



**Queensland
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Changes in diabetes coding from the fifth to the sixth and seventh editions of ICD-10-AM

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Key findings

The coding of diabetes has been impacted by changes in specific Australian Coding Standards between ICD-10-AM editions. ACS 0002 changed in the sixth edition and ACS 0401 changed in the seventh edition. These changes have potentially decreased the scope for diabetes surveillance in collected data.

Within Queensland the number of episodes with diabetes as a principal diagnosis reduced by 56% from July to December 2009 sixth edition (8,925) compared to July to December 2010 seventh edition (3,942).

Within Queensland the number episodes with diabetes as an other (additional) diagnosis reduced by:

- 41% from July to December 2007 fifth edition (49,944) compared to July to December 2008 sixth edition (29,629) and
- 41% from July to December 2009 sixth edition (29,801) compared to July to December 2010 seventh edition (17,725)

1.0 Background and Purpose of the Report

The Queensland Hospital Admitted Patient Data Collection (QHAPDC) collects morbidity data used for national reporting requirements, monitoring standards of care, health funding planning and research into diseases.¹ Data is collected using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) codes.

For certain diseases or conditions, including diabetes, annotations within the ICD-10-AM indicate that an Australian Coding Standard (ACS) exists which directs the appropriate application of ICD-10-AM codes.²⁻⁷ There have been many changes to Australian Coding Standards for diabetes since the first edition of ICD-10-AM in July 1999.⁸

This technical report describes the major changes in specific Australian Coding Standards affecting diabetes coding. ACS 0002 changed in the sixth edition ICD-10-AM (July 2008 to June 2010) and ACS 0401 changed in the seventh edition (July 2010 onwards). We assess the potential impact of these changes on collected diabetes data and consider the implications of using this data for diabetes reporting and surveillance.

2.0 Methodology

Direct comparisons are performed on the number of Queensland hospital episodes with diabetes coded from July 2006 through to December 2010. This period covers data collected using the fifth (July 2006 to June 2008), sixth (July 2008 to June 2010) and seventh (July 2010 onward) editions of ICD-10-AM, with the final six months covering the first available preliminary data collected under the seventh edition. The trend analysis reporting direct age standardized rates covers data collected using the third edition ICD-10-AM (July 2002) through to the seventh edition ICD-10-AM (December 2010), with a projection for 2010/11.

Where counts of hospital episodes are presented or used to calculate rates, an episode is only counted once, with diabetes coded as either a principal diagnosis (PD) or an other diagnosis (OD). If an episode had diabetes coded as both a PD and an OD, the episode was treated as a PD. For diabetes coded to the OD position (10.3% of records dropped due to PD overlap), the first diabetes code encountered in the recorded sequence was used.

Queensland Estimated Resident Populations were used to calculate Queensland specific diabetes rates, these rates were then standardised per 100 000 to the Australian 2001 population.

Results are presented as:

- a) Episodes with diabetes all types (E10-E14)
- b) Episodes with diabetes by type: Type I diabetes (E10), Type II diabetes (E11), Other specified diabetes (E13) and Unspecified diabetes (E14) and
- c) Episodes with diabetes by complication status, either diabetes without complication (E10.9, E11.9, E13.9 and E14.9) or diabetes with complication/s (E10-E14 remaining episodes)

2.1 Exclusions

Episodes with diabetes were extracted with the following exclusions applied: organ donors, unqualified neonates or boarders, sex described as missing or indeterminate, episodes from public psychiatric hospitals and episodes with a usual place of residence recorded as other than Queensland. These exclusions were applied to be consistent with typical definitions used for chronic disease reporting, for example, epidemiological requests and the Queensland Health Chief Health Officer Report.

3.0 Mapping major change in the diabetes specific Australian Coding Standard (ACS 0401) from the fifth to the seventh edition ICD-10-AM

In ACS 0401 from the second edition ICD-10-AM (July 2000) to the sixth edition (June 2008)²⁻⁷ coding instructions stated a diabetes with complication code could be used without specifying a documented cause and effect relationship between the diabetes and complication. This had allowed some scope for the surveillance of diabetes and commonly coexisting complications (comorbidities).⁸

In contrast, a revised ACS 0401 from the seventh edition ICD-10-AM onwards (July 2010) stated that diabetes with complication/s codes were to be applied only when the complication/s were ‘due to’ or ‘secondary to’ diabetes.⁷ This change is likely to have affected both principal diagnoses (Table 3.1) and other diagnoses (Table 3.2). The impact was to narrow the meaning of collected diabetes data, that is, to more accurately reflect documented diabetic cause and effect relationships rather than comorbidities.

Table 3.1 Mapping major change in the meaning of principal diagnosis episodes with diabetes from the fifth to the seventh edition ICD-10-AM

ACS	The meaning of principal diagnosis episodes with diabetes after satisfying criteria outlined in both ACS 0001 and ACS 0401.	ICD-10-AM Edition		
		5	6	7
ACS 0001	‘The diagnosis established after study to be chiefly responsible for occasioning the patient’s episode of care in hospital (or attendance at a healthcare facility)’ ⁵	✓	✓	✓
ACS 0401	Diabetes with complication codes reflect condition/s coexisting with diabetes (comorbidities)	✓	✓	n/a
Revised ACS 0401	Diabetes with complication codes only reflect complication/s ‘due to’ or ‘secondary to’ diabetes	n/a	n/a	✓

3.1 Mapping major change in the Australian Coding Standard for an other (additional) diagnosis (ACS 0002) from the fifth to the seventh edition ICD-10-AM

Diabetes as an other diagnosis (OD) is governed by two coding standards, ACS 0401 (described previously) and ACS 0002 Additional Diagnosis. Within ACS 0002, two sub-definitions have remained consistent from the fifth to the seventh edition of the ICD-10-AM.

An additional diagnosis (or OD) is primarily defined according to ACS 0002 as:

A condition or complaint either co-existing with the principal diagnosis or arising during the episode of care or attendance at a health care facility.⁹

A secondary definition clarifies that:

For coding purposes, additional diagnoses should be interpreted as conditions that affect patient management in terms of requiring any of the following: therapeutic treatment, diagnostic procedures increased nursing care and/or monitoring⁵

In addition to these two sub-definitions, the application of ACS 0002 during the fifth edition (July 2006 to June 2008) was strongly influenced by an additional coding directive issued by the National Centre for Classification in Health (NCCCH). This directive, first implemented in December 2002, confirmed that a single blood sugar level taken during an episode of care would satisfy ACS 0002 coding requirements to assign a code for diabetes.¹⁰

However from the sixth edition onwards (commencing July 2008), this NCCCH directive was rescinded with a single blood sugar level no longer sufficient to meet ACS 0002 coding requirements.¹¹ Consistent with the change in the NCCCH directive, a third definition was added to ACS 0002 to further clarify the purpose of OD data collection:

The national morbidity data collection is not intended to describe the current disease status of the inpatient population, but rather, the conditions that are significant in terms of treatment required, investigations needed and resources used in each episode of care.⁶

On account of these changes (Table 3.2) collected data for OD episodes with diabetes may have a different meaning from the sixth edition ICD-10-AM onwards. Sixth and seventh edition collected OD data using diabetes with complication/s codes may more accurately reflect the documented conditions treated during an episode of care. However, the same collected data may allow less scope for the surveillance of comorbidities using diabetes with complication/s codes.

Table 3.2 Mapping major change in the meaning of other diagnosis episodes with diabetes from the fifth to the seventh edition ICD-10-AM

ACS	The meaning of other diagnosis diabetes episodes after satisfying criteria outlined in both ACS 0002 and ACS 0401.	ICD-10-AM Edition		
		5*	6	7
ACS 0002 Primary Definition	‘A condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted patient care, episode of residential care or attendance at a health care establishment’ †	✓	✓	✓
ACS 0002 Secondary Definition	‘For coding purposes, additional diagnoses should be interpreted as conditions that affect patient management in terms of requiring any of the following: <ul style="list-style-type: none"> • therapeutic treatment ‡ • diagnostic procedures • increased nursing care and/or monitoring’ § 	✓	✓	✓
ACS 0002 Tertiary Definition	‘The national morbidity data collection is not intended to describe the current disease status of the inpatient population, but rather, the conditions that are significant in terms of treatment required, investigations needed and resources used in each episode of care.’	n/a	✓	✓
ACS 0401	‘diabetes with complication’ codes reflect condition/s co-existing with diabetes	✓	✓	n/a
Revised ACS 0401	‘diabetes with complication’ codes reflect complication/s due to or secondary to diabetes	n/a	n/a	✓

* In the fifth edition ICD-10-AM, the application of ACS 0002 was further influenced by a National Centre for Classification in Health directive confirming that a single blood sugar level would fulfil ACS 0002 coding requirements.¹⁰

† ‘, as described by a code’ added to the end of this definition^{6,7}

‡ This phrase is replaced with ‘commencement, alteration or adjustment of therapeutic treatment’ in the sixth and seventh editions ICD-10-AM.^{6,7}

§ This phrase is replaced with ‘increased clinical care and/or monitoring’ in the sixth and seventh editions ICD-10-AM.^{6,7}

4.0 The potential impact of changes in diabetes coding upon QHAPDC episodes with diabetes from the fifth to the seventh edition ICD-10-AM

Although generally inappropriate to attribute changes in hospital morbidity data directly to coding and classification changes,⁸ changes in Australian Coding Standards in the sixth (ACS 0002) and seventh (ACS 0401) edition of the ICD-10-AM may have contributed to some unusual recent trends observed in QHAPDC diabetes data.

4.1 The potential impact of changes in diabetes coding upon principal diagnosis episodes with diabetes in the QHAPDC

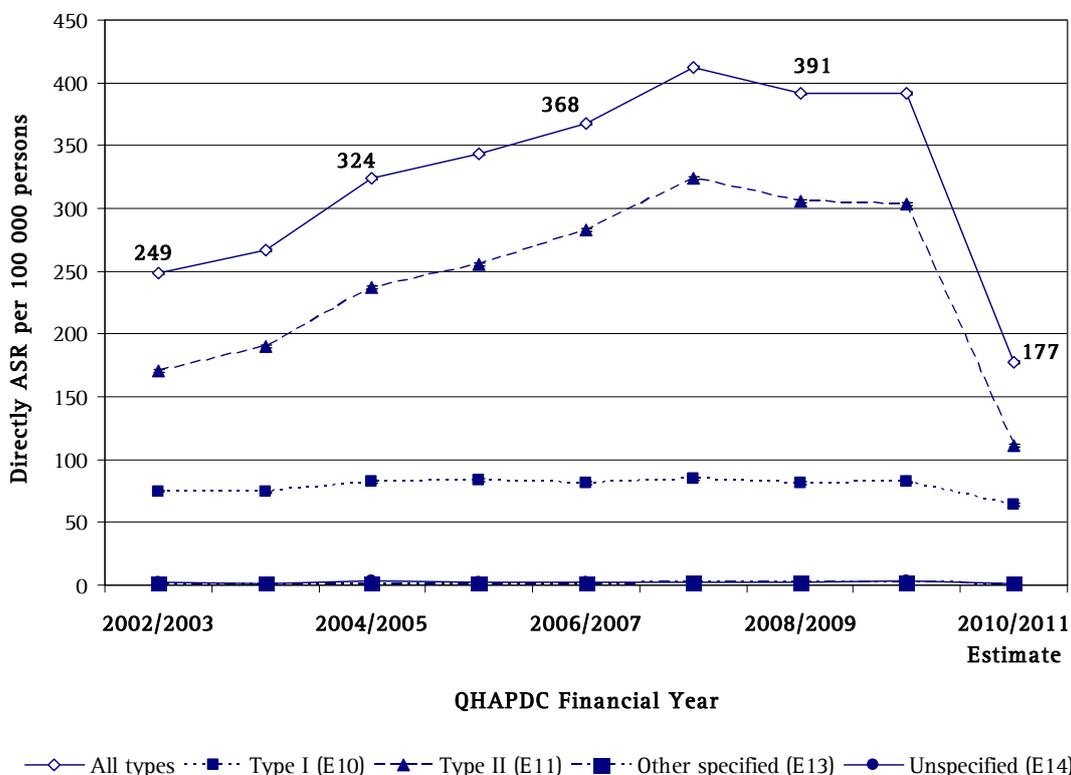
Within Queensland there was an increasing overall trend in the direct age standardised rate of episodes with diabetes as a PD (all diabetes types) from July 2002 to June 2007. From July 2007 to June 2010 the plateau in this trend was explained by a stabilisation in the number of episodes with an increasing Queensland population. The major contributor to this overall increasing trend (all diabetes types) was Type II diabetes (Figure 4.1). This collected data coincides with a period of relative coding consistency for episodes with diabetes as a PD.²⁻⁷

Data collected within QHAPDC for the first half of 2010/11 (July 2010 to December 2010) reflects the start of seventh edition data collection and coinciding with the major change in ACS 0401. Total episodes with diabetes as a PD are 3,942 for July 2010 to December 2010, a 56% decrease compared to equivalent six month period in 2009. These counts have been crudely projected to calculate an annual direct age standardized rate for episodes with diabetes as a PD of 177 per 100 000 for 2010/11 down from 391 per 100 000 in 2009/10 (Figure 4.1).

Table 4.1 Principal diagnosis diabetes hospitalisations within QHAPDC

ICD-10-AM Edition	Year (July to December)	Total Separations	% change compared to the previous year	Diabetes with Complication/s Codes	Diabetes without Complication Codes
5	2006	7,508		7,273	235
	2007	8,445	+12	8,167	278
6	2008	8,400	-1	8,068	332
	2009	8,925	+6	8,615	310
7	2010	3,942	-56	3,568	374

Figure 4-1 Episodes with diabetes as a principal diagnosis in QHAPDC as direct age standardised rates (ASRs) from 2002/03 to 2010/11*



The recording of QHAPDC episodes with diabetes as a PD has potentially been influenced by the change in ACS 0401 in the seventh edition ICD-10-AM. A change in the meaning of diabetes with complication codes to more accurately reflect documented cause and effect is consistent with the decreases seen in a) six monthly counts of episodes with diabetes as a PD and b) the decrease in the 2010/11 projected direct age standardised rate of episodes with diabetes as a PD. Although unlikely that any other influence might account for these sharp decreases, this influence needs confirmation when complete 2010/11 QHAPDC and QLD population data become available.

* 2010/11 is a projected estimate based on preliminary QHAPDC data extracted April 2011. The following calculation is used: (July to December 2010 diabetes PD separations x 2) / QLD 2009 population and then age standardised to the Australian population 2001.

4.2 The potential impact of changes in diabetes coding upon other diagnosis episodes with diabetes in QHAPDC

Prior to July 2008 there was an increasing trend in the direct age standardised rates of episodes with diabetes as an OD (all diabetes types). The major contributor to this trend was Type II diabetes with a gradually decreasing trend for Type I diabetes (Figure 4.2).

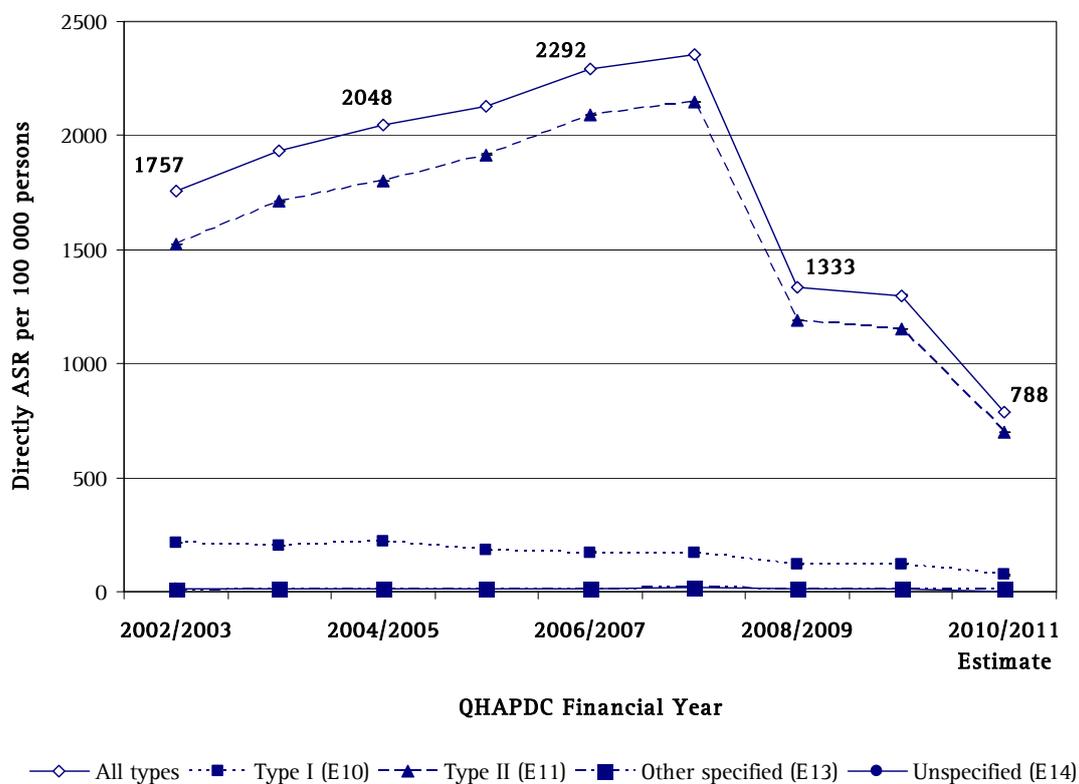
This trend reversed in the first year of sixth edition ICD-10-AM diabetes data collection, 2008/09, with the direct age standardized rate of episodes with diabetes as an OD (all diabetes types) decreased by 43% compared to the previous year (Figure 4.2). This impact is consistent with the implementation of the rescinded NCCH coding advice, whereby a single blood sugar test was no longer sufficient to meet the criteria for coding diabetes under ACS 0002. It is also consistent with the ACS 0002 definition clarification emphasising that national morbidity data collection was not intended for surveillance.

Table 4.2 Diabetes hospitalisations (OD) within QHAPDC

ICD-10-AM Edition	Year (July to December)	Total Separations	% change compared to previous year	Diabetes with Complication/s Codes	Diabetes without Complication Codes
5	2006	46,954		34,268	12,677
	2007	49,944	+6	37,792	12,152
6	2008	29,629	-41	25,109	4,520
	2009	29,801	+1	25,560	4,241
7	2010	17,725	-41	14,791	2,934

In Queensland hospitals in 2010/11, the first year of seventh edition data collection, comparisons of half yearly episodes (July to December) with all diabetes types as an OD show a 41% decrease compared to the previous year (Table 4.2). The projected direct age standardized for all episodes with diabetes as an OD 2010/11 is 788 per 100 000 persons compared to 1,300 per 100 000 in 2009/10. This decrease is consistent with the influence of the seventh edition ACS 0401 coding change narrowing the meaning of diabetes with complication codes from coexisting conditions to documented cause and effect. However this trend needs confirmation as complete data become available.

Figure 4-2 Episodes with diabetes as an other diagnosis in QHAPDC as direct age standardised rates (ASRs) from 2002/03 to 2010/11 *



From sixth edition ICD-10-AM data collection (July 2008) onwards a decreasing trend is observed within Queensland hospital episodes with diabetes recorded as an OD. This contrasts with a long term increasing trend of episodes with diabetes recorded as an OD before the introduction of changes to Australian Coding Standards in the sixth (ACS 0002) and seventh edition (ACS 0401) ICD-10-AM. These data clearly demonstrate that changes in Australian Coding Standards can affect the meaning of collected diabetes data in time series analyses.

* 2010/11 is a projected estimate based on preliminary QHAPDC data extracted April 2011. The following calculation is used: (July to December 2010 diabetes OD separations x 2) / QLD 2009 population and then age standardised to the Australian population 2001.

5.0 The implications for reporting Queensland hospital morbidity data following major changes in diabetes coding in both the sixth and seventh edition ICD-10-AM

The observed trends in Queensland hospital episodes with diabetes, notably type II diabetes, have been strongly influenced by major changes in Australian Coding Standards during both the sixth (July 2008 to June 2010) and seventh (July 2010 to current) edition ICD-10-AM.*

Collected data on episodes with diabetes as a PD and/ or an OD have been influenced by the seventh edition ACS 0401 coding change to more accurately reflect a documented cause and effect relationship when diabetes with complication codes are used.⁷ The potential impact of this coding change would be a reduced scope for diabetes with complication surveillance.

Collected data on episodes with diabetes as an OD have been additionally influenced by a clarification in ACS 0002 in the sixth edition ICD-10-AM.⁶ Consistent with revised ACS 0002 coding requirements, sixth and seventh edition Queensland hospital morbidity data on episodes with diabetes as an OD should more accurately reflect the documented treatment and resources used during an episode of care, rather than disease surveillance.

Changes in counts for episodes of care with diabetes also have the potential to influence other health performance indicators. As an example, the preventable hospitalization category of 'diabetes complications' is defined by both PD and OD diabetes diagnoses.¹² Therefore increased or decreased diabetes counts in the number of Queensland episodes with diabetes will influence the calculation of this indicator.

Therefore as previously reported by Phillips et al⁸, and as highlighted in this report, the accurate interpretation of collected diabetes data over time depends on assessing the potential impact of:

- a) changes in disease classification between ICD-10-AM editions
- b) changes in Australian Coding Standards and
- c) coding directives issued by State or other coding authorities

In summary, critical judgement is needed to distinguish between valid diabetes hospitalisation trends and trend directions unduly influenced by changes in diabetes coding. These constraints in interpretation need to be acknowledged when using reported diabetes hospital morbidity data to comment on either episode level hospitalisation trends, or when health performance indicators are reliant on diabetes hospital morbidity data for their calculation.

* We acknowledge that this report is focused on reporting trends using aggregate diabetes data without considering the potential impact of finer level coding changes.

6.0 References

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