

7 Complications of surgical and medical care, Australia

ICD-10-AM inclusion criteria:

- Principal diagnosis [T80–T88](#).

Hospital separations with a principal diagnosis in the ICD-10-AM range T80–T88 are injuries most likely sustained in the context of receiving medical care (as opposed to injuries most likely sustained in the community), and include post-operative infections, complications associated with prosthetic devices, implants and grafts, and failure or rejection of transplanted organs. While these separations provide a rudimentary measure of the incidence of adverse events related to hospital care, records with principal diagnosis codes outside the range of T80–T88 may also be related to adverse events (e.g. where external cause codes explicitly describe complications when the diagnoses codes do not). As such, the estimated incidence of adverse events related to surgical and medical care may be lower in this report than stated elsewhere (e.g. AIHW 2006).

Using this definition, 74,626 complications of surgical and medical care separations were identified for the period 2004–05 (Table 7.1). These separations represent 16.1% of all hospital separations due to injury and poisoning in 2004–05 and 1.1% of the 7,018,850 episodes of hospital care, for any cause, in Australia in this year.

Accounting for the multiple separations generated by inter-hospital transfers, it is estimated that 69,650 complications of surgical and medical care events (cases) resulted in inpatient hospital care in the 2004–05 period.

Table 7.1: Key indicators for hospitalised complications of surgical and medical care, Australia 2004–05

Key indicators	Males	Females	Persons
Total number of hospital separations due to injury and poisoning	264,139	199,410	463,554
Complications of surgical & medical care separations (T80–T88)	38,199	36,427	74,626
Complications separations as proportion of all injury separations	14.5%	18.3%	16.1%
Estimated number of complications of surgical & medical care cases ^(a)	35,616	34,034	69,650
Cases per 100,000 population	354.4	335.0	344.6
Cases per 100,000 population—age-standardised ^(b)	361.1	318.1	335.7
Total patient-days due to complications of surgical & medical care ^(c)	227,589	217,768	445,357
Mean patient-days per case	6.4	6.4	6.4

(a) Excludes records with a mode of admission of 'transfer from another acute hospital'.

(b) Standardised to the Australian estimated resident population 30th June 2001.

(c) Includes records with a mode of admission of 'transfer from another acute hospital' as contributing to hospital burden due to injury.

7.1 Complications of surgical and medical care cases

ICD-10-AM inclusion criteria:

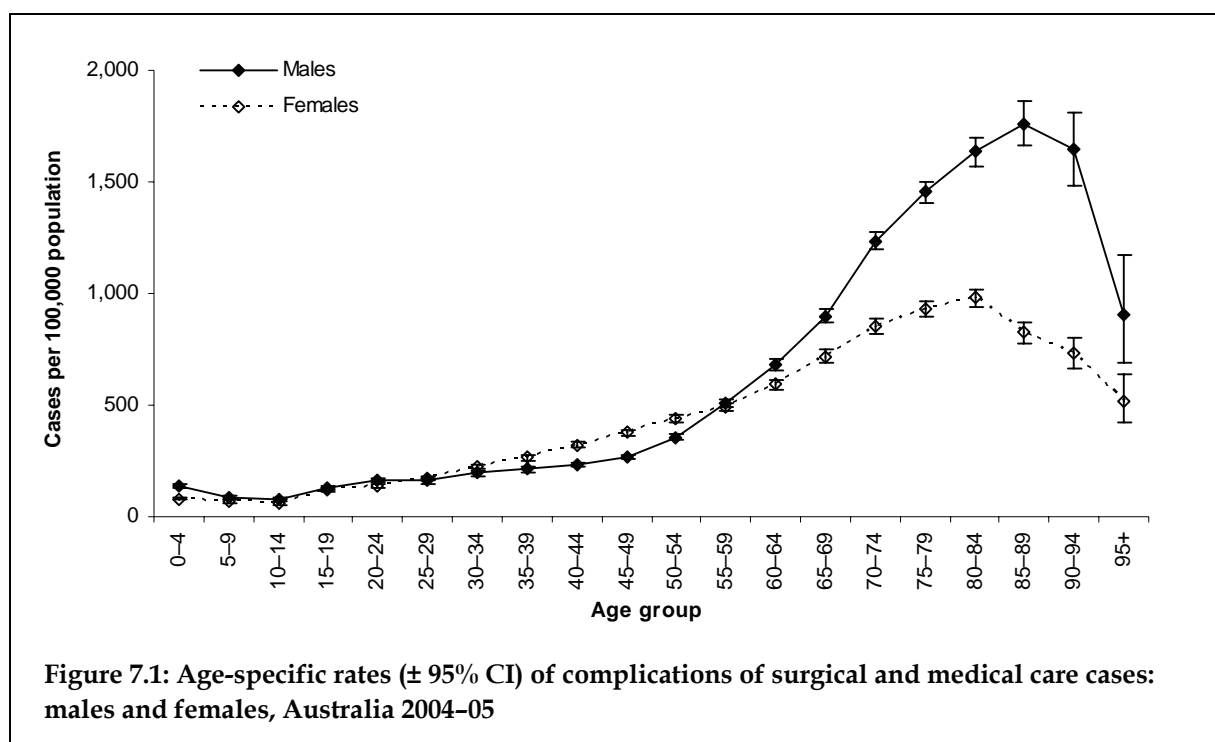
- Principal diagnosis T80-T88, and
- Mode of admission other than 'transfer from another acute hospital'.

As described above, an estimated 69,650 injury cases attributed to complications of surgical and medical care resulted in hospitalisation in 2004–05. The age-standardised rate of these serious injury events was 335.7 per 100,000 population.

Age and sex

The age and sex profile of complications of surgical and medical care in 2004–05 was similar to that presented in earlier years (Berry & Harrison 2007a). Males accounted for a similar proportion of complications cases as for females (males: 51.1%, $n = 35,616$). Accordingly, the age-standardised rate of complications injury cases for males (361.1 per 100,000 population) was only slightly higher than that for females (318.1 per 100,000, a M:F rate ratio of 1.1).

Age-specific rates of complications of surgical and medical care for males and females were similar until the age of 34 years (Figure 7.1). In the middle-adult years (40–54 years), however, rates for females were significantly higher than those for males. As for community injury cases, rates of complications cases increased markedly with increasing age for both males and females, but unlike community injuries, complications rates for older males were significantly higher than those for females from the age of 60 years on. Further, rates of hospitalised complications cases decreased markedly for people in the very oldest age groups.



External cause

Not surprisingly, the vast majority of cases with T80–T88 principal diagnoses were assigned a first external cause describing complications of surgical and medical care (99.5%, Table 7.2). The proportion of complications cases with complications of medical and surgical care external causes was similar for both males (99.4%, $n = 35,414$) and females (99.5%, $n = 33,865$). A small number of complications cases had external causes describing injury events more commonly associated with community injury cases ($n = 293$), most frequently falls and the miscellaneous causes grouped as other unintentional injuries. A further 78 cases (0.1%) either lacked an external cause code entirely or had a first-listed external cause code outside the V01–Y89 range (e.g. sequelae, supplementary factors).

The most common specific type of complications external cause reported for complications of surgical and medical care cases was 'surgical and other medical procedures as the cause of abnormal reaction of the patient, or of later complication, without mention of misadventure at the time of the procedure (Y83–Y84)'. Cases of this type accounted for 96.3% ($n = 67,083$) of all complications of surgical and medical care cases in 2004–05 (Table 7.3). Of cases of this type, the most common specific external cause reported was Y83.1 (surgical operation with implant of artificial internal device), accounting for a third (34.4%) of all complications cases ($n = 23,976$). Y83.1 was the most frequent external cause code assigned to complications cases involving people aged 45 years and over (Table 7.4), but complications cases involving younger people were more commonly coded to Y83.8 (other surgical procedures).

Table 7.2: Major external cause groups for complications of surgical and medical care cases: males, females and persons, Australia 2004–05

External cause	Males	Females	Persons
Unintentional injuries			
Transportation	* (0.0%)	* (0.0%)	11 (0.0%)
Drowning	0 (0.0%)	0 (0.0%)	0 (0.0%)
Poisoning, pharmaceuticals	7 (0.0%)	10 (0.0%)	17 (0.0%)
Poisoning, other substances	0 (0.0%)	* (0.0%)	* (0.0%)
Falls	41 (0.1%)	38 (0.1%)	79 (0.1%)
Fires, burns & scalds	* (0.0%)	0 (0.0%)	* (0.0%)
Other unintentional injuries	97 (0.3%)	62 (0.2%)	159 (0.2%)
<i>Total unintentional injuries</i>	<i>154 (0.4%)</i>	<i>113 (0.3%)</i>	<i>267 (0.4%)</i>
Intentional injuries			
Intentional, self inflicted	5 (0.0%)	8 (0.0%)	13 (0.0%)
Intentional, inflicted by another	* (0.0%)	* (0.0%)	6 (0.0%)
Undetermined intent	* (0.0%)	* (0.0%)	7 (0.0%)
<i>Total intentional injuries</i>	<i>8 (0.0%)</i>	<i>18 (0.1%)</i>	<i>26 (0.0%)</i>
Complications of medical & surgical care	35,414 (99.4%)	33,865 (99.5%)	69,279 (99.5%)
Other or missing [†]	40 (0.1%)	38 (0.1%)	78 (0.1%)
Total complications of medical & surgical care cases	35,616	34,034	69,650

* Small cell counts have been suppressed.

† Unlike Table 2.2, 'other or missing' here does not include external cause codes describing complication of surgical and medical care.

Table 7.3: External cause code categories for complications of surgical and medical care cases: males, females and persons, Australia 2004–05

External cause	Males	Females	Persons
Not complications external cause	182 (0.5%)	159 (0.5%)	341 (0.5%)
Drugs, medicaments & biological substances causing adverse effects in therapeutic use (Y40–Y59)	615 (1.7%)	856 (2.5%)	1,471 (2.1%)
Misadventures to patients during surgical & medical care (Y60–Y69)	265 (0.7%)	285 (0.8%)	550 (0.8%)
Medical devices associated with misadventures in diagnostic & therapeutic use (Y70–Y82)	69 (0.2%)	75 (0.2%)	144 (0.2%)
Surgical & other medical procedures as the cause (...), without mention of misadventure at the time of the procedure (Y83–Y84)	34,452 (96.7%)	32,631 (95.9%)	67,083 (96.3%)
Sequelae of external causes of morbidity & mortality (Y85–Y89)	33 (0.1%)	28 (0.1%)	61 (0.1%)
Total	35,616	34,034	69,650

Table 7.4: First external cause codes for complications of surgical and medical care cases where external cause is Y83 or Y84 by age, Australia 2004–05

External cause	0–4	5–14	15–24	25–44	45–64	65+	All ages †
Surgical operation with transplant of whole organ (Y83.0)	18	52	127	566	897	150	1,810
Surgical operation with implant of artificial internal device (Y83.1)	306	492	962	3,693	7,368	11,155	23,976
Surgical operation with anastomosis, bypass or graft (Y83.2)	37	51	222	971	2,223	3,526	7,030
Surgical operation with formation of external stoma (Y83.3)	96	166	64	117	330	633	1,406
Other reconstructive surgery (Y83.4)	46	66	107	395	534	367	1,515
Amputation of limb(s) (Y83.5)	*	*	15	264	336	444	1,073
Removal of other organ (partial/total) (Y83.6)	171	419	622	1,374	1,736	1,161	5,483
Other surgical procedures (Y83.8)	378	534	1,288	3,961	5,077	4,472	15,710
Surgical procedure, unspecified (Y83.9)	6	5	34	115	192	176	528
Cardiac catheterisation (Y84.0)	0	0	*	*	101	130	247
Kidney dialysis (Y84.1)	16	12	40	260	604	801	1,733
Radiological procedure & radiotherapy (Y84.2)	*	0	0	*	41	40	99
Aspiration of fluid (Y84.4)	*	*	*	7	25	16	54
Insertion of gastric or duodenal sound (Y84.5)	0	0	0	0	*	*	10
Urinary catheterisation (Y84.6)	17	13	30	157	397	1,684	2,298
Blood-sampling (Y84.7)	*	*	*	*	0	*	8
Other medical procedures (Y84.8)	181	132	180	699	1,332	1,335	3,859
Medical procedure, unspecified (Y84.9)	*	*	19	54	76	82	241
Total †	1,281	1,964	3,714	12,668	21,272	26,184	67,083

Note: Shading denotes highest specific category for each age group.

* Small cell counts have been suppressed.

† Totals include 3 cases coded to Y84.3 (shock therapy).

Place and activity

Nearly all complications of surgical and medical care cases were reported to have occurrence in a health service area (96.4%, Table 7.5). Similar proportions of cases for both males and females occurred in health service areas (96.6% vs. 96.3%, respectively). Significantly, the home, the setting for over a quarter of community injury cases, was the reported place of occurrence for only 1.1% of complications cases.

Table 7.5: Place of occurrence for complications of surgical and medical care cases: males, females and persons, Australia 2004–05

Place of occurrence	Males	Females	Persons
Home	354 (1.0%)	385 (1.1%)	739 (1.1%)
Residential institution	41 (0.1%)	35 (0.1%)	76 (0.1%)
School	* (0.0%)	* (0.0%)	6 (0.0%)
Health service area	34,409 (96.6%)	32,763 (96.3%)	67,172 (96.4%)
Other specified institution & public administrative area	* (0.0%)	* (0.0%)	* (0.0%)
Sports & athletics area	* (0.0%)	* (0.0%)	* (0.0%)
Street & highway	13 (0.0%)	5 (0.0%)	18 (0.0%)
Trade & service area	10 (0.0%)	6 (0.0%)	16 (0.0%)
Industrial & construction area	* (0.0%)	* (0.0%)	6 (0.0%)
Other specified place of occurrence	11 (0.0%)	11 (0.0%)	22 (0.0%)
Unspecified place of occurrence	721 (2.0%)	771 (2.3%)	1,492 (2.1%)
Place not reported/not applicable	42 (0.1%)	53 (0.2%)	95 (0.1%)
Total	35,616	34,034	69,650

* Small cell counts have been suppressed.

Table 7.6: Activity at time of occurrence for complications of surgical and medical care cases: males, females and persons, Australia 2004–05

Activity	Males	Females	Persons
While engaged in sports	* (0.1%)	* (0.0%)	* (0.0%)
While engaged in leisure	* (0.0%)	* (0.0%)	* (0.0%)
While working for income	37 (0.1%)	7 (0.0%)	44 (0.1%)
While engaged in other types of work	11 (0.0%)	8 (0.0%)	19 (0.0%)
While resting, sleeping, eating, etc.	83 (0.2%)	87 (0.3%)	170 (0.2%)
Other specified activity	2,884 (8.1%)	2,779 (8.2%)	5,663 (8.1%)
Unspecified activity	1,130 (3.2%)	1,142 (3.4%)	2,272 (3.3%)
Activity not reported/not applicable	31,446 (88.3%)	30,008 (88.2%)	61,454 (88.2%)
Total	35,616	34,034	69,650

* Small cell counts have been suppressed.

The lack of an ICD-10-AM activity code describing ‘while receiving medical care’ or similar is apparent when it comes to complications of surgical and medical care injury cases. Nearly nine in ten complications cases in 2004–05 (88.2%, $n = 61,454$) did not have an activity code reported. In part, this is due to ICD-10-AM coding rules, which only demand the use of activity codes with external causes V01–Y34 (NCCH 2004).

Nonetheless, for prevention purposes it would be useful to understand the circumstances of complications of surgical and medical care cases more fully, including activity. For example, while many complications cases may occur during or shortly after a medical procedure (as may be intuited from the assignment of an Y60–Y69, misadventures to patients during surgical and medical care, code), the circumstances of complications coded as adverse effects of drugs, medicaments and biological substances (Y40–Y59) may vary widely.

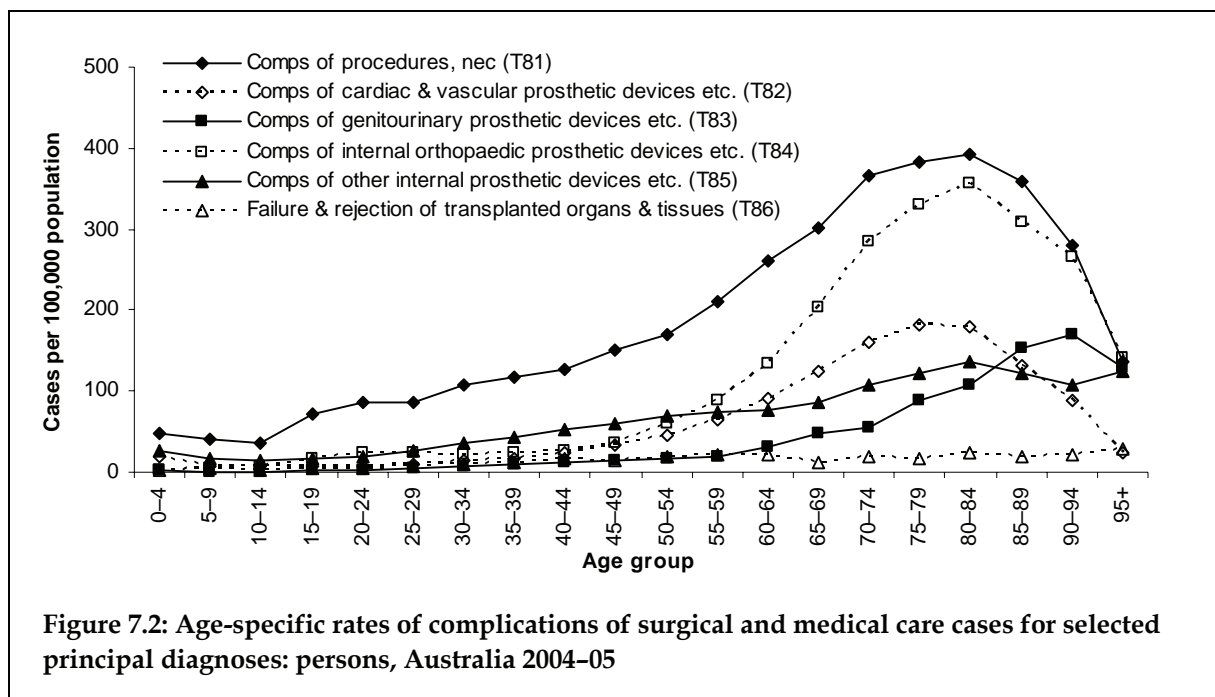
Principal diagnosis

Two in five (41.6%, $n = 28,971$) hospitalised complications of surgical and medical care cases in 2004–05 were assigned a principal diagnosis of T81 (complications of procedures, not elsewhere classified). Similar proportions of cases for both males and females were given a T81 principal diagnosis (Table 7.7). Further, T81 was the most common principal diagnosis for complications cases for all age groups other than the very old (95 years and older, Figure 7.2). For people of this age, the age-standardised rate of cases coded to T84 (complications of internal orthopaedic prosthetic devices, implants and grafts) was fractionally higher than those coded to T81 (141.0 per 100,000 vs. 136.9 per 100,000, respectively).

The rate of cases coded to most types of complications diagnoses decreased after the age of 80 years (e.g. Figure 7.2). The only type of complications case that was observed to continue to increase in rate with very old age was T86 (failure and rejection of transplanted organs and tissues), which reached a peak rate of 28.2 per 100,000 for people aged 95 years and older.

Table 7.7: Principal diagnosis groups for complications of surgical and medical care cases: males, females and persons, Australia 2004–05

Principal diagnosis	Males	Females	Persons
Complications following infusion, transfusion & therapeutic injection (T80)	241 (0.7%)	278 (0.8%)	519 (0.7%)
Complications of procedures, not elsewhere classified (T81)	14,730 (41.4%)	14,241 (41.8%)	28,971 (41.6%)
Complications of cardiac & vascular prosthetic devices, implants & grafts (T82)	4,798 (13.5%)	3,525 (10.4%)	8,323 (11.9%)
Complications of genitourinary prosthetic devices, implants & grafts (T83)	2,334 (6.6%)	1,328 (3.9%)	3,662 (5.3%)
Complications of internal orthopaedic prosthetic devices, implants & grafts (T84)	6,697 (18.8%)	6,554 (19.3%)	13,251 (19.0%)
Complications of other internal prosthetic devices, implants & grafts (T85)	3,898 (10.9%)	6,033 (17.7%)	9,931 (14.3%)
Failure & rejection of transplanted organs & tissues (T86)	1,482 (4.2%)	888 (2.6%)	2,370 (3.4%)
Complications peculiar to reattachment & amputation (T87)	790 (2.2%)	246 (0.7%)	1,036 (1.5%)
Other complications of surgical & medical care, not elsewhere classified (T88)	646 (1.8%)	941 (2.8%)	1,587 (2.3%)
Total	35,616	34,034	69,650



Length of stay

The total number of patient-days attributed to hospitalised complications of surgical and medical care in 2004-05 was 445,357, 23.6% of patient-days due to injury in this year. The mean length of stay per case for complications cases was longer than that for community injury (6.4 days for both males and females). Approximately a fifth of complications of surgical and medical care separated from hospital on the same day as admitted (22.4%, $n = 16,753$) and two in five complications separations, including the same-day separations, reported a length of stay of only one day (39.1%, $n = 29,155$), accounting for a smaller proportion of complications cases than noted for community injury cases. Similarly, a higher proportion of separations attributed to complications (9.1%, $n = 6,757$) had a length of stay of more than 14 days than was observed for community injury case separations.

As for community injury, mean lengths of stay per case for complications of surgical and medical care increased with age (Figure 7.3). Lengths of stay for males and females were similar for all but the oldest people hospitalised due to complications, when the mean length of stay per case for older males declined somewhat after the age of 75 years.

