



Australian Stroke Coalition
**30/60/90 National Stroke Targets
Action Plan**

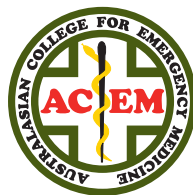
30/60/90 National Stroke Targets

By 2030

- National median endovascular clot retrieval door to puncture time <30mins for transfers
- National median thrombolysis door to needle time <60mins
- National median door in door out time for endovascular clot retrieval <60mins in metro hospitals*
- National median endovascular clot retrieval door to puncture time <90mins for primary presenters
- Certified stroke unit care provided to >90% of patients with primary stroke diagnosis

*Where same-crew ambulance door-in and -out transfer is possible. Regional services retrieving via road should aim for a DIDO time of 75 minutes (hospitals requiring aero-retrieval service are not included in this target).

These targets have been developed in consultation with leading Australian stroke clinicians and researchers, and are endorsed by the following organisations:



Introduction

The Australian Stroke Coalition (ASC) [30/60/90 National Stroke Targets](#) focus on stroke unit access¹ and expedited reperfusion therapies.^{2,3} These were identified as the acute stroke Key Performance Indicators (KPIs), most likely, if optimised, to have the greatest impact on patient outcomes. This document has distilled national and international⁴ best practice opinion and guidelines to assist stroke hospitals and state stroke networks in meeting these targets.

1. Stroke Unit Access and National System Organisation

To ensure all patients have the ability to access stroke unit care and reperfusion treatments, all hospitals in the country should be designated as one of these five stroke hospital categories, according to the 2023 Stroke Foundation National Acute Stroke Services Framework.⁵

- 1. Comprehensive Stroke Centre (CSC)** - a hospital providing 24/7 endovascular therapy (EVT) and neurosurgical services.
- 2. Primary Stroke Centre (PSC)** - a hospital providing 24/7 thrombolysis and stroke unit care.
- 3. Stroke Capable Regional General Hospital (SCRGH)** - a hospital geographically distant from metropolitan centres which provides 24/7 thrombolysis and stroke care approximating stroke unit care, but from which routine transfer to a large PSC or CSC is infeasible, due to distance.
- 4. Telestroke Thrombolysis Centre (TTC)** - a hospital providing telestroke-enabled thrombolysis, ideally 24/7, but not providing stroke unit care.
- 5. General Hospital (GH)** - a hospital which does not provide either thrombolysis or stroke unit care, but which should have protocols for patients presenting with stroke, to ensure rapid transfer to hospitals with thrombolysis and stroke unit care occurs.

We recommend the following actions, at Department of Health, Stroke Network and Local Hospital Network levels, to ensure that every Australian with acute stroke is provided with an opportunity to access certified stroke unit care:

- 1. Map every private and public hospital in Australia to determine whether they are a current or potential CSC, PSC, SCRGH, TTC or GH.**
- 2. Support current and potential CSCs, PSCs and SCRGHs in meeting Australian Stroke Coalition stroke unit certification criteria and gaining certification.**
- 3. Identify and support potential TTCs in joining State or Interstate telestroke networks.**
- 4. Support GHs in developing triage and transfer protocols to ensure patients presenting with stroke directly can access reperfusion and stroke unit care.**
- 5. Work with ambulance and retrieval services to ensure all patients with potential stroke are transferred to hospitals which can provide appropriate acute stroke care.**
- 6. Provide each patient presenting with stroke to Australian TTCs and GHs with the opportunity to access stroke unit care via a CSC, PSC or SCRGH.**
- 7. Facilitate system-wide stroke data collection to monitor stroke hospitalisation processes and outcomes.**

2. Reperfusion optimisation strategies

The American Heart Association (AHA) “Target: Stroke” initiative advocates the adoption of key best practice strategies for expediting reperfusion therapies for acute ischaemic stroke.⁶⁻⁹ These AHA strategies have been workshopped and modified slightly for an Australian context by Australian stroke leaders.

While many strategies are common both to CSCs and other thrombolysing Centres (PSCs, SCRGHs and TTCs), for clarity and ease of use, two versions of these Strategies are provided.

a. Reperfusion optimisation strategies for PSCs, SCRGHs and TTCs

These strategies facilitate rapid assessment and neuroimaging of patients with suspected stroke, and, if indicated, administration of thrombolytic (+/- transfer out for EVT):

- 1. Systematic, coordinated ambulance bypass of all suspected stroke** (following use of validated stroke screening tools or stroke-capable ambulance assessment +/- ambulance-based neuroimaging) to stroke-thrombolysis capable hospitals and severely affected suspected stroke patients to endovascular-capable hospitals where locally indicated (depending on local door to needle, door-in-door out times and transfer distance¹⁰⁻¹²).
- 2. Ambulance code stroke team prenotification** – (e.g., time last known well, anticoagulant use, venous access etc). The code stroke team at a minimum includes CT (or MR) radiographer staff, and medical and nursing stroke team members. Move towards transmitting electronically reliable identifying data pre-arrival - in the interim, use unknown patient protocols if patient cannot be identified and pre-registered pre-arrival.
- 3. Use of stroke toolkits** (including medications commonly used during acute code stroke)
- 4. Rapid triage and direct transfer from ambulance to CT** – acceptance of paramedic observations as sufficient without requiring repetition during triage process, followed by transfer directly from triage to CT on the same ambulance stretcher **without off-loading**,¹³ if deemed medically stable by ambulance, triage and clinical staff. The presence of Advanced Life Support-trained staff is NOT required for otherwise stable stroke patients.
- 5. Attach timer or clock** to chart, clip board, or bed. Acute ischaemic stroke care including EVT requires an accurate, timely, coordinated and systematic evaluation of the patient. A universal clock visible to the ED and stroke teams is an enabling tool for improving the timeliness and quality of care and should be considered for recording critical stages.⁸
- 6. Pre-consent using verbal-only discussions about potential reperfusion therapy** (if informed consent not possible due to stroke deficits, emergency treatment provision is acceptable if next of kin unreachable (reasonable to attempt for up to 5 minutes)).
- 7. Rapid acquisition of neuroimaging** – pre-prepare and connect IV contrast prior to patient arrival to CT. Following direct transfer on the ambulance stretcher, proceed swiftly and directly to multi-modal neuroimaging (non-contrast CT (NCCT), arch to vertex CT angiography (CTA) and CT perfusion (CTP)) unless known contrast allergy. Multimodal imaging should be used for all stroke patients who meet an institutional threshold for clinical stroke severity.¹⁴ Image interpretation and decision-making is supported by automated CT perfusion analysis software.¹⁵ Multi-modal imaging should not delay administration of thrombolytic or contact with the ENI (Endovascular Neuro-interventional) team. An arterial phase CTA from the CTP can be manually sent to PACS to identify large vessel occlusion (LVO) early, where feasible.

- 8. Blood draw for rapid laboratory +/- point of care INR testing** but proceed to thrombolytic administration without awaiting results unless indicated by clinical or past medical history.
- 9. Rapid access to and administration of thrombolytic** – have immediately at hand prior to CT.
- 10. Swift imaging availability** should be facilitated via IT services for the stroke consultant within minutes of acquisition to enable prompt decision making in conjunction with onsite personnel. Pre-notify the consultant decision-maker of the pending NCCT.
- 11. Administration of thrombolytic on the imaging table** following non-contrast imaging, where appropriate – supported by hospital policies to permit this.
- 12. Team-based approach** – parallel workflows for clinical assessment, obtaining venous access, ordering diagnostic tests and commencing treatment.
- 13. Streamlined door-in door-out protocols** should be developed by all non-endovascular capable hospitals receiving acute stroke patients to enable swift door-in-door-out times. Consider commencing Endovascular Neurointervention (ENI) team notification as soon as treatment-eligible LVO is probable (e.g. following a clear hyperdense MCA in LVO syndrome patients). For metropolitan sites the same inbound ambulance crew should be used for the outbound journey.¹⁰ For regional sites decision about the level of medical escort required should be promptly made in conjunction with the stroke physician to prevent unnecessary delay.
- 14. Prompt data feedback** should be provided to both hospital and ambulance staff. Accurately measuring and tracking door to needle times and key time-markers along this pathway allows the treating teams to identify areas for improvement and take appropriate action. A data monitoring and feedback system (such as the [Australian Stroke Clinical Registry](#)) creates a process for providing timely feedback and recommendations for improvement on a case-by-case basis and in hospital aggregate. This system helps identify specific preventable delays, devise strategies to overcome them, set targets, and monitor progress on a case-by-case basis.^{7,8}

b. Reperfusion optimisation strategies for Comprehensive Stroke Centres

These strategies facilitate rapid assessment and neuroimaging of patients with suspected stroke, and, if indicated, administration of thrombolytic and provision of EVT.

- 1. Systematic, coordinated ambulance bypass of all suspected stroke** (following use of validated stroke screening tools or stroke-capable ambulance assessment +/- ambulance-based neuroimaging) to stroke-thrombolysis capable hospitals and severely affected suspected stroke patients to endovascular-capable hospitals where locally indicated (depending on local door to needle, door-in-door out times and transfer distance¹⁰⁻¹²).
- 2. Ambulance code stroke team prenotification** - (e.g., time last known well, anticoagulant use, venous access etc). The code stroke team at a minimum includes CT (or MR) radiographer staff, and medical and nursing stroke team members. Move towards transmitting electronically reliable identifying data pre-arrival - in the interim, use unknown patient protocols if patient cannot be identified and pre-registered pre-arrival.
- 3. Use of stroke toolkits** (including medications commonly used during acute code stroke)
- 4. Rapid triage and direct transfer from ambulance to CT** - acceptance of paramedic observations as sufficient without requiring repetition during triage process, followed by transfer directly from triage to CT on the same ambulance stretcher **without off-loading**,¹³ if deemed medically stable by ambulance, triage and clinical staff. The presence of Advanced Life Support-trained staff is NOT required for otherwise stable stroke patients.
- 5. Attach timer or clock** to chart, clip board, or bed. Acute ischaemic stroke care including endovascular therapy requires an accurate, timely, coordinated and systematic evaluation of the patient. A universal clock visible to the ED and stroke (+/- ENI) team is an enabling tool for improving the timeliness and quality of care and should be considered for recording critical stages.⁸
- 6. Pre-consent using verbal-only discussions about potential reperfusion therapy** (if informed consent not possible due to stroke deficits, emergency treatment provision is acceptable if next of kin unreachable (reasonable to attempt for up to 5 minutes)).
- 7. Rapid acquisition of neuroimaging** - pre-prepare and connect IV contrast prior to patient arrival to CT. Following direct transfer on the ambulance stretcher, proceed swiftly and directly to multi-modal neuroimaging (non-contrast CT, arch to vertex CT angiography and CT perfusion) unless known contrast allergy. Multimodal imaging should be used for all stroke patients who meet an institutional threshold for clinical stroke severity.¹⁴ Image interpretation and decision making is supported by automated CT perfusion analysis software.¹⁵ Multi-modal imaging should not delay administration of thrombolytic or contact with the ENI team. An arterial phase CTA from the CTP can be manually sent to PACS to identify large vessel occlusion (LVO) early, where feasible.
- 8. Blood draw for rapid laboratory +/- point of care INR testing** but proceed to thrombolytic administration without awaiting results unless indicated by clinical or past medical history.
- 9. Rapid access to and administration of thrombolytic** - have immediately at hand prior to CT.
- 10. Swift imaging availability** should be facilitated via IT services for the stroke consultant within minutes of acquisition to enable prompt decision making in conjunction with onsite personnel. Pre-notify consultant decision-maker of pending NCCT.
- 11. Administration of thrombolytic on the imaging table** following non-contrast imaging, where appropriate - supported by hospital policies to permit this.

12. Team-based approach – parallel workflows for clinical assessment, obtaining venous access, ordering diagnostic tests and commencing treatment.

13. Prompt data feedback should be provided to both hospital and ambulance staff. Accurately measuring and tracking door to needle times and key time-markers along this pathway allows the treating teams to identify areas for improvement and take appropriate action. A data monitoring and feedback system (such as the [Australian Stroke Clinical Registry](#)) creates a process for providing timely feedback and recommendations for improvement on a case-by-case basis and in hospital aggregate. This system helps identify specific preventable delays, devise strategies to overcome them, set targets, and monitor progress on a case-by-case basis.^{7,8}

IN ADDITION: for CSCs these Endovascular Neurointervention-specific strategies should be implemented:

1. Pre-notification and rapid activation of the ENI team: The ENI team should be alerted immediately if a possible candidate for thrombectomy is identified based upon a pre-specified clinical severity threshold, or non-contrast imaging suggesting a large vessel occlusion. If a patient is being transferred for potential endovascular therapy, the ENI team should receive pre-notification and an estimated time of arrival.^{16,17}

2. Rapid availability of the ENI team: The hospital should have a policy in place specifying the expected call-arrival times to the ENI suite (preferably ≤ 30 minutes) that the ENI team on call (neurointerventionalist, radiologist, nurses) need to fulfill.¹⁸

3. Expedite transferred patients with known LVO directly from triage to the ENI Suite: Guided by prespecified protocols, eligible stroke patients, transferred to the thrombectomy-capable centre from a referral site, should routinely bypass the Emergency department directly to the ENI suite.¹⁷ Exceptions may include patients with cardiorespiratory instability requiring immediate stabilisation, and patients with significant improvement to non-disabling symptoms, following long-distance (>3 hour) transfer.¹⁴

4. Transfer of patients with newly-identified LVO directly from neuroimaging to the ENI Suite: Directly-presenting stroke patients eligible for endovascular therapy should be directly transported from the CT/MR imaging suites to the ENI suite, if ready to receive the patient, without returning to the Emergency Department.¹⁹

5. Endovascular therapy-ready ENI suite: policies and protocols should ensure the ENI suite is, at all times, in an endovascular therapy-ready state. This includes standardised, pre-prepared equipment tray/cart for endovascular therapy cases that includes all necessary equipment for the case (e.g. BRISK: Brisk Recanalization Ischemic Stroke Kit, with drapes, tubing, syringes, catheters, and devices). Noting that the first-line approach might not always be possible, institutions should have an agreed routine first-line endovascular technique (consensus between operators) so that there is less need for nursing staff to vary equipment/tools based on the person on call.^{16,18}

6. Team-based ENI approach: Parallel workflows by Emergency Department Team, stroke team, and ENI team, including the neurointerventionalist, interventional radiographer, anaesthetist and nursing staff, should be utilised to facilitate rapid angiography and, when indicated, endovascular therapy.^{16-18,20}

7. Anaesthesia access and protocols: Rapid anaesthetic support should be available. General anaesthesia is not required in non-agitated compliant patients. If general anaesthesia is employed, induction should be swift and done without allowing a drop in blood pressure (ideally to maintain systolic blood pressure above 140mm Hg)^{21,22} while minimising any delay to procedure start. These workflow recommendations should be tailored to meet the needs of individual institutions.^{18,23,24}

8. Prompt ENI team data feedback: ENI performance metrics should be promptly shared with appropriate staff utilising thrombolysis data feedback principles stated above.^{7,8,25}

Conclusion

These strategies, if implemented, will lead to substantial improvements in stroke unit access and timely ischaemic stroke reperfusion. Strategies will be reviewed at annual scientific meetings of the Australian and New Zealand Stroke Organisation (ANZSO), and further refinements will provide additional assistance in meeting the 30/60/90 National Stroke Targets, as well as forming a foundation for subsequent system improvements.

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