior to validation testing. It is understood that these changes included:

- "Current Patient" – only the AIHW "Regular Patient status" should be used for nKPI reporting and not the Communicare "Current Patient" definition.
- Deceased Patients – to be included where they meet the "Regular Patient" requirement.
- Changes and fixes to nKPIs 01, 02, 06, 11, 18, 23 and 24.

The specific issues that were identified during the analysis were as follows:

Table 7: Communicare issues summary

nKPI	Description	Report issues	Communicare response
01, 02	Proportion of Indigenous babies born within the previous 12 months whose birth weight has been recorded, 2015-2017 Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	Report data based on valid baby record only, so live births only are included (thus pregnancy outcome data including identification of multiple births and stillborn from mothers' records are not taken into account), nor are babies of unknown gestational age excluded. Multiple births are not included in calculation as this information is only on the mother's record.	If gestation age is not known, it is treated as if it were at least 20 weeks. Gestation at birth is not always available in the child's record and we currently assume the patient did live as otherwise they would not have a patient record. There is currently no formal way to record that the baby was part of a multiple birth within the baby record. This information is only reliably available on the mother's record.
04	Proportion of Indigenous children who are fully immunised, 2015-2017	Communicare records immunisation status on the basis of absence of outstanding recalls in respect of immunisation reviews. Included one negative test case where Communicare records an outstanding immunisation review. Since addressed by Communicare explanation of business rules (see Communicare response). Excluded one test case with no outstanding reviews from both fully or not fully immunised categories. Interpretational issues with definition.	A child is deemed to be fully immunised if: • a child is aged 12 months to less than 24 months then either the completion of a six, twelve or eighteen month immunisation review or the absence of any overdue recalls for immunisation reviews and the absence of any immunisation recalls (other than Panvax, Fluvax or Vaxigrip) implies full immunisation. • a child is aged 24 months to less than 36 months then either the completion of a twelve or eighteen month immunisation review or the absence of any overdue recalls for immunisation reviews and the absence of any immunisation recalls implies full immunisation. • a child is aged 60 months to less than 72 months then either the completion of a four year immunisation review or the absence of any overdue recalls for immunisation reviews and the absence of any immunisation recalls implies full immunisation.
16	Regular clients whose alcohol consumption status has been recorded and	nKPI 16 report initially did not include patients with an AUDIT-C assessment, but has now been resolved by Communicare.	This was an error and has now been fixed.

nKPI	Description	Report issues	Communicare response
	AUDIT-C results		
20	Regular clients who have had the necessary risk factors assessed to enable CVD assessment and results	Risk value ranges 10-15 not always reporting correctly. Two patients with results >2yr old were included incorrectly in the numerator count.	KPI 21 – the CARPA tool has a 5% adjustment applied to the result for aboriginal patients (as required by AIHW), so the reporting is correctly taking account of this. The CVD risk assessment 2 year period will be incorporated in the reporting.
22	Proportion of regular clients who have had a cervical screening, 2015-2017	The procedure of cervical cancer screening applied to a patient failed to register in the nKPI report. This has now been resolved by Communicare.	This was an error and has now been fixed.

3.5 MMEx Results

The following section summarises the outcomes of testing with MMEx by nKPI. Where there was an issue identified, an explanation of the issue and the response by MMEx, is provided in section 3.5.2.

3.5.1 Summary of Results

Table 8: MMEx results summary

nKPI	Meteor Name	MMEx CDS result
01	Proportion of Indigenous babies born within the previous 12 months whose birth weight has been recorded, 2015-2017	I
02	Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	R
03	Proportion of regular clients for whom an MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) was claimed, 2015-2017	U
04	Proportion of Indigenous children who are fully immunised, 2015-2017	R
05	Proportion of regular clients with Type II diabetes who have had an HbA1c measurement result recorded, 2015-2017	I
06	Proportion of regular clients with Type II diabetes whose HbA1c measurement result was within a specified level, 2015-2017	I
07	Proportion of regular clients with a chronic disease for whom a GP Management Plan (MBS Item 721) was claimed, 2015-2017	U
08	Proportion of regular clients with a chronic disease for whom a Team Care Arrangement (MBS Item 723) was claimed, 2015-2017	U

nKPI	Meteor Name	MMEx CDS result
09	Proportion of regular clients whose smoking status has been recorded, 2015-2017	C
10	Proportion of regular clients with a smoking status result, 2015-2017	C
11	Proportion of regular clients who gave birth within the previous 12 months with a smoking status of 'current smoker', 'ex-smoker' or 'never smoked', 2015-2017	C
12	Proportion of regular clients who are classified as overweight or obese, 2015-2017	C
13	Proportion of regular clients who had their first antenatal care visit within specified periods, 2015-2017	R
14	Proportion of regular clients aged 50 years and over who are immunised against influenza, 2015-2017	C
15	Proportion of regular clients with Type II diabetes or COPD who are immunised against influenza, 2015-2017	I
16	Proportion of regular clients whose alcohol consumption status has been recorded, 2015-2017	C
17	Proportion of regular clients who had an AUDIT-C with result within specified levels, 2015-2017	R
18	Proportion of regular clients with a selected chronic disease who have had a kidney function test, 2015-2017	R
19	Proportion of regular clients with a selected chronic disease who have had a kidney function test with results within specified levels, 2015-2017	I
20	Proportion of regular clients who have had the necessary risk factors assessed to enable CVD assessment, 2015-2017	I
21	Proportion of regular clients aged 35 to 74 years who have had an absolute cardiovascular disease risk assessment with results within specified levels, 2015-2017	R
22	Proportion of regular clients who have had a cervical screening, 2015-2017	C
23	Proportion of regular clients with Type II diabetes who have had a blood pressure measurement result recorded, 2015-2017	I
24	Proportion of regular clients with Type II diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	I

	Legend
C	Calculations are correct
E	Errors with potentially significant impact on nKPIs
M	Minor issues – not expected to significantly impact on

	Legend
	nKPIs
I	Calculation correct according to vendor specification, but issues with interpretation on nKPI between vendors
R	Issue identified and vendor will resolve in next release
U	Unable to test

3.5.2 Analysis of Issues

The specific issues that were identified during the analysis were as follows:

Table 9: MMEx issues summary

nKPI	Description	Report issues	MMEx response
01	Proportion of Indigenous babies born within the previous 12 months whose birth weight has been recorded	Report is calculating correctly, but is being generated by the mother's record, not the baby's record.	
02	Proportion of Indigenous babies born within the previous 12 months whose birth weight results were low, normal or high, 2015-2017	The count does not exclude multiple births, and does not exclude where there is an unknown gestational age.	Confirmed the error in this calculation. Will be resolved in the next release (17.2.4).
03	Proportion of regular clients for whom an MBS Health Assessment for Aboriginal and Torres Strait Islander People (MBS Item 715) was claimed, 2015-2017	Not tested, as it was not possible to enter MBS items.	A valid Medicare Provider ID is required before an MBS claim can be batched within the MMEx billing module. The reporting for nKPI 03 [07, 08] relies on the successfully batched billing records to create the report outcomes.
04	Proportion of Indigenous children who are fully immunised, 2015-2017	Calculations not correct. The same patients appear in both the numerator and the denominator. Does not calculate the Numerator (all records in the denominator population are incorrectly counted as immunised).	Confirmed the error in this calculation. Will be resolved in the next release.
05	Proportion of regular clients with Type II diabetes who have had an HbA1c measurement result recorded, 2015-2017	Within MMEx, a disease diagnosis is raised by implementing a disease care plan for the patient, in this case a Diabetes Care Plan. It was noted that a Diabetes care plan does not distinguish the type of diabetes so could not eliminate the Diabetes Type I negative test	

nKPI	Description	Report issues	MMEx response
		cases from the report.	
06	Proportion of regular clients with Type II diabetes whose HbA1c measurement result was within a specified level, 2015-2017	See nKPI 05 issues with inclusion of Diabetes patients.	
07	Proportion of regular clients with a chronic disease for whom a GP Management Plan (MBS Item 721) was claimed, 2015-2017	Not tested with CDS. Unable to test numerator in MMEx (can't enter MBS items).	See response to nKPI 3.
08	Proportion of regular clients with a chronic disease for whom a Team Care Arrangement (MBS Item 723) was claimed, 2015-2017	Not tested with CDS. Unable to test numerator in MMEx (can't enter MBS items).	See response to nKPI 3.
13	Proportion of regular clients who had their first antenatal care visit within specified periods, 2015-2017	Non-Indigenous mothers are counted in the denominator. Where there is no antenatal visit (and thus no gestational age at a visit), the record is counted as a visit with no gestational age – ie. records are included in the "no gestational age" numerator even where there is no visit.	Confirmed the error in this calculation. Will be resolved in the next release.
15	Proportion of regular clients with Type II diabetes or COPD who are immunised against influenza, 2015-2017	See nKPI 05 issues with inclusion of Diabetes patients.	
17	Proportion of regular clients who had an AUDIT-C with result within specified levels, 2015-2017	In most cases this seems correct. However, the calculation for Female 35-44 yrs uses the male group as denominator, giving a wrong result.	Confirmed the error in this calculation. Will be resolved in the next release.
18	Proportion of regular clients with a selected chronic disease who have had a kidney function test, 2015-2017	Count not correct.	MMEx indicated that this was an interpretation issue, but confirmed that this will be resolved in the next release.

nKPI	Description	Report issues	MMEx response
19	Proportion of regular clients with a selected chronic disease who have had a kidney function test with results within specified levels, 2015-2017	See nKPI 05 comments.	
20	Proportion of regular clients who have had the necessary risk factors assessed to enable CVD assessment, 2015-2017	Count not correct. It appears that only patients with an "Ex-smoker" status are counted in the numerator. MMEx only include patients with a DIABETES diagnosis within the numerator counts.	MMEx indicated that the "Smoking Status issue will be resolved in the next release.
23	Proportion of regular clients with Type II diabetes who have had a blood pressure measurement result recorded, 2015-2017	See nKPI 05 comments.	
24	Proportion of regular clients with Type II diabetes whose blood pressure measurement result was less than or equal to 130/80 mmHg, 2015-2017	See nKPI 05 comments.	

3.6 Manual Reporting Results

3.6.1 Loading the Dataset

The latest version of the Manual Submission Form (Version: 6.0), incorporating nKPIs 17 and 21, was released in early May 2017.

The Manual Submission form was uploaded to the IF stage environment portal, run through the approval regime and then submitted. In the live production environment, this would have sent the output files to AIHW, but in the stage environment, these files can be recovered by the IF support team to enable confirmation that totals for disaggregation elements are consistent with the totals entered for the indicator.

The content of the output files that were intended for AIHW were compared with the input data to determine the validity of the transmission and process.

In brief the process was as follows:

1. Upload an OCHREStreams manual submission
2. Download the generated report regarding submission (pdf file)

3. Compare the inputs and outputs
4. Analyse any differences between the two

3.6.2 Summary of Results

It was found that each of the values uploaded in the submission exactly matched the values in the downloaded submission report. It was noted that in nKPI-22 *Female Indigenous regular clients who have had a cervical screening*. The Submission spreadsheet enables an entry to be made for three totals. The output report shows that only the first total is used and the other two are ignored. As the three denominators should be the same, it appears that the two extra cells in the Manual submission spreadsheet are redundant.