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ON SAFETY AND QUALITY IN HEALTH CARE

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Health outcomes for adults with cognitive impairment

A national analysis of public hospital admitted care

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Summary and key findings

The Commission conducted analyses comparing health outcomes for people with and without cognitive impairment receiving admitted care in public hospitals in July 2023. These findings were presented at the Independent Hospital and Aged Care Pricing Authority Conference in August 2023 and are summarised in this report.

Key findings

Two percent of all 2021-22 Australian public hospital separations for patients aged 18-64 had a medical diagnosis associated with cognitive impairment.

When compared to separations without cognitive impairment, separations with cognitive impairment had the following features:

- mostly male (60%, versus 40% separations without cognitive impairment being male)
- higher rates for all comorbid conditions
- higher proportion of older patients than those without cognitive impairment (majority aged 50-64 years, versus 18-34 years).
- more than 1.4 times more emergency admissions (68% versus 48%)
- nine times more intensive care unit admissions (18% versus 2%)
- four times longer stay per hospitalisation (average length of stay 12 days versus three days)

Individuals with cognitive impairment:

- experienced more than twice as many re-hospitalisations (65% versus 29% having two or more separations within the same year)

The associated hospitalisation costs were:

- almost five time higher ($29,100 versus $6,100 average cost per separation)
- 18% higher per acute bed day ($2,912 versus $2,470).

The crude health outcomes for separations with cognitive impairment had:

- almost 11 times higher hospital-acquired complication rates (1,025 versus 97 per 10,000)
- individual complication rates of at least two times higher and up to 41 times higher
- nearly 17-times higher in-hospital mortality rates (552 versus 33 per 10,000).

After adjusting for patient risk factors, separations with cognitive impairment had:

- more than twice the rate of hospital-acquired complications (247 versus 107 per 10,000)
- more than twice the rate of in-hospital mortality (90 versus 39 per 10,000).

While differences in patient risk factors accounted for a large proportion of the difference in mortality and HACs observed in the unadjusted (crude) outcome rates, substantial differences remained following risk adjustment, suggesting further improvements in care and treatment are still required.

Table of Contents

1. Introduction and background

This report summarises analysis conducted by the Australian Commission on Safety and Quality in Health Care (the Commission) to examine health outcomes for people with cognitive impairment admitted to public hospitals in Australia.

Cognitive impairment is a deficit in one or more areas of cognition such as memory, communication, attention, thinking, and judgement [1]. Due to the range of medical conditions that cause cognitive impairment, it can occur at any age [1]. This study included hospital coded diagnoses including acute stroke, delirium, dementia, brain injury, cognitive decline, intellectual disability, neurodegenerative diseases, developmental disorders, congenital malformations, chromosomal abnormalities, and infections affecting the brain.

The severity of cognitive impairment can range from mild to profound, and the degree to which a person's functional independence and quality of life are impacted varies accordingly. Individuals with cognitive impairment are more likely to have negative hospital experiences such as difficulty understanding and following instructions or communicating with staff as well as becoming disoriented and distressed [1,2]. This can result in a reduced capacity to participate in their own care, including providing informed consent [1].

Health care organisations have a legal responsibility to provide reasonable adjustments as a duty of care to prevent discrimination against those with cognitive impairment, as outlined in the Commonwealth Disability Discrimination Act 1992 [3]. Despite this, cognitive impairment is often poorly identified in hospital settings, and identified patients may still experience poor health outcomes due to inequality of care, such as health related symptoms being dismissed due to their impairment, or negative attitudes from staff [1].

The Commission leads and coordinates key improvements in safety and quality in health care across Australia, working in partnership with consumers, carers, clinicians, the Australian, state and territory health systems, the private sector, managers, and healthcare organisations. The Commission has developed numerous resources to support the safety and quality improvement systems in Australian health care, including eight National Safety and Quality Health Service (NSQHS) Standards, which are a national statement on the type and quality of care all patients should receive [4]. Hospitals are formally accredited to the NSQHS Standards, which requires demonstrating adherence to the various specific actions required for clinicians, executives, and governing bodies. There are numerous specific actions within the Standards relevant to the provision and improvement of care for people with cognitive impairment [1,4,5]. Hospitals are required to develop a system to identify and care for people with or at risk of cognitive impairment, recognise acute deterioration of mental state, and manage the use of psychoactive medicines [1,4,5].
In addition to the National Standards, the Commission has also developed the Delirium Clinical Care Standard [6], which is eight quality statements outlining best-practice care for patients at risk of delirium. The Commission will also be releasing a new Clinical Care Standard in 2024 outlining the use of Psychotropic Medicines in Cognitive Disability or Impairment.

2. Data Collection

2.1. Cognitive impairment data

Cognitive impairment was identified using 243 ICD-10-AM 11th edition codes for relevant associated diagnoses on the following categories; acute stroke, delirium and dementia, cognitive decline, brain injury, intellectual disability, neurodegenerative diseases (including Alzheimer's disease), developmental disorders (including autism), congenital malformations, chromosomal abnormalities (including Down's syndrome), and infections of the brain (including neurosyphilis). Diagnoses that do not reliably impair cognition were not included, such as movement disorders. Separations were identified for 197 of the 243 codes. The complete list of ICD-10-AM codes is provided in **Appendix A**.

2.2. Health outcomes

Outcome data were extracted from the Admitted Patient Care National Minimum Data Set (APC-NMDS) for 2014-15 until 2021-22 [7]. Deaths were determined by recorded mode of separation, and hospital-acquired complications (HACs) were determined using ICD-10-AM version 11 diagnosis codes for 13 of the 16 version 3.1 HACs list of complications included in the APC-NMDS. Hospital-acquired delirium was excluded from the list of HACs analysed in this study due to the overlap with the cognitive impairment cohort.

2.3. Inclusions and exclusions

2.3.1. Inclusions

Data were analysed for people aged 18 to 64 at the time of admission. Demographics and hospitalisation data were examined for the one-year period between 2021-22, and hospital acquired complications and in-hospital mortality data were examined for the eight-year period between 2014 to 2022.

2.3.2. Exclusions

Data for people younger than 18-years old were excluded due to limitations with age criteria in diagnosis tools and criteria for before adulthood, and those older than 64-years were excluded to control for age related cognitive decline which was not the focus of this analysis.

Separations from non-public hospitals were excluded as these facilities are outside the scope of the Commission's data access arrangements.

Separations for same day dialysis or chemotherapy were excluded due their increased volume and frequency of admissions. Care type classified organ procurement was also excluded as this was outside the scope of analysis. Separations with a recorded length-of-stay under 1 day or over 120 days were also excluded.

2.4. Study limitations

2.4.1. Jurisdictional comparison

This analysis does not compare differences between Australian states and territories.

2.4.2. Cognitive impairment identification and coding

The true prevalence of cognitive impairment among admitted patients is likely higher than those identified in medical documentation and accurately coded in hospital data, including those with mild impairment or presenting with conditions or comorbidities that mask symptoms. Cognitive impairment was not coded for individuals during all episodes of admitted care, with over half (54%) having at least one other separation with no cognitive impairment noted.

Some of the diagnoses associated with cognitive impairment can be acute and transient, the main example being episodes of delirium. This means that an individual may have some but not all of their separations over the 12-months coded for cognitive impairment. The cohort for no cognitive impairment is comprised of all codes not selected for the cognitive impairment cohort, which includes codes for conditions that result in some but not all individuals with that diagnosis. Participants of the National Disability Insurance Scheme are not identified in the dataset used in this study.

2.4.3. Impact of Covid-19

A detailed analysis was conducted looking at the most recent data covering 2021-2022. It is acknowledged that the impacts of Covid-19 may be reflected in the data in terms of patient characteristics, hospital presentations, quality of hospital diagnosis and resulting clinical coding, and the provision of admitted care including cognitive impairment screening and assessment opportunity.

3. Analysis

Admissions and health outcomes data were available for the entire population of admitted patients, meaning significance testing was not required. Where descriptive data are presented, any difference reported represents the actual change for the population.

Risk adjustment was carried out for in-hospital mortality and hospital-acquired complications analysis to control for patient risk factors: age, sex, surgical versus non-surgical admission, Major Diagnostic Category, intensive care unit admission, urgency of admission, Charlson Comorbidity Index, and transfer status. The patient outcomes risk factors incorporated in the model were aligned to those the Commission and Independent Hospital and Aged Care Pricing Authority consulted on as part of the HACs development and curation process. Risk adjustment coefficients were generated using eight years of available data between 2014-2022 with a stepwise logistic regression model comparing observed outcomes against predict outcomes using the relevant National rates for each year.

4. Results

4.1. Demographic characteristics

Descriptive demographic statistics for public hospital separations in 2021-22 are summarised in Table 1. These data compare admitted care episodes, not individual patients. A care type change in the same episode of care will result in a new separation record e.g., a statistical discharge in the former care type record and statistical admission for the new care type.

Table 1. Demographic characteristics for separations with and without cognitive impairment

	With cognitive impairment	No cognitive impairment
Number of separations, N	59,232	2,722,700
Sex, n (%)		
Male	35,412 (60%)	1,084,324 (40%)
Female	23,805 (40%)	1,637,609 (60%)
Other	14 (0%)	678 (0%)
Age (years)		
mean (SD)	49 (13.2)	42 (13.4)
median (IQR)	53 (41-60)	41 (30-54)
Age group (years), n(%)		
18-34	10,372 (18%)	974,028 (36%)
35-49	13,666 (23%)	804,786 (30%)
50-64	35,194 (59%)	943,886 (35%)
Aboriginal or Torres Strait Islander, n (%)	5,409 (9%)	206,888 (8%)
Health conditions, n(%)		
Chronic obstructive pulmonary disease	2,019 (3%)	41,945 (2%)
Congestive heart failure	2,275 (4%)	24,058 (1%)
Diabetes mellitus	12,023 (20%)	252,013 (9%)
Renal disease	2,848 (5%)	46,157 (2%)
Diagnosis category, n(%)*		
Acute Stroke	21,050 (36%)	-
Delirium, dementia	15,927 (27%)	-
Cognitive Decline	11,966 (20%)	-
Brain Injury	7,777 (13%)	-
Intellectual Disability	3,398 (6%)	-
Degenerative Diseases	2,724 (5%)	-
Developmental Disorder	2,861 (5%)	-
Congenital malformations	1,100 (2%)	-
Chromosomal Abnormalities	495 (1%)	-
Infections	265 (0%)	-

	With cognitive impairment	No cognitive impairment
Socio-economic (SES) disadvantage		
Most disadvantaged (1)	13,210 (23%)	557,644 (21%)
(2)	11,739 (20%)	522,938 (19%)
(3)	12,753 (22%)	601,969 (22%)
(4)	10,770 (18%)	532,229 (20%)
Least disadvantaged (5)	9,795 (17%)	474,854 (18%)

NOTES

All sub-categories exclude separations where value is unknown/not stated/inadequately described

* Diagnosis codes are counted per separation, with some separations having multiple codes

4.1.1. Patient characteristics

The proportions of sex were significantly different between cohorts with the majority of the cognitive impairment (CI) separations being male (60%) and the majority of no cognitive impairment (NCI) separations being female (60%).

The CI cohort was significantly older in terms of average age (49 versus 42), median age (53 versus 41), with almost two thirds of CI separations aged 50-64 years (59%), as shown in Figure 1. There was also a slightly higher proportion of CI separations identified as patients from the Aboriginal or Torres Strait Islander populations (9% versus 8%).

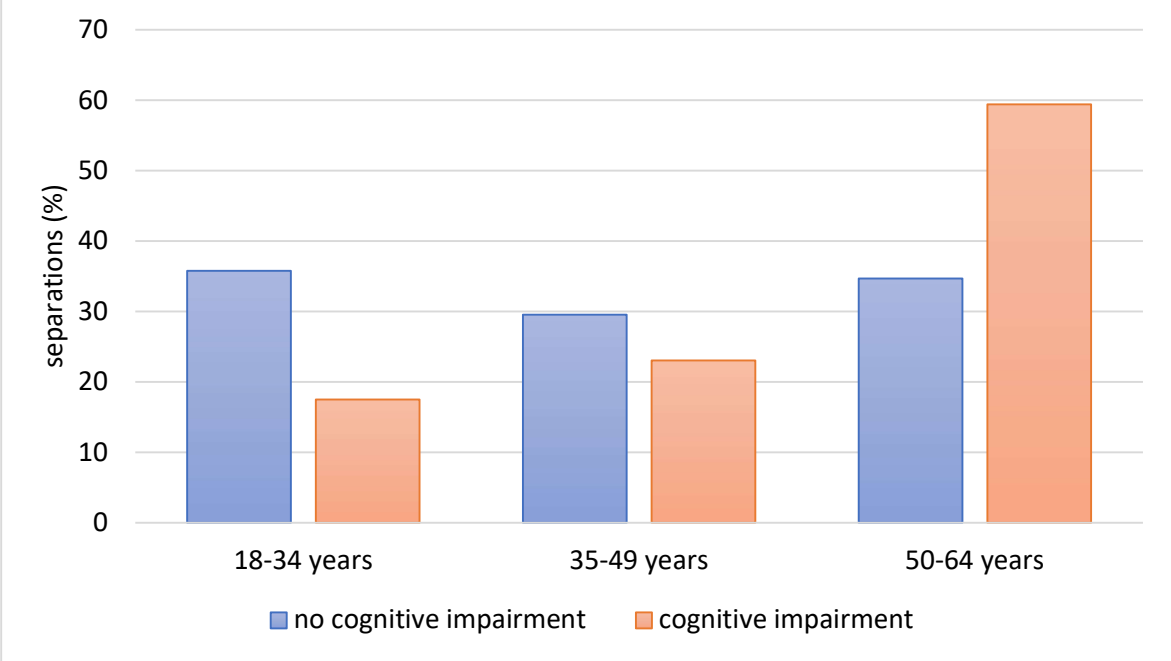


Figure 1. Age categories for separations with and without cognitive impairment

4.1.2. Health conditions

The CI cohort had significantly higher rates of serious health conditions than the NCI cohort, including chronic obstructive pulmonary disease (3% versus 2%), four times more congestive heart failure (4% versus 1%), twice the rate of diabetes mellites (20% versus 9%), and more than double the rate of renal disease (5% versus 2%). These form part of

the seventeen predefined conditions used to calculate the Charlson Comorbidity Index [8], which is described within mortality health outcomes below.

4.1.3. Cognitive impairment categorisation

The cognitive impairment cohort was 2% of all separations. When looking at the categories of cognitive impairment codes (Table 1), the majority of separations with cognitive impairment had an acute stroke diagnosis (36%), followed by mental disorders with known physiological conditions predominantly including dementia and delirium (27%), cognitive decline (20%) and brain injury (13%). The remaining separations were categorised as intellectual disability (6%), developmental disorders including autism (5%), degenerative diseases including Alzheimer's disease (5%), congenital malformations (2%), chromosomal abnormalities including Down's syndrome (1%), and infections impacting cognition including neurosyphilis (0% when rounding to whole digits).

4.1.4. Socio-economic disadvantage

Socio-economic status was derived from reported patient postcode using the 2016 Australian Bureau of Statistics' Socio-Economic Indexes for Areas (SEIFA) postal area Index of Relative Socio-economic Disadvantage (IRSD) [9]. Socio-economic disadvantage is ranked in quintiles using defined cut-off values, with 1 being most disadvantaged and 5 being least disadvantaged. The CI cohort had a significantly higher representation of socioeconomic disadvantage than the NCI cohort, as displayed in Table 1 and Figure 2.

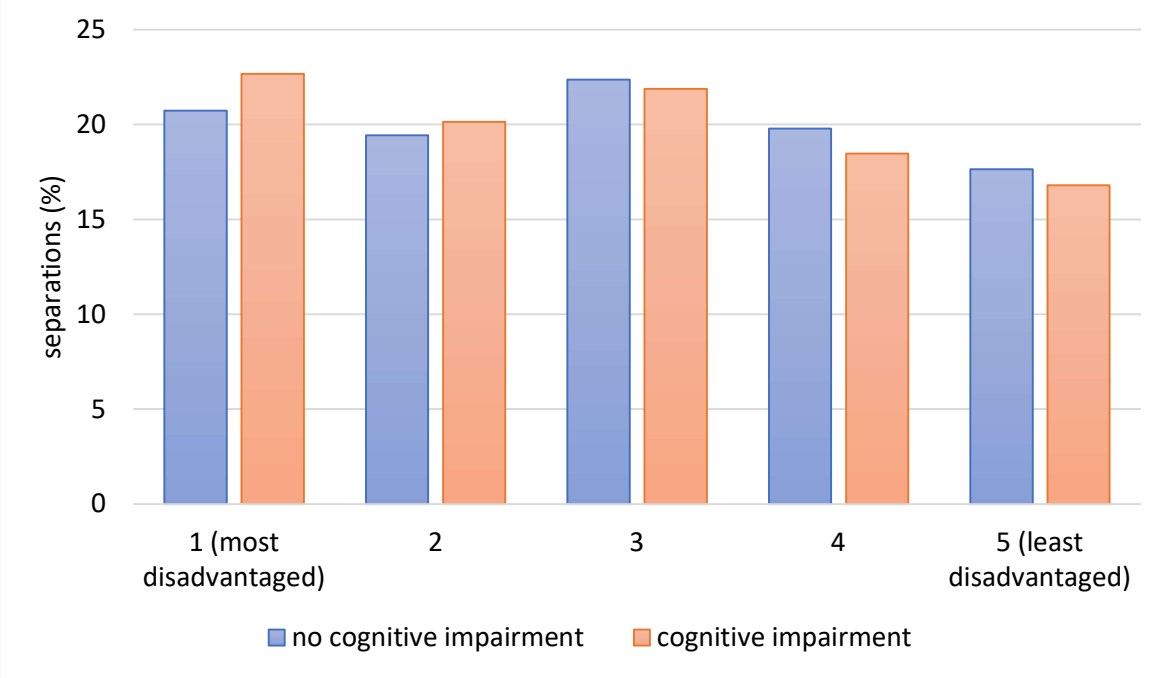


Figure 2. Relative disadvantage of adults with and without cognitive impairment

4.2. Admitted care characteristics

Data regarding the type and degree of hospitalised care were extracted from the Admitted Patient Care National Minimum Dataset, with descriptive data presented in Table 2.

Table 2. Admitted care characteristics for separations with and without cognitive impairment

	With cognitive impairment	No cognitive impairment
Number of separations, N	59,232	2,722,700
Urgency of admission, n(%)		
Emergency	40,261 (68%)	1,309,309 (48%)
Elective	9,279 (16%)	958,512 (35%)
Not assigned	9,665 (16%)	434,903 (16%)
Diagnostic Related Group type, n(%)		
surgical	9,717 (16%)	651,897 (24%)
non-surgical	49,515 (84%)	2,070,803 (76%)
Admission mode, n(%)		
Transferred from another hospital	9,797 (17%)	113,418 (4%)
Statistical admission - episode type change	5,708 (10%)	27,403 (1%)
Other	43,646 (74%)	2,573,296 (95%)
Hospital remoteness, n(%)		
Major cities	44,484 (75%)	1,956,690 (72%)
Inner regional	9,236 (16%)	484,964 (18%)
Outer regional	4,598 (8%)	215,966 (8%)
Remote	710 (1%)	47,511 (2%)
Very remote	177 (0%)	17,248 (1%)
Intensive Care Unit, n(%)	10,820 (18%)	49,007 (2%)
Care type, n(%)		
Acute	44,029 (74%)	2,581,452 (95%)
Rehabilitation	7,987 (13%)	14,927 (1%)
Palliative	1,237 (2%)	7,566 (0%)
Geriatric	310 (1%)	634 (0%)
Psychogeriatric	46 (0%)	15 (0%)
Maintenance	1,129 (2%)	10,442 (0%)
Mental health	4,494 (8%)	107,658 (4%)
Other		6 (0%)
Same day separation, n(%)	14,149 (24%)	1,823,340 (67%)
Length of stay (days)*		
mean (SD)	12 (17.6)	3 (5.4)
median (IQR)	5 (2-14)	1 (1-2)
Cost per separation, mean	$29,100	$6,100
Cost per acute bed day, mean	$2,912	$2,470

NOTES

All sub-categories exclude separations where value is unknown/not stated/inadequately described

SD = Standard deviation, IQR = Interquartile range

* Excludes : length of stay > 120 days or < 1-day, same day haemodialysis and/or chemotherapy, care type = newborns, organ procurement, hospital boarders (care type 7.3, 9 or 10)

4.2.1. Admission type and urgency

When looking at the differences in admitted care, separations from the CI cohort were significantly more likely to be an emergency admission (68% versus 48%) than elective admission (16% versus 35%) or surgical admission (16% versus 24%). CI admissions were also significantly more likely to be a transfer from another hospital (17% versus 4%) and to require intensive care unit admission (18% versus 2%).

4.2.2. Care type

Care type, also referred to as patient activity stream, refers to the types of services and procedures received by the patient during their hospital stay. Care types are either acute, sub-acute, non-acute, or mental health. Acute care is short-term treatment for treating illness and injury, including surgeries. Sub-acute care includes rehabilitation, palliative, geriatric evaluation and management, psychogeriatric care. Non-acute refers to maintenance care, supporting ongoing health related impairment or limitations.
Mental health care is categorised when the primary purpose of treatment is to manage or improve health states related to mental disorders. The majority of separations for each cohort were for acute care (74% for CI and 95% for NCI). The CI cohort had higher rates of all other care types including subacute (16% versus 1%), non-acute (2% versus 0%) and mental health (8% versus 4%). Within sub-acute care, the difference for rehabilitation was 13% versus 1%, and for palliative care it was 2% versus 0%.

4.2.3. Hospital remoteness

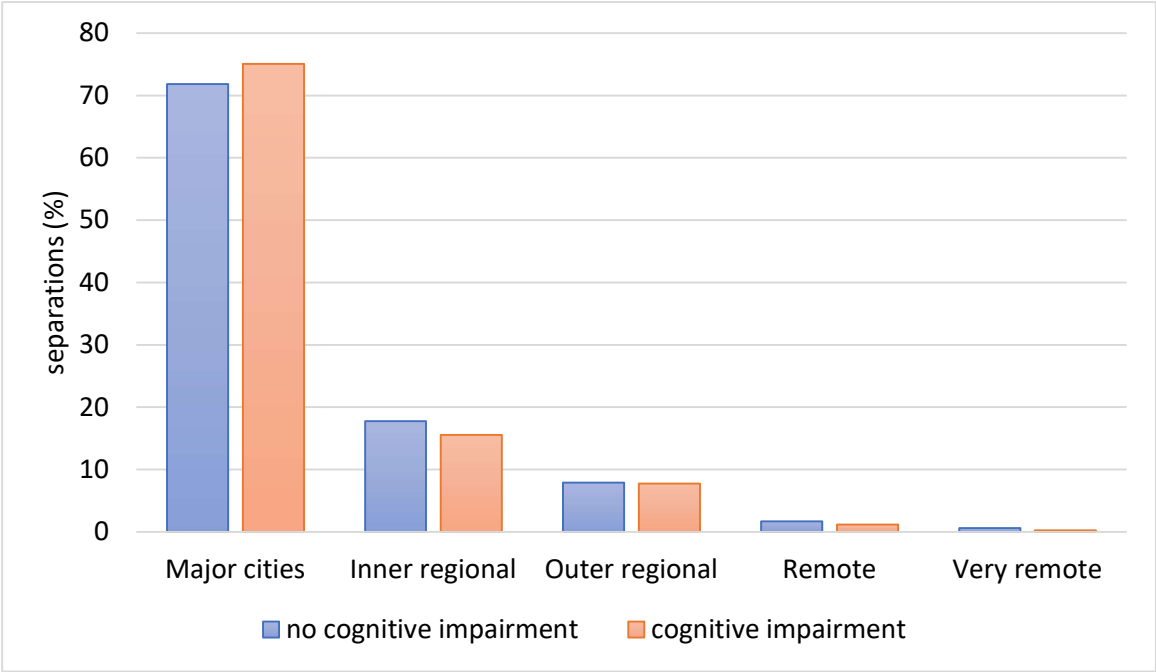


Figure 3 Hospital remoteness for separations with and without cognitive impairment

The majority of patients were treated in major city hospitals. However, this was more pronounced in the CI cohort with 75% of separations treated in major cities, compared to 72% in the non-CI cohort. It would require additional research to determine the degree to which these differences represent prevalence in metropolitan, regional and rural

populations, versus differences in the screening and identification of cognitive impairment at smaller hospital facilities.

4.2.4. Cost and length of stay

CI separations were significantly less likely to be same day hospitalisations (24% versus 67%), with four times higher average length of stay per separation at 12 days versus three days. Average costs per separation were more than four times higher ($29,100 versus $6,100), and the cost per acute bed day was 18% higher ($2,912 versus $2,470).

4.2.5. Frequency of admitted care

Frequency of admission was investigated by comparing individuals with and without CI, as distinct from separations reported in the remainder of this report.

Table 3. Same year separations for patients with and without cognitive impairment

	With cognitive impairment	No cognitive impairment
Number of patients (N)	38,105	1,550,446
Same year separations		
1	13,406 (35%)	1,101,955 (71%)
2 to 3	13,712 (36%)	354,080 (23%)
4 to 5	5,514 (14%)	56,097 (4%)
6 or more	5,473 (14%)	38,314 (2%)
Separations per patient		
mean (SD)	3 (3.7)	2 (1.7)
median (IQR)	2 (1-4)	1 (1-2)
At least one separation with cognitive impairment not recorded	20,648 (54%)	-

As shown in Table 3, individuals with CI were admitted more often, with 65% having two or more separations over the 12-month period, compared to 29% for NCI patients. This included patients hospitalised 2-3 times (36% versus 23%), and 4 or more time (28% versus 6%). The average number of hospitalisations for people with CI was three times (SD=3.5) compared with two times for those with NCI (SD=1.7).

Over half of individuals with cognitive impairment had at least one other hospitalisation in the same year where cognitive impairment was not identified (54%).

4.3. Health outcomes

Health outcomes data are presented in Table 4 for separations with and without cognitive impairment.

Table 4. Health outcomes for separations with and without cognitive impairment

	With cognitive impairment	No cognitive impairment
Hospital Acquired Complications (HACs)		
Separations with at least one HAC*	6,074	26,393
crude rate per 10,000 in-scope^ separations	1,025	97
Mortality		
Number of deaths	3,267	9,074
crude rate per 10,000 separations	552	33
Separations ending in death with at least one HAC *	737 (23%)	1,262 (14%)
Charlson Comorbidity Index, n(%)		
None (0)	22,022 (37%)	2,221,692 (82%)
Mild (1-2)	19,231 (32%)	376,040 (14%)
Moderate (3-4)	11,606 (20%)	63,610 (2%)
Severe (≥ 5)	6,373 (11%)	61,358 (2%)
Potentially preventable hospitalisations		
Chronic obstructive pulmonary disease	307 (1%)	12,523 (0%)
Heart failure	197 (0%)	7,108 (0%)
Diabetes complications	639 (1%)	21,483 (1%)
Kidney and urinary tract infections	426 (1%)	23,859 (1%)
Cellulitis	173 (0%)	25,031 (1%)

NOTES

All sub-categories exclude separations where value is unknown/not stated/inadequately described

* In-scope separations are as per denominator definition in HACs specifications, potentially less than the denominator (total number of separations) used for other descriptive statistics in this table

4.3.1. Hospital-acquired complications

The Commission created a list of 16 agreed hospital-acquired complications (HACs) that are potentially preventable using existing risk mitigation strategies [10]. The HACs are extracted from existing coded data at all public hospitals who monitor the results to identify safety and quality improvement opportunities in specific clinical areas or populations.

The 12 HACS included in this analysis were: healthcare-associated infection, respiratory complications, cardiac complications, surgical complications requiring unplanned return to theatre, endocrine complications, medication complications, venous thromboembolism, gastrointestinal bleeding, pressure injury, falls resulting in fracture or intracranial injury, renal failure, and incontinence.

Four HACs were not included; unplanned intensive care unit admission, which is not currently included in the National Minimum Data Set; two maternity HACs, neonatal birth

trauma, and third and fourth degree perineal laceration during delivery; and delirium, as everyone with delirium coded was included in the cognitive impairment cohort.

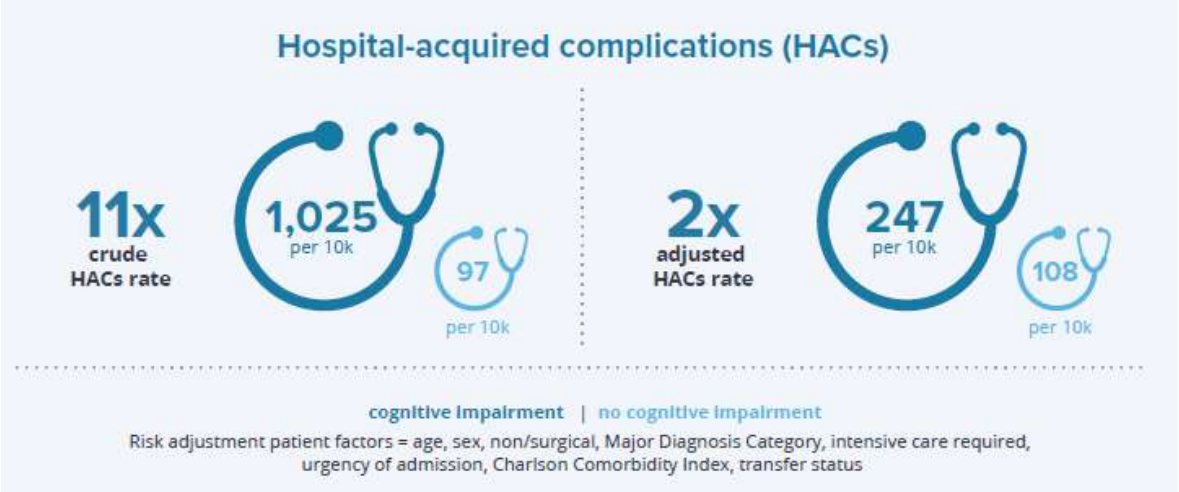


Figure 4. Crude and adjusted rates of hospital-acquired complications for adults with and without cognitive impairment

As shown in Figure 4, the CI cohort had an almost 11 times higher rate of HACs between 2021-22 compared with the NCI cohort, 1,025 versus 97 per 10,000. When adjusting to control for patient risk factors the rate was more than double, 247 versus 107 per 10,000.

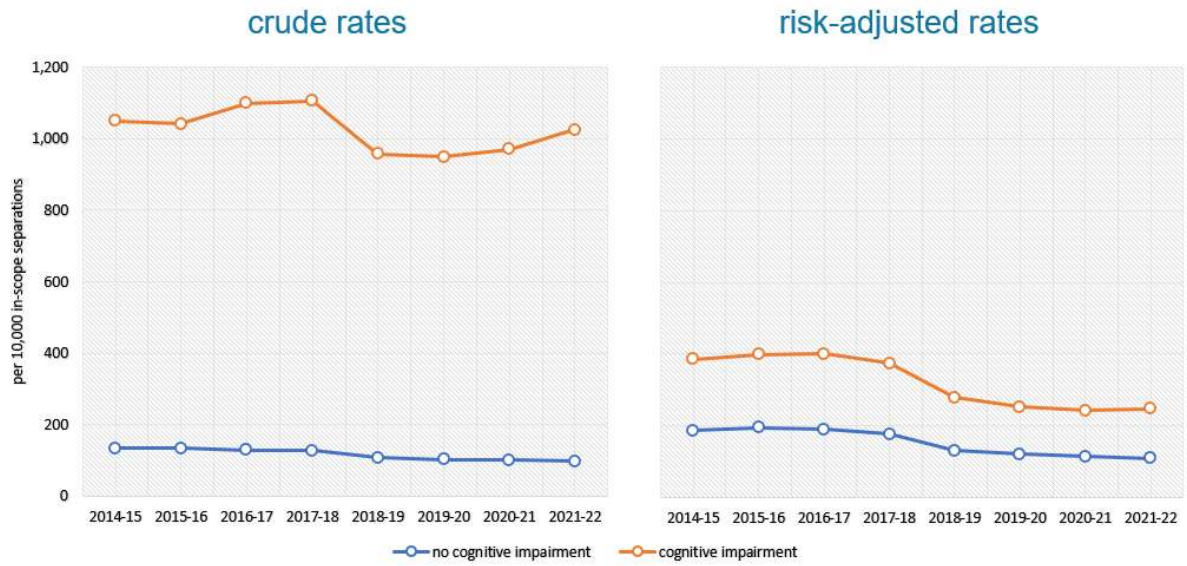


Figure 5. Time series of crude and adjusted rates of hospital-acquired complications for adults with and without cognitive impairment

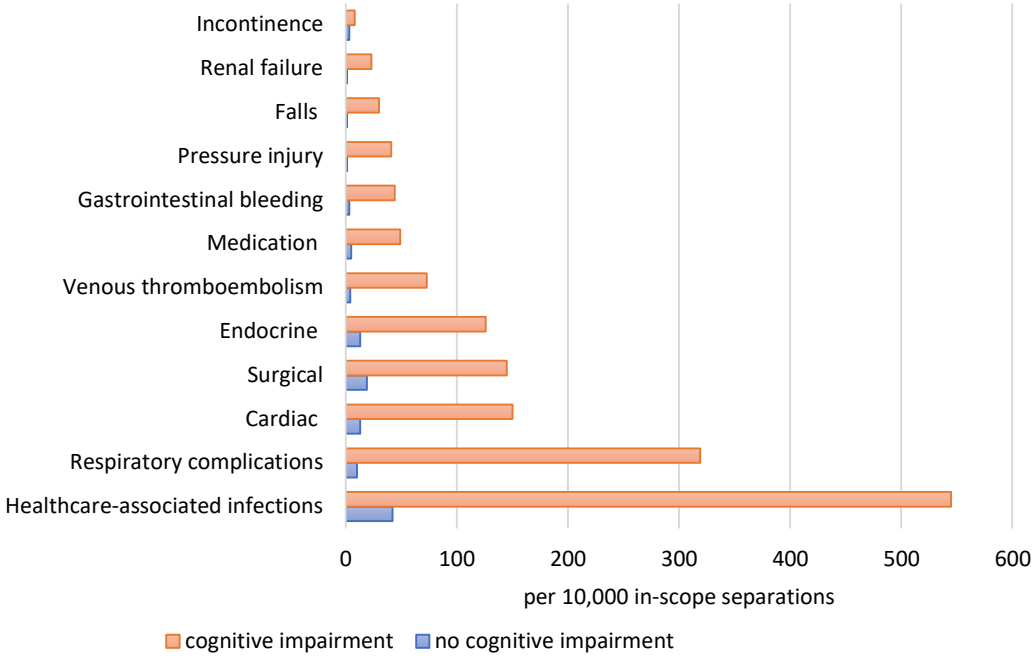
As shown in Figure 5, a time series comparing HACs over eight years from 2014 – 2022 showed that this inequality of outcomes has persisted over time, including worsening in more recent years. The long-term gap in risk-adjusted rates demonstrates that these differences cannot be explained using patient factors alone.

Table 5. Rates of hospital-acquired complications for separations with and without cognitive impairment

	With cognitive impairment	No cognitive impairment
Hospital-acquired complication group, crude rate per 10k in-scope separations		
Healthcare-associated infections	545	42
Respiratory complications	319	10
Cardiac complications	150	13
Surgical complications requiring unplanned return to theatre	145	19
Endocrine complications	126	13
Venous thromboembolism	73	4
Medication complications	49	5
Gastrointestinal bleeding	44	3
Pressure injury	41	1
Falls resulting in fracture or intracranial injury	30	1
Renal failure	23	1
Incontinence	8	3

NOTES

Crude (unadjusted) rates per 10,000 in-scope separations reported



NOTES

Crude rates displayed per 10,000 in-scope separations

Figure 6. Comparison of hospital-acquired complications for separations with and without cognitive impairment

Table 5 and Figure 6 diplay rates of HACs by included complication types. The CI cohort had significantly higher rates for each complication, ranging from almost three times higher for incontence complications (8 versus 3 per 10,000) up to over 41 times higher for pressure injury (41 versus 1 per 10,000). The next largest differences in complication rates

were almost 32 times higher rate of repiratory complications (319 versus 10 per 10,000), and 30 times higher rate of falls resulting in fracture or intracranial injury (30 versus 1 per 10,000).

4.3.2. In-hospital mortality

Hospital mortality was measured by separation mode.

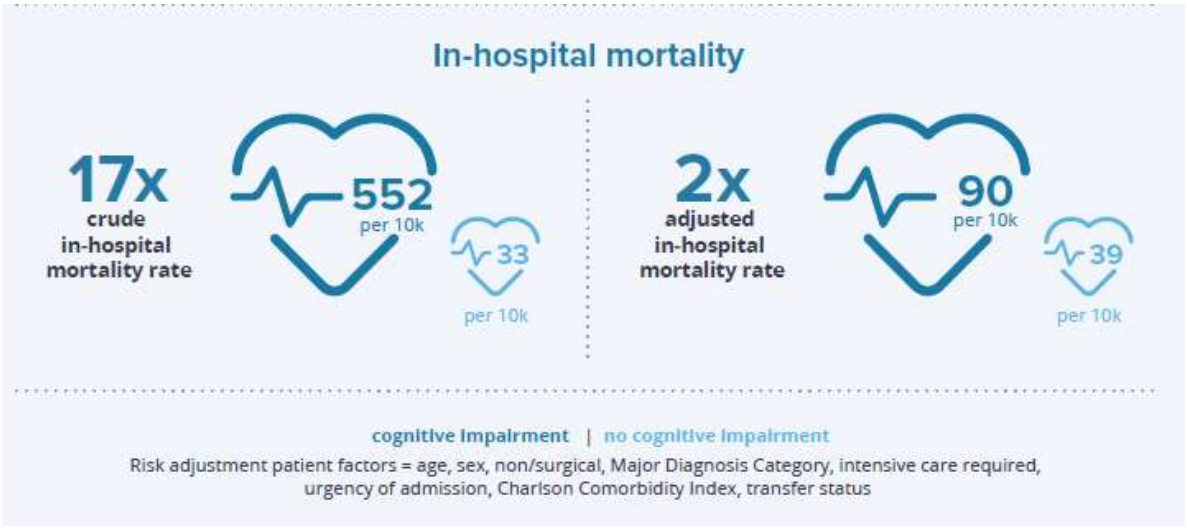


Figure 7. Crude and adjusted rates of in-hospital mortality for adults with and without cognitive impairment

As shown in Figure 7, the CI cohort had an almost 17 times higher rate of in-hospital mortality between 2021-22 compared with the NCI cohort, 552 versus 33 per 10,000. When adjusting to control for patient risk factors the rate was more than double, 90 versus 39 per 10,000.

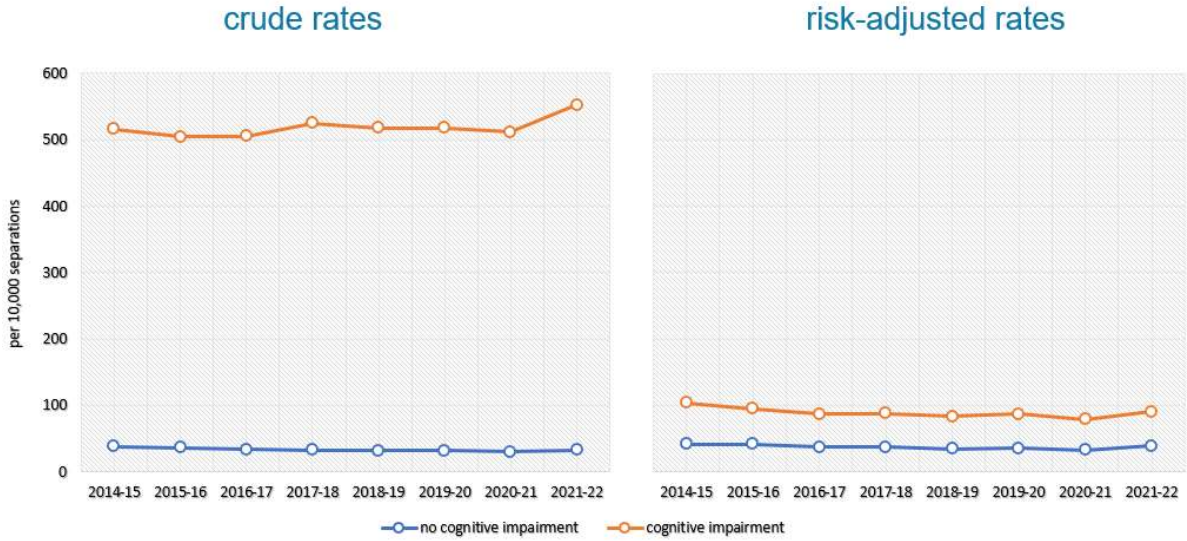


Figure 8. Time series of crude and adjusted rates of in-hospital mortality for adults with and without cognitive impairment

As shown in Figure 8, a time series comparing in-hospital mortality over eight years from 2014 – 2022 showed that this inequality of outcomes has persisted over time, including worsening in more recent years. The long-term gap in risk-adjusted rates also demonstrates that these differences cannot be explained using patient factors alone.

4.3.2.1. One year mortality risk

Risk of death within one year was calculated using the modified Deyo variant of the Charlson Comorbidity Index (CCI) which derives scores based on the number and severity of 17 pre-defined health conditions [8]. Risk was categorised as mild (index of 1-2), moderate (3-4), or severe (5+).

There were fewer CI separations with no comorbidity (37% versus 82%). CI separations had a significantly higher percentage of mild risk (32% versus 14%), moderate risk (20% versus 2%) and severe risk (11% versus 2%).

4.3.3. Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions to hospital for a condition where the primary diagnosis could have been prevented through preventative health interventions and early disease management.

As shown in Table 4, rates of potentially preventable hospitalisations were the same for both cohorts for heart failure (0%), diabetes complications (1%), kidney and urinary tract infections (1%). Rates of cellulitis were lower in separations with CI than those without (0% versus 1%) and rates of chronic obstructive pulmonary disease were higher (1% versus 0%).

5. Discussion

Under the Commonwealth Disability Discrimination Act 1992 all healthcare staff and organisations have a legal responsibility to provide reasonable adjustments as a duty of care to prevent discrimination [3]. To provide adjustments for vulnerable patients, they must first be identified, including risk screening and assessment.

There is currently no patient identifier for cognitive impairment, meaning that the detection and documentation of associated conditions must occur during each episode of admitted care. Routine screening is primarily limited to patients aged 65 years and over. The results in this report show that cognitive impairment is not reliably identified during admitted care, with 54% of cognitively impaired individuals having at least one hospitalisation where their impairment was not recorded. Inequality of health outcomes is likely to persist as long as this remains a largely hidden population.

There are specific guidelines and recommendations for health services to improve the identification and management of vulnerable patients, including those with cognitive impairment. The Commission developed the eight National Safety and Quality Health Service (NSQHS) Standards which are a national statement on the type and quality of care all patients should receive [4]. Hospitals are accredited to the Standards, which means demonstrating adherence to the various actions required for clinicians, executives, and governing bodies.

The standards include actions requiring hospitals to develop a system to identify and care for people with or at risk of cognitive impairment, recognising acute deterioration of mental state, and managing the use of psychoactive medicines that increase risk.

In addition to the National Standards, the Commission has also developed a Delirium Clinical Care Standard [6], which includes eight quality statements outlining best-practice care for patients at risk of delirium, and in 2024 a new Clinical Care Standard will be published outlining the use of Psychotropic Medicines in Cognitive Disability or Impairment.

In addition to the National Standards and Clinical Care Standards, the Commission has developed numerous resources to assist health service consumers, families, and carers, as well as hospital clinicians, executives, and governing bodies. These include user guides for the National Standards, a cognitive impairment guide for consumers and their family or carers which is translated into 24 languages as well as easy-read English, guides to request and enable reasonable adjustments in hospital settings, and additional resources to support actions to support the care of vulnerable populations. Links to these various resources can be found in the next section of this report.

This analysis has shown that it is not just patient risk factors driving long-term inequality in health outcomes for people with cognitive impairment. This means that rates of in-hospital mortality and hospital-acquired complications have the potential to be improved. Suggested steps towards achieving better health outcomes include: better identification of cognitive impairment during admitted care, timely risk screening, risk mitigation strategies to reduce hospital-acquired complication rates, partnering with and communicating with consumers, and recognising acute deterioration of mental state.

5.1. Future directions

Statistical tests were not carried out to compare differences between groups as data were available for the entire population of admitted patients. Future analysis could compare effect sizes to determine the clinical meaningfulness of differences observed.

This study did not compare Australian states and territories, which requires explicit permission from the data custodian of each jurisdiction. Future research could obtain these permissions to allow an analysis of outcomes by jurisdiction in comparison with location specific interventions and strategies.

Cognitive impairment describes difficulty with cognition caused by a variety of different medical diagnoses, being acute or persistent. Future analysis could separate and compare diagnosis specific cognitive impairment, including transient versus ongoing and severity level.

Admitted patients with cognitive impairment form a vulnerable population at higher risk of poor social determinants of health. Future analyses could investigate the degree and impact of social determinants of health on admitted care outcomes for patients with and without cognitive impairment.

Future research could compare findings against patient characteristics, including sex, and population types, such as Aboriginal and Torres Strait Islander people health risks and outcomes.

This study focused on separations rather than individuals. Future analyse could link separations to the individuals receiving admitted care to compare longitudinal outcomes.

Age is a predominate risk factor for the onset or worsening of cognitive impairment [1,6]. Future analysis could stratify outcomes by age category and include data for separations aged 65 years and over.

6. Commission initiatives

The Commission has created numerous resources and guides to assist hospital clinicians, executives, and governing bodies, as well as consumers and their families or carers. Example resources and guides relevant to cognitive impairment are listed below.

National Safety and Quality Health Service Standards

Cognitive impairment resources aligned to the second edition of the NSQHS Standards.

- NSQHS Standards user guide for health service organisations providing care for patients with cognitive impairment or at risk of delirium, 2019
- Cognitive Impairment Actions in the NSQHS Standards, fact sheet, 2019
- Intellectual Disability Actions for clinicians, fact sheet, 2023
- Reducing inappropriate use of antipsychotics in people with dementia, poster, 2018
- Reasonable adjustments, research and resources webpage

Four steps to inclusive health care: with me and about me

Four steps developed to assist clinicians with the provision of care; plan with me, understand me, communicate with me, and act with me.

- Intellectual disability actions for clinicians, fact sheet, 2023
- With Me: Infographic poster, 2023
- About Me – questions to ask about reasonable adjustments, fact sheet, 2023

A better way to care

Information guides detailing safety and quality for patients with cognitive impairment (dementia and delirium), including risk of harm, flowchart for recognition and response, and tailored hospital care.

- A better way to care (second edition), clinician resource, 2019
- Actions for clinicians, fact sheet. 2019
- Actions for consumers, fact sheet. 2014
- Actions for health service managers, fact sheet. 2014
- Caring for cognitive impairment, infographic poster, 2019
- Caring for patients with dementia in hospital, infographic poster, 2019
- Delirium infographic, 2019
- A system for caring for cognitive impairment, poster, 2019
- I've committed to caring for cognitive impairment, interactive poster, 2017

Delirium Clinical Care Standard

Health quality statements and indicators for people at risk of or experiencing delirium. Includes screening of people aged 65 years and older (or 45 years and over for Aboriginal and Torres Strait Islander people) within 24 hours of hospital presentation to enable early risk identification.

- Delirium Clinical Care Standard, revised 2021
- Delirium CCS Clinical fact sheet, 2021
- Delirium CCS Consumer guide, 2021
- Evidence sources, 2016
- Delirium Poster, 2016

Psychotropic Medicines in Cognitive Disability or Impairment Clinical Care Standard

- Clinical Care Standard, draft Standard in consultation and review phase, 2023
- Resources to reduce the inappropriate use of psychotropic medicines, webpage
- Joint Statement on the inappropriate use of psychotropic medicines to manage the behaviours of people with disability and older people, 2022

Patient reported experience and outcome measures

- Condition specific validated Patient Report Outcome Measures, 2023
- Australian Hospital Patient Experience Question Set, Easy English and 20 translations, 2023

Covid-19 and cognitive impairment

- Safe care for people with cognitive impairment during COVID-19, poster, 2020
- Safe hospital care for people with cognitive impairment during COVID-19, clinician factsheet, 2020

My healthcare rights – a guide for people with cognitive impairment

- English guide, 2020
- Easy English guide – simplified English, 2020
- Translations – Arabic, Bengali, Chinese (simplified and traditional), Dari, Farsi, French, Greek, Hindi, Indonesian, Italian, Japanese, Karen, Korean, Macedonian, Nepali, Persian, Portuguese, Punjabi, Spanish, Tagalog, Tamil, Thai, Vietnamese

Other Commission research

- Evidence for the safety and quality issues associated with the care of patients with cognitive impairment in acute settings: a rapid review, 2013
- Australian Atlas of Healthcare Variation series, 2015-2021

7. Terminology

The following definitions are sourced from the ACSQHC Annual Report 2021-22 and the Australian Institute of Health and Welfare's National Minimum Dataset Glossary, unless otherwise stated [11,7].

Aboriginal or Torres Strait Islander: An Aboriginal or Torres Strait Islander is a person of Aboriginal or Torres Strait Islander descent who identifies as an Aboriginal or Torres Strait Islander and is accepted as such by the community in which he or she lives.

Acute: A term used to describe something that comes on sharply and is often brief, intense, and severe.

Acute care: Care provided to patients admitted to hospital that is intended to cure illness, alleviate symptoms of illness, or manage childbirth.

Admission: The process whereby the hospital accepts responsibility for the patient's care and/or treatment. Admission follows a clinical decision based upon specified criteria that a patient requires same-day or overnight care or treatment. An admission may be formal (the administrative process by which a hospital records the commencement of treatment and/or care and/or accommodation of a patient) or statistical.

Clinical Care Standards: Standards developed by the Commission and endorsed by health ministers that identify and define the care people should expect to be offered or receive for specific clinical conditions or procedures. Clinical care standards highlight best-practice care and priority areas for quality improvement, and include indicators to support quality improvement.

Cognitive impairment: Deficits in one or more of the areas of memory, communication, attention, thinking and judgement. Cognitive impairment can be temporary or permanent, and can affect a person's understanding, their ability to carry out tasks or follow instructions, their recognition of people or objects, how they relate to others and how they interpret the environment. Dementia and delirium are common forms of cognitive impairment seen in hospitalised older patients. Cognitive impairment can also be caused by other conditions, such as an acquired brain injury, a stroke, intellectual disability, or drug use.

Comorbidity: defined in relation to an index disease/condition, comorbidity describes any additional disease that is experienced by a person while they have the index disease. The index and comorbid disease/condition will change depending on the focus of the study.

Crude rate: A rate derived from the number of events recorded in a population during a specified time period, without adjustments for other factors such as age

Delirium: An acute disturbance of consciousness, attention, cognition, and perception that tends to fluctuate during the course of the day. Delirium is a serious condition that can be prevented in 30–40% of cases, and should be treated promptly and appropriately. Hospitalised older people with existing dementia are at the greatest risk of developing delirium. Delirium can be hyperactive (the person has heightened arousal, or is restless, agitated, and aggressive) or hypoactive (the person is withdrawn, quiet and sleepy).

Dementia: The progressive decline in cognitive function that affects memory, judgement, attention, language, and problem solving. It is usually gradual, progressive, and irreversible, leading to impaired functioning. The most common types are Alzheimer's disease, vascular dementia, dementia with Lewy bodies, frontotemporal dementia, or a combination of these.

Diagnosis: The act or process of identifying or determining the nature and cause of a disease or injury through evaluation of patient history, examination and review of laboratory data, and the opinion derived from such an evaluation.

Health outcome: A change in the health of an individual or population due wholly or partly to a preventive or clinical intervention.

Hospitalisation: An episode of hospital care that starts with the formal admission process and ends with the formal separation process. An episode of care can be completed by the patient's being discharged, being transferred to another hospital or care facility, or dying, or by a portion of a hospital stay starting or ending in a change of type of care (for example, from acute to rehabilitation).

Hospital-acquired complication: A complication for which clinical risk mitigation strategies may reduce (but not necessarily eliminate) the risk of that complication occurring [10].

Median: is based on the value(s) of the observation(s) at the midpoint of a list of observations ranked from the smallest to the largest.

Mortality: number or rate of deaths in a population during a given time period.

Potentially preventable hospitalisations: admissions to hospital for a condition where the primary diagnosis could have been prevented through preventative health interventions and early disease management. These are categorised based on the National Healthcare Agreement: PI 18–Selected potentially preventable hospitalisations, 2021.

Remoteness classification: Each state and territory is divided into 5 classes of remoteness based on their relative accessibility to goods and services (such as to general practitioners, hospitals, and specialist care) as measured by road distance. The five Remoteness Areas are Major cities*,* Inner regional*,* Outer Regional*,* Remote and Very remote.

Risk: The probability of an event occurring during a specified period of time.

Risk factor: Any factor that represents a greater risk of a health disorder or other unwanted condition or event. Some risk factors are regarded as causes of disease; others are not necessarily so. The opposite of risk are protector factors.

Risk adjustment: The statistical process of identifying and adjusting for variation in outcomes resulting from differences in patient characteristics or risk factors, to comparison of non-equivalent groups.

Safety and quality standards: A set of statements which describe the level of care consumers can expect from a health service. They aim to protect the public from harm and improve the quality of care provided [4].

Same-day hospitalisation: A patient who is admitted to, and has a separation from, hospital on the same date. Also known as same-day patient.

Separation (from hospital): The formal process where a hospital records the completion of an episode of treatment and/or care for an admitted patient – in this report, described by the term hospitalisation.

8. References

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Appendix A. Cognitive impairment ICD-10-AM codes (11th edition)

ICD-10-AM Code (11th edition)	Diagnosis
Infections affecting the brain	
A52.1, A52.2, A52.3, A81.0, A81.2, B50.0	Symptomatic neurosyphilis; Asymptomatic neurosyphilis; Neurosyphilis, unspecified; Creutzfeldt-Jakob disease; Progressive multifocal leukoencephalopathy; Plasmodium falciparum malaria with cerebral complications
Delirium and dementia	
F00.0, F00.1, F00.2, F00.9,	Dementia in Alzheimer's disease with early onset (G30.0+); Dementia in Alzheimer's disease with late onset (G30.1+); Dementia in Alzheimer's disease, atypical or mixed type (G30.8+); Dementia in Alzheimer's disease, unspecified (G30.9+)
F01.0, F01.1, F01.2, F01.3, F01.8, F01.9	Vascular dementia of acute onset; Multi-infarct dementia; Subcortical vascular dementia; Mixed cortical and subcortical vascular dementia; Other vascular dementia; Vascular dementia, unspecified
F02.0, F02.1, F02.2, F02.3, F02.4, F02.8, F03	Dementia in Pick's disease (G31.0+); Dementia in Creutzfeldt-Jakob disease (A81.0+); Dementia in Huntington's disease (G10+); Dementia in Parkinson's disease (G20+); Dementia in human immunodeficiency virus [HIV] disease (B22+); Dementia in other specified diseases classified elsewhere; Unspecified dementia
F04.00, F04.01, F04.02, F04.03, F04.9	Post traumatic amnesia, unspecified; Post traumatic amnesia, duration < 24 hours; Post traumatic amnesia, duration >= 24 hours and < 14 days; Post traumatic amnesia, duration >= 14 days; Amnesic syndrome, unspecified
F05.0, F05.1, F05.8, F05.9, F06.7, F06.9	Delirium not superimposed on dementia, so described; Delirium superimposed on dementia; Other delirium; Delirium, unspecified; Mild cognitive disorder; Unspecified mental disorder due to brain damage and dysfunction and to physical disease or condition
Intellectual disability	
F70.0, F70.1, F70.8, F70.9	Mild mental retardation with the statement of no, or minimal, impairment of behaviour; Mild mental retardation, significant impairment of behaviour requiring attention or treatment; Mild mental retardation, other impairments of behaviour; Mild mental retardation without mention of impairment of behaviour
F71.0, F71.1, F71.8, F71.9	Moderate mental retardation with the statement of no, or minimal, impairment of behaviour; Moderate mental retardation, significant impairment of behaviour requiring attention or treatment; Moderate mental retardation, other impairments of behaviour; Moderate mental retardation without mention of impairment of behaviour
F72.0, F72.1, F72.8, F72.9	Severe mental retardation with the statement of no, or minimal, impairment of behaviour; Severe mental retardation, significant impairment of behaviour requiring attention or treatment; Severe mental retardation, other impairments of behaviour; Severe mental retardation without mention of impairment of behaviour
F73.0, F73.1, F73.8, F73.9	Profound mental retardation with the statement of no, or minimal, impairment of behaviour; Profound mental retardation, significant impairment of behaviour requiring attention or treatment; Profound mental retardation, other impairments of behaviour; Profound mental retardation without mention of impairment of behaviour
F78.0, F78.1, F78.8, F78.9, F79.0, F79.1, F79.8, F79.9	Other mental retardation with the statement of no, or minimal, impairment of behaviour; Other mental retardation, significant impairment of behaviour requiring attention or treatment; Other mental retardation, other impairments of behaviour; Other mental retardation without mention of impairment of behaviour; Unspecified mental retardation with the statement of no, or minimal, impairment of behaviour; Unspecified mental retardation, significant impairment of behaviour requiring attention or treatment; Unspecified mental retardation, other impairments of behaviour; Unspecified mental retardation without mention of impairment of behaviour. *NB: The term 'mental retardation' was updated to 'intellectual disability' in version 12 of the ICD-10-AM.*

Developmental disorder	
F81.0, F81.1, F81.2, F81.3, F81.8, F81.9	Specific reading disorder; Specific spelling disorder; Specific disorder of arithmetical skills; Mixed disorder of scholastic skills; Other developmental disorders of scholastic skills; Developmental disorder of scholastic skills, unspecified; Mixed specific developmental disorders
F83, F84.0, F84.1, F84.2, F84.3, F84.4, F84.5, F84.8, F84.9	Childhood autism; Atypical autism; Rett's syndrome; Other childhood disintegrative disorder; Overactive disorder associated with mental retardation and stereotyped movements; Asperger's syndrome; Other pervasive developmental disorders; Pervasive developmental disorder, unspecified
Degenerative diseases	
G10, G30.0, G30.1, G30.8, G30.9	Huntington's disease; Alzheimer's disease with early onset; Alzheimer's disease with late onset; Other Alzheimer's disease; Alzheimer's disease, unspecified
G31.0, G31.1, G31.2, G31.3, G31.8, G31.9, G36.1, G93.7	Circumscribed brain atrophy; Senile degeneration of brain, not elsewhere classified; Degeneration of nervous system due to alcohol; Lewy body disease; Other specified degenerative diseases of nervous system; Degenerative disease of nervous system, unspecified; Acute and subacute haemorrhagic leukoencephalitis [Hurst]; Reye's syndrome
Acute stroke	
I60, I60.0, I60.1, I60.2, I60.3, I60.4, I60.5, I60.6, I60.7, I60.8, I60.9, I61, I61.0, I61.1, I61.2, I61.3, I61.4, I61.5, I61.6, I61.8, I60, I60.0, I60.1, I60.2, I60.3, I60.4, I60.5, I60.6, I60.7, I60.8, I60.9, I61, I61.0, I61.1, I61.2, I61.3, I61.4, I61.5, I61.6, I61.8, I61.9	Subarachnoid haemorrhage; Subarachnoid haemorrhage from carotid siphon and bifurcation; Subarachnoid haemorrhage from middle cerebral artery; Subarachnoid haemorrhage from anterior communicating artery; Subarachnoid haemorrhage from posterior communicating artery; Subarachnoid haemorrhage from basilar artery; Subarachnoid haemorrhage from vertebral artery; Subarachnoid haemorrhage from other intracranial arteries; Subarachnoid haemorrhage from intracranial artery, unspecified; Other subarachnoid haemorrhage; Subarachnoid haemorrhage, unspecified; Intracerebral haemorrhage; Intracerebral haemorrhage in hemisphere, subcortical; Intracerebral haemorrhage in hemisphere, cortical; Intracerebral haemorrhage in hemisphere, unspecified; Intracerebral haemorrhage in brain stem; Intracerebral haemorrhage in cerebellum; Intracerebral haemorrhage, intraventricular; Intracerebral haemorrhage, multiple localised; Other intracerebral haemorrhage; Intracerebral haemorrhage, unspecified
I63, I63.0, I63.1, I63.2, I63.3, I63.4, I63.5, I63.6, I63.8, I63.9, I64, I67.3, I69, I69.0, I69.1, I69.2, I69.3, I69.4, I69.8, I62, I62.0, I62.1, I62.9	Cerebral infarction; Cerebral infarction due to thrombosis of precerebral arteries; Cerebral infarction due to embolism of precerebral arteries; Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries; Cerebral infarction due to thrombosis of cerebral arteries; Cerebral infarction due to embolism of cerebral arteries; Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries; Cerebral infarction due to cerebral venous thrombosis, nonpyogenic; Other cerebral infarction; Cerebral infarction, unspecified; Stroke, not specified as haemorrhage or infarction; Progressive vascular leukoencephalopathy; Sequelae of cerebrovascular disease; Sequelae of subarachnoid haemorrhage; Sequelae of intracerebral haemorrhage; Sequelae of other nontraumatic intracranial haemorrhage; Sequelae of cerebral infarction; Sequelae of stroke, not specified as haemorrhage or infarction; Sequelae of other and unspecified cerebrovascular diseases; Other nontraumatic intracranial haemorrhage; Subdural haemorrhage (acute)(nontraumatic); Nontraumatic extradural haemorrhage; Intracranial haemorrhage (nontraumatic), unspecified
Congenital malformation	
Q02, Q03.81, Q03.89, Q03.9, Q04.00, Q04.01, Q04.09, Q04.2, Q04.30, Q04.31, Q04.32, Q04.33, Q04.34, Q04.35, Q04.36, Q04.39, Q04.8, Q04.9	Microcephaly; Congenital communicating hydrocephalus; Other congenital hydrocephalus; Congenital hydrocephalus, unspecified; Congenital malformations of corpus callosum, unspecified; Agenesis of corpus callosum; Other congenital malformations of corpus callosum; Holoprosencephaly; Reduction anomalies of brain, unspecified; Reduction anomalies of cerebrum; Reduction anomalies of hypothalamus; Reduction anomalies of cerebellum; Agyria and lissencephaly; Microgyria and pachygyria; Hydranencephaly; Other reduction anomalies of brain; Other specified congenital malformations of brain; Congenital malformation of brain, unspecified
Q85.0, Q85.1, Q85.81, Q85.82, Q85.83, Q85.84, Q85.89, Q85.9 Q86.0, Q86.1, Q86.2, Q86.81, Q86.82,	Neurofibromatosis (nonmalignant); Tuberous sclerosis; Peutz-Jeghers syndrome; Sturge-Weber(-Dimitri) syndrome; Von Hippel-Lindau syndrome; Gardner's syndrome; Other specified phakomatoses; Phakomatosis, unspecified; Fetal alcohol syndrome (dysmorphic); Fetal hydantoin syndrome; Dysmorphism due to warfarin; Congenital malformations due to valproate; Congenital

Q86.83, Q86.84, Q86.85, Q86.86, Q86.87, Q86.89	malformations due to Vitamin A; Congenital malformations due to thalidomide; Congenital malformations due to cytotoxic agents; Congenital malformations due to other drugs; Congenital malformations due to ionising radiation; Congenital malformations due to methylmercury; Congenital malformations due to other specified exogenous causes
Q87.00, Q87.01, Q87.02, Q87.03, Q87.07, Q87.11, Q87.12, Q87.14, Q87.16, Q87.17, Q87.18, Q87.24, Q87.32, Q87.33, Q87.81, Q87.82, Q87.83, Q87.84, Q87.85, Q87.87	Cyclopia; Acrocephalopolysyndactyly; Acrocephalosyndactyly; Cryptophthalmos syndrome; Pena-Shokeir syndrome; Cockayne syndrome; Cornelia de Lange syndrome; Prader-Willi syndrome; Seckel syndrome; Smith-Lemli-Opitz syndrome; Sjogren-Larsson syndrome; Rubinstein-Taybi syndrome; Sotos syndrome; Weaver syndrome; Alport's syndrome; Laurence-Moon-Biedl syndrome; Zellweger syndrome; William's syndrome; Angelman syndrome; Velocardiofacial syndrome [VCFS]
Chromosomal malformation	
Q90.0, Q90.1, Q90.2, Q90.9, Q91.0, Q91.1, Q91.2, Q91.3, Q91.4, Q91.5, Q91.6, Q91.7	Trisomy 21, meiotic nondisjunction; Trisomy 21, mosaicism; Trisomy 21, translocation; Down's syndrome, unspecified; Trisomy 18, meiotic nondisjunction; Trisomy 18, mosaicism; Trisomy 18, translocation; Edwards' syndrome, unspecified; Trisomy 13, meiotic nondisjunction; Trisomy 13, mosaicism; Trisomy 13, translocation; Patau's syndrome, unspecified
Q92.0, Q92.1, Q92.2, Q92.3, Q92.4, Q92.5, Q93.0, Q93.1, Q93.2, Q93.3, Q93.4, Q93.5, Q93.6, Q93.7, Q93.8, Q93.9, Q97.1, Q99.2	Whole chromosome trisomy, meiotic nondisjunction; Whole chromosome trisomy, mosaicism; Major partial trisomy; Minor partial trisomy; Duplications seen only at prometaphase; Duplications with other complex rearrangements; Whole chromosome monosomy, meiotic nondisjunction; Whole chromosome monosomy, mosaicism; Chromosome replaced with ring or dicentric; Deletion of short arm of chromosome 4; Deletion of short arm of chromosome 5; Other deletions of part of a chromosome; Deletions seen only at prometaphase; Deletions with other complex rearrangements; Other deletions from the autosomes; Deletion from autosomes, unspecified; Female with more than three X chromosomes; Fragile X chromosome
Cognitive decline	
R40.1, R41, R41.0, R41.1, R41.2, R41.3, R41.8, R54	Stupor; Other symptoms and signs involving cognitive functions and awareness; Disorientation, unspecified; Anterograde amnesia; Retrograde amnesia; Other amnesia; Other and unspecified symptoms and signs involving cognitive functions and awareness; Senility
Brain injury	
G93.1, S06.1, S06.20, S06.21, S06.22, S06.23, S06.28, S06.30, S06.31, S06.32, S06.33, S06.34, S06.38, S06.4, S06.5, S06.6, S06.8, S06.9	Anoxic brain damage, not elsewhere classified; Traumatic cerebral oedema; Diffuse cerebral and cerebellar brain injury, unspecified; Diffuse cerebral contusions; Diffuse cerebellar contusions; Multiple intracerebral and cerebellar haematomas; Other diffuse cerebral and cerebellar injury; Focal cerebral and cerebellar injury, unspecified; Focal cerebral contusion; Focal cerebellar contusion; Focal cerebral haematoma; Focal cerebellar haematoma; Other focal cerebral and cerebellar injury; Epidural haemorrhage; Traumatic subdural haemorrhage; Traumatic subarachnoid haemorrhage; Other intracranial injuries; Intracranial injury, unspecified