NICE National Institute for Health and Care Excellence

Putting NICE guidance into practice

Resource impact report: Stroke and transient ischaemic attack in over 16s: diagnosis and initial management (update)
(NG128)

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Summary

This report focuses on the recommendations from NICE's guideline on stroke and transient ischaemic attack (TIA) in over 16s: diagnosis and initial management (update) that we think will have the greatest resource impact nationally (for England), and will need the most additional resources to implement or potentially generate the biggest savings. They are:

- Offer thrombectomy between 6 hours and 24 hours of symptom onset, to people who have acute ischaemic stroke and confirmed occlusion of the proximal anterior circulation and if there is the potential to salvage brain tissue (recommendation 1.4.6).
- Consider thrombectomy together with intravenous thrombolysis (where applicable) for people who have acute ischaemic stroke and confirmed occlusion of the proximal posterior circulation and if there is the potential to salvage brain tissue (recommendation1.4.7).
- Do not offer CT brain scanning to people with a suspected TIA unless there is clinical suspicion of an alternative diagnosis that CT could detect (recommendation 1.2.1).
- After specialist assessment in the TIA clinic, consider MRI to determine the territory of ischaemia, or to detect haemorrhage or alternative pathologies. If MRI is done, perform it on the same day as the assessment (recommendation 1.2.2).
- Refer people immediately who have had a suspected TIA for specialist assessment and investigation, to be seen within 24 hours (recommendation 1.1.5).

The full recommendations are given in paragraphs 3.1, 3.2, 3.3 and 3.4.

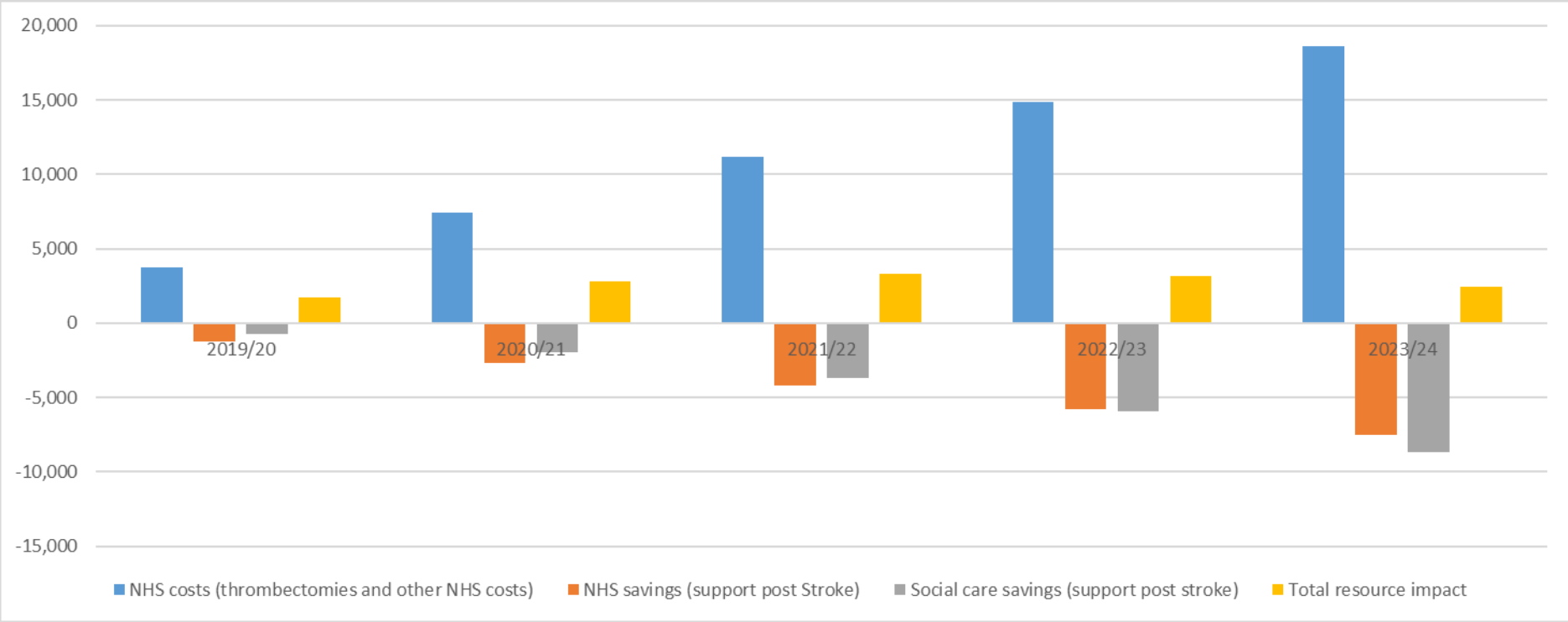
Financial impact

The estimated financial impact of implementing this guideline for England in the next 5 years is a cost of around £1.7 million in 2019/20 rising to a cost of around £2.4 million in 2023/24 as set out in table 1 and figure 1 below.

Table 1 Estimated budget impact of implementing the guideline

	2019/20 (£000s)	2020/21 (£000s)	2021/22 (£000s)	2022/23 (£000s)	2023/24 (£000s)
Rec 1.4.6 Offer thrombectomy to people with anterior stroke last known to be well between 6 hours and 24 hours previously					
NHS costs	1,563	3,125	4,688	6,250	7,813
NHS savings	-458	-970	-1,534	-2,151	-2,821
Social care savings	-306	-823	-1,552	-2,492	-3,644
Resource impact of rec 1.4.6	**799**	**1,332**	**1,602**	**1,607**	**1,348**
Rec 1.4.7 Consider thrombectomy for people with posterior stroke last known to be well within 24 hours					
NHS costs	2,154	4,309	6,463	8,617	10,772
NHS savings	-631	-1,388	-2,147	-2,978	-3,883
Social care savings	-432	-1,141	-2,141	-3,433	-5,015
Resource impact of rec 1.4.7	**1,091**	**1,780**	**2,175**	**2,206**	**1,874**
Rec 1.2.1 and 1.2.2 Do not offer CT brain scanning for suspected TIA					
NHS costs	6	12	19	25	31
NHS savings	-165	-330	-495	-660	-825
Resource impact of recs 1.2.1 and 1.2.2	**-159**	**-318**	**-477**	**-635**	**-794**
Rec 1.1.5 Assess all suspected TIA within 24 hours of symptom onset					
Assess resource impact of rec 1.1.5 locally					
Total NHS costs	3,723	7,446	11,170	14,892	18,616
Total NHS savings	-1,254	-2,688	-4,176	-5,789	-7,529
Total social care savings	-738	-1,964	-3,693	-5,925	-8,658
Total resource impact	**1,731**	**2,795**	**3,301**	**3,178**	**2,427**

Figure 1 Estimated budget impact of implementing the guideline



1 Introduction

1.1 The guideline will update the NICE guideline on stroke and transient ischaemic attack in over 16s: diagnosis and initial management (CG68).

1.2 This report discusses the resource impact of implementing our updated guideline on the diagnosis and initial management of stroke and transient ischaemic attack in England. It aims to help organisations plan for the financial implications of implementing this NICE guideline.

1.3 A resource impact template accompanies this report to help with assessing the resource impact at a local level in England, Wales or Northern Ireland.

1.4 Clinical commissioning groups commission services for people who have had a stroke, except when specialist interventions such as thrombectomy are needed. Specialist neurosurgical interventions such as thrombectomy are commissioned by NHS England. Providers are NHS hospital trusts, including adult neurosciences or neurology centres and ambulance services.

2 Background

2.1 Since NICE published its guideline on stroke and transient ischaemic attack (TIA) in 2008 the management of stroke has changed. New evidence has emerged in areas such as thrombectomy (clot retrieval procedures) in ischaemic stroke, controlling high blood pressure in people with acute haemorrhagic

stroke, the role of hemicraniectomy, and early mobilisation and optimum positioning of people with acute stroke.

2.2 This report highlights the recommendations that are anticipated to have a significant resource impact.

3 Recommendations with a significant resource impact

3.1 **Recommendation 1.4.6** Offer thrombectomy as soon as possible to people who were last known to be well between 6 hours and 24 hours previously (including wake-up strokes):

- who have acute ischaemic stroke and confirmed occlusion of the proximal anterior circulation demonstrated by CTA or MRA and
- if there is the potential to salvage brain tissue, as shown by imaging such as CT perfusion or diffusion-weighted MRI sequences showing limited infarct core volume taking into account the factors in recommendation 1.4.8.

Background

3.1.1 The current NHS England Clinical Commissioning Policy: Mechanical thrombectomy for acute ischaemic stroke (all ages) states that mechanical thrombectomy will be commissioned for anterior circulation stroke where substantial salvageable brain tissue is identified up to 12 hours after the onset of symptoms.

3.1.2 This guideline update highlights new clinical and cost effectiveness evidence that supports the extension of the eligibility period up to 24 hours.

3.1.3 Therefore, the resource impact for this recommendation is a result of the extension of the eligibility period for thrombectomy for

anterior circulation ischaemic stroke from 12 hours to 24 hours. This includes:

- the cost of additional scans
- network arrangements to manage the flow of people to local neurological centres
- additional costs of transferring people to a neurological centre
- additional cost of the intervention
- savings from a reduction in future NHS and social care costs as a result of people being less dependent following thrombectomy compared to standard care.

Assumptions made

Population

3.1.4 There are around 69,800 people in England who have an anterior circulation ischaemic stroke each year.

3.1.5 People present at different times for treatment of anterior circulation ischaemic stroke as set out in table 2 below.

Table 2 When people present with anterior circulation ischaemic stroke

Population	**%**	**People**
People aged over 16 in England	100	44,739,000
People who have an ischaemic stroke	0.156	69,800
People who present within 12 hours of symptoms starting	78.9	55,100
People who present between 12 hours and 24 hours	10.9	7,600
People who present after 24 hours	10.2	7,100
Total	**100**	**69,800**

3.1.6 The population whose pathway changes as a result of this recommendation are people presenting with anterior circulation ischaemic stroke between 12 and 24 hours.

3.1.7 This population is currently assumed to be treated with standard medical care.

3.1.8 The current clinical commissioning policy for mechanical thrombectomy will need thrombectomy services to be set up on a 24-hour basis. It is assumed that the costs for staffing, imaging and interventions being available have already been considered as a result of implementing the NHS England commissioning policy.

3.1.9 In future, people who need a thrombectomy will need to present or be transferred to a thrombectomy hub. It has been modelled that 50% of people who present between 12 and 24 hours will need to be transferred to a thrombectomy hub.

3.1.10 It is assumed that in future practice all people who have acute ischaemic stroke and confirmed occlusion of the proximal anterior circulation, with the potential to salvage brain tissue, confirmed by imaging, and who present between 12 and 24 hours will be treated with a thrombectomy.

3.1.11 The appropriate scanning to assess if people are eligible for thrombectomy is additional to current practice. It is anticipated that 3 people need appropriate scanning to detect one person who could benefit from thrombectomy. Table 3 below summarises current and future practice for people presenting with anterior circulation ischaemic stroke between 12 and 24 hours.

Table 3 Current and future practice for people presenting with anterior circulation ischaemic stroke between 12 and 24 hours

Population	%	Current practice	%	Future practice
People who present with anterior circulation ischaemic stroke between 12 hours and 24 hours		**7,607**		**7,607**
People who are scanned for proximal occlusion of the anterior circulation presenting between 12 hours and 24 hours			40	3,043

People with potential to salvage brain tissue, as shown by CT or MRI scanning techniques		1,014	33.3	1,014
Number of people treated with standard medical care	**100**	**1,014**		
People who live independently post stroke, following standard medical care	14.9	151		
People who live dependently post stroke, following standard medical care	85.1	863		
Number of people treated with thrombectomy			**100**	**1,014**
People who live independently post stroke following thrombectomy			48.1	488
People who live dependently post stroke, following thrombectomy			51.9	526

Costs

3.1.12 Table 4 sets out the NHS costs of the respective interventions and events.

Table 4 Costs of NHS interventions and events

Interventions or events	£
Rapid brain imaging – Best practice tariff 2019/20	399
Transport / ambulance costs	267
Thrombectomy - YA13Z Percutaneous Transluminal Other Procedures on, Intracranial or Extracranial Blood Vessel	11,755
Standard medical care - AA35A-E Stroke – weighted by 2017/18 reference cost activity	5,383
First year NHS costs for people who live independently after an anterior circulation stroke	5,343
First year NHS costs for people who live dependently after an anterior circulation stroke	12,148
Subsequent years NHS costs for people who live independently after an anterior circulation- stroke	410
Subsequent years NHS costs for people who live dependently after an Anterior circulation stroke	1,196

3.1.13 The costs of stroke events to social care are shown in table 5.

Table 5 Social care costs

Social care costs	£
First year social care costs for people who live independently after an anterior circulation stroke	3,562
First year social care costs for people who live dependently after an anterior circulation stroke	8,099
Subsequent years social care costs for people who live independently after an anterior circulation stroke	1,640
Subsequent years social care costs for people who live dependently after an anterior circulation stroke	4,782

Resource impact

3.1.14 The resource impact of implementing recommendation 1.4.6 is set out in tables 6 to 8 below.

Table 6 Estimated health & social care costs for 2019/20 to 2023/24, based on current practice, for people presenting with anterior circulation ischaemic stroke between 12 hours and 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions costs	5,460	5,460	5,460	5,460	5,460
Healthcare post stroke costs	11,294	12,388	13,482	14,577	15,671
Total healthcare costs (see appendix 1)	16,754	17,848	18,942	20,037	21,131
Social care costs (see appendix 2)	7,529	11,905	16,281	20,656	25,032
Total health & social care costs	**24,283**	**29,753**	**35,223**	**40,693**	**46,163**

Table 7 Estimated health & social care costs for 2019/20 to 2023/24, based on future practice, for people presenting with anterior circulation ischaemic stroke between 12 hours and 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions costs	7,023	8,585	10,148	11,710	13,273
Healthcare post stroke costs	10,835	11,418	11,948	12,426	12,850
Total healthcare costs (see appendix 3)	17,858	20,003	22,096	24,136	26,123
Social care costs (see appendix 4)	7,224	11,082	14,729	18,164	21,388
Total health & social care costs	**25,082**	**31,085**	**36,825**	**42,300**	**47,511**

Table 8 Estimated resource impact (RI) of change from current to future practice for people presenting with anterior circulation ischaemic stroke between 12 hours and 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions RI	1,563	3,125	4,688	6,250	7,813
Healthcare savings post stroke	-459	-970	-1,534	-2,151	-2,821
Total healthcare costs	1,104	2,155	3,154	4,099	4,992
Social care savings	-305	-823	-1,552	-2,492	-3,644
Total health & social care costs	**799**	**1,332**	**1,602**	**1,607**	**1,348**

3.2 **Recommendation 1.4.7** Consider thrombectomy together with intravenous thrombolysis (where not contraindicated and within the licensed time window) as soon as possible for people last known to be well up to 24 hours previously (including wake-up strokes):

- who have acute ischaemic stroke and confirmed occlusion of the proximal posterior circulation (that is, basilar or posterior cerebral artery) demonstrated by CTA or MRA and
- if there is the potential to salvage brain tissue, as shown by CT perfusion or diffusion-weighted MRI sequences showing limited infarct core volume taking into account the factors in recommendation 1.4.8.

Background

3.2.1 The outcomes for people who have had a posterior circulation stroke is usually very poor. This is partly due to difficulty in diagnosing the stroke due to no focal presentation. A small infarct in specific areas, for example, in areas of the brain supplied by the basilar artery, can have devastating consequences for functional outcomes.

3.2.2 The current NHS England Clinical Commissioning Policy for mechanical thrombectomy is where the proximal occlusion is in the anterior cerebral circulation. Therefore, there will be additional costs for thrombectomy in people who have an occlusion of the posterior cerebral circulation.

Assumptions made

Population

3.2.3 Around 22.5% of ischaemic strokes are of the posterior cerebral circulation (Merwick and Werring 2014).

3.2.4 It is expected that people with posterior circulation stroke would present at the same rate as the general population from the

Sentinel Stroke National Audit Programme. This means 89.8% of people with an occlusion of the posterior circulation present within 24 hours.

3.2.5 It is anticipated that around 10% of people who have an ischaemic posterior circulation stroke would be eligible for thrombectomy.

3.2.6 It has been assumed that the same number of people in future practice as in current practice will have thrombolysis. Therefore, the best practice tariff for administration of alteplase has not been included in the template. It is assumed that standard medical care and thrombectomy are with or without thrombolysis.

3.2.7 Based on expert clinical opinion it is assumed that for every 3 extra people that will be scanned, 1 extra person will go on to have a thrombectomy.

3.2.8 In future, people who need a thrombectomy will need to present or be transferred to a thrombectomy hub. It has been modelled that 50% of people who present with posterior circulation stroke will need to be transferred to a thrombectomy hub.

3.2.9 Current and future practice for people presenting with a stroke with a proximal occlusion of the posterior circulation within 24 hours of onset are highlighted in table 9.

Table 9 Current and future practice for people presenting with posterior circulation ischaemic stroke within 24 hours

Population	%	Current practice	%	Future practice
People with posterior circulation stroke		**15,703**		**15,703**
People who present within 24 hours	89.8	14,102	89.8	14,102
People who are suitable for thrombectomy with or without thrombolysis	10.0	1,410	10.0	1,410
Number of scans prior to transfer			33.2	4,230
Number of transfers to neurological centres			50.0	705
Number of people treated with standard medical care	99.0	1,396		
People who live independently post stroke, following standard medical care	85.1	208		
People who live dependently post stroke, following standard medical care	14.9	1,188		
Number of people treated with thrombectomy	1	14	100	1,410
People who live independently post stroke following thrombectomy	48.1	7	48.1	678
People who live dependently post stroke, following thrombectomy	51.9	7	51.9	732

Costs

3.2.10 The costs related to strokes where the posterior circulation has been occluded are considered to be the same as those affecting the anterior circulation. The cost of stroke treatment, including thrombectomy, can be found in tables 4 and 5.

Resource impact

3.2.11 Recommendation 1.4.7 is a “consider” recommendation. Consider recommendations are used for recommendations where the evidence of benefit is less certain. As the benefit is less certain clinicians are expected to use their clinical judgement about when the recommendation should apply. This has been taken into account when estimating the proportion of people presenting with posterior stroke who are considered eligible for treatment (10%). The resource impact is set out in tables 10 to 12.

Table 10 Estimated health & social cares for 2019/20 to 2023/24, based on current practice, for people presenting with occlusions of the posterior circulation within 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions costs	7,681	7,681	7,681	7,681	7,681
Healthcare post stroke costs	15,669	17,187	18,704	20,222	21,740
Total healthcare costs (see appendix 5)	23,350	24,868	26,385	27,903	29,421
Social care costs (see appendix 6)	10,446	16,515	22,583	28,652	34,720
Total health & social care costs	**33,796**	**41,383**	**48,969**	**56,555**	**64,141**

Table 11 Estimated health & social care costs for 2019/20 to 2023/24, based on future practice, for people presenting with occlusions of the posterior circulation within 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions costs	9,835	11,990	14,144	16,298	18,453
Healthcare post stroke costs	15,038	15,799	16,558	17,244	17,857
Total healthcare costs (see appendix 7)	24,874	27,789	30,702	33,542	36,310
Social care costs (see appendix 8)	10,014	15,374	20,442	25,219	29,705
Total health & social care costs	**34,888**	**43,162**	**51,144**	**58,761**	**66,015**

Table 12 Estimated resource impact of change from current to future practice for people presenting with occlusions of the posterior circulation within 24 hours

	2019/20 £000	2020/21 £000	2021/22 £000	2022/23 £000	2023/24 £000
Healthcare interventions RI	2,154	4,309	6,463	8,617	10,772
Healthcare savings post stroke	-631	-1,388	-2,146	-2,978	-3,883
Total healthcare costs	1,523	2,921	4,317	5,639	6,889
Social care savings	-432	-1,141	-2,141	-3,433	-5,015
Total health & social care costs	**1,091**	**1,780**	**2,175**	**2,206**	**1,874**

3.3 **Recommendation 1.2.1** Do not offer CT brain scanning to people with a suspected TIA unless there is clinical suspicion of an alternative diagnosis that CT could detect.

Recommendation 1.2.2 After specialist assessment in the TIA clinic, consider MRI (including diffusion-weighted and blood-sensitive sequences) to determine the territory of ischaemia, or to detect haemorrhage or alternative pathologies. If MRI is done, perform it on the same day as the assessment.

Background

3.3.1 Although only recommended in the 2008 guideline where the vascular territory or pathology is uncertain, routine CT imaging for suspected TIA is common current practice in some areas. The committee agreed that this may lead to unnecessary CT scanning and be an inefficient use of NHS resources, extending the length of stay in the emergency department and exposing people to unnecessary radiation.

3.3.2 The committee thought that CT is most useful when there is a clinical suspicion of an alternative diagnosis that CT could detect. It should not be routinely performed for everyone with a suspected TIA as it rarely confirms a diagnosis.

3.3.3 Some people with suspected TIA may need MRI to determine the area of ischaemia, for example before deciding to refer for carotid endarterectomy. MRI may also be needed to detect alternative pathologies such as tumours or haemorrhage. Because not all patients in a TIA clinic will need MRI, clinical assessment by a specialist is important for identifying these people.

Assumptions

3.3.4 The current activity for CT and MRI scans in people who have a TIA is based on NHS Digital Hospital Episode Statistics (HES) for 2017/18.

3.3.5 The future activity for CT and MRI scans in people who have a TIA is based on clinical expert opinion.

Costs

3.3.6 The costs of CT and MRI scanning are shown in table 13.

Table 13 Costs of CT and MRI

Costs of imaging	Cost £
CT scanning for people who have had a TIA[1]	83
MRI scanning for people who have had a TIA[2]	157
1 RD21A Computerised Tomography Scan of One Area, with Post-Contrast Only, 19 years and over - National Tariff 2019/20 2 RD02A Magnetic Resonance Imaging Scan of One Area, with Post-Contrast Only, 19 years and over – National Tariff 2019/20	

Resource impact

3.3.7 The estimated impact of not offering CT scans to all people with suspected TIA is a saving of around £800,000 from 2023/24 onwards. The saving is highlighted in table 14.

Table 14 Comparison of current and estimated future costs for people having imaging following a TIA

	Current practice		Future practice		Change	
	Number	Cost £000s	Number	Cost £000s	Number	Cost £000s
CT	11,327	940	1,382	115	-9,945	-825
MRI	2,106	331	2,304	362	198	31
Resource Impact		**1,271**		**477**		**-794**

3.4 **Recommendation 1.1.5** Refer immediately people who have had a suspected TIA for specialist assessment and investigation, to be seen within 24 hours of onset of symptoms.

Background

3.4.1 Everyone with a suspected TIA should be seen within 24 hours. This is a change from the current recommendations, which only

require urgent assessment for people at high risk of subsequent stroke; those at lower risk are currently seen within a week. This recommendation will not change the number of people who need to be assessed in a TIA clinic, but the same people will now be seen within 24 hours. The provision of daily TIA clinics is not universal, and some areas will need to set up daily TIA clinics to implement this recommendation.

3.4.2 Urgent specialist assessments ensure that people at high risk of stroke are identified early. This allows preventative treatment to begin, which should be introduced as soon as the diagnosis of TIA is confirmed. Immediate assessments have better health outcomes and lower costs for the entire population with a suspected TIA.

Assumptions

3.4.3 The number of people that are being referred for specialist assessment is not anticipated to change over time, instead the number of people will be spread across the week and the weekends.

3.4.4 The timing of assessments in areas where 7-day-a-week TIA clinics are not currently set up may change, however it is assumed because the number of assessments will not change, the costs for assessments will also not change.

3.4.5 Expert clinical opinion is that to run a TIA clinic it will need to be staffed by a consultant or an advanced practitioner (Agenda for Change (AFC) band 8a) who can diagnose a TIA, and they will be supported by a nurse (AFC band 5) who will carry out tests such as electrocardiograms and blood tests.

3.4.6 It is assumed that each additional TIA clinic will run for 4 hours.

Costs

3.4.7 Setting up a 7-day-a-week TIA service in areas that do not currently offer daily clinics may require significant additional resources. It will

be necessary to arrange for clinicians to work over weekends and this may need reorganisation of job plans or additional staff. Providers are advised to assess the potential resource impact of this recommendation locally.

Table 15 Units costs of running a TIA outpatient clinic

Description	Cost per hour (£)	Cost per clinic (£)
Consultant	108	432
Advanced practitioner (band 8a)	38	152
Nurse (band 5)	21	84
Costs are based on midpoints including on-costs using 2019/20 Agenda for Change pay bands and October 2018 Medical and Dental pay bands		

4 Resource impact over time

4.1 The estimated annual cost of implementing this guideline for the population of England based on the uptake in the resource impact assumptions is shown in table 16. The cost from year 5 once steady state is reached is equivalent to around £4,400 per 100,000 population.

4.2 The cost for recommendation 1.1.5 should be assessed locally. Where additional clinics are needed to provide specialist assessment and investigation within 24 hours of a suspected TIA there may be additional costs. The resource impact of these additional costs will vary depending on current practice. Where a 7-day-a-week service is already in place there may not be any additional costs.

Table 16 Resource impact of implementing the guideline using NICE assumptions

	2019/20 (£000s)	2020/21 (£000s)	2021/22 (£000s)	2022/23 (£000s)	2023/24 (£000s)
Rec 1.4.6 Offer thrombectomy to people with anterior stroke last known to be well between 6 hours and 24 hours previously					
NHS costs	1,563	3,125	4,688	6,250	7,813
NHS savings	-458	-970	-1,534	-2,151	-2,821
Social care savings	-306	-823	-1,552	-2,492	-3,644
Resource impact of rec 1.4.6	**799**	**1,332**	**1,602**	**1,607**	**1,348**
Rec 1.4.7 Consider thrombectomy for people with posterior stroke last known to be well within 24 hours					
NHS costs	2,154	4,309	6,463	8,617	10,772
NHS savings	-631	-1,388	-2,147	-2,978	-3,883
Social care savings	-432	-1,141	-2,141	-3,433	-5,015
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Rec 1.2.1 and 1.2.2 Do not offer CT brain scanning for suspected TIA					
NHS costs	6	12	19	25	31
NHS savings	-165	-330	-495	-660	-825
Resource impact of recs 1.2.1 and 1.2.2	**-159**	**-318**	**-477**	**-635**	**-794**
Rec 1.1.5 Assess all suspected TIA within 24 hours of symptom onset					
Assess resource impact of rec 1.1.5 locally					
Total NHS costs	3,723	7,446	11,170	14,892	18,616
Total NHS savings	-1,254	-2,688	-4,176	-5,789	-7,529
Total social care savings	-738	-1,964	-3,693	-5,925	-8,658
Total resource impact	**1,731**	**2,795**	**3,301**	**3,178**	**2,427**

5 Other considerations

5.1 Mechanical thrombectomy is recommended by the NHS England Clinical Commissioning Policy: Mechanical thrombectomy for acute ischaemic stroke (all ages). The model of care includes: the admission of patients to an emergency department in the nearest hospital with a hyperacute stroke unit; undertake the initial investigations including CT or magnetic resonance angiography; start treatment with intravenous thrombolysis as appropriate; and

then transfer urgently those who might benefit from thrombectomy to the nearest thrombectomy centre.

5.2 Not all services are currently set up to work on a 24-hour basis as recommended in the guideline, although when the NHS England Clinical Commissioning Policy is fully implemented this should be resolved.

5.3 Where services are not set up on a 24-hour basis there may be additional costs to providers for access to appropriate facilities, staffing, imaging and inter-facility patient transfer resources. The committee suggests that there will need to be networked arrangements for spoke sites around a thrombectomy 'hub' with fast image transfer, referral, eligibility assessment, and responsive repatriation systems.

5.4 There may be additional costs for commissioners setting up networks around thrombectomy hubs. The committee noted that there are likely to be additional costs incurred in transferring people to these hubs. Establishing thrombectomy hub networks may lead to a redistribution of activity and income between providers. Activity is expected to move from providers who are not able to provide thrombectomy to those providers who are able to provide thrombectomy.

5.5 There may be productivity gains for providers as a result of not offering CT scans for people who have had a TIA. Data are not available to quantify the productivity gains. Organisations may want to assess this impact locally.

6 Implications for commissioners

6.1 Stroke and transient ischaemic attack fall under programme budgeting category 10B cerebrovascular disease.

7 Sensitivity analysis

7.1 There are some assumptions in the model for which no empirical evidence exists, so we cannot be as certain about them. Appropriate minimum and maximum values of variables were used in the sensitivity analysis to assess which variables have the biggest impact on the net cost or saving. This enables users to identify the significant cost drivers.

7.2 Appendix 9 is a table listing all variables modified. The key conclusions are discussed below.

7.3 Varying the number of people in future practice who have thrombectomy after presenting between 12 hours and 24 hours from 60% to 100% leads to an estimated resource impact of between £1.9 million and £2.4 million for England.

7.4 Varying the number of people in future practice presenting with a posterior circulation stroke who have a thrombectomy from 60% to 100% leads to an estimated resource impact of between £1.7 million and £2.4 million for England.

Appendix 1 Estimated NHS costs for 2019/20 to 2023/24, based on current practice, for people presenting between 12 hours and 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
NHS intervention costs											
Thrombectomy	11,755	0	-	0	-	0	-	0	-	0	-
Standard care	5,383	1,014	5,460	1,014	5,460	1,014	5,460	1,014	5,460	1,014	5,460
Initial scanning prior to transfer	399	0	-	0	-	0	-	0	-	0	-
Transport costs for transfer to thrombectomy centre	267	0	-	0	-	0	-	0	-	0	-
NHS supported living costs											
People who live independently in year 1 following standard medical care	5,343	151	808	151	808	151	808	151	808	151	808
People who live dependently in year 1 following standard medical care	12,148	863	10,486	863	10,486	863	10,486	863	10,486	863	10,486
People who live independently in subsequent years following standard medical care	410			151	62	302	124	453	186	605	248
People who live dependently in subsequent years following standard care	1,196			863	1,032	1,726	2,065	2,589	3,097	3,453	4,129
Total NHS cost of current practice			**16,754**		**17,848**		**18,943**		**20,037**		**21,131**

Appendix 2 Estimated social care costs for 2019/20 to 2023/24, based on current practice, for people presenting between 12 hours and 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
Social care supported living costs											
People who live independently in year 1 following standard medical care	3,562	151	538	151	538	151	538	151	538	151	538
People who live dependently in year 1 following standard medical care	8,099	863	6,991	863	6,991	863	6,991	863	6,991	863	6,991
People who live independently in subsequent years following standard medical care	1,640			151	248	302	496	453	744	605	991
People who live dependently in subsequent years following standard care	4,782			863	4,128	1,726	8,256	2,589	12,383	3,452	16,511
Total Social care cost of current practice			**7,529**		**11,905**		**16,281**		**20,656**		**25,032**

Appendix 3 Estimated NHS costs for 2019/20 to 2023/24, based on future practice, for people presenting between 12 hours and 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
NHS intervention costs											
Thrombectomy	11,755	203	2,385	406	4,770	609	7,154	811	9,539	1,014	11,923
Standard care	5,383	811	4,368	608	3,276	405	2,184	203	1,092	0	0
Initial scanning prior to transfer	399	609	243	1,217	486	1,826	728	2,434	971	3,043	1,214
Transport costs for transfer to thrombectomy centre	267	101	27	203	54	304	81	406	108	507	135
NHS supported living costs											
First year costs for people who live independently post stroke, following thrombectomy	5,343	98	521	195	1,043	293	1,564	390	2,085	488	2,607
First year costs for people who live dependently post stroke, following thrombectomy	12,148	105	1,279	211	2,558	316	3,837	421	5,116	526	6,395
Subsequent years costs for people who live independently post stroke, following thrombectomy	410	0	0	98	40	293	120	585	240	976	400
Subsequent years costs for people who live dependently post stroke, following thrombectomy	1,196	0	0	105	126	316	378	632	756	1,053	1,259
People who live independently in year 1 following standard medical care	5,343	121	646	91	485	60	323	30	162	0	0
People who live dependently in year 1 following standard medical care	12,148	691	8,389	518	6,292	345	4,194	173	2,097	0	0
People who live independently in subsequent years following standard medical care	410	0	0	121	50	212	87	272	112	302	124
People who live dependently in subsequent years following standard care	1,196	0	0	691	826	1,208	1,445	1,554	1,858	1,726	2,065
Total NHS cost of future practice			**17,858**		**20,004**		**22,096**		**24,136**		**26,123**

Appendix 4 Estimated social care costs for 2019/20 to 2023/24, based on future practice, for people presenting between 12 hours and 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
Social care supported living costs											
First year costs for people who live independently post stroke, following thrombectomy	3,562	98	348	195	695	293	1,043	390	1,390	488	1,738
First year costs for people who live dependently post stroke, following thrombectomy	8,099	105	853	211	1,705	316	2,558	421	3,411	526	4,264
Subsequent years costs for people who live independently post stroke, following thrombectomy	1,640	0	0	98	160	293	480	585	960	976	1,600
Subsequent years costs for people who live dependently post stroke, following thrombectomy	4,782	0	0	105	503	316	1,510	632	3,021	1,053	5,034
People who live independently in year 1 following standard medical care	3,562	121	431	91	323	60	215	30	108	0	0
People who live dependently in year 1 following standard medical care	8,099	691	5,593	518	4,195	345	2,796	173	1,398	0	0
People who live independently in subsequent years following standard medical care	1,640	0	0	121	198	212	347	272	446	302	496
People who live dependently in subsequent years following standard care	4,782	0	0	691	3,302	1,208	5,779	1,554	7,430	1,726	8,256
Total Social care cost of future practice			**7,224**		**11,082**		**14,729**		**18,164**		**21,388**

Appendix 5 Estimated NHS costs for 2019/20 to 2023/24, based on current practice, for people presenting with occlusions of the posterior circulation within 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
NHS intervention costs											
Thrombectomy	11,755	14	166	14	166	14	166	14	166	14	166
Standard care	5,383	1,396	7,515	1,396	7,515	1,396	7,515	1,396	7,515	1,396	7,515
Initial scanning prior to transfer	399	0	0	0	0	0	0	0	0	0	0
Transport costs for transfer to thrombectomy centre	267	0	0	0	0	0	0	0	0	0	0
NHS supported living costs											
People who live independently in year 1 following thrombectomy	5,343	7	36	7	36	7	36	7	36	7	36
People who live dependently in year 1 following thrombectomy	12,148	7	89	7	89	7	89	7	89	7	89
People who live independently in subsequent years following thrombectomy	410	0	0	7	3	14	6	20	8	27	11
People who live dependently in subsequent years following thrombectomy	1,196	0	0	7	9	15	18	22	26	29	35
People who live independently in year 1 following standard medical care	5,343	208	1,111	208	1,111	208	1,111	208	1,111	208	1,111
People who live dependently in year 1 following standard medical care	12,148	1,188	14,432	1,188	14,432	1,188	14,432	1,188	14,432	1,188	14,432
People who live independently in subsequent years following standard medical care	410	0	0	208	85	416	171	624	256	832	341
People who live dependently in subsequent years following standard care	1,196	0	0	1,188	1,421	2,376	2,842	3,564	4,263	4,752	5,684
Total NHS cost of current practice			**23,350**		**24,868**		**26,385**		**27,903**		**29,421**

Appendix 6 Estimated social care costs for 2019/20 to 2023/24, based on current practice for people presenting with occlusions of the posterior circulation within 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
Social care supported living costs											
First year costs for people who live independently post stroke, following thrombectomy	3,562	7	24	7	24	7	24	7	24	7	24
First year costs for people who live dependently post stroke, following thrombectomy	8,099	7	59	7	59	7	59	7	59	7	59
Subsequent years costs for people who live independently post stroke, following thrombectomy	1,640	0	0	7	11	14	22	20	33	27	44
Subsequent years costs for people who live dependently post stroke, following thrombectomy	4,782	0	0	7	35	15	70	22	105	29	140
People who live independently in year 1 following standard medical care	3,562	208	741	208	741	208	741	208	741	208	741
People who live dependently in year 1 following standard medical care	8,099	1,188	9,622	1,188	9,622	1,188	9,622	1,188	9,622	1,188	9,622
People who live independently in subsequent years following standard medical care	1,640	0	0	208	341	416	682	624	1,023	832	1,365
People who live dependently in subsequent years following standard care	4,782	0	0	1,188	5,681	2,376	11,362	3,564	17,044	4,752	22,725

Appendix 6 Estimated social care costs for 2019/20 to 2023/24, based on current practice for people presenting with occlusions of the posterior circulation within 24 hours

Total Social care cost of current practice			**10,446**		**16,515**		**22,583**		**28,652**		**34,720**

Appendix 7 Estimated NHS costs for 2019/20 to 2023/24, based on future practice, for people presenting with occlusions of the posterior circulation within 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
NHS intervention costs											
Thrombectomy	11,755	293	3,448	573	6,730	852	10,012	1,131	13,294	1,410	16,576
Standard care	5,383	1,117	6,012	838	4,509	558	3,006	279	1,503	0	0
Initial scanning prior to transfer	399	846	338	1,692	675	2,538	1,013	3,384	1,350	4,230	1,688
Transport costs for transfer to thrombectomy centre	267	141	38	282	75	423	113	564	151	705	188
NHS supported living costs											
People who live independently in year 1 following thrombectomy	5,343	141	753	275	1,471	410	2,189	544	2,907	678	3,624
People who live dependently in year 1 following thrombectomy	12,148	152	1,849	297	3,556	442	5,334	587	7,112	732	8,891
People who live independently in subsequent years following thrombectomy	410	0	0	141	58	416	171	826	339	1,370	562
People who live dependently in subsequent years following thrombectomy	1,196	0	0	152	182	449	537	891	1,066	1,478	1,768
People who live independently in year 1 following standard medical care	5,343	166	889	125	667	83	445	42	222	0	0
People who live dependently in year 1 following standard medical care	12,148	950	11,546	713	8,659	475	5,773	238	2,886	0	0
People who live independently in subsequent years following standard medical care	410	0	0	166	68	291	119	374	154	416	171
People who live dependently in subsequent years following standard care	1,196	0	0	950	1,137	1,663	1,989	2,138	2,558	2,376	2,842
Total NHS cost of current practice			**24,874**		**27,789**		**30,702**		**33,542**		**36,310**

Appendix 8 Estimated social care costs for 2019/20 to 2023/24, based on future practice, for people presenting with occlusions of the posterior circulation within 24 hours

	Unit Cost (£)	2019/20		2020/21		2021/22		2022/23		2023/24	
		Number	£000s	Number	£000s	Number	£000s	Number	£000s	Number	£000s
Social care supported living costs											
People who live independently in year 1 following thrombectomy	3,562	141	503	275	981	410	1,459	544	1,938	678	2,416
People who live dependently in year 1 following thrombectomy	8,099	168	1,221	309	2,398	450	3,574	591	4,751	732	5,927
People who live independently in subsequent years following thrombectomy	1,640	0	0	141	231	416	683	826	1,355	1,370	2,247
People who live dependently in subsequent years following thrombectomy	4,782	0	0	152	728	449	2,149	891	4,263	1,478	7,070
People who live independently in year 1 following standard medical care	3,562	166	593	125	445	83	296	42	148	0	0
People who live dependently in year 1 following standard medical care	8,099	950	7,698	713	5,773	475	3,849	238	1,924	0	0
People who live independently in subsequent years following standard medical care	1,640	0	0	166	273	291	478	374	614	416	682
People who live dependently in subsequent years following standard care	4,782	0	0	950	4,545	1,663	7,954	2,138	10,226	2,376	11,362
Total Social care cost of current practice			**10,014**		**15,374**		**20,442**		**25,219**		**29,705**

Appendix 9. Results of sensitivity analysis

Individual variable sensitivity				Recurrent resource impact				
	Baseline value	**Minimum value**	**Maximum value**	**Baseline resource impact (£000s)**	**Minimum resource impact (£000s)**	**Maximum resource impact (£000s)**	**Change (£000s)**	**Sensitivity ratio**
People presenting between 12 and 24 hours, numbers having thrombectomy adjusted against standard medical care	100.00%	60.00%	100.00%	2,427	1,888	2,427	539	0.56
People presenting an occlusion of the posterior circulation within 24 hours having thrombectomy in future practice adjusted against standard medical care	100.00%	60.00%	100.00%	2,427	1,677	2,427	749	0.77

About this resource impact report

This resource impact report accompanies the NICE guideline on Stroke and transient ischaemic attack in over 16s: diagnosis and initial management (update) and should be read in conjunction with it. See terms and conditions on the NICE website.