

## NSW Health Data Quality Assurance Framework for Activity Based Management

**Summary** The purpose of the NSW Health Data Quality Assurance Framework for Activity Based Management (the Framework) is to support a better practice approach to ensuring the quality of data across NSW Health Local Health Districts and their hospitals / services, Speciality Health Networks and the NSW Ministry of Health. It is applicable to data that underlie and are used in activities and purposes related to ABM policy, performance and decision making.

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## **NSW HEALTH DATA QUALITY ASSURANCE FRAMEWORK FOR ACTIVITY BASED MANAGEMENT**

### **PURPOSE**

The NSW Health Data Quality Assurance Framework for Activity Based Management (the Framework) supports a better practice approach to ensuring the quality of data across NSW Health Local Health Districts (LHDs) and their hospitals / services, Specialist Health Networks (SHNs) and the NSW Ministry of Health (the Ministry). It is applicable to data that underlie and are used in activities and for purposes related to Activity Based Management (ABM) policy, performance and decision making. Such data include but are not limited to source data used to populate data submissions to the Independent Hospital Pricing Authority (IHPA) and data used to populate the District and Network Returns (DNRs) by LHDs and SHNs.

This Framework adopts an outcomes-driven approach to data and information management, which is based on the same principles underlying the NSW Information Management Framework.

### **MANDATORY REQUIREMENTS**

NSW Health agencies and services must ensure that District level and health facility level internal data quality assurance system align with the data collection, assessing, monitoring and reporting structure outlined in the Framework. This was identified as a foundational aspect to building readiness and capability within the context of Activity Based Funding and was a key recommendation by the Auditor-General.

Each organisation that seeks to comply with this Framework will need to consider a number of factors when implementing and subsequently managing its data quality using this Framework, including governance, data quality requirements, data quality assessment monitoring regime, staff training and education, supportive resources.

### **IMPLEMENTATION**

The Framework is an essential tool in the Ministry's efforts to improve the accuracy and reliability of data used to make ABF decisions. It is designed to support the development and maintenance of a program(s) of specific quality assurance activities. Preparing for and responding to the Data Quality Framework is a whole-of-health responsibility.

### **REVISION HISTORY**

<b>Version</b>	<b>Approved by</b>	<b>Amendment notes</b>
July 2016 PD2016_030	Deputy Secretary, Strategy and Resources Division	New policy

### **ATTACHMENT**

1. NSW Health Data Quality Assurance Framework for Activity Based Management:  
Framework

**NSW Ministry of Health**

**NSW Health Data  
Quality Assurance  
Framework for Activity  
Based Management**

**Final**

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# 1 Summary

NSW Ministry of Health (the Ministry) has developed a data quality assurance framework to support NSW Health within the context of Activity Based Management (ABM).

ABM was introduced as part of the reform of NSW public health service administration that commenced in 2011. The first steps in the reform process were the introduction of Local Health Districts (LHDs) and Specialty Health Networks (SHNs). The next important reform involved the negotiation of individual service agreements with LHDs/SHNs including the introduction of Activity Based Funding (ABF).

Data quality is considered key to organisational responsiveness, agility and operational excellence. It is a foundational element of ABM (managing performance within the context of ABF). This was reinforced by the Auditor General's 2013 recommendation that:

*"The Ministry should develop a formal data quality assurance framework to improve the accuracy and reliability of data used to make activity based funding decisions."*<sup>1</sup>

From this, the purpose of the NSW Health Data Quality Assurance Framework for Activity Based Management (the Framework) is to support a better practice approach to ensuring the quality of data across NSW Health LHDs and their hospitals/services, SHNs and the Ministry. It is intended for application to data that underlie and are used in activities and for purposes related to ABM policy, performance and decision making.

The Framework has been developed to be generally applicable to NSW Health data collections, although the focus for ABM purposes will be on financial, costing and patient activity data. Such data include but are not limited to source data used to populate data submissions to the Independent Hospital Pricing Authority (IHPA) and data used to populate the District and Network Returns (DNRs) by LHDs and SHNs.

The Framework comprises a hierarchy with three layers—dimensions, components and criteria.

- **Dimensions** – These outline the broad parameters of data quality and assessment. These are aligned with preliminary conceptual work previously completed by the Ministry in 2010.<sup>2</sup> The defined dimensions have been informed by those in the Australian Bureau of Statistics (ABS) data quality framework, which draws on Canadian and European experiences.
- **Components** – Each dimension comprises several components. Each component describes an aspect of data quality specific to the dimension. These components collectively provide the basis for articulating what this dimension of data quality looks like and how it should be assessed.
- **Criteria** – Each component comprises a set of criteria, expressed as specific data quality statements that allow setting of benchmarks for data quality across organisations. These

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<sup>1</sup> NSW Auditor-General, 2013. NSW Auditor-General's Report to Parliament: Volume Ten 2013, Health Overview.

<sup>2</sup> Koronios, A., & J. Gao, 2010, A conceptual data quality management framework in NSW and a data quality assessment methodology – Emergency Department, Admitted-Patient and Waiting Time Data Quality. Final Report.

specific criteria collectively provide the means for determining good practice and assessing data quality.

*Figure 1: Over view of the NSW Health Data Quality Assurance Framework for Activity Based Management*



Collectively, the criteria within this Framework describe the NSW Ministry of Health's expectations for quality of data and associated data management processes supporting ABM.



## 2 Scope

The Framework is applicable to all data collections relevant to ABF and ABM and is to be used by all health agencies including individual LHDs, SHNs and the Ministry. This was identified as a foundational aspect to building readiness and capability within the context of Activity Based Funding and was a key recommendation by the Auditor-General.<sup>3</sup>

The Framework is an essential tool in the Ministry's efforts to improve the accuracy and reliability of data used to make activity based funding decisions. It is designed to support the development and maintenance of a program(s) of specific quality assurance activities. The task of implementing this Framework is discussed separately in a report on the project undertaken to develop the Framework itself.<sup>4</sup>

The Framework is applicable to all health data that supports ABF and ABM, which encompasses:

- Source data used to populate ABF related data submissions to the IHPA, which currently comprise:
  - patient level admitted episode activity (currently quarterly but expected to move to six monthly)
  - patient level admitted subacute and palliative activity (currently quarterly but expected to move to six monthly)
  - patient level emergency department activity (currently quarterly but expected to move to six monthly)
  - patient level non-admitted activity (currently quarterly but expected to move to six monthly)
  - aggregated non-admitted activity (currently quarterly but expected to move to six monthly)
  - National Hospital Cost Data Collection (NHCDC) data (annual).
- Data used to populate the DNRs by LHDs and SHNs:
  - admitted activity data
  - emergency department activity data
  - outpatient activity data
  - revenue data
  - expenditure data
  - staffing data.

The Auditor-General specifically recommended that the scope of a data quality assurance framework for ABF related purposes should, at a minimum, include patient and costing data

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<sup>3</sup> Auditor-General 2013, op. cit.

<sup>4</sup> KPMG, 2014. NSW Ministry of Health: NSW Health Data Quality Assurance Framework for Activity Based Management—Project Report.

included in the DNR. This Framework notes that the DNR data quality is dependent on the quality of the underlying activity, financial and staffing data. Accordingly, this Framework includes within its scope those underlying data collections.

## 2.1 Context

This Framework has been developed in a period of transformation and change. Over the last three years, this involved organisational change through the creation of LHDs and SHNs and transition to ABF.

The ability to achieve the intended efficiency and effectiveness objectives of ABF is underpinned by the collection of timely, accurate and reliable data. Specifically, NSW's activity and cost data are used to calculate the State Price<sup>5</sup> and is combined with data from other States and Territories when IHPA calculates the National Efficient Price. The DNR data also directly inform the determination of transitional grants. As such, it is recognised that this data is now being relied upon for ABF purposes within individual health service agencies, within the Ministry and at the national level.

The Framework also seeks to complement the existing NSW Information Management Framework, the NSW Health Data Quality Management Framework and quality assurance activities that are associated with them.

The NSW Information Management Framework supports the way government administers and uses data and information. It comprises a set of standards, policies, guidelines and procedures which are implemented either manually or, where possible, automated through technology.

The NSW Information Management Framework enables data and information to be managed in a secure, structured and consistent manner. It ensures that data and information can be appropriately shared or used by agencies, individual public sector staff, the community or industry for better services, improved performance management and a more productive public sector.<sup>6</sup>

This Framework adopts an outcomes-driven approach to data and information management, which is based on the same principles underlying the NSW Information Management Framework. These principles are summarised in Table 1.

*Table 1: NSW Information Management Framework – Principles*

**NSW Government data and information is:**

<b>Governed</b>	<ul style="list-style-type: none"><li>▪ As assets of strategic, operational and administrative value to NSW Government agencies</li><li>▪ In a manner that is transparent and accountable to NSW citizens and organisations.</li></ul>
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<sup>5</sup> NSW Health 2013. NSW Activity Based Funding Overview 2013/14. Available: <http://www.health.nsw.gov.au/healthreform/2012/Documents/tech-overview-2013-14.pdf>, accessed 29/10/2014.

<sup>6</sup> NSW Department of Finance and Services, 2014, Available: <http://finance.nsw.gov.au/ict/information-management-framework>, accessed 08/10/14.

**NSW Government data and information is:**

<b>Collected</b>	<ul style="list-style-type: none"> <li>▪ To document or facilitate delivery of services and the functions of NSW Government agencies</li> <li>▪ With respect for the privacy of NSW citizens and the confidentiality of NSW organisations</li> <li>▪ Once, according to agreed standards that support relevance, accuracy and consistency so they are fit for purpose reliable, and can be, where appropriate, re-used by NSW Government agencies to improve service delivery or management reporting.</li> </ul>
<b>Organised</b>	<ul style="list-style-type: none"> <li>▪ Described and linked to related data or information, so they are easy for NSW Government agencies to search, retrieve, use and compare</li> <li>▪ Identified and integrated into systems that allow NSW Government agencies to routinely track and manage them according to their value.</li> </ul>
<b>Secured</b>	<ul style="list-style-type: none"> <li>▪ Against unauthorised access, alteration, loss or deletion, to ensure their integrity and ongoing value to NSW Government agencies</li> <li>▪ Using controlled and auditable processes that demonstrate to NSW citizens and organisations the protection of sensitive data and information.</li> </ul>
<b>Used</b>	<ul style="list-style-type: none"> <li>▪ To support planning, decision making, resource allocation, reporting, communications and transactions by NSW Government agencies</li> <li>▪ Processed and analysed by NSW Government agencies to develop evidence-based policy and deliver targeted services to NSW citizens and organisations</li> <li>▪ And re-used, so NSW Government agencies drive maximum benefit from their investment in these assets.</li> </ul>
<b>Shared</b>	<ul style="list-style-type: none"> <li>▪ With respect for the privacy of NSW citizens and the confidentiality of NSW organisations</li> <li>▪ With other NSW Government agencies to reduce duplication of effort, streamline service delivery and provide a consolidated view of customer needs or public sector performance</li> <li>▪ Published and made available for discovery, where appropriate, by NSW citizens and organisations, providing opportunities to communicate, consult and collaborate or to engage in value-adding processing, analysis and development.</li> </ul>

**NSW Government data and information is:**

<b>Maintained</b>	<ul style="list-style-type: none"><li>▪ Using cost-effective, risk-based measures that facilitate business continuity for NSW Government agencies</li><li>▪ To ensure their availability and reliability, for as long as they support service delivery and accountability by NSW Government agencies</li><li>▪ Systematically destroyed when their use and value has ceased, to minimise the costs and risks to NSW Government agencies of over-retention</li><li>▪ Or systematically archived to protect the enduring rights and interests of NSW citizens and organisations.</li></ul>
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Source: NSW Government<sup>7</sup>

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<sup>7</sup> NSW Department of Finance and Services, 2014, Available: <http://finance.nsw.gov.au/ict/information-management-framework>, Accessed 08/10/14.

## **3 Rationale and foundational concepts**

### **3.1 Data assurance in health**

The provision of effective, efficient and high quality healthcare relies on activity, cost and financial data. All public hospitals have a requirement to collect accurate data in a timely manner.<sup>8</sup> The importance of this responsibility is further heightened within the context of ABM or managing performance within an ABF environment.

The building blocks required for an ABF system are:

- **Classification**—whereby patients and their care are classified into groups that are clinically relevant and cost homogeneous. This requires the use of taxonomies that classify care across different settings in a way that accommodates the variation in complexity and care needs. Such taxonomies allow ABF funded services to be classified into product types for subsequent costing and pricing.
- **Counting**—which recognises that activities (to be funded) need to be counted electronically, in a way that links activity data (admitted episodes, emergency department presentations, outpatient appointments, mental health services and rehabilitation services) with financial (accounting) data.
- **Costing**—through which a representative set of activities are costed at the product level (see ‘Classification’ above). The results of this costing inform work under the ‘Classification’ building block, to improve and refine product classifications. They also inform work in the ‘Pricing’ building block.
- **Pricing**—in which a price is determined for a standard ABF unit of output. The current standard unit of output is the National Weighted Activity Unit (NWAU). Pricing needs to identify and accommodate factors not captured through product classification that materially affect cost of service delivery, such as age of the patient and remote service locations.

These building blocks provide a sense of the expectations in relation to data collection and the scope of data required to effect ABF in New South Wales. In addition, data quality assurance is necessary to ensure counting, costing and pricing can be undertaken reliably and with confidence. It is also necessary to support standardised reporting, data consistency and

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<sup>8</sup> These requirements are embodied in various policy directives and related documents. For example:

- NSW Health 4-Jun-2013. Non-Admitted Patient Activity Reporting Requirements. Section 11.1. Available: [http://www0.health.nsw.gov.au/policies/pd/2013/pdf/PD2013\\_010.pdf](http://www0.health.nsw.gov.au/policies/pd/2013/pdf/PD2013_010.pdf), accessed 29/10/2014.
- NSW Health 6-Nov-2009. Emergency Department Data Dictionary. Available: [http://www0.health.nsw.gov.au/policies/pd/2009/pdf/PD2009\\_071.pdf](http://www0.health.nsw.gov.au/policies/pd/2009/pdf/PD2009_071.pdf), accessed 29/10/2014.

comparability of LHDs and SHNs within New South Wales and of New South Wales with other states and territories.

The relevance of these expectations to LHDs and SHNs is underlined by the *Checklist for LHDs/SHNs*, which identifies the following key requirements:

- Processes in place for activity, revenue, expenditure and budget reporting at LHD, hospital and clinical department levels
- Assessment of performance against agreed priorities and targets.

Accurate and complete data, delivered in a timely fashion are needed to enable these requirements to be met and also to meet the needs of the NSW Health Performance Framework.

High quality activity, costing and financial data is required for a number of other purposes beyond those relating to ABM. The World Health Organization summarises a number of other applications, including:

- Determining the continuing and future care of a patient at all levels of health care
- Medico-legal purposes for the patient, the doctor and the health care service
- Maintaining accurate and reliable information about diseases treated and surgical procedures performed in a hospital and within a community, as well as immunization and screening programmes, including the number and type of participants
- Clinical and health service research on outcomes of health care intervention, if required
- Accurate, reliable and complete statistical information about the uses of health care services within a community
- Teaching health care professionals
- Working out staffing requirements and planning health care services.<sup>9</sup>

## **3.2 Foundational concepts of data quality assurance**

**Data** may be defined as a representation of “facts or concepts or instructions in a formalised manner, suitable for communication, interpretation or processing by manual or electronic means. An element of data is an item, idea, concept or raw fact.”<sup>14</sup>

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<sup>9</sup> World Health Organization, *Improving Data Quality*, World Health Organization, 2003.

<sup>10</sup> Abdelhak, M., Grostick, S, Hankin, MA., Jacobs, E., *Health Information: Management of a Strategic Resource*. Philadelphia, WB Saunders Company, 1996.

A **data collection** may be defined as a set of records each containing data for one or more data items. Data collections usually will be electronic or computer based.

**Health information** refers to “organised data collected about an individual patient, or the summary of information about that patient’s entire experience with his or her health care provider.”<sup>11</sup> Health information is also referred to as activity data, providing information about the number and mix of patients being treated by a clinical departmental unit, hospital, LHD or NSW Health as a whole.

**Data quality** reflects the extent to which data is complete, consistent, objective, unbiased and complies with known standards (such as criteria and benchmarks).<sup>12</sup> In this context, **data quality assurance efforts** provide an evaluation or monitoring framework to assess and continue to improve the quality of data.

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<sup>11</sup> Davis N, LaCour M. Introduction to Information Technology. Philadelphia, WB Saunders, 2002.

<sup>12</sup> Abdelhak, M., Grostick, S, Hankin, MA., Jacobs, E., *Health Information: Management of a Strategic Resource*. Philadelphia, WB Saunders Company, 1996.

## 4 The NSW Health Data Quality Assurance Framework for Activity Based Management

The Framework comprises the following elements, each of which is described in further details below.

*Figure 2: Overview of the NSW Health Data Quality Assurance Framework for Activity Based Management*



### 4.1 Dimensions

These summarise different aspects of data quality and form the top level of the Framework. The dimensions specified in this Framework have been informed by the Australian Bureau of Statistics data quality framework which drew from Canadian and European experiences. They comprise:

- **Institutional Environment** - There is an environment which supports the collection of effective and credible data. Evidence of such an environment would be sets of policies and practices aimed at establishing and maintaining quality of data collected by the organisation, as well as clear ownership of data quality at a high level within the organisation. For example, existing policy directives and requirements for financial audit of general ledgers.<sup>13</sup>
- **Relevance** - The data collected meet the needs of end users within an ABM environment. Evidence of relevance would be documented processes and procedures to review the scope and definitions of data and their sufficiency for ABM specific purposes, such as determining the State Price, performance monitoring and managing activity targets.
- **Accuracy** - Accuracy refers to the degree to which the data correctly describe the phenomenon they were designed to measure.<sup>14</sup> Evidence of accuracy would be (assessed) correctness of values of key data items, compliance with designated classification standards and code sets, and established processes for checking and revising data.
- **Timeliness** - The data available meet internal management and external reporting requirements. Evidence of timeliness would be that data are recorded or submitted in

<sup>13</sup> NSW Health 4-Jun-2013 and NSW Health 6-Nov-2009, Op. cit.

<sup>14</sup> Australian Bureau of Statistics, 4-May-2009. ABS Data Quality Framework, May 2009. Catalogue number 1520.0. Available: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1520.0Main%20Features1May+2009>, accessed 8/10/2014.



accordance with the timelines required for its use within ABM. For example, DNRs are received by the published deadline.

- **Coherence** - Data items are internally and externally consistent and are comparable over time. In a coherent data environment, where a critical relationship exists among data items, that relationship should be met by the items' values. Also, in a coherent data environment, where two collections should contain the same number of records, they do. For example, the value in the length of stay field for of an admitted hospital episode record matches the value implied by admission date, separation date and leave days fields.
- **Usability** - The data are relevant and used. Evidence of usability would be the existence of documentation for end users that educates and supports informed interpretation of the data for ABM purposes, and production of management reports based on the data.

## 4.2 Components

Each dimension comprises several components. Each component describes an aspect of data quality specific to the dimension. These components collectively provide the basis for articulating what this dimension of data quality looks like and how it should be assessed.

Collectively, the components within a dimension characterise that dimension and provide the basis from which specific quality criteria can be established. The components within each dimension are:

- **Institutional Environment**
  - **Professional independence** - Staff exercise their role professionally and operate without internal or external influences to inappropriately modify data.
  - **Adequacy of resources** - The organisation puts in place the appropriate level of resources required for the collection, management and dissemination of data to meet the required standards.
  - **Commitment to quality** - Ongoing focus is maintained on ensuring that data quality are at the highest levels. Responsibility for data quality and for rectifying data quality issues resides with the LHD/SHN executive.
- **Relevance**
  - **Scope** - The data collections include all the items required by end users to manage in an ABM environment. Note that external standards for determining scope exist, such as the ABF Data Specifications published by IHPA<sup>15</sup>, as well as internal Ministry specifications such as the DNR.
  - **Classifications and standards** - Data classifications and standards align with user requirements.

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<sup>15</sup> IHPA 12-May-2014. ABF Data Request Specifications. Available: <https://www.ihsa.gov.au/what-we-do/abf-data-request-specifications> accessed 30/10/2014.

- **Accuracy** - Accuracy refers to the degree to which the data correctly describes the phenomenon they were designed to measure.<sup>16</sup>
  - **Reasonableness** - The data are sufficiently accurate for the intended purpose. Determination of reasonableness usually will require some form of data audit or review relative to a designated source of truth (such as hospital discharge summaries for admitted episode data) and setting of a benchmark level of accuracy for different data items.
  - **Coverage** - The collection has complete coverage. Assessment of coverage requires designation of the scope for a specific data collection and comparison of data collected with that scope. For example, the scope for the Non Admitted Patient data collection is defined by the relevant Policy Directive.<sup>17</sup>
  - **Revision** - The collection allows for revision within a timely manner.
- **Timeliness**
  - **Timing** - The data required to meet internal management and external stakeholder reporting requirements are available at the required time. Note that benchmarks for timeliness are implied by reporting timeframes specified in either Ministry policies or IHPA requirements. LHDs and SHNs might also assess timeliness against internal requirements.
- **Coherence**
  - **Internal consistency** - Related data items within a collection have consistent values.
  - **Historical consistency** - The impact of changes in data collection over time are identified and understood. Note that historical consistency might also be assessed against acceptable variability over time but that its principle purpose is to ensure that changes in counting rules and data definitions are understood and their impacts on the data themselves can be reconciled between time periods where different rules or definitions applied.
  - **External consistency** - Related data items across datasets have consistent values and related record numbers across data sets can be reconciled. This component is critical for ensuring external credibility of data. Assessing external consistency may require determination of a source of truth, against which other data are compared. For example, total numbers of admitted episodes reported in DNRs may be required to be reconcilable with total admitted episodes in EDWARD (as the source of truth for this purpose).
- **Usability**
  - **Fit for purpose** - The outputs are relevant to needs of end users.

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<sup>16</sup> Australian Bureau of Statistics, 4-May-2009. ABS Data Quality Framework, May 2009. Catalogue number 1520.0. Available: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1520.0Main%20Features1May+2009>, accessed 8/10/2014.

<sup>17</sup> NSW Health 4-Jun-2013. Op. cit.

- **Understanding of the data** - End users have sufficient understanding of the data that is made available. Note that data providers cannot guarantee end users' understanding and that this component needs to be assessed in terms of education, information provision and awareness raising undertaken by those providers.

### 4.3 Criteria

Data quality assurance requires explicit criteria that allow the responsible parties to measure and assess their performance against those criteria. This Framework provides criteria for each of the components within each dimension of quality.

Given the need for this Framework to operate across a number of diverse data collections that support ABM, these criteria are expressed as general quality statements rather than as specific collection or data dependent performance requirements. Many of these statements are expressed as better practice statements and others imply the need for specific audit or review activities. This approach allows the Framework to be applied to new collections or data that may be included within the scope of ABM relevant data in the future.

The following table provides the full details of the Framework. As stated above, it describes data quality requirements rather than explicitly prescribing assurance actions that should be carried out. The task of implementing the Framework through a program of assurance activities is discussed in the report on the project undertaken to develop this Framework.<sup>18</sup>

That report refers to policies and procedures which, at the time the Framework was prepared, either need to be developed or exist and compliance with which should be assessed. For example, the requirement for a code of conduct policy to support professional integrity of those who have key roles in the collection and management of data. When applying the Framework each organisation needs to consider:

- **The specific quality requirements of each collection:** For example, the data submission timelines and the acceptable level of data error will vary across collections. These are not prescribed in this document as it is a Framework, and these requirements may change from time to time and are articulated in other formal policy documents.
- **The classification and data standards:** These will be specific to each collection to which the Framework is applied and thus will need to be identified for each collection and the criteria adapted accordingly.
- **The source of truth:** For assessing external consistency, the preferred source of truth to be used will vary according to the collections being compared and the data items being compared within them. The preferred source of truth will need to be determined and criteria for external consistency developed accordingly.

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<sup>18</sup> KPMG, 2014. Op. cit.

**Table 2: Data Quality Assurance Requirements**

Dimension	Quality Statement	Components	Component characteristics	Criteria
<b>Institutional Environment</b>	There is an environment which supports the collection of effective and credible data.	<b>Professional independence</b>	Staff exercise their role professionally and operate without inappropriate internal or external influences.	<ul style="list-style-type: none"> <li>• The organisation has a code of conduct that applies to all staff involved in the collection, management and use of data.<sup>19</sup></li> <li>• Staff are provided with information and education on the code of conduct.</li> <li>• Staff are tested periodically on their understanding of the code.</li> <li>• Staff comply with the code of conduct and there are processes in place at the organisation to monitor non-compliance.</li> </ul>
		<b>Adequacy of resources and supporting systems</b>	The organisation puts in place the appropriate level of resources with the capability required for the collection, management and dissemination of data to meet the required standards.	<ul style="list-style-type: none"> <li>• There are sufficient staff with the knowledge and competencies required to collect, process and manage the data to achieve the required level of data quality.</li> <li>• Staff have the appropriate systems to collect and manage data.</li> <li>• There are defined processes, procedures and policies governing the collection, management and dissemination of data.</li> <li>• The processes, procedures and policies are sufficient to ensure the quality of data.</li> </ul>

<sup>19</sup> At the time of preparing this Framework, the Ministry had an existing Code of Conduct that contained general provisions regarding behaviour and actions by NSW Health staff. Implementation of this Framework would require consideration of whether those general provisions are sufficient for ABM data quality assurance purposes. This issue is discussed in the report on the project undertaken to develop this Framework (KPMG 2014, op. cit.).

Dimension	Quality Statement	Components	Component characteristics	Criteria
		<b><i>Commitment to quality</i></b>	Ongoing focus is maintained on ensuring that data quality is at the highest levels. Responsibility for data quality and for rectifying data quality issues resides with the LHD/SHN executive.	<ul style="list-style-type: none"> <li>• Data quality is systematically measured and monitored, with issues promptly addressed.</li> <li>• There is routine reporting of data quality to the organisation's Executive and Board.</li> <li>• The overall responsibility resides with the Chief Executive through sign-off or certification of a statement on data quality.</li> </ul>
<b>Relevance</b>	The data collected meets the needs of end users within an ABM environment.	<b><i>Scope</i></b>	The data collections include all the items required by end users to manage in an ABM environment.	<ul style="list-style-type: none"> <li>• The scope of the data collection is clearly identified, documented and endorsed by Executive.</li> <li>• There is a mechanism to ensure that the data items are relevant and sufficient to meeting user requirements.</li> <li>• Data elements are regularly reviewed for identification of duplication or redundancy across and within collections.</li> <li>• User requirements are largely met.</li> </ul>
		<b><i>Classifications and standards</i></b>	Data classifications and standards align with user and institutional requirements.	<ul style="list-style-type: none"> <li>• The scope of the classifications and standards are documented and endorsed by Executive.</li> <li>• Staff involved in the collection of data have access to educational support regarding the classifications and standards.</li> <li>• There is an appropriate level of understanding of the classifications and standards.</li> </ul>

Dimension	Quality Statement	Components	Component characteristics	Criteria
<b>Accuracy</b>	Accuracy refers to the degree to which the data correctly describes the phenomenon they were designed to measure. <sup>20</sup>	<b><i>Reasonableness</i></b>	The data are sufficiently accurate for the intended purpose.	<ul style="list-style-type: none"> <li>• Data accuracy benchmarks have been established and are regularly reviewed with an emphasis on continuous quality improvement.</li> <li>• The accuracy of data is systematically reviewed by the organisation.</li> <li>• Data accuracy benchmarks are met.</li> <li>• Where benchmarks are not met, causes are identified and actions taken to rectify those causes.</li> <li>• The organisation complies with the classifications and standards endorsed by the Ministry (including national standards where nominated by the Ministry).</li> </ul>
		<b><i>Coverage</i></b>	The collection has complete coverage.	<ul style="list-style-type: none"> <li>• The organisation systematically reviews the coverage of data and addresses issues promptly.</li> <li>• The organisation meets the data coverage scope requirements.</li> <li>• Missing data do not undermine the utility of the collection.</li> </ul>
		<b><i>Revision</i></b>	The collection allows for revision within a timely manner.	<ul style="list-style-type: none"> <li>• Data are subjected to periodic review and material errors are rectified in the required timeframe.</li> </ul>

<sup>20</sup>

<http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/1520.0Main%20Features6May%202009?opendocument&tabname=Summary&prodno=1520.0&issue=May%202009&num=&view=>

Dimension	Quality Statement	Components	Component characteristics	Criteria
<b>Timeliness</b>	The data available meets internal management and external reporting requirements.	<b><i>Timing</i></b>	The data are available that meet internal management and external stakeholder reporting requirements.	<ul style="list-style-type: none"> <li>• The timing benchmarks for each collection are established and documented, with specific reference to timing requirements established by the Ministry (or national requirements where nominated by the Ministry).</li> <li>• The organisation routinely monitors whether timing benchmarks are met for each collection.</li> <li>• Timeliness benchmarks of data are met.</li> <li>• Where benchmarks are not met, causes are identified and actions taken to rectify those causes.</li> <li>• Data processing activities are routinely monitored to ensure that data is collected and reported in a timely manner.</li> <li>• Late submission of data does not undermine the utility of the collection.</li> </ul>
<b>Coherence</b>	Data items are internally consistent and comparable over time.	<b><i>Internal consistency</i></b>	Related data items have consistent values.	<ul style="list-style-type: none"> <li>• Key data items within the data collection that have critical relationships are identified.</li> <li>• Benchmarks, in terms of compliance with relationships among key data items, are established.</li> <li>• The organisation systematically reviews whether those benchmarks are met.</li> <li>• Where benchmarks are not met, causes are identified and effective action taken to rectify those causes.</li> </ul>

Dimension	Quality Statement	Components	Component characteristics	Criteria
		<b>Historical consistency</b>	The impact of changes in data collection over time are identified and understood.	<ul style="list-style-type: none"> <li>• Changes in data collection have been identified, documented and their impact assessed.</li> <li>• Defined mechanisms to allow the reconciliation of data over time have been implemented.</li> <li>• Users are made aware of discontinuities in the comparability of data and their implications for interpretation of data.</li> </ul>
		<b>External consistency</b>	Related data items across datasets have consistent values.	<ul style="list-style-type: none"> <li>• Key data items across data collections that have critical relationships are identified and documented.</li> <li>• Benchmarks, in terms of compliance with relationships of key data items across collections, are established.</li> <li>• Benchmarks for comparison of record numbers among data collections are established.</li> <li>• The organisation systematically reviews whether data item and record number benchmarks are met.</li> <li>• Where benchmarks are not met, causes are identified and effective action taken to rectify those causes.</li> </ul>
<b>Usability</b>	The data are relevant and used.	<b>Fit for purpose</b>	The outputs are relevant to needs of end users.	<ul style="list-style-type: none"> <li>• There is a mechanism that allows end users to determine their output requirements.</li> <li>• User requirements are largely met.</li> </ul>



Dimension	Quality Statement	Components	Component characteristics	Criteria
		<b><i>Understanding of the data</i></b>	End users have sufficient understanding of the data that is made available.	<ul style="list-style-type: none"> <li>• Data made available to organisational users are presented in an appropriate manner to inform decision making.</li> <li>• There is a readily accessible document that defines the data from an end user perspective.</li> <li>• End users have access to educational support regarding the available data and its interpretation.</li> <li>• There is an appropriate level of understanding of the data by the principal organisational users of the data including understanding of data limitations.</li> </ul>

## 4.4 How the Framework addresses data quality requirements

Section 3.2 referred to data quality in terms of the extent to which data is complete, consistent, objective, unbiased and complies with known standards. Each of these requirements can be addressed through the Framework and its application, as follows:

- **Complete**—is addressed directly through the components of Scope and Coverage and indirectly through the component of Fit for purpose.
- **Consistent**—is addressed directly through the dimension of Coherence.
- **Objective**—is addressed directly through the dimension of Institutional Environment and, indirectly, through the dimension of Accuracy.
- **Unbiased**—is addressed directly through the dimension of Accuracy and indirectly through the components of Scope, Coverage and Fit for purpose.
- **Complies with known standards**—is addressed directly through the component of Classification and Standards.

The Framework includes additional elements that go beyond the concept of data quality presented in Section 3.2, such as Timeliness and Understanding of the Data. These are important extensions that are intended to ensure the utility of the data for ABM purposes.

## 4.5 Organisational requirements to apply and manage within the Framework

Each organisation that seeks to comply with this Framework will need to consider a number of factors when implementing and subsequently managing its data quality using this Framework. These are outlined as follows:

Area for consideration	Activities
<b>Governance</b>	<ul style="list-style-type: none"> <li>• Identification of roles and responsibilities within the organisation for data quality management.</li> <li>• Lines of accountability for the various requirements of the Framework.</li> <li>• Agreed escalation procedures when material data quality issues are identified.</li> </ul>
<b>Data quality requirements</b>	<ul style="list-style-type: none"> <li>• Identification of the data quality requirements for each collection in terms of the data standards, timeliness and level of accuracy required.</li> </ul>
<b>Data quality assessment and monitoring regime</b>	<ul style="list-style-type: none"> <li>• A detailed assessment and monitoring plan that identifies the specific activities that need to be undertaken including:               <ul style="list-style-type: none"> <li>- timing and frequency</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>- outputs and reporting requirements (which requires development of quality benchmarks and performance indicators relative to those benchmarks)</li> <li>- responsibility for assessment, reporting and taking actions to rectify data quality issues.</li> </ul>
<b>Staff training and education</b>	<ul style="list-style-type: none"> <li>• A strategy to ensure that existing and new staff are aware of the requirements for data quality and their role in ensuring the quality of the data.</li> </ul>
<b>Supportive resources</b>	<ul style="list-style-type: none"> <li>• A regular assessment of whether the organisation has the people, processes and systems in place required for the provision of quality data. This assessment should be undertaken for all relevant areas of the organisation involved in entry, management and submission of data within scope of this Framework (see below).</li> </ul>

## 4.6 Role delineation for data quality assurance

The implementation of the Framework requires an integrated approach to implementation across LHDs/SHNs. The responsibility for better practice data quality lies with both clinical and non-clinical staff across NSW Health, including but not limited to Chief Executives, those whose role is centred on data analysis and management, clinicians (medical/nursing/allied health) collecting patient level data, and other administrative staff such as ward clerks. This is set out in more detail in Table 3.

*Table 3: Role delineation for data quality assurance by staff group*

Staff group	Roles	Responsibilities
<b>Executive staff</b>	Provide overall governance and oversight for health data quality assurance.	<p>The Chief Executive is the primary staff member responsible for data quality. As such, the CE should be responsible for certification or sign-off on statements of data quality and particularly for data submitted by LHDs and SHNs to the Ministry.</p> <p>Executive staff are responsible for the receipt and action of data quality reports, endorsement of policies/protocols /procedures, and the implementation of data quality assurance efforts within areas of responsibility. Executive staff also have a key role in influencing the organisational culture as it pertains to data quality.</p>

Staff group	Roles	Responsibilities
<b>Clinical unit/departmental managers</b>	Improve the quality of data collected in the health care facility as they are responsible for the overall management of the facility and the quality of the information produced. <sup>21</sup>	<p>Responsible for the coordination and implementation of data quality assurance efforts within areas of responsibility (business units).</p> <p>Data custodians are responsible for the day-to-day management of data from an operational perspective. As the data custodian, the staff member works to improve the accuracy, usability and accessibility of data.</p> <p>Departmental managers may serve as the data custodians for the organisation.</p>
<b>Clinicians (medical/nursing/allied health)</b>	The preparation of clinical documentation underlying activity data collections. Collection and entry of data, and review of data quality assurance reports.	<p>Responsible for preparing accurate, consistent and timely clinical documentation.</p> <p>Responsible for primary data collection and resolution of any data errors. This includes timely data collection practices.</p> <p>Senior clinicians also have a role in supporting junior clinical staff to adopt better practice approaches to data entry.</p>
<b>Finance managers and officers</b>	<p>The management of financial systems, including billing and accounting systems. The preparation and documentation of accounting transactions generally and of journal transactions specifically related to DNRs.</p> <p>Collection and entry of financial data into billing and other accounting systems.</p>	<p>Responsible for documentation of financial data in compliance with accounting standards and other applicable standards endorsed or promulgated by the Ministry.</p> <p>Primary data collection, internal audit and resolution of identified data or accounting errors.</p> <p>Preparation of financial reports and financial components of DNRs.</p>

<sup>21</sup> World Health Organization, *Improving Data Quality: A Guide for Developing Countries*, World Health Organization, 2003.

Staff group	Roles	Responsibilities
<b>Data managers, analysts and quality officers</b>	Support for data collection, analysis/reporting and quality.	Responsible for liaison with all other staff members in relation to data collection, analysis/reporting and quality matters. This includes detailed review of issues identified and addressing of root causes of data integrity issues. This involves leadership on quality assurance matters across the LHD/SHN.
<b>Information technology staff, trainers and administrators</b>	Support for Information, communications and technology for data collection and monitoring data quality.	Responsible for the maintenance of data integrity and for the implementation of system changes to improve data quality. This includes training of staff in systems and implications for quality. The system administration is also responsible for the documentation of resources which may support data quality.
<b>Administrative staff (e.g. admission clerks/ward clerks)</b>	Support for data collection and monitoring data quality.	Responsible for direct data entry, peer training and support in data entry, identifying and resolving data anomalies, and implementation/review of data capture processes.