Indicator Specification
Acute Stroke
Clinical Care Standard

June 2015

Clinical Care Standards

strokefoundation

Suggested citation

Acknowledgment

Disclaimer

Contents

Acute Stroke Clinical Care Standard

1 A person with suspected stroke is immediately assessed at first contact using a validated stroke screening tool, such as the F.A.S.T. (Face, Arm, Speech and Time) test.

2 A patient with ischaemic stroke for whom reperfusion treatment is clinically appropriate, and after brain imaging excludes haemorrhage, is offered a reperfusion treatment in accordance with the settings and time frames recommended in the *Clinical guidelines for stroke management*.

3 A patient with stroke is offered treatment in a stroke unit as defined in the *Acute stroke services framework*.

4 A patient's rehabilitation needs and goals are assessed by staff trained in rehabilitation within 24–48 hours of admission to the stroke unit. Rehabilitation is started as soon as possible, depending on the patient's clinical condition and their preferences.

5 A patient with stroke, while in hospital, starts treatment and education to reduce their risk of another stroke.

6 A carer of a patient with stroke is given practical training and support to enable them to provide care, support and assistance to a person with stroke.

7 Before a patient with stroke leaves the hospital, they are involved in the development of an individualised care plan that describes the ongoing care that the patient will require after they leave hospital. The plan includes rehabilitation goals, lifestyle modifications and medicines needed to manage risk factors, any equipment they need, follow-up appointments, and contact details for ongoing support services available in the community. This plan is provided to the patient before they leave hospital, and to their general practitioner or ongoing clinical provider within 48 hours of discharge.

Introduction

Stroke occurs when the supply of blood to the brain is suddenly interrupted. This may result in part of the brain dying, leading to a sudden impairment that can affect a range of activities such as speaking, swallowing, thinking, moving and communicating.[a] The degree of damage caused by a stroke is dependent on the amount of time the brain tissue is denied blood supply. This 'time is brain' concept means that avoiding delays in diagnosis and treatment of stroke is a priority.

In about 80 per cent of people who have a stroke, an artery supplying blood to the brain suddenly becomes blocked (ischaemic stroke). In the remaining 20 per cent, an artery begins to bleed (haemorrhagic stroke).[a]

In Australia, stroke is the second leading cause of death and a major cause of disability.[b] Its impact is greater in some communities than in others, with higher prevalence rates in Aboriginal and Torres Strait Islander peoples compared with non-Indigenous Australians, and in people from the lowest socio-economic group compared with those from the highest socio-economic group.[a]

Receiving the right care at the right time in the right place can significantly improve an individual's chance of surviving a stroke and recovering to lead a full and independent life.[c,d] Timely care can only occur if people recognise the early symptoms of stroke. In 2013, only 49 per cent of people in Australia presented to hospital within three hours of stroke onset and 58 per cent within four-and-a-half hours.[e] The National Stroke Foundation is raising public awareness of the symptoms of stroke with its 'F.A.S.T.' campaign (Face, Arm, Speech and Time), to help people recognise the signs of stroke and call 000 for an ambulance.[f]

The Acute Stroke Clinical Care Standard aims to ensure that patients with stroke receive optimal treatment during the acute phase of management. It covers recognition of stroke, rapid assessment, early management and early initiation of an individualised rehabilitation plan. For more information about the Clinical Care Standard, visit **www.safetyandquality.gov.au/ccs**.

The Commission has developed this set of indicators to assist with local implementation of the Clinical Care Standard. Use of the indicators is optional. The indicators can be used by health services to monitor the implementation of the quality statements, and to identify and address areas that require improvement. Monitoring the implementation of Clinical Care Standards will assist in meeting some of the requirements of the National Safety and Quality Health Service Standards.

a   Australian Institute of Health and Welfare. Stroke and its management in Australia: an update. Canberra: AIHW; 2013.
b   Australian Institute of Health and Welfare. Chronic diseases summary. Canberra: AIHW; 2014.
c   National Stroke Foundation. Clinical guidelines for stroke management. Melbourne: NSF; 2010.
d   Stroke Unit Trialists Collaboration. Organised inpatient (stroke unit) care after stroke. Cochrane database of systematic reviews. 2013(9).
e   National Stroke Foundation. National Stroke Audit: Acute services clinical audit report. Melbourne: NSF; 2013.
f   National Stroke Foundation. Signs of stroke – F.A.S.T. Available at **http://strokefoundation.com.au/what-is-a-stroke/signs-of-stroke**.

The process to develop these indicators comprised:

- an environmental scan of existing local and international indicators; and
- a prioritisation review and refinement of the indicators with a dedicated sub-committee of the Topic Working Group, and review by the Topic Working Group and Clinical Care Standards Advisory Committee.

Where no indicator was identified for a given quality statement, the sub-committee drafted new indicators based on their experience with audits in relevant sectors.

The specification of the indicators aims to support the consistent local collection of data related to the implementation of this Clinical Care Standard. It sets out the name for each indicator along with the rationale, computation, numerator, denominator, relevant inclusion and exclusion criteria, and associated references.

Role of the Commission: indicator specification

Responsibilities of the Australian Commission on Safety and Quality in Health Care are specified in the *National Health Reform Act 2011* and the *National Health Reform Agreement 2011.*

The National Health Reform Act requires the Commission to 'formulate, in writing, indicators relating to health care safety and quality matters (9)(1)(g), and to 'promote, support and encourage the use of indicators formulated…'(9)(1)(i).

The National Health Reform Agreement specifies the Commission's responsibility to 'recommend national datasets for safety and quality…' (clause B80d).

The Commission's work program is driven by the *Australian Safety and Quality Framework for Health Care* principles, which state that health care delivery should be consumer centred, driven by information, and organised for safety.

Definition of acute stroke used in this indicator specification

These specifications refer to patients with acute stroke. The definition used for acute stroke is any patient with one of the following *International Classification of Diseases and Related Health Problems, 10th revision, Australian Modification* (ICD-10-AM, 9th edition)[a] diagnoses codes assigned as the principal diagnosis[b] for the patient's admitted episode of care, or is sequenced as one of the first two additional diagnoses.[c] These specifications also refer to other data elements in the list of inclusions and exclusions. Where a data element is a national standard, the identifier used in the national metadata registry – METeOR[d] – is referenced.

Acute stroke in these specifications includes:

Intracerebral haemorrhage:

- I61.0 Intracerebral haemorrhage in hemisphere, subcortical (Deep intracerebral haemorrhage)
- I61.1 Intracerebral haemorrhage in hemisphere, cortical (Cerebral lobe haemorrhage) (Superficial intracerebral haemorrhage)
- I61.2 Intracerebral haemorrhage in hemisphere, unspecified
- I61.3 Intracerebral haemorrhage in brain stem
- I61.4 Intracerebral haemorrhage in cerebellum
- I61.5 Intracerebral haemorrhage, intraventricular
- I61.6 Intracerebral haemorrhage, multiple localised
- I61.8 Other intracerebral haemorrhage
- I61.9 Intracerebral haemorrhage, unspecified

Unspecified nontraumatic intracranial haemorrhage:

- I62.9 Intracranial haemorrhage (nontraumatic), unspecified

Cerebral infarction:

- I63.0 Cerebral infarction due to thrombosis of precerebral arteries
- I63.1 Cerebral infarction due to embolism of precerebral arteries
- I63.2 Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries
- I63.3 Cerebral infarction due to thrombosis of cerebral arteries
- I63.4 Cerebral infarction due to embolism of cerebral arteries
- I63.5 Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries
- I63.6 Cerebral infarction due to cerebral venous thrombosis, nonpyogenic
- I63.8 Other cerebral infarction
- I63.9 Cerebral infarction, unspecified

Cerebrovascular accident not otherwise specified:

- I64 Stroke, not specified as haemorrhage or infarction (Cerebrovascular accident not otherwise specified)

a   ICD-10-AM (9th edition).

b   METeOR identifier: 514304. Definition: 'The diagnosis established after study to be chiefly responsible for occasioning a patient's service event or episode'.

c   METeOR identifier: 514271. Definition: 'A condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted patient care, episode of residential care or attendance at a health care establishment'.

d   See http://meteor.aihw.gov.au/content/index.phtml/itemId/181162.

Exclusions to the definition of acute stroke in these specifications:

- G45 Transient cerebral ischaemic attacks and related syndromes (Note: excludes all subcategories G45.0 to G45.9).
- I62.0 Subdural haemorrhage (acute) (nontraumatic)
- I62.1 Nontraumatic extradural haemorrhage (Nontraumatic epidural haemorrhage)
- S06.5 Sub-dural haematoma (Traumatic subdural haemorrhage)
- S06.6 Traumatic sub-arachnoid haemorrhage (Subarachnoid haematoma)

Atrial fibrillation in these specifications

Indicator 5c includes patients with both ischaemic stroke and atrial fibrillation. The relevant codes for atrial fibrillation are:

- Paroxysmal atrial fibrillation (I48.0)
- Persistent atrial fibrillation (I48.1)
- Chronic atrial fibrillation (I48.2)
- Typical atrial flutter (Type I atrial flutter) (I48.3)
- Atypical atrial flutter (Type II atrial flutter) (I48.4)
- Atrial fibrillation and atrial flutter, unspecified (I48.9)

Quality statement 1 – Early assessment

A person with suspected stroke is immediately assessed at first contact using a validated stroke-screening tool, such as the F.A.S.T. (Face, Arm, Speech and Time) test.

Indicator 1a: Assessment by ambulance services

Definitional attributes

Name: Proportion of patients with suspected stroke who are assessed using a validated stroke screening tool by ambulance services.

Rationale: Early recognition of stroke symptoms is critical to ensuring optimal outcomes for stroke patients.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients transported to hospital via ambulance with suspected stroke, who were screened for stroke by ambulance using a validated screening tool, in the reference ambulance service or Local Hospital Network (LHN).[a]

Numerator criteria:
Inclusions
Patients transported to hospital via ambulance with suspected stroke.

Exclusions
Non-ambulance presentations, including elective admissions, and patients for whom stroke occurred during the hospital episode.

Denominator: Total number of patients transported to hospital via ambulance with suspected stroke in the reference ambulance service or LHN.

Denominator criteria:
Inclusions
Patients transported to hospital via ambulance with suspected stroke.

Exclusions
Non-ambulance presentations, including elective admissions, and patients for whom stroke occurred during the hospital episode.

Setting: Ambulance.

Comments: The choice of reference population (ambulance service or LHN) depends on the service that is generating the indicators for local review (ambulance or health service), and the structure of ambulance services (whether they map to LHNs).

Some validated screening tools for stroke include the F.A.S.T. (Face, Arm Speech Time) test[b] and the Melbourne Ambulance Stroke Score (MASS).[2] The F.A.S.T. test is:

FACE: Check their face. Has their mouth drooped?

ARMS: Can they lift both arms?

SPEECH: Is their speech slurred? Do they understand you?

TIME: Time is critical. If you see any of these signs call 000 straight away.

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a   A definition of local hospital network (LHN) is available at **www.publichospitalfunding.gov.au/directory**.

b   National Stroke Foundation. Signs of stroke F.A.S.T. Melbourne. Available at
   http://strokefoundation.com.au/what-is-a-stroke/signs-of-stroke/.

Quality statement 1 – Early assessment

References

1. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

2. Bray J, Martin J, Cooper G, Barger B, Bernard S, Bladin C. Paramedic identification of stroke: community validation of the Melbourne ambulance stroke screen. Cerebrovascular Diseases. 2005; 20(1):28–33.

Quality statement 1 – Early assessment

Indicator 1b: Assessment in the emergency department

Definitional attributes

Name: Proportion of patients admitted to hospital following presentation to the emergency department (ED) with a final diagnosis of stroke who were screened for stroke in the emergency department using a validated stroke screening tool.

Rationale: Early recognition of stroke symptoms is critical to ensuring optimal outcomes for stroke patients.

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients admitted to hospital following presentation to an ED with a final diagnosis of stroke who were screened for stroke in the ED using a validated stroke screening tool, in the hospital or LHN.

Numerator criteria:

Inclusions
Patients admitted to hospital following presentation to ED with a final diagnosis of stroke (I61.x, I62.9, I63.x and I64.x).[a]

Care type = '1' (acute care).[b]

Exclusions
Patients whose stroke occurred after an admission to hospital for management of other conditions.

Inter-hospital transfer (within two days of admission) with diagnosis of stroke.

Unconscious patients.

Denominator: Total number of patients admitted to hospital following presentation to ED with a final diagnosis of stroke in the hospital or LHN.

Denominator criteria:

Inclusions
Patients admitted to hospital following presentation to ED with a final diagnosis of stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Patients whose stroke occurred after an admission to hospital for management of other conditions.

Inter-hospital transfer (within two days of admission) with diagnosis of stroke.

Unconscious patients.

a   ICD-10-AM (9th edition).

b   METeOR identifier: 491557.

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Quality statement 1 – Early assessment

Setting: Acute/Hospital.

Comments: The F.A.S.T. test is:

FACE: Check their face. Has their mouth drooped?

ARMS: Can they lift both arms?

SPEECH: Is their speech slurred? Do they understand you?

TIME: Time is critical. If you see any of these signs call 000 now.[a]

The Recognition of Stroke in the Emergency Room (ROSIER) scale is another screening tool validated for use in ED.[1] The scale has been found to sensitively identify stroke, thereby helping ED staff to make appropriate referrals to the stroke team.[1]

References

1. Nor AM, Davis J, Sen B et al. The Recognition Of Stroke In the Emergency Room (ROSIER) scale: development and validation of a stroke recognition instrument. Lancet Neurology 2005;4(11):727-734.

Supplementary sources:

2. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

3. National Stroke Foundation. National Stroke Audit: Acute Services Organisational Survey Report. Melbourne: NSF, 2013.

a   National Stroke Foundation. Signs of stroke F.A.S.T. Melbourne. Available at http://strokefoundation.com.au/what-is-a-stroke/signs-of-stroke/.

Quality statement 2 – Time-critical therapy

A patient with ischaemic stroke, for whom reperfusion treatment is clinically appropriate, and after brain imaging excludes haemorrhage, is offered a reperfusion treatment in accordance with the settings and time frames recommended in the *Clinical guidelines for stroke management.*

Indicator 2a: Transport to a hospital able to provide thrombolysis

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke who were transported by ambulance to a hospital able to provide thrombolysis.

Rationale: Access to thrombolysis remains low in Australia, though some Australian centres have achieved thrombolysis rates of 20%.[1] Access to timely thrombolysis is a validated predictor of ischaemic stroke patient outcome, shown to reduce length of acute stay and potentially reduce in-hospital mortality.[2]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of stroke who were transported by ambulance, to a hospital able to provide thrombolysis.

Numerator criteria:

Inclusion
Patients with a final diagnosis of stroke (I61.x, I62.9, I63.x and I64[a]) who were transported by ambulance to a hospital able to provide thrombolysis.

Exclusions
Patients who are elective admissions.

Patients who have a stroke in the hospital.

Patients for whom it is not possible to administer thrombolysis within 4.5 hours of symptom onset.

Denominator: Total number of patients with a final diagnosis of stroke.

Denominator criteria:

Inclusion
Patients with a final diagnosis of stroke (I61.x, I62.9, I63.x and I64).[a]

Exclusions
Patients who are elective admissions.

Patients who have a stroke in the hospital.

Patients for whom it is not possible to administer thrombolysis within 4.5 hours of symptom onset.

Setting: Pre-hospital/ambulance.

Comments: Patients with a final diagnosis of stroke are specified as it clearly identifies the population of interest.

References

1. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.
2. Hamidon BB and Dewey HM. Impact of acute stroke team emergency calls on in-hospital delays in acute stroke care. Journal of Clinical Neuroscience 2007; 14(9):831–834.

a   ICD-10-AM (9th edition).

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Quality statement 2 – Time-critical therapy

Indicator 2b: Thrombolysis in ischaemic stroke

Definitional attributes

Name: Proportion of patients with a final diagnosis of ischaemic stroke who were thrombolysed.

Rationale: Evidence shows that intravenous thrombolytic therapy (recombinant tissue plasminogen activator [rt-PA]) is beneficial for selected patients with ischaemic stroke. It should be delivered in well-equipped centres with adequate expertise and infrastructure for monitoring, rapid assessment and investigation of acute stroke patients.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of ischaemic stroke who were thrombolysed.

Numerator criteria:
Inclusions
Patients diagnosed with ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Nil.

Denominator: Total number of patients with a final diagnosis of ischaemic stroke.

Denominator criteria:
Inclusions
Patients with a final diagnosis of ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Patients for whom thrombolysis is contraindicated (see Comments), and for whom the contraindication is documented.

Setting: Acute/Hospital.

Comments: Use of thrombolysis does not have a procedure code, so this is difficult to capture from administrative datasets.

This indicator also applies to patients who are tele-thrombolysed.

Contraindications for thrombolysis include:[1,2]

- presentation >4.5 hours from stroke onset or uncertain onset time
- evidence of intracranial haemorrhage on the CT-scan
- high blood pressure on repeated measures (systolic blood pressure ≥185mmHg or diastolic blood pressure >110mmHg)
- minor stroke rapidly improving
- INR >1.5 if patient is taking warfarin or other anticoagulation therapy[c]
- seizure at stroke onset
- heparin given within the last 48 hrs and has elevated PTT or has a known hereditary or acquired haemorrhagic diathesis (e.g. PT or APTT greater than normal)[d]

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a   ICD-10-AM (9th edition).
b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.
c   INR is international normalised ratio.
d   PTT is partial thromboplastin time; PT is prothrombin time; APPT is activated partial thromboplastin time.

Quality statement 2 – Time-critical therapy

- platelet count <100,000/μL
- serum glucose is <2.8 mmol/L or >22.0 mmol/L
- recent (within 2 weeks) major surgery
- major co-morbidity or receiving palliative care
- clinical suggestion of intracranial haemorrhage even if CT scan normal or recent or past history of haemorrhage that, in the opinion of the clinician, the increased risk of intracranial bleeding would outweigh the potential benefits of treatment
- other absolute and relative contraindications as per the Product Information may also apply.

References

1. Levi CLR and Smith B. The implementation of intravenous tissue plasminogen activator in acute ischaemic stroke: a scientific position statement from the National Stroke Foundation and the Stroke Society of Australasia. Internal Medicine Journal 2009;39(5):317–324.

2. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

Supplementary sources:
3. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

4. Lannin NA, Cadilhac D, Anderson C et al. The Australian Stroke Clinical Registry Annual Report 2011. Report No 3, Heidelberg : The George Institute for Global Health and National Stroke Research Institute, 2012.

Quality statement 2 – Time-critical therapy

Indicator 2c: Presentation and intravenous thrombolysis within 4.5 hours of symptom onset

Definitional attributes

Name: Proportion of patients with ischaemic stroke presenting to hospital and thrombolysed within 4.5 hours (i.e. within 270 minutes) of symptom onset, with documentation that intravenous thrombolysis was administered.

Rationale: Meta-analysis of clinical trials has shown that thrombolysis improves outcomes and the outcomes are more pronounced with earlier intervention.[1] Recombinant tissue plasminogen activator (rt-PA) given up to 4.5 hours after ischaemic stroke onset is associated with an increased chance of favourable outcomes.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of ischaemic stroke who presented to hospital within 4.5 hours (i.e. within 270 minutes) of symptom onset, with documentation that intravenous thrombolysis was administered.

Numerator criteria:

Inclusions
Patients with a final diagnosis of ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Patients with unknown time of symptom onset.

Denominator: Total number of patients with a final diagnosis of ischaemic stroke who presented to hospital within 4.5 hours (i.e. within 270 minutes) of symptom onset.

Denominator criteria:

Inclusions
Patients with a final diagnosis of ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Patients with unknown time of symptom onset.

Patients for whom thrombolysis is contraindicated (see Comments), and for whom the contraindication is documented.

Setting: Acute/Hospital.

Comments: Thrombolysis within 4.5 hours of symptom onset is indicated for ischaemic stroke. However, it is recognised that in many cases patients and their families or carers will not be able to describe with precision the time from symptom onset.

The Australian Stroke Clinical Registry's (AuSCR) definition of 'onset of stroke time' is:

The time of the most recent stroke … experienced by a person. It is the date that the patient's symptoms were first recognised. If the patient describes progressive symptoms, record the time of the very first symptom. If the patient woke with symptoms of stroke that were not present when they went to sleep, then record the time the patient was last seen well.[2]

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a   ICD-10-AM (9th edition).

b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.

Quality statement 2 – Time-critical therapy

Contraindications for thrombolysis include:[3,4]

- presentation >4.5 hours from stroke onset or uncertain onset time
- evidence of intracranial haemorrhage on the CT-scan
- high blood pressure on repeated measures (systolic blood pressure ≥185mmHg or diastolic blood pressure >110mmHg)
- minor stroke rapidly improving
- INR >1.5 if patient is taking warfarin or other anticoagulation therapy[a]
- seizure at stroke onset
- heparin given within the last 48 hrs and has elevated PTT or has a known hereditary or acquired haemorrhagic diathesis (e.g. PT or APTT greater than normal)[b]
- platelet count <100,000/µL
- serum glucose is <2.8 mmol/L or >22.0 mmol/L
- recent (within 2 weeks) major surgery
- major co-morbidity or receiving palliative care
- clinical suggestion of intracranial haemorrhage even if CT scan normal or recent or past history of haemorrhage that, in the opinion of the clinician, the increased risk of intracranial bleeding would outweigh the potential benefits of treatment
- other absolute and relative contraindications as per the Product Information may also apply.

References

1. Wardlaw JM, Murray V, Berge E, del Zoppo GJ. Thrombolysis for acute ischaemic stroke. The Cochrane database of systematic reviews 2014;7.

2. Australian Stroke Clinical Registry (AuSCR). Data Dictionary: Data Information – How to collect and enter data. Sydney: The George Institute for Global Health and National Stroke Research Institute, 2010.[c]

3. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

4. Levi CLR and Smith B. The implementation of intravenous tissue plasminogen activator in acute ischaemic stroke: a scientific position statement from the National Stroke Foundation and the Stroke Society of Australasia. Internal Medicine Journal 2009;39(5):317–324.

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a   INR is international normalised ratio.

b   PTT is partial thromboplastin time; PT is prothrombin time; APPT is activated partial thromboplastin time.

c   Available at **www.AusCR.com.au/wp-content/uploads/Data-Dictionary-Acute-Version1.51.pdf**.

Quality statement 2 – Time-critical therapy

Indicator 2d: Thrombolysis within 60 minutes of hospital arrival

Definitional attributes

Name: Proportion of patients with a final diagnosis of ischaemic stroke who were thrombolysed within 60 minutes of hospital arrival.

Rationale: Access to timely thrombolysis is a validated predictor of ischaemic stroke patient outcome. Meta-analysis of clinical trials has shown that thrombolysis improves outcomes and the outcomes are more pronounced with earlier intervention.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of ischaemic stroke, who were thrombolysed within 60 minutes of arrival to a hospital able to provide thrombolysis.

Numerator criteria:
Inclusions
Patients with a final diagnosis of ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Nil.

Denominator: Total number of patients with a final diagnosis of ischaemic stroke who were thrombolysed after arrival at a hospital able to provide thrombolysis.

Denominator criteria:
Inclusions
Patients with a final diagnosis of ischaemic stroke (I63.x, I64).[a,b]

Exclusions
Patients for whom thrombolysis is contraindicated (see Comments), and for whom the contraindication is documented.

Setting: Acute/Hospital

Comments: Contraindications for thrombolysis include:[2,3]

- presentation >4.5 hours from stroke onset or uncertain onset time
- evidence of intracranial haemorrhage on the CT-scan
- high blood pressure on repeated measures (systolic blood pressure ≥185mmHg or diastolic blood pressure >110mmHg)
- minor stroke rapidly improving
- INR >1.5 if patient is taking warfarin or other anticoagulation therapy[c]
- seizure at stroke onset
- heparin given within the last 48 hrs and has elevated PTT or has a known hereditary or acquired haemorrhagic diathesis (e.g. PT or APTT greater than normal)[d]
- platelet count <100,000/μL
- serum glucose is <2.8 mmol/L or >22.0 mmol/L
- recent (within 2 weeks) major surgery

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a   ICD-10-AM (9th edition).
b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.
c   INR is international normalised ratio.
d   PTT is partial thromboplastin time; PT is prothrombin time; APPT is activated partial thromboplastin time.

Quality statement 2 – Time-critical therapy

- major co-morbidity or receiving palliative care
- clinical suggestion of intracranial haemorrhage even if CT scan normal or recent or past history of haemorrhage that, in the opinion of the clinician, the increased risk of intracranial bleeding would outweigh the potential benefits of treatment
- other absolute and relative contraindications as per the Product Information may also apply.

References

1. Wardlaw JM, Murray V, Berge E, del Zoppo GJ. Thrombolysis for acute ischaemic stroke. The Cochrane database of systematic reviews. 2014;7.

2. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

3. Levi CLR and Smith B. The implementation of intravenous tissue plasminogen activator in acute ischaemic stroke: a scientific position statement from the National Stroke Foundation and the Stroke Society of Australasia. Internal Medicine Journal 2009;39(5):317–324.

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Quality statement 2 – Time-critical therapy

Indicator 2e: Time from onset of symptoms to thrombolysis

Definitional attributes

Name: Time from onset of symptoms to thrombolysis for patients with a final diagnosis of ischaemic stroke.

Rationale: Meta-analysis of clinical trials has shown that thrombolysis improves outcomes and the outcomes are more pronounced with earlier intervention.[1] Tissue plasminogen activator (rt-PA) given up to 4.5 hours (i.e. up to 270 minutes) after ischaemic stroke onset is associated with an increased chance of favourable outcomes.[1]

Collection and usage attributes

Computation: Time (in minutes) from symptom onset to administration of thrombolytic agent or intervention.

Data for this indicator is analysed as median time and interquartile range (IQR) (in minutes) from symptom onset to administration of thrombolytic agent or intervention.

IQR is calculated by subtracting the value at the 1st quartile (lower) from the 3rd quartile (upper):

$$IQR = xu - xl$$

Both median and IQR are calculated using the total number of patients with a final diagnosis of ischaemic stroke (I63.x, I64)[a,b] who are thrombolysed.

Setting : Acute/Hospital.

Comments: A denominator is not required for this indicator since median is calculated by locating the 50th percentile.

The interquartile range (IQR) is the difference between the third and the first quartiles. It is a measure of dispersion.

References

1. Wardlaw JM, Murray V, Berge E, del Zoppo GJ. Thrombolysis for acute ischaemic stroke. The Cochrane database of systematic reviews 2014;7.

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a   ICD-10-AM (9th edition).

b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.

Quality statement 3 – Stroke unit care

A patient with stroke is offered treatment in a stroke unit as defined in the *Acute Stroke Services Framework.*

Indicator 3a: Admission into a stroke unit

Definitional attributes

Name: Proportion of patients with a final diagnosis of acute stroke who have documented treatment in a stroke unit at any time during their hospital stay, in the reference Local Hospital Network (LHN) or other stroke network.

Rationale: There is strong evidence that specialised stroke units, staffed with a multidisciplinary team of stroke specialists, improve patient outcomes and reduce stroke mortality.[1,2]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of acute stroke who have documented evidence of treatment in a stroke unit at any time during their acute hospital admission.

Numerator criteria:
Inclusions
Patients with a final diagnosis of acute stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Denominator: Total number of patients with a final diagnosis of acute stroke who were admitted to hospital.

Denominator criteria:
Inclusions
Patients with a final diagnosis of acute stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Setting: Acute/Hospital.

Comments: A 'stroke unit' is defined as care provided in a hospital ward with the following minimum elements:

- co-located beds within a geographically defined unit
- dedicated, multidisciplinary team with members who have a special interest in stroke or rehabilitation
- multidisciplinary team that meets at least once per week to discuss patient care
- team has access to regular professional development and education relating to stroke.[3]

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a   ICD-10-AM (9th edition).
b   METeOR identifier: 491557.

Quality statement 3 – Stroke unit care

There are two types of stroke units that treat acute stroke patients:

1. Acute Stroke Unit which accepts patients acutely but discharges early (usually within 7 days)

2. Comprehensive Stroke Unit which accepts patients acutely but also provides rehabilitation for at least several weeks.

Each model has a service provided in a discrete ward or dedicated beds within a larger ward, with a specialised multidisciplinary team with allocated staff for the care of patients with stroke. Patient admission into either of the two stroke unit types is relevant to this indicator.

References

1. Australian Council on Healthcare Standards. ACHS Clinical Indicator Users' Manual 2012. Sydney: ACHS, 2012.

2. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

3. National Stroke Foundation. Acute Stroke Services Framework. Melbourne: NSF, 2015.[a]

Supplementary source:
4. Lannin NA, Cadilhac D, Anderson C et al. The Australian Stroke Clinical Registry Annual Report 2011. Report No 3, Heidelberg: The George Institute for Global Health and National Stroke Research Institute, 2012.

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a   Available at http://strokefoundation.com.au/site/media/Acute_Stroke_Framework_Services_2011.pdf.

Quality statement 3 – Stroke unit care

Indicator 3b: 90% of acute hospital admissions on a stroke unit

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke who spend at least 90% of their acute hospital admission on a stroke unit.[1]

Rationale: Good care on a dedicated stroke unit is the single most effective way to improve outcomes for people with stroke.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of stroke who spend at least 90% of their acute hospital admission on a stroke unit.

Numerator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Denominator: Total number of patients with a final diagnosis of stroke who were admitted to hospital.

Denominator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

a   ICD-10-AM (9th edition).
b   METeOR identifier: 491557.
c   Available at **http://www.hscic.gov.uk/iqi**.
d   Available at **http://strokefoundation.com.au/site/media/Acute_Stroke_Framework_Services_2011.pdf**.

Setting: Acute/Hospital.

Comments: A stroke unit is defined as care provided in a hospital ward with the following minimum elements:

- co-located beds within a geographically defined unit
- dedicated, multidisciplinary team with members who have a special interest in stroke or rehabilitation
- multidisciplinary team that meets at least once per week to discuss patient care
- team has access to regular professional development and education relating to strokeand education relating to stroke.[2]

There are two types of stroke units that treat acute stroke patients:

1. Acute Stroke Unit which accepts patients acutely but discharges early (usually within 7 days)

2. Comprehensive Stroke Unit which accepts patients acutely but also provides rehabilitation for at least several weeks.

Each model has a service provided in a discrete ward or dedicated beds within a larger ward, with a specialised multidisciplinary team with allocated staff for the care of patients with stroke. Patient admission into either of the two stroke unit types is relevant to this indicator.

References

1.   National Health Service (UK). Patients who spend at least 90% of their time on a stroke unit (CV10). Acute care indicators 2012 (cited October 2013).[c]

Supplementary sources:
2.   National Stroke Foundation. Acute Stroke Services Framework. Melbourne: NSF, 2015.[d]

3.   National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

Quality statement 4 – Early rehabilitation

A patient's rehabilitation needs and goals are assessed by staff trained in rehabilitation within 24–48 hours of admission to the stroke unit. Rehabilitation is started as soon as possible, depending on the patient's clinical condition and their preferences.

Indicator 4a: Assessment for rehabilitation by a physiotherapist within 24–48 hours of hospital admission

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke with a documented physiotherapy assessment within 24–48 hours of presentation to hospital.[1]

Rationale: Early physiotherapy assessment is an important and clear starting point to the acute care assessment, management, rehabilitation, and discharge planning process. If applied systematically, early allied health assessment should improve the appropriateness of the ongoing inpatient and discharge care needs.[1] Physiotherapy assessment is a good indicator of rehabilitation activity.

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of stroke with a documented physiotherapy assessment within 24–48 hours of presentation to hospital.

Numerator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Denominator: Patients with a final diagnosis of stroke who were admitted to hospital.

Denominator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Patients who refuse the assessment/decline rehabilitation.

Setting: Acute/Hospital.

Comments: This indicator has been slightly modified from the Australian Council on Healthcare Standards indicator used as part of the previous Stroke Foundation Acute Services Audit which specifies an assessment within 48 hours of hospital admission.

Rehabilitation assessment by a physiotherapist is associated with improved patient outcomes.[2]

a   ICD-10-AM (9th edition).
b   METeOR identifier: 491557.

Quality statement 4 – Early rehabilitation

References

1. Australian Council on Healthcare Standards. ACHS Clinical Indicator User Manual 2015 - Internal Medicine version 6. Sydney: ACHS, 2015.

2. Pollock A, Baer G, Campbell P, Choo PL, Forster A, Morris J, et al. Physical rehabilitation approaches for the recovery of function and mobility following stroke. Cochrane Database of Systematic Reviews 2014; Issue 4.

Supplementary source:
3. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

Clinical Care Standards

Quality statement 4 – Early rehabilitation

Indicator 4b: Rehabilitation therapy within 48 hours of initial assessment

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke who start rehabilitation therapy within 48 hours of initial assessment.

Rationale: Patients managed in acute stroke units that offer active rehabilitation programs generally spend less time in bed and more time standing, walking and being active.[1,2] These units also have demonstrated good patient outcomes.[3]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Proportion of patients with a final diagnosis of stroke who commence rehabilitation therapy within 48 hours of initial assessment.

Numerator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Exclusions
Nil.

Denominator: Patients with a final diagnosis of stroke who were admitted to hospital.

Denominator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Exclusions
Stroke patients who decline rehabilitation, return to pre-morbid function, are in a coma and/or unresponsive (not simply drowsy), or where there are limitations of therapy (i.e. advance care directive is enacted and/or the patient is on a palliative care pathway).

Setting: Hospital.

Comments: Nil.

References

1. Langhorne P and Pollock A. What are the components of effective stroke unit care? Age and Ageing 2002; 31(5):365–371.

2. Bernhardt J, Chitravas N, Meslo IL et al. Not all stroke units are the same: a comparison of physical activity patterns in Melbourne, Australia, and Trondheim, Norway. Stroke 2008; 39(7): 2059–2065.

3. Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. Cochrane Database of Systematic Reviews 2013; Issue 9.

Supplementary sources:

4. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013. (excludes the 48 hour specification).

5. Australian Stroke Coalition Rehabilitation Working Group. Assessment for Rehabilitation: Pathway and Decision-Making Tool 2012. Melbourne, Australia.[b]

a   ICD-10-AM (9th edition).
b   Available at: **http://australianstrokecoalition.com.au/projects/assessment-for-rehabilitation-pathway-and-decision-making-toolnual-and-decision-making-tool/**.

Quality statement 4 – Early rehabilitation

Indicator 4c: Treatment for a rehabilitation goal commencing during an acute hospital admission

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke who undergo treatment by a therapist for an identified and documented rehabilitation goal during their acute hospital admission.

Rationale: Rehabilitation is effective in reducing stroke impairment and in preventing complications.

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Proportion of patients with a final diagnosis of stroke who undergo treatment for an identified rehabilitation goal during their acute hospital admission.

Numerator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Denominator: Proportion of patients with a final diagnosis of stroke.

Denominator criteria:
Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Care type = '1' (acute care).[b]

Exclusions
Stroke patients who decline rehabilitation, return to pre-morbid function, are in a coma and/or unresponsive (not simply drowsy), or where there are limitations of therapy (i.e. advance care directive is enacted and/or the patient is on a palliative care pathway).[1]

Setting: Hospital.

Comments: The rehabilitation goals should be determined jointly by the patient and their family, and undertaken by a qualified health professional with expertise in the particular impairment. The rehabilitation goals should be documented.[1]

Reference

1. Australian Stroke Coalition Rehabilitation Working Group. Assessment for Rehabilitation: Pathway and Decision-Making Tool 2012. Melbourne, Australia.[c]

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a   ICD-10-AM (9th edition).
b   METeOR identifier: 491557.
c   Available at: http://australianstrokecoalition.com.au/projects/assessment-for-rehabilitation-pathway-and-decision-making-toolnual-and-decision-making-tool/.

Clinical Care Standards

Quality statement 5 – Minimising risk of another stroke

A patient with stroke, while in hospital, starts treatment and education to reduce their risk of another stroke.

Indicator 5a: Discharge on antihypertensive medication (haemorrhagic stroke)

Definitional attributes

Name: Proportion of patients with a final diagnosis of haemorrhagic stroke discharged on antihypertensive medication, where not contraindicated.[1]

Rationale: Hypertension is the strongest modifiable risk factor for recurrent stroke, and the efficacy of antihypertensive medication to prevent stroke recurrence has been demonstrated.[1]

Reduction in blood pressure, irrespective of initial blood pressure, has been shown to reduce the recurrence of stroke and combined vascular events including myocardial infarction.[2]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of haemorrhagic stroke patients discharged from hospital on antihypertensive medication, where not contraindicated.

Numerator criteria:

Inclusions
Patients diagnosed with haemorrhagic stroke (I61.x, I62.9).[a]

Care type = '1' (acute care).[b]

Exclusions
Nil.

Denominator: Total number of patients with a final diagnosis of haemorrhagic stroke who are discharged from hospital.

Denominator criteria:

Inclusions
Patients diagnosed with haemorrhagic stroke (I61.x, I62.9).[a]

Care type = '1' (acute care).[b]

Exclusions
Patients for whom antihypertensives are contraindicated and documented.

Setting: Acute/Hospital.

Comments: Contraindications for antihypertensives may include symptomatic hypotension, patient refusal, or where there are limitations of therapy (i.e. advanced care directive is enacted and/or the patient is on a palliative care pathway).

a   ICD-10-AM (9th edition).
b   METeOR identifier: 491557.

Quality statement 5 – Minimising risk of another stroke

Compliance with this indicator requires:

1. evidence of prescription and administration of an antihypertensive agent prior to discharge.

2. contraindications clearly documented.

Note that this indicator is also relevant to ischaemic stroke. However, a more specific indicator has been included in these specifications for ischaemic stroke. See Indicator 5b: Discharge on statin, antihypertensive and antithrombotic medications (ischaemic stroke).

References

1. Lakhan SE, Sapko MT. Blood pressure lowering treatment for preventing stroke recurrence: a systematic review and meta-analysis. Internal Archives of Medicine 2009;2(1):30.

2. Australian Council on Healthcare Standards. ACHS Clinical Indicator User Manual 2015 – Internal Medicine version 6. Sydney: ACHS, 2015.

Supplementary sources:
3. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

4. Lannin NA, Cadilhac D, Anderson C et al. The Australian Stroke Clinical Registry Annual Report 2011. Report No 3, Heidelberg: The George Institute for Global Health and National Stroke Research Institute, 2012.

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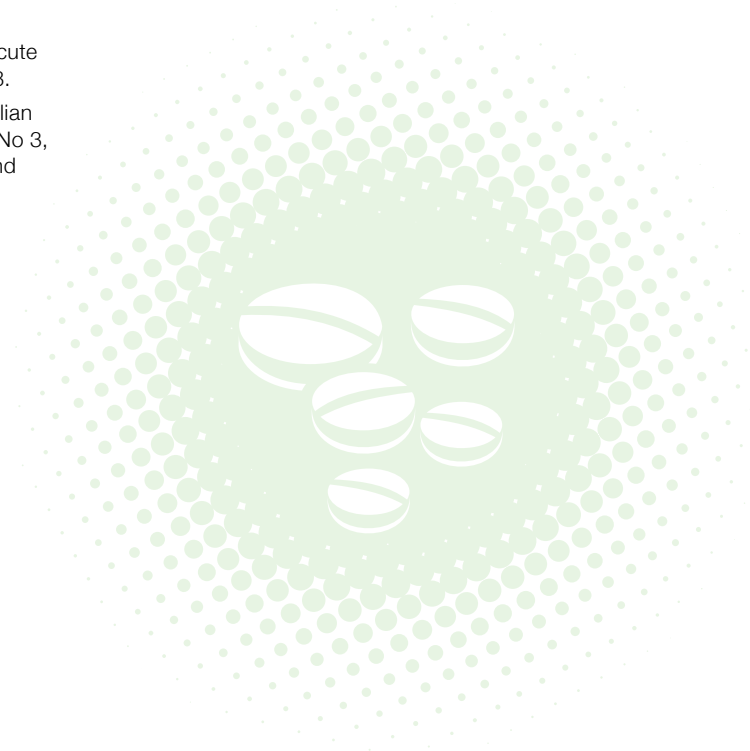
Quality statement 5 – Minimising risk of another stroke

Indicator 5b: Discharge on statin, antihypertensive and antithrombotic medications (ischaemic stroke)

Definitional attributes

Name: Proportion of patients with a final diagnosis of ischaemic stroke who are discharged on statin, antihypertensive and antithrombotic medications, where not contraindicated.

Rationale: Ischaemic stroke patients should be discharged on statin, antihypertensive and antithrombotic medications to ensure optimal outcomes.

Lowering lipid levels (using a statin) is an effective primary and secondary prevention treatment for vascular events, including stroke.[1]

The use of antiplatelet drugs has been shown to provide a 22% reduction in vascular events (myocardial infarction, stroke or vascular death) in patients with a previous stroke or transient ischaemic attack (TIA).[2]

Most antihypertensive drugs have been shown to reduce blood pressure, the recurrence of stroke and cardiovascular events.[3]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerators: Patients with a final diagnosis of ischaemic stroke discharged from hospital on statin, antihypertensive and antithrombotic medications, where not contraindicated.

Numerator criteria:

Inclusions
Patients with a final diagnosis of ischaemic stroke (163.x, I64).[a,b]

Care type = '1' (acute care).[c]

Exclusions
Nil.

Denominator: Patients with a final diagnosis of stroke who were discharged from hospital.

Denominator criteria:

Inclusions
Patients diagnosed with ischaemic stroke (163.x, I64).[a,b]

Care type = '1' (acute care).[c]

Exclusions
Patients for whom statin, antihypertensive or antithrombotic medications are contraindicated, and for whom the contraindication(s) is documented.

Setting: Acute/Hospital.

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a   ICD-10-AM (9th edition).

b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.

c   METeOR identifier: 491557.

Quality statement 5 – Minimising risk of another stroke

Comments: Contraindications for each element should be documented separately within this care-bundle.

Contraindications for antihypertensives or statins or antithrombotics may include patient refusal, symptomatic hypotension (for antihypertensives), or where there are limitations of therapy (i.e. advance care directive is enacted or the patient is on a palliative care pathway).

Antithrombotic medications include: oral anticoagulants, such as warfarin, apixaban, rivaroxaban or dabigatran; and antiplatelet agents, such as aspirin, clopidogrel or dipyridamole.

References

1. The Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) Investigators. High-dose atorvastatin after stroke or transient ischemic attack. New England Journal of Medicine 2006; 355(6):549–559.

2. Antithrombotic Trialists' Collaboration. Collaborative meta-analysis of randomised trials of antiplatelet therapy for prevention of death, myocardial infarction, and stroke in high risk patients. British Medical Journal 2002; 324(7329): 71–86.

3. Lakhan SE, Sapko MT. Blood pressure lowering treatment for preventing stroke recurrence: a systematic review and meta-analysis. Internal Archives of Medicine 2009;2(1):30.

Supplementary sources:

4. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

5. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

6. Lannin NA, Cadilhac D, Anderson C et al. The Australian Stroke Clinical Registry Annual Report 2011. Report No 3, Heidelberg: The George Institute for Global Health and National Stroke Research Institute, 2012.

Clinical Care Standards

Quality statement 5 – Minimising risk of another stroke

Indicator 5c: Discharge on oral anticoagulants for atrial fibrillation

Definitional attributes

Name: Proportion of ischaemic stroke patients with atrial fibrillation discharged on oral anticoagulants, where not contraindicated.

Rationale: Non-valvular atrial fibrillation is a common arrhythmia and an important risk factor for stroke. The administration of oral anticoagulation therapy, unless there are contraindications, is an established effective strategy in preventing recurrent stroke in patients with a high stroke risk, such as those with atrial fibrillation, or prior TIA or stroke.[1]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of ischaemic stroke patients with documented atrial fibrillation prescribed oral anticoagulation therapy at hospital discharge.

Numerator criteria:
Inclusions
Patients diagnosed with ischaemic stroke (I63.x, I64)[a,b] AND with atrial fibrillation (I48.x).[a]

Care type = '1' (acute care).[c]

Exclusions
Nil.

Denominator: Total number of ischaemic stroke patients with documented atrial fibrillation at hospital discharge.

Denominator criteria:
Inclusions
Patients diagnosed with ischaemic stroke (I63.x, I64)[a,b] AND with atrial fibrillation (I48.x).[a]

Care type = '1' (acute care).[c]

Exclusions
Patients for whom oral anticoagulants are contraindicated, and for whom the contraindication is documented.

Setting: Acute/Hospital.

Comments: Contraindications for oral anticoagulants may include patient refusal or where there are limitations of therapy (i.e. advance care directive is enacted or the patient is on a palliative care pathway).

Oral anticoagulants include warfarin, apixaban, rivaroxaban or dabigatran.

Reference

1. Furie KL, Kasner SE, Adams RJ et al. Guidelines for the prevention of stroke in patients with stroke or transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke 2011; 42(1):227–276.

Supplementary source:
2. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

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a   ICD-10-AM (9th edition).
b   Note that although I64 is 'Stroke, not specified as haemorrhage or infarction', more than 80% of strokes coded to this category are ischaemic.
c   METeOR identifier: 491557.

Quality statement 5 – Minimising risk of another stroke

Indicator 5d: Risk factor modification advice before leaving the hospital

Definitional attributes

Name: Proportion of stroke patients who, before leaving the hospital, have documented evidence of advice on risk factor modification relating to both medications and lifestyle.

Rationale: Lifestyle changes focused on risk factor modification and adherence to medication will reduce the risk of subsequent stroke.[1] Risk factor modification advice is an important component of stroke health promotion.[a]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients who, before leaving the hospital, have documented evidence of advice on risk factor modification relating to both medications and lifestyle.

Numerator criteria: *Inclusions*
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[b]

Care type = '1' (acute care).[c]

Separation mode ='9' (discharge to usual residence or own accommodation).[d]

Exclusions
Nil.

Denominator: Stroke patients discharged from hospital.

Denominator criteria: *Inclusions*
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[b]

Care type = '1' (acute care).[c]

Separation mode ='9' (discharge to usual residence or own accommodation).[d]

Exclusions
Stroke patients with minimal capacity to modify their risk factors. This includes patients whose cognitive impairment or communication difficulties were so great that the patient could not participate in education provided to them.

Stroke patients who refuse advice.

Patients for whom there are limitations of therapy (i.e. advance care directive is enacted/ the patient is on a palliative care pathway).

Setting: Acute/Hospital.

Comments: The advice on risk factor or lifestyle modification should include smoking cessation, improved diet, increased regular exercise and reduced alcohol consumption. The advice should be individualised and delivered using behavioural techniques such as educational or motivational counselling.[1] This advice should also be provided to carer(s).

Reference

1. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

a   Rationale provided by Stroke Indicator Working Group.

b   ICD-10-AM (9th edition).

c   METeOR identifier: 491557.

d   METeOR identifier: 270094. Includes discharge to usual residence, own accommodation or welfare institution (includes prisons, hostels and group homes providing primarily welfare services).

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Quality statement 6 – Carer training and support

A carer of a patient with stroke is given practical training and support to enable them to provide care, support and assistance to a patient with stroke.

Indicator 6a: Carer support needs assessment

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke whose carer(s) have a documented formal needs assessment.

Rationale: Assessment of carer support needs allows for referral to appropriate services.

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Patients with a final diagnosis of stroke whose carer(s) have had a documented formal needs assessment.

Numerator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions
Stroke patients discharged from hospital who do not have a carer.

Denominator: Patients with a final diagnosis of stroke who have a carer upon discharge from hospital.

Denominator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions
Stroke patients discharged from hospital who do not have a carer.

Where patient or carer refuses a formal assessment.

Setting: Hospital and/or home.

Comments: N/A.

Reference

Supplementary source:
National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

a   ICD-10-AM (9th edition).
b   METeOR identifier: 270094. Includes discharge to usual residence, own accommodation or welfare institution (includes prisons, hostels and group homes providing primarily welfare services).

Quality statement 6 – Carer training and support

Indicator 6b: Carer training

Identifying and definitional attributes

Name: Proportion of patients with a final diagnosis of stroke who require assistance with activities of daily living, and whose carer(s) received relevant training prior to discharge from hospital.

Rationale: Evidence suggests that carers benefit from training in a range of activities related to patient care prior to patient discharge from hospital.[1] Such training has produced long-term benefits for stroke patients such as reduced institutionalisation and mortality.[2]

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Patients with a final diagnosis of stroke who require assistance with activities of daily living, and whose carer or carers received training prior to discharge from hospital.

Numerator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions
Stroke patients discharged from hospital who do not have a carer.

Denominator: Patients with a final diagnosis of stroke who require assistance with activities of daily living upon discharge from hospital and who have a carer or carers.

Denominator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions
Stroke patients discharged from hospital who do not have a carer.

Patients whose carers do not want training in personal care.

Setting: Hospital and/or home

Comments: Carer training should include the following components:

- personal care techniques
- communication strategies
- physical handling techniques
- ongoing prevention and other stroke-specific problems
- safe swallowing
- dietary modification
- management of behaviours and psychosocial issues.[3]

References

1. Kalra L, Evans A, Perez I et al. Training carers of stroke patients: randomised controlled trial. British Medical Journal 2004; 328(7448):1099.

2. Grasel E, Schmidt R, Biehler J et al. Long-term effects of the intensification of the transition between inpatient neurological rehabilitation and home care of stroke patients. Clinical Rehabilitation 2006; 20(7): 577–583.

3. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF; 2010.

Supplementary source:
4. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.

a   ICD-10-AM (9th edition).

b   METeOR identifier: 270094. Includes discharge to usual residence, own accommodation or welfare institution (includes prisons, hostels and group homes providing primarily welfare services).

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Quality statement 7 – Transition from hospital care

Before a patient with stroke leaves the hospital, they are involved in the development of an individualised care plan that describes the ongoing care that the patient will require after they leave the hospital. The plan includes rehabilitation goals, lifestyle modifications and medicines needed to manage risk factors, any equipment they need, follow-up appointments, and contact details for ongoing support services available in the community. This plan is provided to the patient before they leave hospital, and to their general practitioner or ongoing clinical provider within 48 hours of discharge.

Indicator 7a: Written care plan

Definitional attributes

Name: Proportion of patients with a final diagnosis of stroke, with evidence that a documented plan for their ongoing care in the community was developed with and provided to the patient and/or their carer prior to discharge.[1]

Rationale: A range of interventions have been shown to reduce the risk of another stroke and are outlined in the *Clinical Guidelines for Stroke Management*. A written care plan should address all relevant lifestyle modifications. The plan aims to encourage self-management strategies to assist the patient in maximising their recovery from stroke.

Collection and usage attributes

Computation: *(Numerator ÷ denominator) x 100*

Numerator: Total number of patients with a final diagnosis of stroke with evidence that a documented plan for their ongoing care in the community was developed with and provided to the patient and/or their carer prior to discharge into the community.[2]

Numerator criteria:

Inclusions
Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions
Nil.

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a   ICD-10-AM (9th edition).
b   METeOR identifier: 270094. Includes discharge to usual residence, own accommodation or welfare institution (includes prisons, hostels and group homes providing primarily welfare services).

Quality statement 7 – Transition from hospital care

Denominator: Total number of patients with a final diagnosis of stroke who were discharged into the community.

Denominator criteria:

Inclusions

Patients diagnosed with stroke (I61.x, I62.9, I63.x and I64).[a]

Separation mode ='9' (discharge to usual residence or own accommodation).[b]

Exclusions

Patients refusing a care plan.

Setting: Acute/Hospital.

Comments: This indicator is part of the NSF Clinical Audit.

The Australian Stroke Coalition recommends the use of the My Stroke Care Plan.[3]

The care plan should include the following information:

- risk factor modification – smoking cessation, diet low in fat and sodium and high in fruits and vegetables, increased regular exercise, adherence to medication and reduced alcohol consumption
- community services
- stroke support services
- further rehabilitation or outpatient appointments
- appropriate contact numbers[3]
- equipment needed.

The care plan should be developed by a multidisciplinary team.

References

1. Australian Council on Healthcare Standards. ACHS Clinical Indicator Users' Manual 2012. Sydney: ACHS, 2012.

2. National Stroke Foundation. Clinical Guidelines for Stroke Management. Melbourne: NSF, 2010.

3. National Stroke Foundation. My Stroke Care Plan. Melbourne: NSF, 2013.[c]

Supplementary sources:

4. National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF; 2013.

5. Lannin NA, Cadilhac D, Anderson C et al. The Australian Stroke Clinical Registry Annual Report 2011. Report No 3, Heidelberg: The George Institute for Global Health and National Stroke Research Institute, 2012.

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a   ICD-10-AM (9th edition).

b   METeOR identifier: 270094. Includes discharge to usual residence, own accommodation or welfare institution (includes prisons, hostels and group homes providing primarily welfare services).

c   Available at: **http://strokefoundation.com.au/site/media/NSF_MyStrokeCarePlan_web2.pdf**.

Indicators of effectiveness

Indicators of effectiveness, also known as outcome indicators, provide markers of how close care is to recommended care, monitor outcomes and provide signals to patients and clinicians on quality of care.

In 2009, Health Ministers endorsed the recommendation by the Commission that hospitals routinely review a set of *core hospital-level outcome indicators*. The indicator set includes:

- in-hospital mortality for stroke
- unplanned readmission within 30 days following management of stroke.

These indicators were subsequently included in the national health *Performance and Accountability Framework* (PAF).[a] The PAF specifies indicators that are intended to be publicly reported by the National Health Performance Authority at hospital and Local Hospital Network level. The specification for these indicators is published on the Commission's web site,[b] and the public and private hospital sector have been provided with a Toolkit which enables local generation of these indicators.

Ongoing monitoring and review of a set of outcome-based indicators can detect significant variance and highlight issues of data quality and consistency, resources, or of quality of care. High outlier rates should be seen as a prompt to further detailed investigation. Several jurisdictions and private hospital ownership groups generate these indicators, and provide them to hospitals for routine review and investigation of high outlier rates.

Where routine access to linked datasets is available, or where individual patient follow-up is authorised for studies and registries, the following endpoints are sometimes used in monitoring patient outcomes:

- 30-day mortality following stroke (the NSW Bureau of Health Information reports risk-adjusted, linked 30-day AMI mortality rates for NSW)[c]
- Discharge to usual place of residence (refer to the Australian Stroke Clinical Registry[d] and the Stroke Foundation National Stroke Audit Acute Services)[e]
- Three-month outcome indicators based on survival status, place of residence, living alone status, recurrent stroke episode since discharge, quality of life (refer to the Australian Stroke Clinical Registry and the Registry of the Canadian Stroke Network).

Three-month outcome indicators are best collected via manual case follow-up or, for death and readmission, linked datasets.

a   Available at http://www.nhpa.gov.au/internet/nhpa/publishing.nsf/Content/PAF.

b   See http://www.safetyandquality.gov.au/our-work/information-strategy/indicators/.

c   See http://www.bhi.nsw.gov.au/publications/annual_performance_report_series/healthcare_in_focus_2012.

d   Australian Stroke Clinical Registry – Annual Report 2011. Available at http://www.AusCR.com.au/wp-content/uploads/2011-AuSCR-ANNUAL-REPORT-FINAL.pdf.

e   National Stroke Foundation. National Stroke Audit: Acute Services Clinical Audit Report. Melbourne: NSF, 2013.