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Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
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Appendix to: Dang T, Chan W, Khawaja S, et al. Hospital costs for unplanned re-admissions within 30 days of hospitalisations with heart failure, Australia, 2013–2017: a retrospective cohort study. *Med J Aust* 2024; doi: 10.5694/mja2.52424.

Supplementary methods

Table 1. International Classification of Disease, tenth revision, Australian modification (ICD-10-AM) diagnosis codes for heart failure

ICD-10-AM diagnosis code	Name
I50.0–9	Congestive heart failure
I11.0	Hypertensive heart disease with congestive heart failure
I13.0	Hypertensive heart and kidney disease with congestive heart failure
I13.2	Hypertensive heart and kidney disease with both congestive heart failure and kidney failure

2. Classification of re-admission diagnoses into preventability groups

To determine the preventability of re-admissions, we adopted an approach previously used to identify heart failure readmissions that are potentially related to hospital care [1] and classified the readmissions into 4 groups.

Using this classification, two clinicians (a medical officer and a heart failure specialist cardiologist) independently assessed re-admission diagnoses and allocated them to one of four groups based on the degree of potential preventability, with disagreement resolved by a third clinician (general cardiologist). Group 1 (most preventable) included re-admission diagnoses that may be the result of an actual or potential complication or an adverse event during the index hospitalisation. These events could be heart failure-specific (e.g., re-admission with acute kidney injury that may be due to excessive diuresis) or due to the hospitalisation (e.g. readmission with deep vein thrombosis or infection which may be hospital-acquired). Group 2 consisted of re-admissions for the same condition as the initial hospital admission (heart failure). While some re-admissions with recurrence of heart failure could reflect progression of heart failure, suboptimal patient care, such as delays in diagnosis, treatment or referral, poor assessment and inadequate or inappropriate patient management, including premature discharge, could contribute to re-admission with heart failure. Group 2 was therefore also deemed potentially preventable. Group 3 consisted of re-admission diagnoses potentially related to the index heart failure admission. Any re-admission diagnoses not allocated to Groups 1 to 3 were allocated to Group 4 (i.e. group 4 allocation was by exclusion). Group 4 was deemed the least preventable.

For Group 1, we included diagnoses listed in the Hospital Acquired Complications list of the Australian Commission on Safety and Quality in Health Care, except for admission to intensive care (not relevant for evaluation of re-admissions) and re-admission with “Heart failure and pulmonary oedema”, allocated to group 2. As the Hospital Acquired Complications list was developed for all conditions leading to hospitalisation rather than specifically for heart failure, further potential heart failure-specific complications or adverse events could be allocated to group 1, including medication and procedural complications.

Both reviewers were provided written instructions, including definitions of complications (unanticipated problem that arises following, and is a result of, a procedure, treatment, or illness) and adverse events (Therapeutic Goods Administration definition: unintended and sometimes harmful occurrences associated with the use of a medicine, vaccine or medical device including side effects) [2] prior to allocating the re-admission diagnoses.

The 58,977 included unplanned re-admissions were associated with 827 re-admission diagnoses. Overall agreement between reviewers for unplanned re-admissions was 75% (i.e., for 75% of re-admissions the two reviewers agreed on the allocation group). We did not assess intra-rater variability or reliability.

Group	Three Digit ICD-10 AM Diagnosis code and description
1	J18 Pneumonia, organism unspecified
1	I48 Atrial fibrillation and flutter
1	I21 Acute myocardial infarction
1	N17 Acute kidney failure
1	L03 Cellulitis
1	A41 Other sepsis
1	N39 Other disorders of urinary system
1	I20 Angina pectoris
1	I95 Hypotension
1	E11 Type 2 diabetes mellitus
1	J22 Unspecified acute lower respiratory infection
1	E87 Other disorders of fluid, electrolyte and acid-base balance
1	R55 Syncope and collapse
1	K92 Other diseases of digestive system
1	R06 Abnormalities of breathing
1	I63 Cerebral infarction
1	S72 Fracture of femur
1	F05 Delirium, not induced by alcohol and other psychoactive substances
1	J96 Respiratory failure, not elsewhere classified
1	R10 Abdominal and pelvic pain
1	M10 Gout
1	A09 Other gastroenteritis and colitis of infectious and unspecified origin
1	E86 Volume depletion
1	I47 Paroxysmal tachycardia
1	J69 Pneumonitis due to solids and liquids
1	R00 Abnormalities of heart beat
1	R04 Haemorrhage from respiratory passages
1	R42 Dizziness and giddiness
1	J10 Influenza due to other identified influenza virus
1	D68 Other coagulation defects
1	I26 Pulmonary embolism
1	S01 Open wound of head
1	G45 Transient cerebral ischaemic attacks and related syndromes
1	S06 Intracranial injury
1	T82 Complications of cardiac and vascular prosthetic devices, implants and grafts
1	R11 Nausea and vomiting
1	R33 Retention of urine
1	R53 Malaise and fatigue
1	R41 Other symptoms and signs involving cognitive functions and awareness
1	S32 Fracture of lumbar spine and pelvis
1	I49 Other cardiac arrhythmias
1	R29 Other symptoms and signs involving the nervous and musculoskeletal systems

Group	Three Digit ICD-10 AM Diagnosis code and description
1	S22 Fracture of rib(s), sternum and thoracic spine
1	J15 Bacterial pneumonia, not elsewhere classified
1	R31 Unspecified haematuria
1	A08 Viral and other specified intestinal infections
1	I64 Stroke, not specified as haemorrhage or infarction
1	S42 Fracture of shoulder and upper arm
1	S00 Superficial injury of head
1	A04 Other bacterial intestinal infections
1	T81 Complications of procedures, not elsewhere classified
1	T83 Complications of genitourinary prosthetic devices, implants and grafts
1	L97 Ulcer of lower limb, not elsewhere classified
1	J06 Acute upper respiratory infections of multiple and unspecified sites
1	K29 Gastritis and duodenitis
1	J12 Viral pneumonia, not elsewhere classified
1	S82 Fracture of lower leg, including ankle
1	K25 Gastric ulcer
1	S09 Other and unspecified injuries of head
1	A40 Streptococcal sepsis
1	K26 Duodenal ulcer
1	S52 Fracture of forearm
1	R40 Somnolence, stupor and coma
1	R57 Shock, not elsewhere classified
1	M86 Osteomyelitis
1	S81 Open wound of lower leg
1	S79 Other and unspecified injuries of hip and thigh
1	R50 Fever of other and unknown origin
1	S51 Open wound of forearm
1	R26 Abnormalities of gait and mobility
1	A49 Bacterial infection of unspecified site
1	I46 Cardiac arrest
1	S39 Other and unspecified injuries of abdomen, lower back and pelvis
1	I80 Phlebitis and thrombophlebitis
1	K22 Other diseases of oesophagus
1	J20 Acute bronchitis
1	I33 Acute and subacute endocarditis
1	J14 Pneumonia due to Haemophilus influenzae
1	E10 Type 1 diabetes mellitus
1	J40 Bronchitis, not specified as acute or chronic
1	J13 Pneumonia due to Streptococcus pneumoniae
1	M80 Osteoporosis with pathological fracture
1	S80 Superficial injury of lower leg
1	T85 Complications of other internal prosthetic devices, implants and grafts
1	I61 Intracerebral haemorrhage
1	D70 Agranulocytosis
1	L02 Cutaneous abscess, furuncle and carbuncle

Group	Three Digit ICD-10 AM Diagnosis code and description
1	M00 Pyogenic arthritis
1	B34 Viral infection of unspecified site
1	S02 Fracture of skull and facial bones
1	S29 Other and unspecified injuries of thorax
1	I74 Arterial embolism and thrombosis
1	L27 Dermatitis due to substances taken internally
1	M11 Other crystal arthropathies
1	L89 Pressure injury
1	S30 Superficial injury of abdomen, lower back and pelvis
1	S70 Superficial injury of hip and thigh
1	T84 Complications of internal orthopaedic prosthetic devices, implants and grafts
1	I51 Complications and ill-defined descriptions of heart disease
1	I62 Other nontraumatic intracranial haemorrhage
1	T45 Poisoning by primarily systemic and haematological agents, not elsewhere classified
1	T46 Poisoning by agents primarily affecting the cardiovascular system
1	S12 Fracture of neck
1	K65 Peritonitis
1	N12 Tubulo-interstitial nephritis, not specified as acute or chronic
1	S49 Other and unspecified injuries of shoulder and upper arm
1	S89 Other and unspecified injuries of lower leg
1	T50 Poisoning by diuretics and other and unspecified drugs, medicaments and biological substances
1	T78 Adverse effects, not elsewhere classified
1	T38 Poisoning by hormones and their synthetic substitutes and antagonists, not elsewhere classified
1	K91 Postprocedural disorders of digestive system, not elsewhere classified
1	N30 Cystitis
1	I82 Other venous embolism and thrombosis
1	I97 Postprocedural disorders of circulatory system, not elsewhere classified
1	R79 Other abnormal findings of blood chemistry
1	S61 Open wound of wrist and hand
1	S73 Dislocation, sprain and strain of joint and ligaments of hip
1	D69 Purpura and other haemorrhagic conditions
1	B37 Candidiasis
1	R05 Cough
1	S20 Superficial injury of thorax
1	S40 Superficial injury of shoulder and upper arm
1	S83 Dislocation, sprain and strain of joints and ligaments of knee
1	D62 Acute posthaemorrhagic anaemia
1	J93 Pneumothorax
1	N10 Acute tubulo-interstitial nephritis
1	S50 Superficial injury of forearm
1	T79 Certain early complications of trauma, not elsewhere classified
1	T80 Complications following infusion, transfusion and therapeutic injection
1	J95 Postprocedural respiratory disorders, not elsewhere classified
1	R25 Abnormal involuntary movements
1	G81 Hemiplegia

Group	Three Digit ICD-10 AM Diagnosis code and description
1	I66 Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction
1	N14 Drug- and heavy-metal-induced tubulo-interstitial and tubular conditions
1	R63 Symptoms and signs concerning food and fluid intake
1	T42 Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs
1	E16 Other disorders of pancreatic internal secretion
1	S62 Fracture at wrist and hand level
1	J09 Influenza due to certain identified influenza virus
1	R35 Polyuria
1	N19 Unspecified kidney failure
1	R45 Symptoms and signs involving emotional state
1	T88 Other complications of surgical and medical care, not elsewhere classified
1	S46 Injury of muscle and tendon at shoulder and upper arm level
1	S90 Superficial injury of ankle and foot
1	R58 Haemorrhage, not elsewhere classified
1	S41 Open wound of shoulder and upper arm
1	S91 Open wound of ankle and foot
1	T43 Poisoning by psychotropic drugs, not elsewhere classified
1	G25 Other extrapyramidal and movement disorders
1	I22 Subsequent myocardial infarction
1	J11 Influenza, virus not identified
1	S19 Other and unspecified injuries of neck
1	S92 Fracture of foot, except ankle
1	S99 Other and unspecified injuries of ankle and foot
1	R34 Anuria and oliguria
1	S27 Injury of other and unspecified intrathoracic organs
1	S43 Dislocation, sprain and strain of joints and ligaments of shoulder girdle
1	J86 Pyothorax
1	L08 Other local infections of skin and subcutaneous tissue
1	L29 Pruritus
1	L50 Urticaria
1	S33 Dislocation, sprain and strain of joints and ligaments of lumbar spine and pelvis
1	T13 Other injuries of lower limb, level unspecified
1	T86 Failure and rejection of transplanted organs and tissues
1	B99 Other and unspecified infectious diseases
1	A02 Other salmonella infections
1	E13 Other specified diabetes mellitus
1	R27 Other lack of coordination
1	S59 Other and unspecified injuries of forearm
1	R02 Gangrene, not elsewhere classified
1	T39 Poisoning by nonopioid analgesics, antipyretics and antirheumatics
1	T44 Poisoning by drugs primarily affecting the autonomic nervous system
1	I38 Endocarditis, valve unspecified
1	I60 Subarachnoid haemorrhage
1	J02 Acute pharyngitis
1	J38 Diseases of vocal cords and larynx, not elsewhere classified

Group	Three Digit ICD-10 AM Diagnosis code and description
1	J67 Hypersensitivity pneumonitis due to organic dust
1	A48 Other bacterial diseases, not elsewhere classified
1	J85 Abscess of lung and mediastinum
1	J16 Pneumonia due to other infectious organisms, not elsewhere classified
1	J17 Pneumonia in diseases classified elsewhere
1	J80 Adult respiratory distress syndrome
1	T87 Complications peculiar to reattachment and amputation
1	R21 Rash and other nonspecific skin eruption
1	R30 Pain associated with micturition
1	S31 Open wound of abdomen, lower back and pelvis
1	S37 Injury of urinary and pelvic organs
1	S60 Superficial injury of wrist and hand
1	S71 Open wound of hip and thigh
1	S76 Injury of muscle and tendon at hip and thigh level
1	S85 Injury of blood vessels at lower leg level
1	S86 Injury of muscle and tendon at lower leg level
1	T11 Other injuries of upper limb, level unspecified
1	B33 Other viral diseases, not elsewhere classified
1	H59 Postprocedural disorders of eye and adnexa, not elsewhere classified
1	I23 Certain current complications following acute myocardial infarction
1	J04 Acute laryngitis and tracheitis
1	J21 Acute bronchiolitis
1	A05 Other bacterial food-borne intoxications, not elsewhere classified
1	A32 Listeriosis
1	E46 Unspecified protein-energy malnutrition
1	G21 Secondary parkinsonism
1	K28 Gastrojejunal ulcer
1	N99 Postprocedural disorders of genitourinary system, not elsewhere classified
1	R32 Unspecified urinary incontinence
1	S14 Injury of nerves and spinal cord at neck level
1	S63 Dislocation, sprain and strain of joints and ligaments at wrist and hand level
1	S93 Dislocation, sprain and strain of joints and ligaments at ankle and foot level
1	J00 Acute nasopharyngitis [common cold]
1	L59 Other disorders of skin and subcutaneous tissue related to radiation
1	E14 Unspecified diabetes mellitus
1	G24 Dystonia
1	N02 Recurrent and persistent haematuria
1	S69 Other and unspecified injuries of wrist and hand
1	R03 Abnormal blood-pressure reading, without diagnosis
1	S13 Dislocation, sprain and strain of joints and ligaments at neck level
1	S23 Dislocation, sprain and strain of joints and ligaments of thorax
1	S26 Injury of heart
1	S34 Injury of nerves and lumbar spinal cord at abdomen, lower back and pelvis level
1	S36 Injury of intra-abdominal organs
1	S64 Injury of nerves at wrist and hand level

Group	Three Digit ICD-10 AM Diagnosis code and description
1	S65 Injury of blood vessels at wrist and hand level
1	S66 Injury of muscle and tendon at wrist and hand level
1	S95 Injury of blood vessels at ankle and foot level
1	S96 Injury of muscle and tendon at ankle and foot level
1	T07 Unspecified multiple injuries
1	T09 Other injuries of spine and trunk, level unspecified
1	T36 Poisoning by systemic antibiotics
1	G97 Postprocedural disorders of nervous system, not elsewhere classified
1	T37 Poisoning by other systemic anti-infectives and antiparasitics
2	I50 Heart failure
2	J90 Pleural effusion, not elsewhere classified
2	J81 Pulmonary oedema
3	J44 Other chronic obstructive pulmonary disease
3	R07 Pain in throat and chest
3	I35 Nonrheumatic aortic valve disorders
3	I42 Cardiomyopathy
3	I25 Chronic ischaemic heart disease
3	D50 Iron deficiency anaemia
3	D64 Other anaemias
3	N18 Chronic kidney disease
3	I13 Hypertensive heart and kidney disease
3	I27 Other pulmonary heart diseases
3	I70 Atherosclerosis
3	I44 Atrioventricular and left bundle-branch block
3	I83 Varicose veins of lower extremities
3	I11 Hypertensive heart disease
3	I10 Essential (primary) hypertension
3	I08 Multiple valve diseases
3	I34 Nonrheumatic mitral valve disorders
3	K72 Hepatic failure, not elsewhere classified
3	I31 Other diseases of pericardium
3	R18 Ascites
3	R60 Oedema, not elsewhere classified
3	R09 Other symptoms and signs involving the circulatory and respiratory systems
3	I24 Other acute ischaemic heart diseases
3	I05 Rheumatic mitral valve diseases
3	E85 Amyloidosis
3	I12 Hypertensive kidney disease
3	J44 Other chronic obstructive pulmonary disease
3	R07 Pain in throat and chest
3	I35 Nonrheumatic aortic valve disorders
3	I42 Cardiomyopathy
3	I25 Chronic ischaemic heart disease
3	D50 Iron deficiency anaemia
3	D64 Other anaemias

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3	N18 Chronic kidney disease
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3	N18 Chronic kidney disease
3	I13 Hypertensive heart and kidney disease
3	I27 Other pulmonary heart diseases
3	I70 Atherosclerosis
3	I44 Atrioventricular and left bundle-branch block
3	I83 Varicose veins of lower extremities
3	I11 Hypertensive heart disease
3	I10 Essential (primary) hypertension
3	I08 Multiple valve diseases
4	K59 Other functional intestinal disorders
4	K56 Paralytic ileus and intestinal obstruction without hernia
4	M54 Dorsalgia
4	J84 Other interstitial pulmonary diseases
4	K57 Diverticular disease of intestine
4	F41 Other anxiety disorders
4	K52 Other noninfective gastroenteritis and colitis
4	M25 Other joint disorders, not elsewhere classified
4	K80 Cholelithiasis
4	J45 Asthma

Group	Three Digit ICD-10 AM Diagnosis code and description
4	C78 Secondary malignant neoplasm of respiratory and digestive organs
4	J47 Bronchiectasis
4	M79 Other soft tissue disorders, not elsewhere classified
4	F03 Unspecified dementia
4	K85 Acute pancreatitis
4	C34 Malignant neoplasm of bronchus and lung
4	Z04 Examination and observation for other reasons
4	K21 Gastro-oesophageal reflux disease
4	K31 Other diseases of stomach and duodenum
4	J98 Other respiratory disorders
4	R13 Dysphagia
4	K55 Vascular disorders of intestine
4	G47 Sleep disorders
4	R56 Convulsions, not elsewhere classified
4	H81 Disorders of vestibular function
4	K40 Inguinal hernia
4	C79 Secondary malignant neoplasm of other and unspecified sites
4	F10 Mental and behavioural disorders due to use of alcohol
4	Z48 Other surgical follow-up care
4	R51 Headache
4	C18 Malignant neoplasm of colon
4	F32 Depressive episode
4	K81 Cholecystitis
4	M17 Gonarthrosis [arthrosis of knee]
4	Z74 Problems related to care-provider dependency
4	D46 Myelodysplastic syndromes
4	E83 Disorders of mineral metabolism
4	M51 Other intervertebral disc disorders
4	N13 Obstructive and reflux uropathy
4	I71 Aortic aneurysm and dissection
4	T40 Poisoning by narcotics and psychodysleptics [hallucinogens]
4	K42 Umbilical hernia
4	C90 Multiple myeloma and malignant plasma cell neoplasms
4	K64 Haemorrhoids and perianal venous thrombosis
4	K70 Alcoholic liver disease
4	K76 Other diseases of liver
4	M84 Disorders of continuity of bone
4	Z75 Problems related to medical facilities and other health care
4	B02 Zoster [herpes zoster]
4	C67 Malignant neoplasm of bladder
4	G20 Parkinson's disease
4	Z49 Care involving dialysis
4	C61 Malignant neoplasm of prostate
4	K83 Other diseases of biliary tract
4	M70 Soft tissue disorders related to use, overuse and pressure

Group	Three Digit ICD-10 AM Diagnosis code and description
4	C91 Lymphoid leukaemia
4	C92 Myeloid leukaemia
4	F01 Vascular dementia
4	G31 Other degenerative diseases of nervous system, not elsewhere classified
4	G40 Epilepsy
4	M35 Other systemic involvement of connective tissue
4	M75 Shoulder lesions
4	N20 Calculus of kidney and ureter
4	N40 Hyperplasia of prostate
4	R44 Other symptoms and signs involving general sensations and perceptions
4	R47 Speech disturbances, not elsewhere classified
4	Z50 Care involving use of rehabilitation procedures
4	C83 Non-follicular lymphoma
4	K11 Diseases of salivary glands
4	K43 Ventral hernia
4	L30 Other dermatitis
4	M47 Spondylosis
4	R19 Other symptoms and signs involving the digestive system and abdomen
4	S05 Injury of eye and orbit
4	Z51 Other medical care
4	C22 Malignant neoplasm of liver and intrahepatic bile ducts
4	C25 Malignant neoplasm of pancreas
4	C64 Malignant neoplasm of kidney, except renal pelvis
4	D47 Other neoplasms of uncertain or unknown behaviour of lymphoid, haematopoietic and related tissue
4	E27 Other disorders of adrenal gland
4	G93 Other disorders of brain
4	M06 Other rheumatoid arthritis
4	M16 Coxarthrosis [arthrosis of hip]
4	M19 Other arthrosis
4	M48 Other spondylopathies
4	N04 Nephrotic syndrome
4	T18 Foreign body in alimentary tract
4	C44 Other malignant neoplasms of skin
4	F31 Bipolar affective disorder
4	F43 Reaction to severe stress, and adjustment disorders
4	G30 Alzheimer's disease
4	G43 Migraine
4	I89 Other noninfective disorders of lymphatic vessels and lymph nodes
4	M71 Other bursopathies
4	M94 Other disorders of cartilage
4	T68 Hypothermia
4	C16 Malignant neoplasm of stomach
4	C19 Malignant neoplasm of rectosigmoid junction
4	E05 Thyrotoxicosis [hyperthyroidism]
4	F00 Dementia in Alzheimer's disease (G30.-+)

Group	Three Digit ICD-10 AM Diagnosis code and description
4	G41 Status epilepticus
4	J70 Respiratory conditions due to other external agents
4	K62 Other diseases of anus and rectum
4	N45 Orchitis and epididymitis
4	C85 Other and unspecified types of non-Hodgkin lymphoma
4	E03 Other hypothyroidism
4	K44 Diaphragmatic hernia
4	K61 Abscess of anal and rectal regions
4	L98 Other disorders of skin and subcutaneous tissue, not elsewhere classified
4	N28 Other disorders of kidney and ureter, not elsewhere classified
4	C20 Malignant neoplasm of rectum
4	C56 Malignant neoplasm of ovary
4	D59 Acquired haemolytic anaemia
4	E22 Hyperfunction of pituitary gland
4	G62 Other polyneuropathies
4	J32 Chronic sinusitis
4	K20 Oesophagitis
4	K30 Functional dyspepsia
4	K41 Femoral hernia
4	K51 Ulcerative colitis
4	K63 Other diseases of intestine
4	K75 Other inflammatory liver diseases
4	M13 Other arthritis
4	M72 Fibroblastic disorders
4	N49 Inflammatory disorders of male genital organs, not elsewhere classified
4	T67 Effects of heat and light
4	C50 Malignant neoplasm of breast
4	H16 Keratitis
4	I84 Haemorrhoids
4	M05 Seropositive rheumatoid arthritis
4	M46 Other inflammatory spondylopathies
4	R93 Abnormal findings on diagnostic imaging of other body structures
4	T17 Foreign body in respiratory tract
4	T25 Burn of ankle and foot
4	Z54 Convalescence
4	B00 Herpesviral [herpes simplex] infections
4	C15 Malignant neoplasm of oesophagus
4	C45 Mesothelioma
4	C77 Secondary and unspecified malignant neoplasm of lymph nodes
4	C80 Malignant neoplasm without specification of site
4	C94 Other leukaemias of specified cell type
4	E88 Other metabolic disorders
4	G50 Disorders of trigeminal nerve
4	G70 Myasthenia gravis and other myoneural disorders
4	K04 Diseases of pulp and periapical tissues

Group	Three Digit ICD-10 AM Diagnosis code and description
4	K12 Stomatitis and related lesions
4	K35 Acute appendicitis
4	K66 Other disorders of peritoneum
4	M31 Other necrotising vasculopathies
4	M60 Myositis
4	M76 Enthesopathies of lower limb, excluding foot
4	N95 Menopausal and other perimenopausal disorders
4	R68 Other general symptoms and signs
4	A15 Respiratory tuberculosis, bacteriologically and histologically confirmed
4	B35 Dermatophytosis
4	C23 Malignant neoplasm of gallbladder
4	C84 Mature T/NK-cell lymphomas
4	D12 Benign neoplasm of colon, rectum, anus and anal canal
4	F06 Other mental disorders due to brain damage and dysfunction and to physical disease
4	F20 Schizophrenia
4	F25 Schizoaffective disorders
4	F44 Dissociative [conversion] disorders
4	F60 Specific personality disorders
4	G53 Cranial nerve disorders in diseases classified elsewhere
4	G55 Nerve root and plexus compressions in diseases classified elsewhere
4	G72 Other myopathies
4	G83 Other paralytic syndromes
4	G90 Disorders of autonomic nervous system
4	H40 Glaucoma
4	I86 Varicose veins of other sites
4	K06 Other disorders of gingiva and edentulous alveolar ridge
4	K58 Irritable bowel syndrome
4	K71 Toxic liver disease
4	K82 Other diseases of gallbladder
4	K86 Other diseases of pancreas
4	L12 Pemphigoid
4	L40 Psoriasis
4	M43 Other deforming dorsopathies
4	M65 Synovitis and tenosynovitis
4	M81 Osteoporosis without pathological fracture
4	M87 Osteonecrosis
4	N32 Other disorders of bladder
4	N41 Inflammatory diseases of prostate
4	R14 Flatulence and related conditions
4	R49 Voice disturbances
4	R52 Pain, not elsewhere classified
4	R69 Unknown and unspecified causes of morbidity
4	Z46 Fitting and adjustment of other devices
4	Z59 Problems related to housing and economic circumstances
4	Z73 Problems related to life-management difficulty

Group	Three Digit ICD-10 AM Diagnosis code and description
4	A86 Unspecified viral encephalitis
4	C24 Malignant neoplasm of other and unspecified parts of biliary tract
4	C43 Malignant melanoma of skin
4	C71 Malignant neoplasm of brain
4	C88 Malignant immunoproliferative diseases
4	C93 Monocytic leukaemia
4	D32 Benign neoplasm of meninges
4	D37 Neoplasm of uncertain or unknown behaviour of oral cavity and digestive organs
4	D52 Folate deficiency anaemia
4	D53 Other nutritional anaemias
4	D56 Thalassemia
4	D58 Other hereditary haemolytic anaemias
4	D73 Diseases of spleen
4	F11 Mental and behavioural disorders due to use of opioids
4	F30 Manic episode
4	F33 Recurrent depressive disorder
4	G12 Spinal muscular atrophy and related syndromes
4	G44 Other headache syndromes
4	G56 Mononeuropathies of upper limb
4	G58 Other mononeuropathies
4	G61 Inflammatory polyneuropathy
4	G71 Primary disorders of muscles
4	G91 Hydrocephalus
4	H43 Disorders of vitreous body
4	H53 Visual disturbances
4	H54 Visual impairment including binocular or monocular blindness
4	H66 Suppurative and unspecified otitis media
4	H83 Other diseases of inner ear
4	J31 Chronic rhinitis, nasopharyngitis and pharyngitis
4	J39 Other diseases of upper respiratory tract
4	J82 Pulmonary eosinophilia, not elsewhere classified
4	K02 Dental caries
4	K10 Other diseases of jaws
4	K46 Unspecified abdominal hernia
4	L53 Other erythematous conditions
4	L72 Follicular cysts of skin and subcutaneous tissue
4	M24 Other specific joint derangements
4	M32 Systemic lupus erythematosus
4	M34 Systemic sclerosis
4	M77 Other enthesopathies
4	M96 Postprocedural musculoskeletal disorders, not elsewhere classified
4	N23 Unspecified renal colic
4	N34 Urethritis and urethral syndrome
4	N48 Other disorders of penis
4	N50 Other disorders of male genital organs

Group	Three Digit ICD-10 AM Diagnosis code and description
4	R16 Hepatomegaly and splenomegaly, not elsewhere classified
4	R22 Localised swelling, mass and lump of skin and subcutaneous tissue
4	R39 Other symptoms and signs involving the urinary system
4	R46 Symptoms and signs involving appearance and behaviour
4	R54 Senility
4	T59 Toxic effect of other gases, fumes and vapours
4	Z03 Medical observation and evaluation for suspected diseases and conditions
4	Z63 Other problems related to primary support group, including family circumstances
4	A16 Respiratory tuberculosis, not confirmed bacteriologically or histologically
4	A37 Whooping cough
4	A42 Actinomycosis
4	A85 Other viral encephalitis, not elsewhere classified
4	A87 Viral meningitis
4	B01 Varicella [chickenpox]
4	B15 Acute hepatitis A
4	B18 Chronic viral hepatitis
4	B26 Mumps
4	B36 Other superficial mycoses
4	B44 Aspergillosis
4	B46 Zygomycosis
4	B59 Pneumocystosis (J17.3*)
4	B69 Cysticercosis
4	C11 Malignant neoplasm of nasopharynx
4	C21 Malignant neoplasm of anus and anal canal
4	C26 Malignant neoplasm of other and ill-defined digestive organs
4	C32 Malignant neoplasm of larynx
4	C48 Malignant neoplasm of malignant neoplasm of retroperitoneum and peritoneum
4	C49 Malignant neoplasm of other connective and soft tissue
4	C53 Malignant neoplasm of cervix uteri
4	C54 Malignant neoplasm of corpus uteri
4	C57 Malignant neoplasm of other and unspecified female genital organs
4	C65 Malignant neoplasm of renal pelvis
4	C74 Malignant neoplasm of adrenal gland
4	C76 Malignant neoplasm of other and ill-defined sites
4	C81 Hodgkin lymphoma
4	C82 Follicular lymphoma
4	C86 Other specified types of T/NK-cell lymphoma
4	C95 Leukaemia of unspecified cell type
4	D04 Carcinoma in situ of skin
4	D09 Carcinoma in situ of other and unspecified sites
4	D13 Benign neoplasm of other and ill-defined parts of digestive system
4	D33 Benign neoplasm of brain and other parts of central nervous system
4	D36 Benign neoplasm of other and unspecified sites
4	D41 Neoplasm of uncertain or unknown behaviour of urinary organs
4	D43 Neoplasm of uncertain or unknown behaviour of brain and central nervous system

Group	Three Digit ICD-10 AM Diagnosis code and description
4	D51 Vitamin B12 deficiency anaemia
4	D65 Disseminated intravascular coagulation [defibrination syndrome]
4	D66 Hereditary factor VIII deficiency
4	D75 Other diseases of blood and blood-forming organs
4	D89 Other disorders involving the immune mechanism, not elsewhere classified
4	E04 Other nontoxic goitre
4	E21 Hyperparathyroidism and other disorders of parathyroid gland
4	E23 Hypofunction and other disorders of pituitary gland
4	E24 Cushing's syndrome
4	F02 Dementia in other diseases classified elsewhere
4	F13 Mental and behavioural disorders due to use of sedatives or hypnotics
4	F15 Mental and behavioural disorders due to use of other stimulants, including caffeine
4	F17 Mental and behavioural disorders due to use of tobacco
4	F19 Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances
4	F22 Persistent delusional disorders
4	F23 Acute and transient psychotic disorders
4	F34 Persistent mood [affective] disorders
4	F40 Phobic anxiety disorders
4	F45 Somatoform disorders
4	F50 Eating disorders
4	F51 Nonorganic sleep disorders
4	F52 Sexual dysfunction, not caused by organic disorder or disease
4	F54 Psychological and behavioural factors associated with disorders or diseases classified elsewhere
4	F91 Conduct disorders
4	G04 Encephalitis, myelitis and encephalomyelitis
4	G06 Intracranial and intraspinal abscess and granuloma
4	G11 Hereditary ataxia
4	G23 Other degenerative diseases of basal ganglia
4	G46 Vascular syndromes of brain in cerebrovascular diseases (I60-I67+)
4	G51 Facial nerve disorders
4	G57 Mononeuropathies of lower limb
4	G63 Polyneuropathy in diseases classified elsewhere
4	G92 Toxic encephalopathy
4	G95 Other diseases of spinal cord
4	H04 Disorders of lacrimal system
4	H10 Conjunctivitis
4	H11 Other disorders of conjunctiva
4	H19 Disorders of sclera and cornea in diseases classified elsewhere
4	H20 Iridocyclitis
4	H21 Other disorders of iris and ciliary body
4	H31 Other disorders of choroid
4	H35 Other retinal disorders
4	H47 Other disorders of optic [2nd] nerve and visual pathways
4	H49 Paralytic strabismus
4	H57 Other disorders of eye and adnexa

Group	Three Digit ICD-10 AM Diagnosis code and description
4	H58 Other disorders of eye and adnexa in diseases classified elsewhere
4	H60 Otitis externa
4	H70 Mastoiditis and related conditions
4	H91 Other hearing loss
4	H93 Other disorders of ear, not elsewhere classified
4	J01 Acute sinusitis
4	J03 Acute tonsillitis
4	J05 Acute obstructive laryngitis [croup] and epiglottitis
4	J34 Other disorders of nose and nasal sinuses
4	J42 Unspecified chronic bronchitis
4	J46 Status asthmaticus
4	J60 Coalworker's pneumoconiosis
4	J61 Pneumoconiosis due to asbestos and other mineral fibres
4	J62 Pneumoconiosis due to dust containing silica
4	J92 Pleural plaque
4	K08 Other disorders of teeth and supporting structures
4	K14 Diseases of tongue
4	K45 Other abdominal hernia
4	K50 Crohn's disease [regional enteritis]
4	K60 Fissure and fistula of anal and rectal regions
4	K90 Intestinal malabsorption
4	L04 Acute lymphadenitis
4	L05 Pilonidal cyst
4	L22 Diaper [napkin] dermatitis
4	L43 Lichen planus
4	L51 Erythema multiforme
4	L52 Erythema nodosum
4	L55 Sunburn
4	L56 Other acute skin changes due to ultraviolet radiation
4	L95 Vasculitis limited to skin, not elsewhere classified
4	M01 Direct infections of joint in infectious and parasitic diseases classified elsewhere
4	M02 Reactive arthropathies
4	M15 Polyarthrosis
4	M21 Other acquired deformities of limbs
4	M30 Polyarteritis nodosa and related conditions
4	M33 Dermatopolymyositis
4	M66 Spontaneous rupture of synovium and tendon
4	M85 Other disorders of bone density and structure
4	M89 Other disorders of bone
4	M90 Osteopathies in diseases classified elsewhere
4	N03 Chronic nephritic syndrome
4	N05 Unspecified nephritic syndrome
4	N21 Calculus of lower urinary tract
4	N31 Neuromuscular dysfunction of bladder, not elsewhere classified
4	N35 Urethral stricture

Group	Three Digit ICD-10 AM Diagnosis code and description
4	N36 Other disorders of urethra
4	N42 Other disorders of prostate
4	N47 Redundant prepuce, phimosis and paraphimosis
4	N61 Inflammatory disorders of breast
4	N76 Other inflammation of vagina and vulva
4	O04 Medical abortion
4	O80 Single spontaneous delivery
4	O82 Single delivery by caesarean section
4	O99 Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium
4	Q27 Other congenital malformations of peripheral vascular system
4	Q38 Other congenital malformations of tongue, mouth and pharynx
4	Q39 Congenital malformations of oesophagus
4	Q43 Other congenital malformations of intestine
4	R20 Disturbances of skin sensation
4	R43 Disturbances of smell and taste
4	R59 Enlarged lymph nodes
4	R61 Hyperhidrosis
4	S03 Dislocation, sprain and strain of joints and ligaments of head
4	S67 Crushing injury of wrist and hand
4	S68 Traumatic amputation of wrist and hand
4	S87 Crushing injury of lower leg
4	S98 Traumatic amputation of ankle and foot
4	T24 Burn of hip and lower limb, except ankle and foot
4	T28 Burn of other internal organs
4	T56 Toxic effect of metals
4	T60 Toxic effect of pesticides
4	T63 Toxic effect of contact with venomous animals
4	Z01 Other special examinations and investigations of persons without complaint or reported diagnosis
4	A39 Meningococcal infection
4	B17 Other acute viral hepatitis
4	B25 Cytomegaloviral disease
4	B45 Cryptococcosis
4	B86 Scabies
4	C02 Malignant neoplasm of other and unspecified parts of tongue
4	C03 Malignant neoplasm of gum
4	C06 Malignant neoplasm of other and unspecified parts of mouth
4	C08 Malignant neoplasm of other and unspecified major salivary glands
4	C12 Malignant neoplasm of pyriform sinus
4	C13 Malignant neoplasm of hypopharynx
4	C40 Malignant neoplasm of bone and articular cartilage of limbs
4	C41 Malignant neoplasm of bone and articular cartilage of other and unspecified sites
4	C51 Malignant neoplasm of vulva
4	C66 Malignant neoplasm of ureter
4	C68 Malignant neoplasm of other and unspecified urinary organs
4	D00 Carcinoma in situ of oral cavity, oesophagus and stomach

Group	Three Digit ICD-10 AM Diagnosis code and description
4	D01 Carcinoma in situ of other and unspecified digestive organs
4	D03 Melanoma in situ
4	D05 Carcinoma in situ of breast
4	D07 Carcinoma in situ of other and unspecified genital organs
4	D14 Benign neoplasm of middle ear and respiratory system
4	D16 Benign neoplasm of bone and articular cartilage
4	D17 Benign lipomatous neoplasm
4	D21 Other benign neoplasms of connective and other soft tissue
4	D22 Melanocytic naevi
4	D23 Other benign neoplasms of skin
4	D24 Benign neoplasm of breast
4	D25 Leiomyoma of uterus
4	D35 Benign neoplasm of other and unspecified endocrine glands
4	D38 Neoplasm of uncertain or unknown behaviour of middle ear and respiratory and intrathoracic organs
4	D45 Polycythaemia vera
4	D48 Neoplasm of uncertain or unknown behaviour of other and unspecified sites
4	D60 Acquired pure red cell aplasia [erythroblastopenia]
4	D61 Other aplastic anaemias
4	D72 Other disorders of white blood cells
4	D80 Immunodeficiency with predominantly antibody defects
4	D81 Combined immunodeficiencies
4	D83 Common variable immunodeficiency
4	D84 Other immunodeficiencies
4	E53 Deficiency of other B group vitamins
4	E77 Disorders of glycoprotein metabolism
4	E78 Disorders of lipoprotein metabolism and other lipidaemias
4	F07 Personality and behavioural disorders due to brain disease, damage and dysfunction
4	F12 Mental and behavioural disorders due to use of cannabinoids
4	F29 Unspecified nonorganic psychosis
4	F39 Unspecified mood [affective] disorder
4	G03 Meningitis due to other and unspecified causes
4	G35 Multiple sclerosis
4	G37 Other demyelinating diseases of central nervous system
4	G54 Nerve root and plexus disorders
4	G60 Hereditary and idiopathic neuropathy
4	G73 Disorders of myoneural junction and muscle in diseases classified elsewhere
4	G82 Paraplegia and tetraplegia
4	G99 Other disorders of nervous system in diseases classified elsewhere
4	H00 Hordeolum and chalazion
4	H02 Other disorders of eyelid
4	H05 Disorders of orbit
4	H17 Corneal scars and opacities
4	H25 Senile cataract
4	H26 Other cataract
4	H27 Other disorders of lens

Group	Three Digit ICD-10 AM Diagnosis code and description
4	H33 Retinal detachments and breaks
4	H34 Retinal vascular occlusions
4	H44 Disorders of globe
4	H61 Other disorders of external ear
4	H65 Nonsuppurative otitis media
4	H92 Otagia and effusion of ear
4	I81 Portal vein thrombosis
4	I85 Oesophageal varices
4	J35 Chronic diseases of tonsils and adenoids
4	K01 Embedded and impacted teeth
4	K13 Other diseases of lip and oral mucosa
4	K27 Peptic ulcer, site unspecified
4	L01 Impetigo
4	L10 Pemphigus
4	L57 Skin changes due to chronic exposure to nonionising radiation
4	L60 Nail disorders
4	L81 Other disorders of pigmentation
4	L84 Corns and callosities
4	M20 Acquired deformities of fingers and toes
4	M23 Internal derangement of knee
4	M50 Cervical disc disorders
4	M62 Other disorders of muscle
4	M67 Other disorders of synovium and tendon
4	N26 Unspecified contracted kidney
4	N43 Hydrocele and spermatocele
4	N51 Disorders of male genital organs in diseases classified elsewhere
4	N64 Other disorders of breast
4	N75 Diseases of Bartholin's gland
4	N81 Female genital prolapse
4	N82 Fistulae involving female genital tract
4	N84 Polyp of female genital tract
4	N92 Excessive, frequent and irregular menstruation
4	N93 Other abnormal uterine and vaginal bleeding
4	N94 Pain and other conditions associated with female genital organs and menstrual cycle
4	Q06 Other congenital malformations of spinal cord
4	Q13 Congenital malformations of anterior segment of eye
4	Q78 Other osteochondrodysplasias
4	Q89 Other congenital malformations, not elsewhere classified
4	R12 Heartburn
4	R15 Faecal incontinence
4	R76 Other abnormal immunological findings in serum
4	R77 Other abnormalities of plasma proteins
4	R82 Other abnormal findings in urine
4	R89 Abnormal findings in specimens from other organs, systems and tissues
4	S10 Superficial injury of neck

Group	Three Digit ICD-10 AM Diagnosis code and description
4	S16 Injury of muscle and tendon at neck level
4	S21 Open wound of thorax
4	T14 Injury of unspecified body region
4	T20 Burn of head and neck
4	T21 Burn of trunk
4	T51 Toxic effect of alcohol
4	Z08 Follow-up examination after treatment for malignant neoplasms
4	Z09 Follow-up examination after treatment for conditions other than malignant neoplasms
4	Z12 Special screening examination for neoplasms
4	Z13 Special screening examination for other diseases and disorders
4	Z29 Need for other prophylactic measures
4	Z42 Follow-up care involving plastic surgery
4	Z43 Attention to artificial openings
4	Z47 Other orthopaedic follow-up care
4	Z52 Donors of organs and tissues
4	Z58 Problems related to physical environment
4	Z60 Problems related to social environment
4	Z65 Problems related to other psychosocial circumstances
4	Z76 Persons encountering health services in other circumstances
4	M62 Other disorders of muscle

3. Two-part model used to estimate re-admission costs, adjusted for patient characteristics and comorbidities

Differences in costs by age group, sex, and region, adjusted for other characteristics, were estimated in a two-part model[3]. The first part calculated the probability of having positive re-admission costs in a probit model (Equation 1); the second (Equation 2) estimated the positive re-admission costs for each re-admission using generalised linear model with a log-link function and gamma distribution[4]. Mean costs per re-admission with 95% confidence intervals (CI) were estimated by multiplying the results of parts 1 and 2 (Equation 3), using the Stata command *twopm*.

We considered variables that may impact hospital costs which were adjusted for in the model. These included age, sex, year of re-admission, patient private health insurance, region, requirement for intensive care, requirement for mechanical ventilation, requirement for surgery or other procedure, primary diagnoses and diagnosis-related group for re-admission, other medical conditions, and the length of stay.

Equation 1: Probability of hospital costs

$$Pr(\text{Cost}_i > 0) = \alpha_0 + \alpha_1 A_i + \alpha_2 \sum_{d=2}^{794} \text{DR}_i + \alpha_3 \sum_{s=2}^6 \text{S}_i + \alpha_4 \sum_{y=2}^5 \text{Y}_i + \alpha_5 \text{G}_i + \alpha_6 \text{I}_i + \alpha_7 \text{M}_i + \alpha_8 \text{IS}_i + \alpha_9 \text{L}_i + \alpha_{10} \sum_{y=2}^4 \text{P}_i + \alpha_{11} \sum_{y=2}^5 \text{D}_i + \sum_{j=1}^{180} \alpha_j \text{CC}_{ij} + \sum_{j=202}^{204} \alpha_j \text{CC}_{ij} + \varepsilon_i$$

Where: A is age at the time of the admission, DR is the diagnosis-related group, S is the state, Y is the year of admission, G is sex, I is whether patient i went to an intensive care unit; M is whether patient i need mechanical ventilation; IS is whether patient i had insurance; L is length of stay; P is whether patient underwent a procedure or surgery during the admission; D is the primary diagnosis; CC is 180 conditions status derived from the Condition Categories classification and three additional CCs (202-204) corresponding to a past history of coronary angiography, percutaneous coronary intervention or coronary artery bypass surgery, and ε is the error term for patient i $\sim N(0, 1)$.

Equation 2: Cost estimation

$$g(\mu_i) = X_i \beta, \text{Cost}_i \sim F$$

Where: $\mu_i = E[\text{Cost}_i]$

$$g = \ln()$$

$$X_i \beta = \beta_0 + \beta_1 A_i + \beta_2 \sum_{d=2}^{794} \text{DR}_i + \beta_3 \sum_{s=2}^6 \text{S}_i + \beta_4 \sum_{y=2}^5 \text{Y}_i + \beta_5 \text{G}_i + \beta_6 \text{I}_i + \beta_7 \text{M}_i + \beta_8 \text{IS}_i + \beta_9 \text{L}_i + \beta_{10} \sum_{y=2}^4 \text{P}_i + \beta_{11} \sum_{y=2}^5 \text{D}_i + \sum_{j=1}^{180} \beta_j \text{CC}_{ij} + \sum_{j=202}^{204} \beta_j \text{CC}_{ij}$$

Where μ_i is the expected (mean) cost; F is a distribution function (gamma) for Costs; g is a link function (log); A, DR, S, Y, G, I, M, IS, L, P, D and CC are the same variables as explanatory variables in Equation 1.

Equation 3: Multiplying the first and second part

$$E[\text{Cost}|X] = \Pr(\text{Cost} > 0|X) * g(E[\text{Cost}|\text{Cost} > 0, X])$$

Where X is the explanatory variable.

References

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- 3 Ciminata G, Geue C, Langhorne P, Wu O. A two-part model to estimate inpatient, outpatient, prescribing and care home costs associated with atrial fibrillation in Scotland. *BMJ Open* 2020; 10: e028575.
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Supplementary results

Table 2. Baseline characteristics of patients at index admission, by missing data costs status

Characteristics	Total	Admissions with missing costs	Admissions without missing costs	<i>P</i>
Admissions	165612	9865	155747	
Age (years), mean (standard deviation)	78.6 (12.0)	78.5 (12.1)	78.6 (12.0)	0.50
Sex				0.21
Men	85964 (51.9%)	5181 (52.5%)	80783 (51.9%)	
Women	79648 (48.1%)	4684 (47.4%)	74964 (48.1)	
Hospital type				
Public hospital	142914 (86.3%)	5958 (60.4%)	136956 (87.9%)	<0.001
Private hospital	22698 (13.7%)	3907 (39.6%)	18791 (12.1%)	
Region				<0.001
New South Wales/Australian Capital Territory	55487 (33.5%)	4569 (46.3%)	50918 (32.7%)	
Queensland	32944 (19.9%)	2741 (27.8%)	30203 (19.4%)	
South Australia/Northern Territory	13477 (8.1%)	238 (2.4%)	13239 (8.5%)	
Tasmania	3571 (2.2%)	164 (1.7%)	3407 (2.2%)	
Victoria	43331 (26.2%)	1668 (16.9%)	41663 (26.8%)	
Western Australia	16802 (10.2%)	485 (4.9%)	16317 (10.5%)	
Prior cardiac history				
Acute coronary syndrome	18547 (11.2%)	1141 (11.6%)	17406 (11.2%)	0.23
Ischemic heart disease	31664 (19.1%)	2458 (24.9%)	29206 (18.8%)	<0.001
Hypertension	62321 (37.6%)	3915 (39.7%)	58406 (37.5%)	<0.001
Congestive heart failure	75396 (45.5%)	4704 (47.7%)	70692 (45.4%)	<0.001
Valvular and rheumatic heart disease	21149 (12.8%)	1645 (16.7%)	19504 (12.5%)	<0.001
Arrhythmia or conduction system disorder	45621 (27.6%)	3060 (31.0%)	42561 (27.3%)	<0.001
Cerebrovascular diseases	5144 (3.1%)	313 (3.2%)	4831 (3.1%)	0.69
Vascular disease	9492 (5.7%)	630 (6.4%)	8862 (5.7%)	0.004
Diabetes	69233 (41.8%)	3884 (39.4%)	65349 (42.0%)	<0.001
Other medical conditions				
Major and metastatic cancer	5365 (3.2%)	367 (3.7%)	4998 (3.2%)	0.005
Chronic liver disease/cirrhosis	2886 (1.7%)	171 (1.7%)	2715 (1.7%)	0.94
Chronic lung disease	34995 (21.1%)	2172 (22.0%)	32823 (21.1%)	0.026
Pneumonia	33763 (20.4%)	2136 (21.7%)	31627 (20.3%)	0.001
Dialysis or renal failure	49704 (30.0%)	2860 (29.0%)	46844 (30.1%)	0.023
Fluid and electrolyte disorders	46031 (27.8%)	2851 (28.9%)	43180 (27.7%)	0.011
Anaemia and other haematological disorders	45136 (27.3%)	2758 (28.0%)	42378 (27.2%)	0.11
Psychiatric disorders	11913 (7.2%)	825 (8.4%)	11088 (7.1%)	<0.001
Geriatric syndromes				
Dementia and senility	9130 (5.5%)	492 (5.0%)	8638 (5.6%)	0.018
Chronic ulcers	7635 (4.6%)	500 (5.1%)	7135 (4.6%)	0.025
Protein-calorie malnutrition	24567 (14.8%)	1598 (16.2%)	22969 (14.8%)	<0.001
Incontinence, urinary tract infection and other urinary tract disorders	33768 (20.4%)	2170 (22.0%)	31598 (20.3%)	<0.001
Hemiplegia, paraplegia, paralysis, functional disability	10400 (6.3%)	596 (6.0%)	9804 (6.3%)	0.32

Figure 1. Density distribution of re-admission costs, before and after imputing missing values

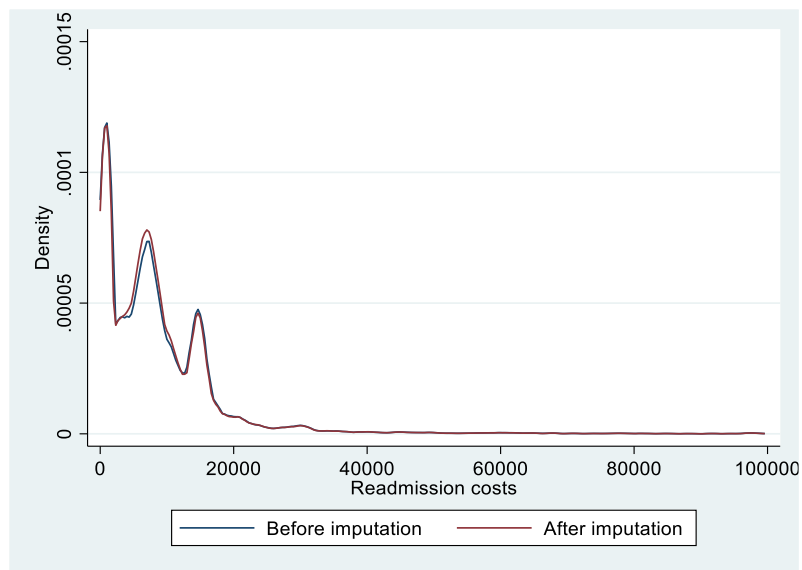


Table 3. Condition Categories used to define conditions listed in baseline characteristics

Condition	Condition Category
Prior Cardiac History	
Acute coronary syndrome	CC81 Acute myocardial infarction
	CC82 Unstable angina and other acute ischemic heart disease
Ischemic heart disease	CC83 Angina pectoris/old myocardial infarction
	CC84 Coronary atherosclerosis/other chronic ischemic heart disease
Hypertension	CC91 Hypertension
Congestive heart failure	CC80 Congestive heart failure
Valvular and rheumatic heart disease	CC86 Valvular and rheumatic heart disease
Arrhythmia or conduction system disorder	CC92 Specified heart arrhythmias
	CC93 Other heart rhythm and conduction disorders
Cerebrovascular diseases	CC95 Cerebral hemorrhage
	CC96 Ischemic or unspecified stroke
	CC97 Precerebral arterial occlusion and transient cerebral ischemia
	CC98 Cerebral atherosclerosis and aneurysm
	CC99 Cerebrovascular disease, unspecified
Vascular disease	CC104 Vascular disease with complications
	CC105 Vascular disease
Other Conditions	
Diabetes	CC15 Diabetes with renal or peripheral circulatory manifestation
	CC16 Diabetes with neurologic or other specified manifestation
	CC17 Diabetes with acute complications
	CC18 Diabetes with ophthalmologic or unspecified manifestation
	CC19 Diabetes without complication
	CC20 Type I diabetes mellitus
	CC119 Proliferative diabetic retinopathy and vitreous haemorrhage
	CC120 Diabetic and other vascular retinopathies
Major and metastatic cancer	CC7 Metastatic cancer and acute leukemia
	CC8 Lung, upper digestive tract, and other severe cancers
	CC9 Lymphatic, head and neck, brain, and other major cancers
Chronic liver disease & cirrhosis	CC25 End-stage liver disease
	CC26 Cirrhosis of liver
Chronic lung disease	CC108 Chronic obstructive pulmonary disease
	CC109 Fibrosis of lung and other chronic lung disorders
Pneumonia	CC111 Aspiration and specified bacterial pneumonias
	CC112 Pneumococcal pneumonia, empyema, lung abscess
	CC113 Viral and unspecified pneumonia, pleurisy
Dialysis or renal failure	CC129 End stage renal disease
	CC130 Dialysis status
	CC131 Renal failure
Fluid and electrolyte disorders	CC23 Disorders of fluid/electrolyte/acid-base balance
Anaemia and other haematological disorders	CC44 Severe hematological disorders
	CC46 Coagulation defects and other specified haematological disorders
	CC47 Iron deficiency and other/unspecified anemias and blood disease
Psychiatric disorders	CC54 Schizophrenia

Condition	Condition Category
	CC55 Major depressive, bipolar, and paranoid disorders
	CC56 Reactive and unspecified psychosis
	CC57 Personality disorders
	CC58 Depression
	CC59 Anxiety disorders
	CC60 Other psychiatric disorders
Geriatric Syndromes	
Dementia and senility	CC49 Dementia
	CC50 Senility, nonpsychotic organic brain syndromes/conditions
Chronic ulcers	CC148 Decubitus ulcer of skin
	CC149 Chronic ulcer of skin, except decubitus
Protein-calorie malnutrition	CC21 Protein-calorie malnutrition
Incontinence, UTI and other urinary tract disorders	CC134 Incontinence
	CC135 Urinary tract infection
	CC136 Other urinary tract disorders
Hemiplegia, paraplegia, paralysis, functional disability	CC100 Hemiplegia/hemiparesis
	CC101 Cerebral palsy and other paralytic syndromes
	CC102 Speech, language, cognitive, perceptual deficits
	CC67 Quadriplegia, other extensive paralysis
	CC68 Paraplegia
	CC69 Spinal cord disorders/injuries
	CC177 Amputation status, lower limb/amputation complications
	CC178 Amputation status, upper limb

Table 4. Results of the two-part model (does not include variables excluded because of collinearity)

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
Probit model					
Age group					
Group 3 (65 - <75 yrs)	3.80	0.43 to 7.18	1.72	2.21	0.027
Group 4 (75 - <85 yrs)	2.71	0.68 to 4.75	1.04	2.61	0.009
Sex					
Male	1.54	0.40 to 2.69	0.58	2.64	0.008
State					
Group 2 (Queensland)	7.24	1.30 to 13.17	3.03	2.39	0.017
Group 5 (Victoria)	1.44	0.26 to 2.63	0.60	2.38	0.017
Diagnosis-related group	0.013	0.002 to 0.025	0.006	2.47	0.014
Year	0.65	0.16 to 1.14	0.25	2.58	0.010
Insurance status	-1.16	-3.38 to 1.06	1.13	-1.02	0.31
Length of stay	0.50	0.12 to 0.87	0.19	2.61	0.009
Partition status	-1.00	-1.99 to -0.02	0.50	-2	0.046
Primary diagnosis	0.0001	-0.0006 to 0.0008	0.0003	0.3	0.76
CC6 Other infectious iseases	0.42	-1.03 to 1.88	0.74	0.57	0.57
CC10 Breast, prostate, colorectal and other cancers and tumours	-1.89	-3.42 to -0.36	0.78	-2.42	0.016
CC12 Other digestive and urinary neoplasms	7.78	2.97 to 12.59	2.45	3.17	0.002
CC15 Diabetes with renal or peripheral circulatory manifestation	0.38	-0.39 to 1.15	0.39	0.96	0.34
CC19 Diabetes without complication	-0.91	-2.24 to 0.42	0.68	-1.34	0.18
CC21 Protein-calorie malnutrition	-4.54	-8.28 to -0.79	1.91	-2.37	0.018
CC23 Disorders of fluid/electrolyte/acid-base balance	0.26	-0.91 to 1.44	0.60	0.44	0.66
CC24 Other endocrine/metabolic/nutritional disorders	2.49	0.22 to 4.76	1.16	2.15	0.032
CC26 Cirrhosis of liver	-23.53	-33.31 to -13.75	4.99	-4.72	<0.001
CC34 Peptic ulcer, haemorrhage, other specified gastrointestinal disorders	-3.68	-7.80 to 0.43	2.10	-1.75	0.08
CC36 Other gastrointestinal disorders	2.88	0.39 to 5.37	1.27	2.27	0.023
CC38 Rheumatoid arthritis and inflammatory connective tissue disease	-7.07	-13.58 to -0.55	3.32	-2.13	0.033
CC40 Osteoarthritis of hip or knee	-6.19	-11.58 to -0.81	2.75	-2.25	0.024
CC41 Osteoporosis and other bone/cartilage disorders	-0.85	-3.53 to 1.83	1.37	-0.62	0.53
CC43 Other musculoskeletal and connective tissue disorders	6.62	-0.30 to 13.54	3.53	1.87	0.06
CC45 Disorders of immunity	-19.68	-35.37 to -4.00	8.00	-2.46	0.014
CC46 Coagulation defects and other specified Haematological disorders	-1.62	-3.57 to 0.34	1.00	-1.62	0.10
CC47 Iron deficiency and other/unspecified anaemias and blood disease	0.97	-1.37 to 3.31	1.19	0.81	0.42
CC48 Delirium and encephalopathy	-4.16	-7.53 to -0.79	1.72	-2.42	0.016
CC49 Dementia	4.75	2.27 to 7.22	1.26	3.76	<0.001
CC51 Drug/alcohol psychosis	-9.18	-14.45 to -3.91	2.69	-3.41	0.001
CC53 Drug/alcohol abuse, without dependence	11.83	—	—	—	—
CC73 Parkinsons and Huntington's diseases	-8.81	-16.48 to -1.14	3.91	-2.25	0.024
CC74 Seizure disorders and convulsions	-10.60	-18.40 to -2.80	3.98	-2.66	0.008
CC76 Mononeuropathy, other neurological conditions/injuries	-2.88	-4.88 to -0.88	1.02	-2.82	0.005
CC79 Cardiorespiratory failure & shock	-6.51	-11.94 to -1.08	2.77	-2.35	0.019
CC80 Congestive heart failure	-0.82	-2.54 to 0.90	0.88	-0.93	0.35
CC81 Acute myocardial infarction	2.76	0.46 to 5.05	1.17	2.35	0.019
CC82 Unstable angina and other acute ischemic heart disease	-3.32	-5.30 to -1.34	1.01	-3.28	0.001

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
CC83 Angina pectoris/old myocardial infarction	-1.57	-3.39 to 0.26	0.93	-1.68	0.09
CC84 Coronary atherosclerosis/other chronic ischemic heart disease	-3.22	-6.50 to 0.05	1.67	-1.93	0.05
CC86 Valvular and rheumatic heart disease	10.70	0.72 to 20.69	5.10	2.10	0.036
CC89 Hypertensive heart and renal disease or encephalopathy	-6.56	-11.73 to -1.39	2.64	-2.49	0.013
CC91 Hypertension	2.23	0.77 to 3.69	0.74	2.99	0.003
CC92 Specified heart arrhythmias	-2.28	-4.09 to -0.46	0.92	-2.46	0.014
CC93 Other heart rhythm and conduction disorders	3.58	-0.40 to 7.56	2.03	1.76	0.08
CC94 Other and unspecified heart disease	1.48	0.21 to 2.76	0.65	2.28	0.023
CC104 Vascular disease with complications	-6.15	-11.63 to -0.67	2.80	-2.20	0.028
CC106 Other circulatory disease	2.25	-1.47 to 5.97	1.90	1.19	0.24
CC108 Chronic obstructive pulmonary disease	-1.49	-3.42 to 0.43	0.98	-1.52	0.13
CC109 Fibrosis of lung and other chronic lung disorders	-0.05	-3.01 to 2.91	1.51	-0.03	0.97
CC111 Aspiration and specified bacterial pneumonias	-8.75	—	—	—	—
CC113 Viral and unspecified pneumonia, pleurisy	7.44	1.14 to 13.74	3.22	2.31	0.021
CC114 Pleural effusion/pneumothorax	3.35	0.23 to 6.47	1.59	2.11	0.035
CC115 Other lung disorders	0.89	-0.42 to 2.19	0.67	1.33	0.18
CC123 Cataract	11.03	—	—	—	—
CC127 Other ear, nose, throat, and mouth disorders	-3.86	-6.71 to -1.01	1.45	-2.65	0.008
CC131 Renal failure	0.40	-1.38 to 2.18	0.91	0.44	0.66
CC135 Urinary tract infection	-0.31	-1.70 to 1.08	0.71	-0.44	0.66
CC136 Other urinary tract disorders	1.51	-0.53 to 3.55	1.04	1.45	0.15
CC140 Male genital disorders	-7.07	-13.28 to -0.86	3.17	-2.23	0.026
CC148 Decubitus ulcer of skin	1.14	-1.47 to 3.76	1.34	0.86	0.39
CC152 Cellulitis, local skin infection	3.38	-0.56 to 7.33	2.01	1.68	0.09
CC153 Other dermatological disorders	-3.58	-6.85 to -0.31	1.67	-2.14	0.032
CC155 Major head injury	-6.07	-11.76 to -0.39	2.90	-2.09	0.036
CC162 Other injuries	1.21	-0.57 to 3.00	0.91	1.33	0.18
CC163 Poisonings and allergic reactions	-6.41	-10.63 to -2.19	2.15	-2.97	0.003
CC164 Major complications of medical care and trauma	-7.71	-13.67 to -1.75	3.04	-2.54	0.011
CC166 Major symptoms, abnormalities	2.37	0.18 to 4.57	1.12	2.12	0.034
CC167 Minor symptoms, signs, findings	1.33	0.34 to 2.32	0.51	2.63	0.009
CC176 Artificial openings for feeding or elimination	-5.70	-8.56 to -2.84	1.46	-3.90	<0.001
CC180 Radiation therapy	-0.56	-3.18 to 2.07	1.34	-0.41	0.68
Model constant (intercept term)	-1306.79	-2297.65 to -315.93	505.55	-2.58	0.01
Generalised linear model					
Age group					
Group 2(55-<65 yrs)	-0.007	-0.045 to -0.032	0.020	-0.33	0.74
Group 3 (65 - <75 yrs)	0.052	0.017 to 0.088	0.018	2.88	0.004
Group 4 (75 - <85 yrs)	0.047	0.013 to 0.082	0.018	2.69	0.007
Group 5 (≥85 yrs)	0.053	0.018 to 0.089	0.018	2.96	0.003
Sex					
Male	-0.014	-0.027 to 0.000	0.007	-1.94	0.05
State					
Group 2 (Queensland)	-0.030	-0.048 to -0.013	0.009	-3.37	0.001
Group 3 (South Australia/Northern Territory)	-0.133	-0.156 to -0.109	0.012	-11.28	<0.001
Group 4 (Tasmania)	-0.088	-0.129 to -0.047	0.021	-4.20	<0.001
Group 5 (Victoria)	-0.043	-0.060 to -0.026	0.009	-4.91	<0.001
Group 6 (Western Australia)	-0.086	-0.110 to -0.063	0.012	-7.16	<0.001

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
Diagnosis-related group	0.001	-0.001 to -0.001	0.000	-31.67	<0.001
Year	-0.035	-0.040 to -0.031	0.002	-15.00	<0.001
Private	0.16	0.14 to 0.19	0.01	12.71	<0.001
Intensive care unit treatment	0.79	0.74 to 0.83	0.02	36.13	<0.001
Mechanical ventilation	0.59	0.52 to 0.66	0.04	15.61	<0.001
Insurance status	-0.015	-0.035 to 0.006	0.011	-1.38	0.17
Length of stay	0.031	0.029 to 0.033	0.001	32.05	<0.001
Partition status	-0.36	-0.38 to -0.34	0.010	-35.66	<0.001
Primary diagnosis	0.000	-0.000 to -0.000	0.000	-56.18	<0.001
CC1 Human Immunodeficiency virus/acquired immunodeficiency syndrome	-0.077	-0.283 to 0.128	0.105	-0.74	0.46
CC2 Septicaemia/shock	-0.002	-0.032 to 0.029	0.016	-0.10	0.92
CC3 Central nervous system infection	-0.007	-0.175 to 0.161	0.086	-0.08	0.93
CC4 Tuberculosis	-0.28	-0.44 to -0.11	0.09	-3.24	0.001
CC5 Opportunistic infections	0.006	-0.084 to 0.095	0.046	0.13	0.90
CC6 Other infectious diseases	0.006	-0.013 to 0.025	0.010	0.64	0.52
CC7 Metastatic cancer and acute leukaemia	-0.042	-0.089 to 0.005	0.024	-1.75	0.08
CC8 Lung, upper digestive tract, and other severe cancers	-0.082	-0.130 to -0.034	0.025	-3.33	0.001
CC9 Lymphatic, head and neck, brain, and other major cancers	-0.134	-0.181 to -0.087	0.024	-5.59	<0.001
CC10 Breast, prostate, colorectal and other cancers and tumours	-0.030	-0.066 to 0.005	0.018	-1.68	0.09
CC11 Other respiratory and heart neoplasms	-0.118	-0.282 to 0.046	0.084	-1.41	0.16
CC12 Other digestive and urinary neoplasms	-0.072	-0.108 to -0.037	0.018	-3.97	<0.001
CC13 Other neoplasms	-0.070	-0.096 to -0.043	0.013	-5.19	<0.001
CC14 Benign neoplasms of skin, breast, eye	-0.071	-0.149 to 0.007	0.040	-1.79	0.07
CC15 Diabetes with renal or peripheral circulatory manifestations	0.024	0.005 to 0.042	0.009	2.52	0.012
CC16 Diabetes with neurologic or other specified manifestations	0.042	0.023 to 0.062	0.010	4.24	0
CC17 Diabetes with acute complications	-0.022	-0.069 to 0.025	0.024	-0.93	0.35
CC18 Diabetes with ophthalmologic or unspecified manifestation	-0.027	-0.054 to 0.000	0.014	-1.99	0.047
CC19 Diabetes without complication	-0.023	-0.039 to -0.008	0.008	-3.03	0.002
CC21 Protein-calorie malnutrition	0.024	0.007 to 0.041	0.009	2.74	0.006
CC22 Other significant endocrine and metabolic disorders	-0.026	-0.050 to -0.002	0.012	-2.11	0.035
CC23 Disorders of fluid/electrolyte/acid-base balance	-0.033	-0.048 to -0.018	0.008	-4.19	<0.001
CC24 Other endocrine/metabolic/nutritional disorders	0.034	0.017 to 0.051	0.009	3.94	<0.001
CC25 End-stage liver disease	-0.003	-0.056 to 0.050	0.027	-0.13	0.9
CC26 Cirrhosis of liver	0.114	0.066 to 0.162	0.024	4.66	<0.0010
CC27 Chronic hepatitis	-0.016	-0.069 to 0.038	0.027	-0.57	0.57
CC28 Acute liver failure/disease	0.174	0.029 to 0.320	0.074	2.35	0.019
CC29 Other hepatitis and liver disease	0.040	0.003 to 0.076	0.019	2.13	0.033
CC30 Gallbladder and biliary tract disorders	-0.009	-0.053 to 0.034	0.022	-0.43	0.67
CC31 Intestinal obstruction/perforation	0.067	0.010 to 0.123	0.029	2.32	0.02
CC32 Pancreatic disease	0.037	-0.033 to 0.107	0.036	1.03	0.30
CC33 Inflammatory bowel disease	-0.046	-0.259 to 0.166	0.109	-0.43	0.67
CC34 Peptic ulcer, haemorrhage, other specified gastrointestinal disorders	-0.018	-0.043 to 0.006	0.012	-1.45	0.15
CC35 Appendicitis	0.075	-0.118 to 0.268	0.098	0.77	0.44
CC36 Other gastrointestinal disorders	0.006	-0.009 to 0.020	0.007	0.77	0.44
CC37 Bone/joint/muscle infections/necrosis	-0.010	-0.062 to 0.043	0.027	-0.36	0.72
CC38 Rheumatoid arthritis and inflammatory connective tissue disease	0.027	-0.024 to 0.077	0.026	1.04	0.30
CC39 Disorders of the vertebrae and spinal discs	0.039	-0.004 to 0.082	0.022	1.76	0.08

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
CC40 Osteoarthritis of hip or knee	-0.027	-0.062 to 0.007	0.018	-1.54	0.12
CC41 Osteoporosis and other bone/cartilage disorders	0.011	-0.027 to 0.048	0.019	0.55	0.58
CC42 Congenital/developmental skeletal and connective tissue disorders	0.340	-0.111 to 0.792	0.230	1.48	0.14
CC43 Other musculoskeletal and connective tissue disorders	-0.005	-0.021 to 0.011	0.008	-0.62	0.54
CC44 Severe haematological disorders	0.012	-0.044 to 0.068	0.028	0.41	0.68
CC45 Disorders of immunity	-0.090	-0.151 to -0.028	0.031	-2.87	0.004
CC46 Coagulation defects and other specified haematological disorders	0.007	-0.015 to 0.029	0.011	0.63	0.53
CC47 Iron deficiency and other/unspecified anaemias and blood disease	-0.019	-0.034 to -0.004	0.008	-2.43	0.015
CC48 Delirium and encephalopathy	-0.004	-0.023 to 0.015	0.010	-0.43	0.67
CC49 Dementia	0.027	0.003 to 0.051	0.012	2.21	0.027
CC50 Senility, nonpsychotic organic brain syndromes/conditions	0.046	-0.028 to 0.119	0.038	1.22	0.22
CC51 Drug/alcohol psychosis	0.025	-0.028 to 0.079	0.027	0.93	0.35
CC52 Drug/alcohol dependence	0.031	-0.011 to 0.072	0.021	1.45	0.15
CC53 Drug/alcohol abuse, without dependence	-0.003	-0.026 to 0.021	0.012	-0.23	0.82
CC54 Schizophrenia	-0.025	-0.098 to 0.047	0.037	-0.69	0.49
CC55 Major depressive, dipolar, and paranoid disorders	0.043	-0.036 to 0.123	0.040	1.07	0.29
CC56 Reactive and unspecified psychosis	0.079	-0.086 to 0.243	0.084	0.94	0.35
CC57 Personality disorders	0.131	-0.030 to 0.292	0.082	1.6	0.11
CC58 Depression	0.022	-0.025 to 0.068	0.024	0.92	0.36
CC59 Anxiety disorders	-0.006	-0.067 to 0.054	0.031	-0.21	0.83
CC60 Other psychiatric disorders	-0.047	-0.071 to -0.022	0.013	-3.68	<0.001
CC61 Profound mental retardation/developmental disability	0.638	0.431 to 0.845	0.106	6.04	<0.001
CC62 Severe mental retardation/developmental disability	-0.276	-0.372 to -0.180	0.049	-5.61	<0.001
CC63 Moderate mental retardation/developmental disability	-0.297	-0.429 to -0.166	0.067	-4.45	<0.001
CC64 Mild/unspecified mental retardation/developmental disability	-0.017	-0.137 to 0.102	0.061	-0.29	0.77
CC65 Other developmental disability	-0.191	-0.390 to 0.007	0.101	-1.89	0.06
CC67 Quadriplegia, other extensive paralysis	0.447	0.178 to 0.717	0.137	3.26	0.001
CC69 Spinal cord disorders/injuries	0.064	-0.084 to 0.212	0.076	0.85	0.40
CC70 Muscular dystrophy	0.022	-0.141 to 0.185	0.083	0.27	0.79
CC71 Polyneuropathy	-0.034	-0.098 to 0.030	0.032	-1.05	0.30
CC72 Multiple sclerosis	0.093	-0.157 to 0.343	0.128	0.73	0.46
CC73 Parkinsons and Huntington's diseases	-0.021	-0.072 to 0.031	0.026	-0.79	0.43
CC74 Seizure disorders and convulsions	-0.035	-0.095 to 0.026	0.031	-1.12	0.26
CC75 Coma, brain compression/anoxic damage	-0.006	-0.082 to 0.070	0.039	-0.16	0.87
CC76 Mononeuropathy, other neurological conditions/injuries	0.033	-0.003 to 0.068	0.018	1.80	0.07
CC77 Respirator dependence/tracheostomy status	-0.087	-0.187 to 0.012	0.051	-1.73	0.08
CC78 Respiratory arrest	0.177	-0.159 to 0.512	0.171	1.03	0.30
CC79 Cardiorespiratory failure & shock	0.004	-0.020 to 0.028	0.012	0.31	0.75
CC80 Congestive heart failure	0.036	0.021 to 0.051	0.008	4.63	<0.001
CC81 Acute myocardial infarction	-0.027	-0.049 to -0.005	0.011	-2.44	0.015
CC82 Unstable angina and other acute ischemic heart disease	-0.017	-0.047 to 0.014	0.016	-1.07	0.29
CC83 Angina pectoris/old myocardial infarction	-0.035	-0.059 to -0.011	0.012	-2.89	0.004
CC84 Coronary atherosclerosis/other chronic ischemic heart disease	0.021	-0.001 to 0.042	0.011	1.89	0.06
CC85 Heart infection/inflammation, except rheumatic	0.061	-0.025 to 0.148	0.044	1.39	0.17
CC86 Valvular and rheumatic heart disease	0.028	0.011 to 0.045	0.009	3.25	0.001

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
CC87 Major congenital cardiac/circulatory defect	0.299	0.109 to 0.490	0.097	3.08	0.002
CC88 Other congenital heart/circulatory disease	-0.017	-0.115 to 0.080	0.050	-0.35	0.73
CC89 Hypertensive heart and renal disease or encephalopathy	-0.062	-0.111 to -0.012	0.025	-2.45	0.014
CC90 Hypertensive heart disease	0.102	-0.124 to 0.328	0.115	0.89	0.38
CC91 Hypertension	-0.054	-0.068 to -0.040	0.007	-7.45	<0.001
CC92 Specified heart arrhythmias	0.019	0.004 to 0.035	0.008	2.44	0.015
CC93 Other heart rhythm and conduction disorders	-0.005	-0.025 to 0.015	0.010	-0.49	0.62
CC94 Other and unspecified heart disease	0.034	0.004 to 0.065	0.016	2.20	0.028
CC95 Cerebral haemorrhage	0.095	-0.023 to 0.212	0.060	1.58	0.11
CC96 Ischemic or unspecified stroke	-0.022	-0.074 to 0.031	0.027	-0.81	0.42
CC97 Precerebral arterial occlusion and transient cerebral ischemia	0.002	-0.051 to 0.055	0.027	0.08	0.94
CC98 Cerebral atherosclerosis and aneurysm	-0.006	-0.159 to 0.147	0.078	-0.08	0.94
CC99 Cerebrovascular disease, unspecified	0.092	-0.107 to 0.291	0.102	0.91	0.36
CC100 Hemiplegia/hemiparesis	-0.003	-0.049 to 0.043	0.023	-0.11	0.91
CC101 Cerebral palsy and other paralytic syndromes	0.052	-0.061 to 0.166	0.058	0.9	0.37
CC102 Speech, language, cognitive, perceptual deficits	-0.001	-0.031 to 0.029	0.015	-0.08	0.94
CC104 Vascular disease with complications	-0.015	-0.048 to 0.017	0.017	-0.92	0.36
CC105 Vascular disease	0.001	-0.033 to 0.035	0.017	0.07	0.95
CC106 Other circulatory disease	0.020	0.002 to 0.037	0.009	2.20	0.028
CC107 Cystic fibrosis	-0.214	-0.481 to 0.053	0.136	-1.57	0.12
CC108 Chronic obstructive pulmonary disease	-0.010	-0.026 to 0.005	0.008	-1.33	0.18
CC109 Fibrosis of lung and other chronic lung disorders	0.006	-0.024 to 0.037	0.016	0.39	0.69
CC110 Asthma	-0.059	-0.098 to -0.021	0.020	-3.03	0.002
CC111 Aspiration and specified bacterial pneumonias	0.048	0.005 to 0.090	0.022	2.20	0.028
CC112 Pneumococcal pneumonia, empyema, lung abscess	0.108	0.033 to 0.183	0.038	2.83	0.005
CC113 Viral and unspecified pneumonia, pleurisy	0.012	-0.004 to 0.028	0.008	1.50	0.13
CC114 Pleural effusion/pneumothorax	0.003	-0.025 to 0.031	0.014	0.20	0.84
CC115 Other lung disorders	-0.047	-0.064 to -0.030	0.009	-5.43	<0.001
CC116 Legally blind	0.062	-0.065 to 0.188	0.065	0.96	0.34
CC117 Major eye infections/inflammations	0.075	-0.150 to 0.300	0.115	0.65	0.52
CC118 Retinal detachment	-0.029	-0.180 to 0.123	0.077	-0.37	0.71
CC119 Proliferative diabetic retinopathy and vitreous Haemorrhage	0.088	-0.059 to 0.234	0.075	1.17	0.24
CC120 Diabetic and other vascular retinopathies	-0.097	-0.231 to 0.037	0.068	-1.41	0.16
CC121 Retinal disorders, except detachment and vascular retinopathies	-0.078	-0.146 to -0.010	0.035	-2.25	0.024
CC122 Glaucoma	0.069	-0.081 to 0.218	0.076	0.90	0.37
CC123 Cataract	-0.026	-0.058 to 0.007	0.017	-1.56	0.12
CC124 Other eye disorders	0.029	-0.003 to 0.061	0.016	1.80	0.07
CC125 Significant ear, nose, and throat disorders	-0.099	-0.159 to -0.039	0.031	-3.21	0.001
CC126 Hearing loss	-0.023	-0.084 to 0.038	0.031	-0.75	0.45
CC127 Other ear, nose, throat, and mouth disorders	0.022	-0.006 to 0.051	0.015	1.55	0.12
CC128 Kidney transplant status	0.028	-0.056 to 0.112	0.043	0.66	0.51
CC130 Dialysis status	-1.286	-1.319 to -1.252	0.017	-75.38	<0.001
CC131 Renal failure	-0.010	-0.026 to 0.006	0.008	-1.21	0.23
CC132 Nephritis	-0.050	-0.109 to 0.010	0.030	-1.64	0.10
CC133 Urinary obstruction and retention	0.029	0.002 to 0.056	0.014	2.14	0.032
CC134 Incontinence	0.061	0.040 to 0.082	0.011	5.73	<0.001
CC135 Urinary tract infection	0.048	0.026 to 0.070	0.011	4.30	<0.001

Variable	Parameter estimate (coefficient)	95% Confidence Interval	Standard error	z	P
CC136 Other urinary tract disorders	-0.032	-0.058 to -0.006	0.013	-2.43	0.015
CC138 Pelvic inflammatory disease and other specified female genital disorders	0.027	-0.080 to 0.133	0.054	0.49	0.62
CC139 Other female genital disorders	-0.024	-0.075 to 0.026	0.026	-0.94	0.35
CC140 Male genital disorders	0.017	-0.013 to 0.048	0.016	1.12	0.26
CC142 Miscarriage/abortion	0.716	-0.037 to 1.470	0.384	1.86	0.06
CC143 Completed pregnancy with major complications	-0.281	-0.754 to 0.192	0.241	-1.16	0.24
CC144 Completed pregnancy with complications	0.224	-0.403 to 0.850	0.320	0.70	0.48
CC145 Completed pregnancy without complications (normal delivery)	-0.183	-0.783 to 0.417	0.306	-0.60	0.55
CC146 Uncompleted pregnancy with complications	0.345	-0.120 to 0.811	0.237	1.45	0.15
CC147 Uncompleted pregnancy with no or minor complications	0.093	-0.291 to 0.477	0.196	0.47	0.64
CC148 Decubitus ulcer of skin	0.062	0.034 to 0.090	0.014	4.4	0
CC149 Chronic ulcer of skin, except decubitus	-0.048	-0.122 to 0.026	0.038	-1.27	0.21
CC151 Other third-degree and extensive burns	-0.028	-0.258 to 0.201	0.117	-0.24	0.81
CC152 Cellulitis, local skin infection	0.049	0.025 to 0.072	0.012	4.12	0
CC153 Other dermatological disorders	0.021	-0.002 to 0.043	0.012	1.78	0.07
CC155 Major head injury	-0.023	-0.060 to 0.014	0.019	-1.21	0.23
CC156 Concussion or unspecified head injury	-0.047	-0.089 to -0.004	0.022	-2.14	0.033
CC157 Vertebral fractures without spinal cord injury	-0.006	-0.053 to 0.042	0.024	-0.23	0.82
CC158 Hip fracture/dislocation	-0.019	-0.055 to 0.016	0.018	-1.05	0.29
CC159 Major fracture, except of skull, vertebrae, or hip	-0.015	-0.075 to 0.046	0.031	-0.48	0.63
CC160 Internal injuries	0.026	-0.048 to 0.100	0.038	0.68	0.49
CC161 Traumatic amputation	-0.015	-0.512 to 0.482	0.254	-0.06	0.95
CC162 Other injuries	0.020	0.001 to 0.039	0.010	2.06	0.04
CC163 Poisonings and Allergic reactions	0.011	-0.027 to 0.049	0.020	0.57	0.57
CC164 Major complications of medical care and trauma	0.022	-0.003 to 0.046	0.012	1.73	0.08
CC165 Other complications of medical care	-0.030	-0.075 to 0.015	0.023	-1.31	0.19
CC166 Major symptoms, abnormalities	-0.037	-0.051 to -0.023	0.007	-5.22	<0.001
CC167 Minor symptoms, signs, findings	0.032	0.018 to 0.046	0.007	4.56	<0.001
CC170 Serious perinatal problem affecting newborn	0.578	0.052 to 1.103	0.268	2.15	0.031
CC174 Major organ transplant status	0.225	0.081 to 0.370	0.074	3.06	0.002
CC175 Other organ transplant/replacement	0.054	0.015 to 0.093	0.020	2.73	0.006
CC176 Artificial openings for feeding or elimination	0.065	-0.003 to 0.134	0.035	1.87	0.06
CC177 Amputation status, lower limb/amputation complications	0.084	0.036 to 0.131	0.024	3.42	0.001
CC178 Amputation status, upper limb	-0.382	-0.500 to -0.265	0.060	-6.36	<0.001
CC179 Post-surgical states/aftercare/elective	0.022	0.005 to 0.038	0.008	2.58	0.010
CC180 Radiation therapy	-0.002	-0.051 to 0.047	0.025	-0.07	0.95
CC202 Prior coronary angiography	-0.014	-0.042 to 0.014	0.014	-0.98	0.33
CC203 Prior percutaneous coronary intervention	0.006	-0.040 to 0.053	0.024	0.28	0.78
CC204 Prior coronary artery bypass graft surgery	0.012	-0.063 to 0.087	0.038	0.31	0.76
Model constant (intercept)	81.18	71.91 to 90.44	4.72	17.18	<0.001

* Results of the two part model (probit and generalised linear model) output shown, including the model parameter estimate (coefficient), the 95% confidence interval for the parameter estimate, the standard error of the parameter estimate, z (parameter estimate/standard error), and statistical significance testing result (P).

Table 5. Unplanned re-admission costs by sex, age group, and state/territory, adjusted for all other factors (two-part model)

	Comparison	P
Sex	2 vs 1	0.05
Age groups	2 vs 1	0.74
Group 1 (<55 yrs)	3 vs 1	0.003
Group 2 (55- <65 yrs)	4 vs 1	0.006
Group 3 (65 - <75 yrs)	5 vs 1	0.002
Group 4 (75 - <85 yrs)	3 vs 2	<0.001
Group 5 (≥85 yrs)	4 vs 2	<0.001
	5 vs 2	<0.001
	4 vs 3	0.61
	5 vs 3	0.93
	5 vs 4	0.42
Region	2 vs 1	0.001
Group 1 (New South Wales/Australian Capital Territory)	3 vs 1	<0.001
Group 2 (Queensland)	4 vs 1	<0.001
Group 3 (South Australia/Northern Territory)	5 vs 1	<0.001
Group 4 (Tasmania)	6 vs 1	<0.001
Group 5 (Victoria)	3 vs 2	<0.001
Group 6 (Western Australia)	4 vs 2	0.005
	5 vs 2	0.16
	6 vs 2	<0.001
	4 vs 3	0.049
	5 vs 3	<0.001
	6 vs 3	0.001
	5 vs 4	0.030
	6 vs 4	0.94
	6 vs 5	<0.001

STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) check list (the page numbers provided refer to the submitted manuscript, not the published article or its Supporting Information file).

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5
		(b) For matched studies, give matching criteria and number of exposed and unexposed	NA
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5
Bias	9	Describe any efforts to address potential sources of bias	5,7
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	6-7
		(b) Describe any methods used to examine subgroups and interactions	7
		(c) Explain how missing data were addressed	7
		(d) If applicable, explain how loss to follow-up was addressed	5
		(e) Describe any sensitivity analyses	7
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	15
		(b) Give reasons for non-participation at each stage	15
		(c) Consider use of a flow diagram	15
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	16
		(b) Indicate number of participants with missing data for each variable of interest	7
		(c) Summarise follow-up time (eg, average and total amount)	7
Outcome data	15*	Report numbers of outcome events or summary measures over time	7-8