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## Hospital utilisation and funding for patients with selected chronic conditions - 3. Renal dialysis

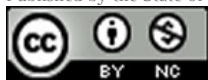
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## Hospital utilisation and funding for patients with selected chronic conditions - 3. Renal dialysis

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Patients with chronic kidney disease (CKD), in particular those with end-stage kidney disease (ESKD) in most cases require renal replacement therapy, which includes kidney transplantation, or regular renal dialysis<sup>1</sup>. In 2010/11, same-day renal dialysis was the most common reason for same-day acute episodes of care in both public and private Australian hospitals<sup>2</sup>, and it is estimated that in 2004/05, \$586M was spent on health care expenditure for CKD in admitted patient hospital services nationally, of which \$458M were for dialysis<sup>3</sup>. In Queensland, the number of adults requiring renal replacement therapy is expected to increase by 69% from 2005 to 2017<sup>4</sup>. Although it is relatively simple to count the number of same-day renal dialysis episodes within admitted patient care settings, the total hospital utilisation in an admitted patient care setting by patients requiring renal dialysis has not been thoroughly evaluated in the past.

This is the third report of the series looking at the hospital utilisation and expenditure by the Queensland Government for hospital care for patients with various chronic conditions. Episodes of care for patients requiring renal dialysis were studied. Patients were included in the study cohort if there was at least one episode of care that involved renal dialysis (ICD-10AM: Z49.1, Z49.2, ACHI 13100-00 – 13100-08) in the Queensland Hospital Admitted Patient Data Collection (QHAPDC) between 1 July 2003 and 30 June 2010. The methodology for defining the sample and in-scope admissions is described in earlier reports of the series<sup>5,6</sup>. Note that the in-scope population may include those who required renal dialysis for non-chronic diseases, such as acute renal failure, and these patients may not require on-going dialysis therapies. Although these patients may have a different hospital utilisation pattern to those with chronic conditions, they were not differentiated as it was considered that they are a minor group within the cohort.

### Characteristics of episodes involving renal dialysis

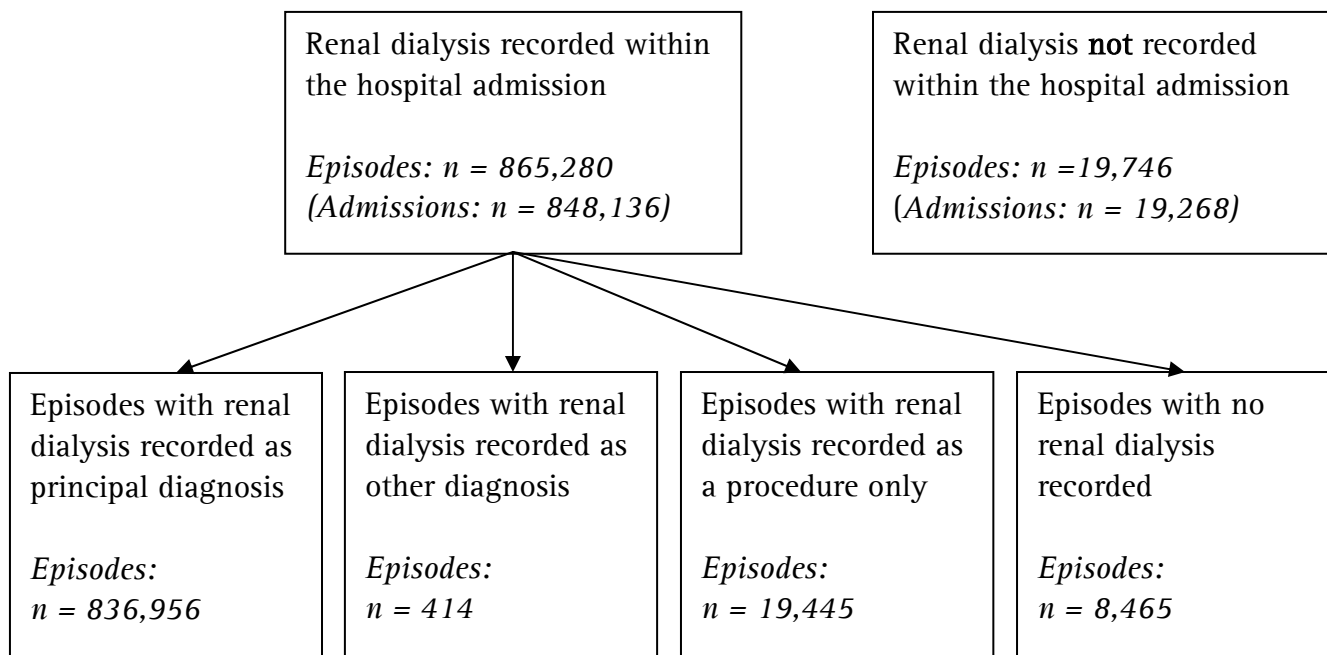
During the study period, there were 885,026 episodes of care by those patients who had a record of receiving renal dialysis in an admitted patient care setting, consisting of 4,746 unique patients. Approximately 14% of these patients identified themselves as Indigenous\*. Approximately, 38% of the cohort had at least one vascular access surgery<sup>†</sup> recorded, which is known to be cost effective if conducted appropriately, but which is prone to a high infection rate<sup>4</sup>. 564 patients had a kidney transplant procedure recorded, and only 25 (4.4%) of these patients identified themselves as Indigenous. For those who had at least one episode that involved renal dialysis in 2009/10, the average number of episodes in that year was 69.7 and 81.3 for non-Indigenous and Indigenous populations, respectively. Figure 1 shows the breakdown of episodes for patients in the cohort by diagnosis type. The cohort consists of 2 broad admission types; 1) hospital admissions that involve

\* The Indigenous status of a patient was based on whether the patient had ever identified as Indigenous in QHAPDC during the study period

† Vascular access surgery defined by the Australian Classification of Health Interventions codes: 13109-00, 13109-01, 13112-00, 34509-01 34512-00, 34512-01.

renal dialysis (which includes index episodes), and 2) hospital admissions that do not involve renal dialysis. Admissions that involve renal dialysis were further broken down into 4 mutually exclusive episodes of care groups, depending on how dialysis was recorded, or whether it was recorded at all within an episode of care (but was recorded in other episodes in the same hospital admission).

**Figure 1. Schematic representation of episodes of care for patients who ever received renal dialysis in an admitted patient care setting**



Note: includes index episodes of care

## Co-existing conditions

### 1. Principal diagnosis and other diagnoses, where renal dialysis was recorded

Between 2003/04-2009/10, when a patient had a record of having renal dialysis within an episode of care, almost 98% of the episodes had the principal diagnosis of renal dialysis (Z49.1, Z49.2). Z49.1 (Extracorporeal dialysis) accounted for 98.5% of these, and Z49.2 (Other dialysis) accounted for 1.5%.

For episodes with a principal diagnosis of renal dialysis, 51% did not have any other diagnosis recorded. For those episodes with other diagnoses recorded, ICD-codes that were commonly recorded were:

- Chronic kidney failure (N18.x; 96.9%)
- Hypertension (I10.x; 12.7%) and
- Type 2 diabetes (E11.x; 11.9%).

There were 19,859 episodes of care where there was no principal diagnosis of renal dialysis, but renal dialysis was recorded as an other diagnosis or as a procedure within the episode of care. The average length of stay for these episodes of care was 9 days, and as patients with ESKD usually

require dialysis several times a week<sup>4</sup>, it is likely that renal dialysis was routine for these patients and not necessarily relevant to the reason for their hospital stay. For these episodes:

- 414 episodes had renal dialysis as an other diagnosis.
  - The Australian Coding Standards state that if the original intent of the episode of care was for same-day dialysis, but the stay was extended due to unforeseen conditions, the conditions responsible for extending the patients' length of stay should be recorded as principal diagnosis, with Z49.1 or Z49.2 as an additional diagnosis<sup>7</sup>.
  - However, only a very small proportion of episodes had renal dialysis coded as an other diagnosis. It is not clear whether this is the result of poor recording of Z49.1 and/or Z49.2 as an other diagnosis, or whether renal dialysis was legitimately not recorded within the episode of care.
- conditions such as kidney failure (N17-N19.x; 11.0%), diabetes (E10-E14.x; 10.6%) and coronary heart disease (I20-I25.x; 5.7%) were commonly recorded as principal diagnoses
- more than 19% had a principal diagnosis of *Injury, Poisoning and Certain Other Consequences of External Causes* (S00-T98.x), where almost all of these were for complications of surgical and medical care, not elsewhere classified (T80-T88.x). These complications represent a relatively common occurrence at the patient level with 45% and 53% of the non-Indigenous and Indigenous population, respectively, in the cohort having at least one episode with these complications (T80-T88.x) recorded as their principal diagnosis. 82.9% of these episodes of care had an external cause code that showed delayed complications of medical care with place of occurrence as Health service area (Y92.22). External cause codes recorded for this subgroup included:
  - abnormal reaction, or of later complication, without mention of misadventure at the time for kidney dialysis (Y84.1; 46.0%)
  - operation with anastomosis, bypass or graft (Y83.2; 27.3%)
  - other medical procedures (Y84.8; 9.7%);

## 2. Principal diagnosis where renal dialysis was not recorded

Between 2003/04-2009/10, 28,211 'ever-coded' episodes did not have a record of having renal dialysis within the episode of care, although approximately 30% of them were part of an admission that involved renal dialysis.

For those episodes that were part of a renal dialysis-related admission:

- more than half (54%) of the episodes had a principal diagnosis starting with Z (ICD-10AM Chapter 21: *Factors influencing health status and contact with health services*), where more than 80% of these had a principal diagnosis of Z50.x (Care involving use of rehabilitation procedures) or Z75.x (Problems related to medical facilities and other health care). Most of the episodes with a principal diagnosis starting with Z75 were for Z75.11 (Person awaiting admission to residential aged care service)
- some of these patients had regular episode changes while they were undergoing rehabilitation or waiting for admission to an aged care facility. Some patients had more than 100 episode changes within one hospital admission.

For those episodes that were not part of an admission that involved renal dialysis:

- approximately 21% had a principal diagnosis starting with Z (ICD-10AM Chapter 21: *Factors influencing health status and contact with health services*). Most of them were for conditions relating to adjustment/replacement of a device, likely for renal dialysis (e.g. Preparatory care for dialysis (Z49.0), Adjustment and management of other implanted devices (Z45.8))
- 12% of these episodes had procedure of apheresis, which is an extracorporeal therapy that is utilised to clean out waste from the blood system.
- 12% had Complications of surgical and medical care, not elsewhere classified (T80-T88.x) as principal diagnosis
- of these episodes of care with no renal dialysis recorded, 4,338 episodes were from 543 patients who had a kidney transplant procedure prior to these episodes.

### 3. Common diagnoses

For patients with renal dialysis ever recorded:

- 88% of the cohort had N18.x (Chronic renal failure) recorded at least once
- more than 76% of patients had at least one ICD-10AM code starting with I (ICD-10AM Chapter 9: *Diseases of the Circulatory System*)
- 65% had hypertension (I10) recorded at least once
- 68% had at least one condition that is classified as *Endocrine, Nutritional and Metabolic Diseases* (ICD-10AM Chapter 4)
- 38% had diabetes (E10-E14.x) coded at least once
- approximately 44% had a tobacco-related diagnosis (*Z86.43* – personal history of tobacco disorder, *Z72.0* – Tobacco use, current or *F17.x* – Mental and behavioural disorders due to tobacco) recorded at least once.

### Funding

In 2009/10, funding provided by the Queensland Government for treatment of patients who had been admitted for renal dialysis at least once since 2003/04 totalled approximately \$173M in admitted care settings (Table 1). Approximately \$106M was funded primarily to provide dialysis services in hospital, with an average funding of \$715 per episode of care (Table 2). This accounted for 61% of the total of funding for these patients. Of the episodes of care for the total cohort, approximately \$25M was funded for episodes that did not involve dialysis. On average, they were funded approximately \$4,400 per episode of care. \$42M was funded for episodes where patients received renal dialysis, but the principal diagnosis was not renal dialysis, with an average funding of approximately \$13,000 per episode of care. As mentioned in an earlier section of the report, the average length of stay for these episodes was 9 days, which may indicate that the type of care required may have been complex resulting in a higher cost. *Injury, Poisoning and Certain Other Consequences of External Causes* (S00-T98.x) accounted for \$10M within this sub group, which largely consisted of admissions for complications of surgical and medical care, not elsewhere classified (T80-T88.x).

### Acknowledgements

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**Table 1. Total funding for episodes of care by type of principal diagnoses recorded for patients who required renal dialysis, 2009/10**

Principal Diagnosis	Had renal dialysis within the episode of care		
	Yes	No	Total
Certain Infectious and Parasitic Diseases (A00-B99)	\$1,790,256 (N = 134)	\$1,126,160 (N = 169)	<b>\$2,916,416</b> (N = 303)
Neoplasms (C00-D48)	\$1,440,028 (N = 63)	\$1,237,530 (N = 294)	<b>\$2,677,558</b> (N = 357)
Diseases of the Blood and Blood-Forming Organs and Certain Disorders Involving the Immune Mechanism (D50-D89)	\$174,113 (N = 25)	\$231,739 (N = 87)	<b>\$405,853</b> (N = 112)
Endocrine, Nutritional and Metabolic Diseases (E00-E89)	\$6,564,232 (N = 522)	\$2,202,532 (N = 440)	<b>\$8,766,764</b> (N = 962)
Mental and Behavioural Disorders (F00-F99)	\$182,542 (N = 15)	\$109,987 (N = 23)	<b>\$292,529</b> (N = 38)
Diseases of the Nervous System (G00-G99)	\$475,189 (N = 35)	\$257,734 (N = 219)	<b>\$732,924</b> (N = 254)
Diseases of the Eye And Adnexa (H00-H59)	\$48,521 (N = 7)	\$94,204 (N = 33)	<b>\$142,725</b> (N = 40)
Diseases of the Ear and Mastoid Process (H60-H95)	\$25,148 (N = 6)	\$51,911 (N = 31)	<b>\$77,059</b> (N = 37)
Diseases of the Circulatory System (I00-I99)	\$7,183,143 (N=471)	\$2,284,978 (N = 372)	<b>\$9,468,121</b> (N = 843)
Diseases of the Respiratory System (J00-J99)	\$3,282,997 (N=244)	\$1,369,323 (N = 176)	<b>\$4,652,320</b> (N = 420)
Diseases of the Digestive System (K00-K93)	\$2,289,310 (N=190)	\$1,139,690 (N = 207)	<b>\$3,429,000</b> (N = 397)
Diseases of the Skin and Subcutaneous Tissue (L00-L99)	\$229,016 (N = 28)	\$316,679 (N = 83)	<b>\$545,695</b> (N = 111)
Diseases of the Musculoskeletal System and Connective Tissue (M00-M99)	\$1,699,985 (N = 73)	\$423,360 (N = 71)	<b>\$2,123,345</b> (N = 144)
Diseases of the Genitourinary System (N00-N99)	\$4,002,239 (N = 298)	\$4,579,995 (N = 596)	<b>\$8,582,234</b> (N = 894)
Pregnancy, Childbirth and the Puerperium (O00-O99)	\$31,543 (N = 5)	\$13,943 (N = 4)	<b>\$45,485</b> (N = 9)
Congenital Malformations, Deformations and Chromosomal Abnormalities (Q00-Q99)	\$67,067 (N = 9)	\$124,251 (N = 7)	<b>\$191,318</b> (N = 16)
Symptoms, Signs and Abnormal Clinical and Laboratory Findings, Not Elsewhere Classified (R00-R99)	\$865,140 (N = 200)	\$871,027 (N = 318)	<b>\$1,736,168</b> (N = 518)
Injury, Poisoning and Certain Other Consequences of External Causes (S00-T98)	\$10,303,201 (N = 712)	\$4,340,898 (N = 760)	<b>\$14,644,099</b> (N = 1472)
Factors Influencing Health Status and Contact with Health Services (Z00-Z99), excluding renal dialysis	\$1,305,933 (N=239)	\$4,100,298 (N = 1,706)	<b>\$5,406,230</b> (N = 1,945)
Renal Dialysis (Z49.1, Z49.2)	\$106,208,327 (N = 148,626)	\$0 (N = 0)	<b>\$106,208,327</b> (N = 148,626)
<b>Total (\$)</b>	<b>\$148,167,930</b> (N = 151,902)	<b>\$24,876,239</b> (N = 5,596)	<b>\$173,044,169</b> (N = 157,498)

Source: Queensland Hospital Admitted Patient Data Collection, pAWS\_archive database



**Table 2. Average and total funding for episodes of care by type of diagnoses recorded for patients who required renal dialysis, 2009/10**

Type	Renal dialysis involved		No renal dialysis recorded
	Principal diagnosis Z49.1 or Z49.2	Principal diagnosis not Z49.1, Z49.2	
# of episodes (n)	148,626	3,276	5,596
Psychiatric ( av. \$)	\$0.00	\$20.57	\$1.17
Sub/Non-Acute ( av. \$)	\$0.00	\$300.51	\$452.31
ICU ( av. \$)	\$1.66	\$1,704.64	\$166.10
DRG ( av. \$)	\$712.94	\$10,782.46	\$3,825.78
Total ( av. \$)	\$714.60	\$12,808.18	\$4,445.36
<b>Total (\$)</b>	<b>\$106,208,326.93</b>	<b>\$41,959,602.86</b>	<b>\$24,876,238.98</b>

Source: Queensland Hospital Admitted Patient Data Collection, pAWS\_archive database

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