

# Stroke and transient ischaemic attack (TIA)

When designing stroke and TIA services, consider the following interventions as ways to achieve specific productivity improvements whilst maintaining the quality and safety of clinical care. This approach is being trialled as a beta product alongside the Map of Medicine Stroke and transient ischaemic attack (TIA) pathway, which covers all areas of patient care.

## Therapeutic interventions

### Immediate brain imaging

All patients with suspected stroke should receive immediate brain imaging<sup>1,2</sup> and be admitted directly to a specialist acute stroke unit.<sup>3</sup>

A 2004 National Institute for Health Research (NIHR) Health Technology Assessment (HTA) which explored the optimum timing of brain imaging for acute stroke patients found that the most effective strategy was to scan all patients immediately.<sup>1,2</sup> This provided the greatest benefits in terms of most quality-adjusted life years (QALYs) achieved and least overall costs.<sup>1,2</sup> National Institute for Health and Clinical Excellence (NICE) stroke quality standard state that patients with acute stroke should receive brain imaging within 1 hour of arrival.<sup>4</sup>

Health economic evaluations have shown that immediate specialist care reduces inpatient length of stay, six-month disability and 90-day recurrent strokes, and improves QALYs in all stroke and TIA patients, when compared with GP care.<sup>5,6</sup>

### Early specialist assessment for TIA

Patients with TIA, who are at high risk of recurrence, should undergo specialist assessment within 24 hours of presentation.<sup>7</sup>

The 2008 Scottish Intercollegiate Guidelines Network (SIGN) Stroke/TIA guideline recommends prompt specialist assessment for all TIA patients at high risk of recurrence.<sup>7</sup> This recommendation is based on health economic evidence which associated early active management at a daily non-appointment TIA clinic with an 80% drop in the risk of stroke recurrence.<sup>6</sup>

### Thrombolysis

Give intravenous (IV) tissue plasminogen activator (alteplase) to patients with confirmed acute ischaemic stroke within 3 hours of onset of stroke symptoms.<sup>8</sup>

The NICE 2007 technology appraisal of alteplase in the treatment of acute ischaemic stroke concluded that alteplase plus best supportive care is clinically and cost effective when compared with best supportive care alone.<sup>8</sup> A 2005 decision analysis showed that in acute stroke patients, thrombolytic treatment is associated with an incremental cost-effectiveness ratio (ICER) of £16,623 per QALY when compared with standard care.<sup>9</sup>

### Thrombolysis botulinum toxin type A (BTX-A) in the treatment of post-stroke spasticity

Use BTX-A alongside physiotherapy to treat post-stroke muscle spasticity.<sup>10</sup>

BTX-A offers greater clinical benefit when compared with oral anti-spasmodic medications where both are used in a regimen including physiotherapy.<sup>10</sup> A 2005 health economic evaluation found that patients with post-stroke wrist or clenched fist spasticity had more successfully treated months when receiving BTX-A as first or second-line therapy when compared with those on a regimen based on oral anti-spasmodic medications.<sup>10</sup> The costs per successfully treated month, including physiotherapy and other rehabilitation costs, were £942 for BTX-A as first-line therapy; £1,387 for BTX-A as second-line therapy, and £1,697 for oral anti-spasmodic therapy alone.<sup>10</sup>

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## Primary prevention

### Anticoagulation in patients with atrial fibrillation (AF) at risk of ischaemic stroke

Place all patients with AF at risk of ischaemic stroke on anticoagulation therapy.<sup>11</sup>

NHS Improvement estimates there are 12,500 people who suffer strokes directly attributable to AF annually, with up to 40% of patients who could benefit from anticoagulation not receiving it.<sup>12</sup> Identifying and treating these patients appropriately would prevent around 6,000 strokes annually and save 4,000 lives.<sup>12</sup> The cost per stroke due to AF is estimated to be £11,900 in the first year after stroke occurrence. This can be saved by maintaining a patient on warfarin for a year, at an estimated total cost, including monitoring, of £383.<sup>12</sup>

## Secondary Prevention

### Anti platelet therapy

Use aspirin combination therapy in the secondary prevention of ischaemic stroke.<sup>3,7</sup>

NICE and SIGN guidance recommend aspirin plus modified-release dipyridamole (ASA-MRD) over aspirin (ASA) monotherapy as it delivers better clinical results in terms of stroke-free life years, disability-free life years and recurrent strokes averted.<sup>3,7</sup> Health economic modeling results have shown the cost-effective value of combination therapy, as patients on ASA gained an average of 10.8 QALYs at a lifetime cost of treatment per patient of \$44,396 (approx. £24,000 as of January 2004), whilst patients on ASA-MRD gained an average of 11.1 QALYs at a lifetime cost of treatment per patient of \$41,425 (approx. £23,000 as of January 2004).<sup>13,14</sup>

### Angiotensin-converting enzyme (ACE) inhibitor therapy

Use a combination of an ACE inhibitor and thiazide diuretic for all patients stroke/TIA to prevent further vascular events.<sup>4,7</sup>

The 2008 SIGN Stroke/TIA guideline recommends placing all patients with previous stroke or TIA regardless of blood pressure on daily combination therapy of an ACE inhibitor (perindopril 4mg/day) and a diuretic (indapamide 2.5mg/day).<sup>4,7</sup> A 2009 health economic evaluation comparing this regimen with standard care, found patients had fewer recurrent strokes and improved QALYs over a 4-year monitoring period with a cost per QALY below £25,000.<sup>15</sup>

### Lipid management

Place all patients who have had an ischaemic stroke or TIA on generic lipid-lowering medications.<sup>7,16,17</sup>

In patients with previous cerebrovascular disease, treatment with a lipid-lowering drug (HMG-CoA reductase inhibitor) reduces the risk of non-fatal stroke, total stroke, coronary events, cardiovascular disease mortality, and all-cause death.<sup>7,16,17</sup>

A 28-day course of a branded statin is on average about 6 times more costly than an appropriate generic statin, despite having similar clinical efficacy.<sup>18,19</sup> The number of prescriptions for statin therapy continues to increase by around 20% per year.<sup>18,19</sup> Current expenditure on statins is around £500 million per year. Initiating patients on simvastatin 40mg (or another statin of similar efficacy and cost) could result in considerable savings.<sup>18,19</sup>

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## Key dates

The Map of Medicine systematically monitors the medical literature for the latest productivity interventions and will update this document as new evidence emerges.

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## Methodology

The productivity considerations presented in this document are relevant to the UK. They were identified by systematically searching for and appraising productivity evidence from multiple sources, including NICE guidance, health economic databases and Zynx Health (a sister company of Map of Medicine).

A productivity message explicitly states interventions that can reduce the cost of care, whilst maintaining or improving patient outcomes. Actions that are believed to lead to improved productivity, but lack unequivocal clinical or economic evidence, are not included.

Some productivity considerations are informed by more recent evidence than that included in relevant national guidelines.

The document has been peer reviewed by an independent group of experts.

## Feedback

This approach to productivity guidance is being trialled as a beta product alongside the Map of Medicine Stable angina pathway. We welcome your feedback. If you know of additional resources that describe cost-effective interventions, please forward the reference information to us at [productivity@mapofmedicine.com](mailto:productivity@mapofmedicine.com).

## Other topics of interest:

Productivity considerations for service design – [Cardiovascular disease risk management](#)

Productivity considerations for service design – [Diabetes](#)

Productivity considerations for service design – [Stable coronary artery disease](#)

## References

1. Wardlaw JM, Keir SL, Seymour J et al. [What is the best imaging strategy for acute stroke?](#) Health Technology Assessment 2004; 8: 1-180.
2. Wardlaw JM, Seymour J, Cairns J et al. [Immediate computed tomography scanning of acute stroke is cost-effective and improves quality of life.](#) Stroke 2004; 35: 2477-83.
3. National Collaborating Centre for Chronic Conditions (NCCC). [Stroke: National clinical guideline for diagnosis and initial management of acute stroke and transient ischaemic attack \(TIA\).](#) London: Royal College of Physicians; 2008.
4. National Institute for Health and Clinical Excellence (NICE). [Stroke Quality Standard.](#) London: NICE; 2010.
5. Rothwell PM, Giles MF, Chandratheva A et al. [Effect of urgent treatment of transient ischaemic attack and minor stroke on early recurrent stroke \(EXPRESS study\): a prospective population-based sequential comparison.](#) Lancet 2007; 370: 1432-42.
6. Lavallee PC, Meseguer E, Abboud H et al. [A transient ischaemic attack clinic with round-the-clock access \(SOS-TIA\): feasibility and effects.](#) Lancet Neurol 2007; 6: 953-60.
7. Scottish Intercollegiate Guidelines Network (SIGN). [Management of patients with stroke/TIA: assessment, investigation, immediate management and secondary prevention.](#) A national clinical guideline. SIGN Publication no. 108. Edinburgh: SIGN; 2008.
8. National Institute for Health and Clinical Excellence (NICE). [Alteplase for the treatment of acute ischaemic stroke.](#) NICE Technology appraisal guidance 122. London; 2007.
9. Mar J, Begiristain JM, Arrazola A. [Cost-effectiveness analysis of thrombolytic treatment for stroke.](#) Cerebrovasc Dis 2005; 20: 193-200.
10. Ward A, Roberts G, Warner J et al. [Cost-effectiveness of botulinum toxin type A in the treatment of post-stroke spasticity.](#) Rehabil Med 2005; 37: 252-257.
11. National Collaborating Centre for Chronic Conditions. [Atrial fibrillation: National clinical guideline for management in primary and secondary care.](#) London: Royal College of Physicians; 2006.
12. Tyndall K. [The Guidance on Risk Assessment and Stroke Prevention in Atrial Fibrillation.](#) London: NHS Improvement; 2009.
13. Sarasin FP, Gaspoz JM, Bounameaux H. [Cost-effectiveness of new antiplatelet regimens used as secondary prevention of stroke or transient ischaemic attack.](#) Arch of Intern Medicine 2000; 160: 2773-78.
14. Beard SM, Gaffney L, Bamber L et al. [Economic modelling of antiplatelet therapy in the secondary prevention of stroke.](#) Med Economics 2004; 7: 117-134.
15. Tavakoli M, Pumford N, Woodward M et al. [An economic evaluation of a perindopril-based blood pressure lowering regimen for patients who have suffered a cerebrovascular event.](#) European Journal of Health Economics 2009; 10: 111-9.
16. Vrečer M, Turk S, Drinovec J et al. [Use of statins in primary and secondary prevention of coronary heart disease and ischaemic stroke: a meta-analysis of randomized trials.](#) Int Clin Pharmacol Ther 2003; 41: 567-557.
17. Kongnakorn T, Ward A, Roberts CS et al. [Economic evaluation of atorvastatin for prevention of recurrent stroke based on the SPARCL trial.](#) Value Health 2009; 12: 880-7.
18. National Institute for Health and Clinical Excellence (NICE). [Lipid modification: Cardiovascular risk assessment and the modification of blood lipids for the primary and secondary prevention of cardiovascular disease.](#) Clinical guideline 67. London: NICE; 2008.
19. NHS Institute for Innovation and Improvement (NHSI). [Converting the potential into reality: 10 steps a commissioner can take to realise the benefits of the Better Care, Better Value indicators.](#) Warwick: NHSI; 2009.

### Disclaimer

This document is not to be substituted for a healthcare professional's diagnosis or clinical decisions.