

REPORT

# Inpatient Management of Diabetes Mellitus

Monitoring and evaluation plan

Health Economics and Evaluation Team



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## Abbreviations

Term	Definition
ACI	Agency for Clinical Innovation
AIHW	Australian Institute of Health and Welfare
BGL	Blood Glucose Level
BHI	Bureau of Health Information
CEC	Clinical Excellence Commission
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification
IHI	Institute of Healthcare Improvement
IIMS	Incident Information Management System
IMDM	Inpatient Management of Diabetes Mellitus
LBVC	Leading Better Value Care
LHD	Local Health District/s
LOS	Length of Stay
M&E	Monitoring and Evaluation
Ministry	NSW Ministry of Health
NHMRC	National Health and Medical Research Council
NWAU	National Weighted Activity Unit
NSW	New South Wales
PREM	Patient reported experience measure
PROM	Patient reported outcome measure
PROMIS-29	Patient Reported Outcomes Measurement Information System
Roadmaps	A program management tool to oversee achievement of program milestones
ROI	Return on investment
SAPHaRI	Secure Analytics for Population Health and Research Intelligence
SLA	Service Level Agreement

## Glossary of evaluation terms

**Baseline** a pre-intervention assessment that is used to compare changes after implementation.

**Dose response** in this context is the examination of the link between dose and response as part of determining if a program caused the outcome and to what extent.

**Economic evaluation** is the process of systematic identification, measurement and valuation of inputs and outcomes of two alternative activities, and the subsequent comparative analysis of these. Economic evaluation methods provide a systematic way to identify, measure, value, and compare the costs and consequences of various programs, policies, or interventions.

**Efficiency** is a measure of how economic inputs (resources such as funds, expertise, time) are converted into results.

**Evaluability** is an assessment of the extent that an intervention can be evaluated in a reliable and credible fashion.

**Evaluand** is the subject of an evaluation, typically a program or system rather than a person.

**Focus group** is a group of people, selected for their relevance to an evaluation. Focus groups are facilitated by a trained facilitator in a series of discussions designed to share insights, ideas, and observations on a topic of concern.

### Evaluation domains

**Appropriateness** is the extent that program activities are appropriate for the outcomes in which it is to achieve.

**Effectiveness** measures program effects in the target population/patient cohort by assessing the progress in the outcomes that the program is to achieve.

**Impact** is the long-term, cumulative effect of programs/interventions over time on what they ultimately aim to change. It assesses program effectiveness in achieving its ultimate goals.

**Sustainability** is the extent that the benefits of a program are maintained after formal support has ended.

**Access and reach** measures how accessible the program is to the target population (access) and how many of the target population have accessed the program (reach).

### Formative and summative evaluation

**Formative evaluation (monitoring)** in formative (early) evaluation, programs or projects are typically assessed during their development or early implementation to provide information about how to revise and modify for improvement. In terms of the Leading Better Value Care program, there are two realms of formative evaluation. The first is the formative evaluation of the statewide program to indicate if programs are progressing towards goals and to define what improvements can be made to the overall program. The second realm is the assessment of the program at a site level to determine what is needed for local improvements.

**Summative evaluation (impact)** the purpose of summative evaluation is to make value judgements on the worth, merit and significance of a program. This is typically assessed at the end of an operating cycle or once a program has been settled. Findings are used to help decide whether a program should be adopted, continued, or modified.

**Implementation fidelity** is the degree that an intervention has been delivered as intended and is critical to the successful translation of evidence-based interventions into practice.

**Implicit design** is a design with no formal control group and where measurement is made before and after exposure to the program.

**Indicator** is a specific, observable, and measurable characteristic or change that shows the progress a program is making toward achieving a specific outcome.

**Inferential statistical analysis** is statistical analysis using models to confirm relationships among variables of interest or to generalise findings to an overall population.

**Interrupted time series analysis** is a continuous sequence of observations on a population, taken repeatedly (normally at equal intervals) over time to measure changes and map trends.

**Interview guide** is a list of issues or questions that guide the discussion in an interview.

**Linear mixed models** are an extension to the linear model. It includes random effects in addition to the usual fixed effects.

**Longitudinal data or pre and post analysis** is collected over a period of time, sometimes involving a stream of data for particular persons or entities to show trends.

**Macro-meso-micro evaluation** approach refers to a three level approach to evaluation. In terms of Leading Better Value Care, this is:

- macro – statewide
- meso – LHD
- micro – local sites.

**Measuring tools or instruments** are devices used to collect data (such as questionnaires, interview guidelines, audits and observation record forms).

**Monitoring and evaluation (M&E)** is a process that helps improve performance and achieve results. Its goal is to improve current and future management of outputs, outcomes and impact.

**Multiple lines of evidence** is the use of several independent evaluation strategies to address the same evaluation issue, relying on different data sources, analytical methods, or both.

**Primary data** is collected by an evaluation team specifically for the evaluation study.

**Program** in terms of program evaluation, a program is a set of activities managed together over a sustained period of time that aims to achieve outcomes for a client or client group.

**Program evaluation** is a rigorous, systematic and objective process to assess a program's effectiveness, efficiency, appropriateness and sustainability.

### **Program theory and program logic**

**Program theory** explains how and why the program is intended to work and the causal links between activities and consequences.

**Program logic** is a pictorial depiction of the program theory.

**Qualitative data** are observations that are categorical rather than numerical, and often involve knowledge, attitudes, perceptions, and intentions.

**Quantitative data** are observations that are numerical.

**Secondary data** is collected and recorded by another person or organisation, usually for different purposes than the current evaluation.

**Stakeholders** are people or organisations that are invested in a program or that are interested in the results or what will be done with the results of an evaluation.

**Statistical analysis** is the manipulation of numerical or categorical data to predict phenomena, to draw conclusions about relationships among variables or to generalise results.

**Stratified sampling** is a probability sampling technique that divides a population into relatively homogeneous layers called strata, and selects appropriate samples independently in each of those layers.

**Surveys** are a data collection method that involves a planned effort to collect needed data from a sample (or a complete census) of the relevant population. The relevant population consists of people or entities affected by the program.

**Triangulation**, in the context of Leading Better Value Care, facilitates validation of data through cross verification from more than two sources.

**Utility** is the extent that an evaluation produces and disseminates reports that informs relevant audiences and have beneficial impact on their work.

The following table sets out the monitoring and evaluation cycle for LBVC programs.

**Table 1 LBVC monitoring and evaluation cycle**

<b>Evaluative perspectives</b>	<b>Expected economic benefits</b> from the intervention – predicted	<b>Evidence foundations</b> of the intervention – program theory/logic model	<b>Implementation evaluation</b> – intervention coverage, fidelity of implementation and contributing factors	<b>Outcomes evaluation</b> – patient and provider experience and patient outcomes	<b>Economic evaluation</b> – benefits and return on investment
<b>Planning</b>	Quantitative	Qualitative/ quantitative			
<b>Formative</b> evaluation – early and ongoing alongside quarterly reporting			Qualitative/ quantitative	Quantitative	Quantitative
<b>Summative</b> evaluation – at 12 months and 2 years			Qualitative/ quantitative	Quantitative	Quantitative



## Executive summary

Diabetes is a significant public health challenge in NSW. Inadequate management of diabetes can increase the risk of complications including heart disease, stroke, kidney disease, peripheral vascular disease, retinopathy and neuropathy and can lead to frequent hospitalisations and prolonged lengths of stay. People in hospital with diabetes stay longer than those without diabetes resulting in an increased risk of adverse health outcomes. This can impact on overall experience and quality of life and incur additional healthcare costs.

In 2016, the NSW Ministry of Health introduced the Leading Better Value Care (LBVC) initiative to improve the health status of people in NSW. This initiative moved the focus of healthcare from volume to value. The statewide program to improve *Inpatient management of diabetes mellitus (IMDM)* has been included in the LBVC program for 2017-18. This will align care in NSW to the Institute of Health Improvement (IHI) Triple Aim\* of improving patient and provider experience, population health outcomes, and system efficiency and effectiveness.

This document outlines the monitoring and evaluation plan for the LBVC initiative to improve in-hospital management of diabetes mellitus for patients who require subcutaneous insulin within NSW hospitals.

The program will be implemented across NSW local health districts (LHDs) in the 2017-18 financial year. It will promote the delivery of best practice in hospital care for people with diabetes to improve patient experience, outcomes and system efficiency. Best practice includes early identification of abnormal blood glucose levels, appropriate risk stratification and management, blood glucose monitoring, multidisciplinary involvement where required, and self-management support including transfer of care to facilitate longer term diabetes management.

The LBVC program provides an opportunity to align measurement systems to improve monitoring of program implementation and to support the achievement of program milestones. This alignment aims to ensure that NSW Health works together to monitor implementation through roadmaps, progresses towards the achievement of outcomes with service level agreements, and understands the overall impact of the program on the NSW health system.

This monitoring and evaluation plan is a guide to assess the extent that the program has achieved system changes and intended outcomes as outlined by the program objectives and program logic. It will assess sustainability and aims to provide useful information to guide future investment decisions related to the in-hospital management of people with diabetes mellitus.

ACI will lead the data collection, analyses and feedback process for the formative and summative evaluation components in collaboration with state-wide data custodians, local health districts implementation teams, other pillars and the Ministry.

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\* The IHI Triple Aim is a framework developed by the Institute for Healthcare Improvement that describes an approach to optimising health system performance.

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## Introduction

### Diabetes mellitus in New South Wales

Diabetes is a major public health challenge in New South Wales (NSW) and across Australia. It is a chronic condition characterised by insufficient insulin production, or use, and high levels of glucose in the blood. Poorly managed diabetes can increase the risk of a range of complications and comorbidities including heart disease, stroke, kidney disease, peripheral vascular disease, retinopathy, neuropathy and lower limb amputation<sup>2</sup>. People with diabetes who are admitted to hospital have an increased risk of hyperglycaemia and/or hypoglycaemia due to acute illness and reduced oral intake. This increases the risk of infections and other complications, reduces patient experience and outcomes, and increases the length and cost of hospital stays<sup>3</sup>.

The prevalence of diabetes in Australia has tripled over the past 25 years. In 2014-15 an estimated 5% of Australians aged 18 years and over reported living with type 2 diabetes<sup>4</sup>. Rates are twice as high in lower socioeconomic groups (8%) compared with those in higher groups (3%). Aboriginal and/or Torres Strait Islander Australians are almost four times more likely to have diabetes than non-Aboriginal Australians<sup>5</sup>. In NSW in 2014-15 diabetes was a factor in over 200,000 or 11% of hospitalisations, costing \$1.4 billion. Between 2012-13 and 2014-15, people with diabetes stayed in hospital an average of two days longer than people without diabetes, contributing to an average increase in costs of 8% per annum<sup>6</sup>.

### Improving inpatient management of diabetes mellitus

In response to the challenges associated with the inpatient management of diabetes, the Agency for Clinical Innovation (ACI) NSW Diabetes Taskforce commissioned the SAX Institute to define best practice strategies for in-hospital care of people with diabetes requiring insulin. Following this review, the Taskforce nominated five key recommendations that now guide one of the NSW Leading Better Value Care (LBVC) programs: *Inpatient management of diabetes mellitus (IMDM)*.

### Recommendations

1. To develop and implement processes to support continuous improvement in inpatient diabetes care, such as local clinical audit cycles and a mechanism to benchmark key performance indicators across NSW.
2. Investment to enhance the capability and/or capacity of general ward staff in the care of patients with diabetes.
3. Timely and appropriate access to inpatient diabetes management teams for people with diabetes.
4. Implementation of procedures for safe transfers of care for people with diabetes within hospital wards and across settings. This may include criteria-led discharge.
5. Standardised identification and screening processes for patients with diabetes on presentation to hospital.

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<sup>2</sup> Australian Institute of Health and Welfare. Burden of lower limb amputations due to diabetes in Australia, Australian burden of disease study 2011 series no. 10. Canberra: AIHW, 2017.

<sup>3</sup> Lai J, Wong V. SAX institute. Evidence check: Inpatient Insulin Management Final Version 1. Sydney: SAX institute, 2017.

<sup>4</sup> Australian Institute of Health and Welfare. How many Australians have diabetes? 2016 [internet]. Canberra: AIHW, [cited 2017 April 5, last updated 2016 Dec]. Available at: <http://www.aihw.gov.au/how-common-is-diabetes/>

<sup>5</sup> Lai J, Wong V. 2017.

<sup>6</sup> Agency for Clinical Innovation Health Economics and Evaluation Team Diabetes data report. NSW; ACI. 2016. Source: *Admitted Patient, Emergency Department Attendance & Deaths Register, NSW Ministry of Health Secure Analytics for Population Health Research and Intelligence. (Hospitalisations represent separations).*

## Document outline

This document outlines the monitoring and evaluation (M&E) plan for the LBVC program aimed at improving inpatient management of diabetes mellitus. It has been developed in consultation with the ACI Acute Care team and clinicians from the NSW Diabetes Taskforce and the In-hospital Management Working Group.

The framework has been informed by key documents relevant to best practice care, meetings with the ACI diabetes project teams, collaborative program logic development, and workshops with ACI staff and clinicians. It includes:

- an overview of the NSW LBVC initiative
- an explanation of the IMDM program
- the purpose, focus, limitations, and design of the evaluation
- a program logic that illustrates how the model of care is expected to achieve the desired outcomes
- key evaluation questions and sub-questions
- the methods, data sources and analysis that will be conducted to answer the key questions
- the governance, codes of behaviour and ethical framework that underpin the evaluation
- identification of relevant audiences and communication of findings.

Evaluation planning has been undertaken between February and May 2017 to meet timeframes for LBVC. At the time of writing, the IMDM program continues to be refined. As such, this framework reflects current understanding of program design and implementation. Specific measures and tools may continue to be developed to support monitoring and evaluation. Accordingly, this framework will be reviewed and updated as necessary in order to reflect any changes over time.

## Background

### Leading Better Value Care

In late 2016, the NSW Ministry of Health introduced the statewide LBVC initiative. The objective of LBVC is to improve the NSW Health system performance against the Institute of Healthcare Improvement (IHI) Triple Aim of improving patient and provider experience, population health outcomes, and system efficiency and effectiveness.

The tranche one LBVC initiative comprises of eight clinical programs in the 2017-18 financial year, including the IMDM program. Figure 1 shows the Triple Aim as denoted in LBVC.

**Figure 1: Triple aim of LBVC**



Leading Better Value Care initiatives will be implemented by each Local Health District (LHD) and incorporated into LHD roadmaps and service level agreements (SLAs) for the purpose of monitoring and informing local quality improvements. A comprehensive impact evaluation will be undertaken after programs have been implemented within each LHD. The purpose of the impact evaluation will be to assess the overall impact of each initiative and guide decision-making around the value (worth, merit and significance) of the LBVC initiative.

## **Inpatient management for diabetes mellitus program overview**

The IMDM program aims to implement best practice care for adult patients with diabetes who require subcutaneous insulin administration in acute care settings. Best practice in hospital care for people with diabetes includes early and clear identification of abnormal blood glucose, appropriate risk stratification and management, blood glucose monitoring, multidisciplinary involvement, and self-management support including transfer of care to facilitate longer-term diabetes management<sup>7</sup>. Hospital systems and structures that can support delivery of best practice care include leadership, ongoing clinical education, a system of measurement and feedback and access to appropriate clinical expertise<sup>8</sup>.

The objectives of the program are to:

- provide advice and support for statewide standardised audit, review and feedback to underpin continuous improvement and benchmarking in the administration of insulin for people in hospital with diabetes
- increase identification of people with diabetes in hospital who require insulin
- increase clinical staff skill, knowledge and ability to provide best practice care to people with diabetes
- implement strategies to facilitate access to appropriately specialised diabetes care
- reduce insulin prescribing errors
- reduce hyperglycaemic and hypoglycaemic episodes and other adverse events related to suboptimal insulin management
- reduce complication rates for people with diabetes requiring insulin
- reduce mean hospital length of stay (LOS) for people with diabetes who require insulin
- improve the patient and carer experience of the in hospital management of diabetes.

The following strategies are under development to support LHDs across NSW in this achieving these objectives.

- A capability building strategy to support best practice management of people with diabetes who require insulin including implementation of a subcutaneous insulin chart.
- Development of a definition for best practice management of people in hospital with diabetes who require insulin. This includes early identification and screening processes, timely and appropriate access to specialist care, procedures for safe transfer of care and self-management support.
- Advice and support for local audits to support feedback, continuous improvement and benchmarking across NSW.

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<sup>7</sup> Lai J, Wong V. 2017.

<sup>8</sup> Lai J, Wong V. 2017.

# The monitoring and evaluation plan

## Purpose

Program evaluation is an essential feature of the NSW Government and is outlined in the NSW Government Program Evaluation Guidelines. Comprehensive evaluation provides an evidence base for program improvement and can contribute to informed decision making. Results of robust evaluations can contribute to appropriate investment strategies and future policy and program directions to improve outcomes for the people of NSW.

The implementation of the IMDM program will be accompanied by several monitoring activities to guide its progress and identify areas for improvement. Once the program has had sufficient time to settle, an impact evaluation will be undertaken to determine the overall effect of the program, including intended and unintended outcomes.

The purpose of this plan is to guide monitoring and evaluation (M&E) and:

- provide insight into the implementation of the program across NSW, including the key enablers and barriers to adoption (monitoring)
- determine if outcomes have been met (impact)
- assess the impact of the IMDM program in terms of its impact on the NSW health system (impact)
- define data sources and collection methods, both existing and required, to assess the program across the IHI Triple Aim including expected and unexpected outcomes, experience of care, efficiencies and effectiveness.

## Scope and timing

Implementation of the IMDM program will occur throughout the 2017-18 financial year in two six-month phases: July to December 2017 and January to June 2018. Outcomes and impacts are expected to be incrementally realised from July 2017 at phase one sites and December 2017 at phase two sites. The availability of administrative data for the periods required will affect the timing of the evaluation.

## Measurement alignment

This M&E plan will inform data requirements and collection systems. This is consistent with the Ministry's LBVC measurement alignment framework, which focusses on creating shared priorities across the NSW healthcare system.

There are three measurement levels aligned to guide the IMDM program from implementation milestones through to achievement of the end of program outcomes (Figure 2).

These three levels include:

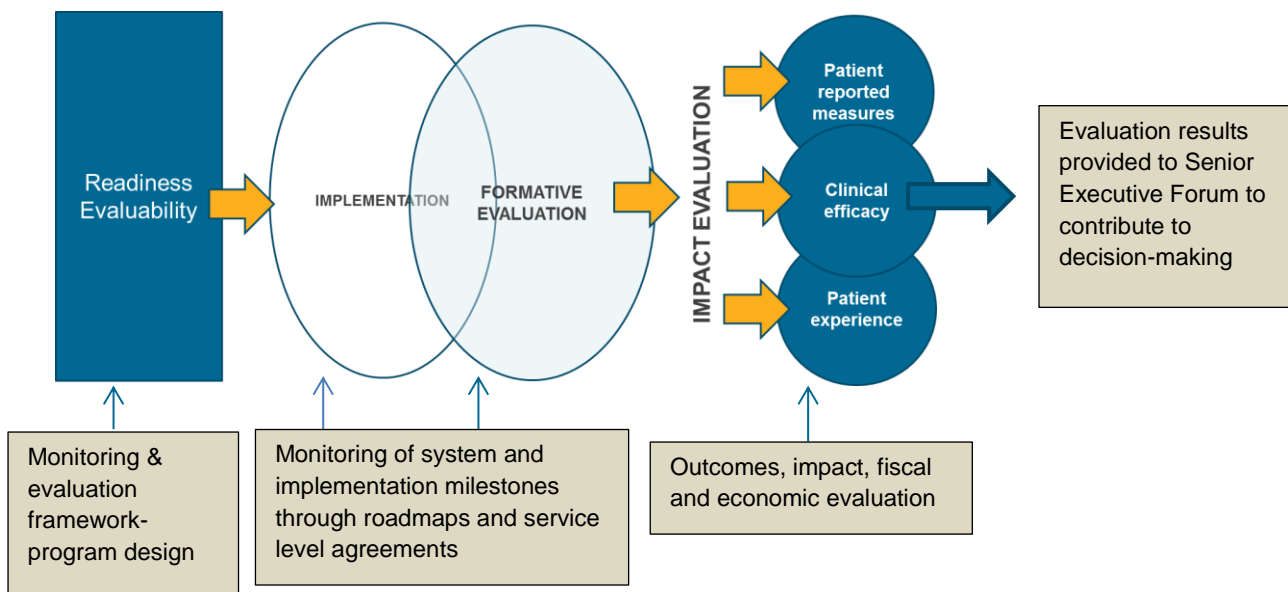
- program/project roadmaps
- service level agreements
- impact evaluation conducted by the NSW Health Pillars including the ACI and Clinical Excellence Commission (CEC).

A fourth level of data reporting has been established for the first year of LBVC programs. This is a set of quarterly indicators to show that the program is progressing and will be reported to ACI to track. After 12 months, ACI will use the results from the quarterly reporting data to assess outcomes achieved and apply these to a formative economic/fiscal analysis.

Measurement alignment within the M&E plan will enable:

- oversight of program delivery against anticipated milestones to identify and manage unexpected deviations (monitoring via roadmaps and service level agreements).
- a clear structure and methodology for the statewide end of program impact evaluation to guide investment, disinvestment and future improvements.
- a consistent source of data collection that is integrated to avoid variation and duplication.

**Figure 2: Monitoring and evaluation approach for LBVC programs**



## Methods

Monitoring and evaluation of IMDM program will take a macro, meso, micro approach (Figure 3). consistent with the LBVC measurement alignment framework. The impact evaluation, including data collection and analysis and presentation of findings, will be the responsibility of relevant Pillars.

**Figure 3 Macro, meso, micro approach**



The evaluation will involve mixed methods. A pre post-implementation design will test for changes due to the program. The evaluation will be conducted in two stages. Stage one will involve a statewide quantitative administrative data analysis to identify state and LHD pre and post implementation changes. Stage two will use this data to develop a matrix and methodology to select a representative sample of LHDs. Qualitative data will be collected from this sample to provide context and complement the quantitative results.



Data sources for the evaluation will include:

- administrative patient data
- roadmap and service level agreement reports and supporting data
- standardised clinical process mapping
- patient reported outcomes
- patient experience questionnaires (in collaboration with BHI)
- staff focus groups, interviews and/or questionnaires
- patient focus groups, interviews and/or questionnaires.

### Patient cohort

The patient cohort for the IMDM program is acute admitted patients aged 16 years and over with diabetes requiring subcutaneous insulin management.

International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10 AM) codes for this cohort are shown in Table 2.

**Table 2 Patient cohort for the IMDM program**

Code	Description
E10, O24.0	Type 1 diabetes
E11, O24.1	Type 2 diabetes
O24.4	Gestational diabetes
E13	Diabetes, other
E10.1, E11.0, E11.1, E12.0, E12.1, E13.0, E13.1, E14.0, E14.1	Diabetes, acute complication
E10.2, E10.3, E10.4, E10.5, E10.6, E10.7, E11.2, E11.3, E11.4, E11.5, E11.6, E11.7, E12.2, E12.3, E12.4, E12.5, E12.6, E12.7, E13.2, E13.3, E13.4, E13.5, E13.6, E13.7, E14.2, E14.3, E14.4, E14.5, E14.6, E14.7	Diabetes, chronic complication
E14, O24.3, O24.9	Diabetes, unspecified

## Limitations and risks

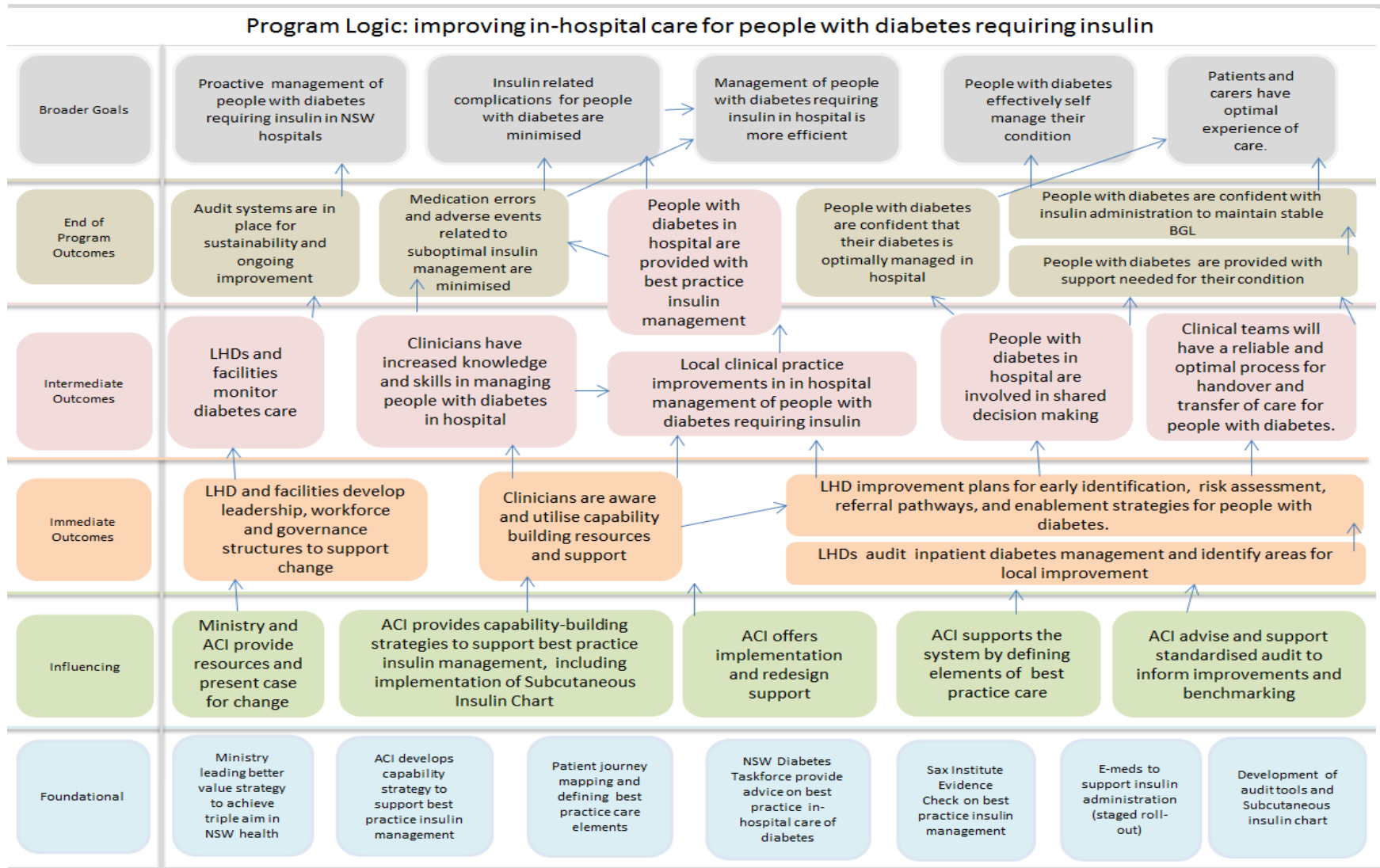
There are several limitations and potential risks to the M&E of the IMDM program. These are noted below and will be monitored, and where necessary, addressed, throughout the evaluation.

- The evaluand is the statewide IMDM program. It is out of the LBVC scope to evaluate individual sites.
- More than one year of data post-implementation may be required to measure the impact of changes, noting possible year on year fluctuations.
- The expected variability and breadth of responses to the program across LHDs will be difficult to capture in order to measure program fidelity and attribution. Where this is predominant, a design to capture outcomes by program will be undertaken, such as difference in difference analysis.
- The outcomes for people with diabetes may be influenced by a range of external confounding factors (such as lifestyle and socio-economic factors) that are out of scope of this evaluation.
- Standardised collection of clinical processes and other data measures within the data plan are under development and availability for evaluation is not assured.
- A comprehensive baseline across all variables is not currently available.
- Pre and post analysis has been defined as the major analytical method that will be used to track trends over time. This has been selected as it is considered the most robust method within the existing resourcing and time available. However, there are risks that if enough time points are not measured, seasonal and other variations will not be identified and may therefore impact on result translation. To reduce these threats, time points will be determined from baseline over several years.

## Program logic

The program logic outlines how the IMDM program will work to achieve its intended outcomes. It provides a foundation to guide M&E and track progress over time. Figure 4 presents the program logic for improving in-hospital care for people with diabetes who require insulin.

Figure 4 Program logic for Inpatient Management of Diabetes Mellitus



### Assumptions within the program logic

All programs (and program logics) include assumptions. These assumptions are tested during the evaluation to understand the potential facilitators and barriers to anticipated changes. The assumptions for the IMDM program include that:

- the SAX evidence review is representative of current diabetes management in NSW hospitals
- LHD executive, facility service managers and clinicians agree that there is a case for change and that improvements are required
- LHDs will identify clinical leaders and review workforce required to drive local practice changes
- governance processes will be established to support local accountability for improvements
- there are avoidable adverse events related to suboptimal insulin management.

### Key evaluation questions

Evaluation questions are used to guide the focus of an evaluation. The key questions are determined based on the program logic and in particular the immediate, intermediate and end of program outcomes (Table 3). This M&E plan includes questions related to both monitoring and outcome measures.

**Table 3: Key evaluation questions**

Evaluation domain	Measurement alignment domain	Key evaluation question
Appropriateness	Implementation fidelity	To what extent was the program implemented as intended?
Effectiveness	Improving experience of care	What LHD clinical processes changed and to what extent did this improve in hospital care for people with diabetes requiring insulin?
		What were the facilitators and constraints to the program being embedded?
		To what extent has the program had an impact on the experience of people with diabetes who require insulin in hospital?

Evaluation domain	Measurement alignment domain	Key evaluation question
		To what extent does the workforce feel knowledgeable and confident to apply best practice management for people with diabetes who require insulin in hospital?
Impact	Improving healthcare of the public	To what extent has the program reduced the adverse outcomes associated with poor glycaemic control?
		To what extent has the program impacted the outcomes of people with diabetes in hospital who require insulin?
Sustainability	Providing efficient and appropriate care	To what extent has the program impacted the efficiency of managing people with diabetes who require insulin in hospital?
		To what extent has the program been implemented statewide and is further investment required?
Access and reach	Improving healthcare of the public	Did the program reach its intended cohort?
		For whom did the program work and in what context?

## Data and analysis matrixes

The following data matrixes outlines the data sources, collection and analysis methods that will be used to answer the key evaluation questions.

**Table 4 Data and analysis matrix: Roadmaps**

Key evaluation question (KEQ)	Indicator	Method	Data source	Analysis	Responsibility and comments
To what extent was the program implemented as intended?	Number and location of sites implementing compared by LHD  Number of sites within LHD with ACI partnership audit  Audit completed  Executive sponsor and governance established  Improvement plan in place  Staff education reach and uptake - # eligible staff completing training  Awareness and adoption of subcutaneous insulin chart	Descriptive analysis reported through roadmaps	LHD/Facility reporting mechanism	Descriptive reports	Roadmaps

Key evaluation question (KEQ)	Indicator	Method	Data source	Analysis	Responsibility and comments
What LHD clinical processes changed and to what extent did this improve in hospital care for people with diabetes who require insulin?	<p>Access to appropriately skilled staff in diabetes care</p> <p>Identification/screening systems</p> <p>Patient referral pathway in place</p> <p>Compliance with subcutaneous insulin chart</p>	Audit of records	Audit	Needs assessment prepared from audit results – used to establish local improvement plans	ACI responsible for data collection through Audit
To what extent does the workforce feel knowledgeable and confident to apply best practice management for people with diabetes requiring insulin in hospital?	<p>Knowledge and attitude change</p> <p>Practice changes resulting from knowledge and attitude change</p> <p>Uptake and usage of education/training initiatives developed</p>	Reported through Roadmaps	LHD/Facility reporting mechanism	Assessment of correlation/association between staff feedback on knowledge and capacity changes, and the transfer to practice.	Roadmaps
What were the facilitators and constraints to the program being embedded?	Identification of enablers and barriers to implementation	Semi-structured interviews	LHD/Facility reporting mechanism	Assessment of enablers and barriers to implementation to contribute to program improvement at a local level and potentially statewide	ACI responsible for data collection and analysis

**Table 5 Data and analysis matrix: SLA monitoring**

Key evaluation question and progress	Indicator	Method	Data source	Analysis	Responsibility and comments
To what extent does the workforce feel knowledgeable and confident to apply best practice management for people with diabetes requiring insulin in hospital?	# of staff completing education modules in inpatient diabetes care	Reported through SLA	LHD/Facility reporting mechanism	Descriptive	Service level agreements
What LHD clinical processes changed and to what extent did this improve in hospital care for people with diabetes requiring insulin?	The total # of services that participate in clinical audit and % of admissions audited	Reported through SLA	LHD/Facility reporting mechanism Admitted Patient Data Collection	Descriptive	Roadmaps



**Table 6 Data analysis matrix: 1st year quarterly reporting**

Key evaluation question and progress	Indicator	Method	Data source	Analysis	Responsibility and comments
To what extent was the program implemented as intended?	% patients screened for diabetes at admission	Reported through quarterly monitoring  12 month assessment of progress  Economic/fiscal analysis of results	LHD/Facility reporting mechanism	Descriptive to indicate program progression towards longer term outcomes	ACI responsible for data collection and analysis
	% patients with shared care plan			Analysis of benefits realised after 12 months.	
	% of patients with known diabetes and continuing blood glucose testing			Benefits realised will be applied to economic/fiscal analysis through separations, beddays, NWAUs avoided	
	Utilisation (separations, beddays, NWAUs)			Economic/fiscal benefits applied to BaU to determine indicative benefits	
	% patients avoiding hypoglycaemia				
	Reduction in adverse incidents/adverse complications				

**Table 7 Data and analysis matrix: Evaluation**

Key evaluation question	Measure	Method	Data source	Analysis	Responsibility and comments
To what extent has the program had an impact on the experience of people with diabetes requiring insulin in hospital?	Patient experience of care	BHI patient survey – linked data by cohort for baseline, increased sample size of cohort where needed for time points.  Patient focus groups/ interviews as required – potential for deviant case sampling in relation to patient survey results	BHI patient survey  Primary data	Pre and post comparisons	ACI will work collaboratively with BHI to collect and analyse data
To what extent has the program reduced the adverse outcomes associated with poor glycaemic control?	Change in complication rates compared with matched ICD-10-AM without diabetes	Comparison of patient cohort complications compared to same cohort without diabetes	Admitted Patient Data Collection	Matched cohort analysis	Data collection and analysis is the responsibility of ACI
To what extent has the program impacted the outcomes of people with diabetes in hospital requiring insulin?	% patients avoiding hypoglycaemia  Reduction in adverse incidence/common complications  Mean BGL levels  No. of hypo/ hyperglycaemic episodes	Pre and post comparisons	To be defined – not yet available	Pre and post comparisons from baseline (some measures are included as indicators in first year quarterly reporting) to impact	Data collection and analysis is the responsibility of ACI

Key evaluation question	Measure	Method	Data source	Analysis	Responsibility and comments
	<p>Hyperglycaemic and hypoglycaemic episodes</p> <p>Rapid response calls related to hypo/hyperglycaemia</p> <p>% of patients avoiding hypoglycaemia</p> <p>Patient reported outcome measure information system PROMIS-29</p>	<p>Change in disease health status and quality of life across disease stages</p> <p>Trended over time</p>	<p>To be defined</p> <p>IIMS</p>	<p>Identification of changes over time using quantum of results for sample (this may not be available until adequate sample size data available)</p> <p>Access to IIMS to be negotiated</p>	<p>Data collection and analysis is the responsibility of ACI</p> <p>IIMS available to CEC – analysis responsibility of ACI</p>
To what extent has the program impacted the efficiency of managing	Mean LOS compared with matched ICD-10-AM codes without diabetes	Counterfactual comparison Economic comparison of	Admitted Patient Data Collection	Comparison of cohort with matched cohort for utilisation	Data collection and analysis is the responsibility of ACI

Key evaluation question	Measure	Method	Data source	Analysis	Responsibility and comments
people with diabetes requiring insulin in hospital?	<p>NWAU per separation</p> <p>NWAU for cohort</p> <p>Patient complexity compared to non diabetes patients</p> <p>Unplanned re-admissions</p> <p>Economic comparison of BaU base case with post implementation results (fiscal and utilisation)</p> <p>Summative economic evaluation (comparative economic analysis of pre and post implementation utilisation and fiscal results)</p> <p>NSW Return on Investment for project</p>	<p>BaU base case with post implementation results (fiscal and utilisation)</p> <p>Summative economic evaluation (comparative economic analysis of pre and post implementation utilisation and fiscal results)</p> <p>NSW Return on Investment for project</p>		<p>Pre-implementation Business as Usual base case to be used to as baseline for comparative economic analysis with post implementation results.</p> <p>Summative assessment of net impact through comparison of quantifiable costs and benefits of the base case with the quantifiable costs and benefits of implementation of the model of care</p> <p>The summative evaluation including economic analysis identifying return on investment, net present value and utilisation analysis results will inform decisions regarding ongoing investment</p> <p>Measurement data to</p>	

Key evaluation question	Measure	Method	Data source	Analysis	Responsibility and comments
				<p>assess extent of alignment with best practice/ideal patient pathway, verified with interview data.</p> <p>Degree that current systems support ongoing monitoring and improvement of best practice clinical care.</p>	
To what extent has the program been implemented statewide and is further investment required?	<p>Alignment with best practice</p> <p>Systems for data collection, feedback and ongoing improvement</p> <p>Governance</p> <p>Partnerships</p>	Semi-structured interviews from sample LHD, ACI and Ministry staff	<p>LHD clinicians, service managers and executives</p> <p>ACI staff</p> <p>Ministry staff</p>	<p>Measurement data to assess extent of alignment with best practice/ideal patient pathway, verified with interview data.</p> <p>Degree that current systems support ongoing monitoring and improvement of best practice clinical care.</p>	Data collection and analysis is the responsibility of ACI
Did the program reach its intended cohort?	<p>% of patients assessed for diabetes at admission</p> <p>% of patients with management plans as proportion of total patients with diabetes</p>	Identification of program reach	To be defined – not yet available	Trended over time to determine access and reach	Data collection and analysis is the responsibility of ACI

Key evaluation question	Measure	Method	Data source	Analysis	Responsibility and comments
	% of patients with known diabetes with appropriate blood glucose testing				
For whom did the program work and in what context?	Assessment of patient characteristics	Descriptive study	Admitted Patient Data Collection	Analysis of outcome by patient sub group	Data collection and analysis is the responsibility of ACI

## Governance

Consistent with the *NSW Program Evaluation Guidelines* and the *ACI Framework: Understanding Program Evaluation*, the evaluation of the LBVC initiative for IMDM will be conducted by ACI Health Economics and Evaluation Team and include establishment of an Evaluation Steering Committee. The Steering Committee will comprise (at minimum) content area experts (clinicians) and evaluation expertise with representation from LHDs, the Endocrine Network and Diabetes Taskforce and independent experts. The Steering Committee will be responsible for ensuring that the evaluation is conducted in accordance with this M&E plan and to ensure findings are communicated to relevant stakeholders and audiences. A checklist against the *NSW Program Evaluation Guidelines* is attached at Appendix I and is to be used to guide the evaluation activities.

### Communication and reporting plan

The dissemination of evaluation findings will be critical to inform future planning and investment decisions related to improving the outcomes and experience for people with diabetes. Communication of evaluation findings will be provided in an appropriate form to each audience and stakeholder group identified. Forums for feedback and discussion of results will be important for reflection and learning. The evaluation governance committee will define a comprehensive communication plan.

### Audience and stakeholders

Key audiences and stakeholders include the following.

- The NSW Ministry Senior Executive Forum membership; NSW Health Executive and Chief Executives, including the LBVC leadership team: interest in overall impact and future investment or disinvestment decisions.
- The ACI Executive and Network Managers: to understand program effectiveness, impact and directions for this and future programs. To understand and explain factors affecting clinical variation.
- The ACI Endocrine Network and Diabetes Taskforce: to assess program effectiveness and provide feedback loop for ongoing improvement in the care of people with diabetes mellitus.
- LHD clinicians, service managers and executive: to understand factors affecting local performance and comparison with state and/or peer group equivalents, and to implement local quality improvement initiatives.
- People with diabetes in hospital and their carers: as partners in the care provided.

### Codes of behaviour and ethics

This M&E plan comprises the delivery of human services and potentially confidential information. The evaluation will be conducted in an ethical manner and all individual records will be destroyed at the end of the evaluation.

The evaluation will be conducted in compliance with:

- *ACI Responsible governance, management and conduct of research: An ACI framework*<sup>9</sup>
- Australasian Evaluation Society (AES) Guidelines for the ethical conduct of evaluations<sup>10</sup>

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<sup>9</sup> Agency for Clinical Innovation. Responsible conduct management and conduct of research, an ACI framework. NSW: ACI, 2013. Available from: [http://intranet.aci.health.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0009/491652/Research-Framework11.pdf](http://intranet.aci.health.nsw.gov.au/__data/assets/pdf_file/0009/491652/Research-Framework11.pdf)

- National Health and Medical Research Council (NHMRC) *National Statement on Ethical Conduct of Human Research*<sup>11</sup>.

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<sup>10</sup> Australasian Evaluation Society. Guidelines for the ethical conduct of evaluations. NSW: AES, 2013. Available from: [https://www.aes.asn.au/images/stories/files/membership/AES\\_Guidelines\\_web\\_v2.pdf](https://www.aes.asn.au/images/stories/files/membership/AES_Guidelines_web_v2.pdf)

<sup>11</sup> The National Health and Medical Research Council, the Australian Research Council and the Australian Vice-Chancellors' Committee. National statement on ethical conduct in human research. Canberra: Commonwealth of Australia: 2007 [updated May 2015; cited 2017 Mar 20]. Available from: [https://www.nhmrc.gov.au/\\_files\\_nhmrc/publications/attachments/e72\\_national\\_statement\\_may\\_2015\\_150514\\_a.pdf](https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72_national_statement_may_2015_150514_a.pdf)



## Appendices

### Evaluation of programs in ACI checklist

#### Compliance with the NSW Government Program Evaluation Guidelines (January 2016)

This checklist is designed to assist people involved in evaluations in ACI ensure that evaluations are consistent with the NSW Government Program Evaluation Guidelines. A full copy of the Guidelines and the corresponding Toolkit can be accessed here:

<https://www.treasury.nsw.gov.au/projects-initiatives/centre-program-evaluation>

#### Definitions

Program evaluation builds evidence to contribute to decision making that can assist programs to operate at their optimal and to deliver good outcomes to end users.

In terms of evaluation in NSW, program refers to “A set of activities managed together over a sustained period of time that aim to achieve an outcome for a client or client group.” Program evaluation refers to “A rigorous, systematic and objective process to assess a program’s effectiveness, efficiency, appropriateness and sustainability.”

#### Principles (quick check)

The Guidelines take a principles based approach using nine principles that underpin best practice in program evaluation. These are noted below for quick assessment. The principles and associated activities form the remainder of this checklist under a series of focus areas.

Principle	Check (✓)
Evaluation has been built into the program design	
Evaluation is based on sound methods	
Resources and adequate time to evaluate is included in the program	
The right mix of expertise and independence has been used to develop and undertake the evaluation	
Proper governance and oversight has been established	
The evaluation design and conduct in its undertaking meets ethical standards	
Relevant stakeholders have informed and guided the evaluation	
Evaluation data has been used meaningfully	
The evaluation is transparent and open to scrutiny	

## Planning evaluation

Assessment of key processes underpinning good practice	Check (✓)	Corresponding page # in guidelines
Has the subject of the evaluation been clearly defined?		11
Is there a clearly defined scope?		11
Is the purpose of the evaluation clear (ie what decisions will the evaluation be used to inform – continuing, expanding or discontinuing)?		11
Are key roles and responsibilities for the evaluation allocated (who will manage, who will commission, who will conduct, who will implement findings)?		11
Are key evaluation questions defined?		11
Is there an authorising environment for the evaluation (ie: authorisation to access data, interview end users/staff)?		15

## Governance

Use governance processes to ensure oversight of evaluation design, implementation and reporting.

Assessment of key processes underpinning good practice	Check (✓)	Corresponding page # in guidelines
Is there a governance structure in place to oversight the evaluation?		11
Does the governance structure include staff with appropriate seniority and understanding of evaluation?		11
Does the governance structure include staff/stakeholders with expertise in the content area?		11
Does the governance structure include staff/stakeholders with expertise in evaluation methods?		11
Does the governance structure include processes to disseminate information?		11

## Audience and stakeholders

Assessment of key processes underpinning good practice	Check (✓)	Corresponding page # in guidelines
Do stakeholders include program participants, senior decision makers, government and non-government staff involved in managing and delivering the program?		15
Has audience (those that will receive and use the evaluation findings) been identified (ie executive funders, Cabinet, Network)?		11
Has a stakeholder communication strategy been developed as part of the evaluation plan?		12
Are stakeholders involved in all aspects of the evaluation – planning, design, conducting and understanding of the results?		12

## Undertaking the evaluation

Assessment of key processes underpinning good practice	Check (✓)	Corresponding page # in guidelines
Have good project management principles, practice and tools been established to manage the evaluation?		15
Have sound methods been established to answer each of the key evaluation questions and any sub questions?		11
Have data sources and analysis approaches been defined for each question/method?		11
Are data sources (both primary and secondary) valid and robust?		11
Has data been used meaningfully to report clear statements of findings for consideration?		11
Is the evaluation plan, conduct and findings (methods, assumptions and analyses) transparent and open to scrutiny?		12
Have the ethical implications of the evaluation activities been considered and addressed adequately where personal data and impacts on vulnerable groups is potential?		12
Are privacy safeguards in place for end users, staff and vulnerable populations?		12
Is ethics approval required and if so, sought prior to commencing data collection?		12

## Using key findings

Assessment of key processes underpinning good practice	Check (✓)	Corresponding page # in guidelines
Is there a plan for communicating findings to decision makers, service providers and other stakeholders?		16
Is there a plan for how the key findings will be used?		16

The Health Economics and Evaluation Team can be contacted for further advice.

Further appendices will comprise instruments developed for data collection and will be attached in due course.